

TROPICAL LEPIDOPTERA, 14(1-2): 1-110 2003 (2007)

# CRAMBIDAE OF ALDABRA ATOLL (LEPIDOPTERA: PYRALOIDEA)

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**ABSTRACT.**— The Family Crambidae is represented on the western Indian Ocean atoll of Aldabra by 9 subfamilies of 44 genera and 49 species. Ten genera (type-species indicated) are described as new: *Lirabotys* n. gen. (*liralis* Legrand); *Pioneabathra* n. gen. (*olesialis* Walker); *Legrandellus* n. gen. (*fuscolarosalis* Legrand); *Microgeshna* n. gen. (*laportei* Legrand); *Ommatobotys* n. gen. (*ommatalis* Hampson); *Poliobotys* n. gen. (*ablactalis* Walker); *Nausinoella* n. gen. (*aphrospila* Meyrick); *Glyphodella* n. gen. (*savialis* Legrand); *Chabulina* n. gen. (*putrisalis* Viette); and *Alytana* n. gen. (*aldabralis* Viette). Six species: *Autocharis linealis* n. sp., *A. discalis* n. sp., *Notarcha digitalis* n. sp., *Synclera seychellensis* n. sp., *Herpetogramma juba* n. sp., and *H. continuialis* n. sp., are newly described. There are 15 new combinations of Aldabra species and one species, *Alytana aldabralis*, is elevated from subspecific to full species rank. *Platamonina* is proposed as a replacement name for the preoccupied *Platamonia* Lederer, 1863. The American species *Salbia haemorrhoidalis* Guenée, 1854, is transferred to *Orphanostigma*. The African *Noorda ecthoemata* Hampson and the Malagasian *N. seyrigalis* Marion and Viette are transferred to *Autocharis*. Two South African species, *Botys prolausalis* Walker and *Pyrausta rufitincta* Hampson, are transferred to *Lirabotys*. The South African *Bocchoris flavibrunnea* Hampson and the Malagasian *Diastictis vadonalis* Viette are transferred to *Glyphodella*. *Hydrocampa tenera* Butler, described from Sulawesi, is transferred to *Chabulina*. *Eurrhyarodes abnegatalis* (Walker), formerly a junior synonym of *E. tricoloralis* (Zeller), is reinstated as a separate species with *E. confusalis* (Warren) as a junior synonym. Nine species (18.4%) and 1 subspecies are endemic to Aldabra, and a total of 12 species (24.5%) are endemic to the Aldabra Group (Aldabra, Assumption, Astove, Cosmoledo) of atolls. Relationships of nonendemic species are 38.8% Cosmopolitan or Palearctic, 30.6% Ethiopian, 4.1% Western Indian Ocean, and 2.0% Oriental. All taxa are characterized and detailed descriptions are given for most of them, including all new genera and species. Keys are provided to subfamilies, genera, and species. Adult moths and genitalia of both sexes (where known) are illustrated for all species, and representative wing venation drawings are included for all genera. Geographic distributions, host data, and disposition of type-specimens are given to the extent known, and synonymies are provided for included genera and species. Zoogeographic and phylogenetic relationships of included taxa are discussed where sufficiently known.

**KEY WORDS:** Acentropinae, *Achyra*, Africa, *Alytana* n.gen., *Autocharis*, *Autocharis discalis* n.sp., *Autocharis linealis* n.sp., biodiversity, biology, *Bocchoris*, *Botys*, *Chabulina* n.gen., *Chrysocatharylla*, *Cirrhochrista*, *Condylorrhiza*, Crambinae, *Crociodolomia*, Cybalomiinae, *Diaphania*, *Diasemiopsis*, *Diastictis*, distribution, *Duponchelia*, Ethiopian, *Eurrhyarodes*, Evergestinae, expeditions, Glaphyriinae, *Glyphodella* n.gen., *Hellula*, *Herpetogramma*, *Herpetogramma continuialis* n.sp., *Herpetogramma juba* n.sp., *Hodebertia*, hostplants, *Hydrocampa*, *Hymenia*, *Hymenoptychis*, *Isocentris*, *Legradnellus* n.gen., *Lirabotys* n.gen., Madagascar, *Marasmia*, *Metasia*, *Microgeshna* n.gen., *Nausinoella* n.gen., *Noorda*, Noordinae, *Notarcha*, *Notarcha digitalis* n.sp., Nymphulinae, Odontiinae, *Omiodes*, *Ommatobotys* n.gen., *Orphanostigma*, *Pagyda*, *Palpita*, *Parapoynx*, *Pardomima*, *Pessocosma*, *Pioneabathra* n.gen., *Platamonina* n.name, *Poliobotys* n.gen., Pyralidae, *Pyrausta*, *Pyraustinae*, *Salbia*, Schoenobiinae, *Scirpophaga*, Seychelles, South Africa, Spilomelinae, *Spoladea*, *Stemorrhages*, *Stenochora*, Sulawesi, *Synclera*, *Synclera seychellensis* n.sp., taxonomy, *Thyridiphora*, zoogeography.

There have been but two comprehensive studies of Aldabran Lepidoptera, that of Fryer (1912) based on his collecting in 1908-09, and that of Legrand (1965) who collected extensively on both Aldabra and the granitic Seychelles in 1956 and 1958-60.

The genesis of the present paper lies in three months of entomological field studies on Aldabra by the senior author, then engaged as a participant in phase III of the Royal Society expedition to that atoll during January, February and March, of 1968. His collections from that period comprise about 12,000 insect specimens, approximately 9,000 of which are Lepidoptera, including about 1,850 specimens of the family Crambidae. Smaller collections have been made by other workers from time to time. Frith's (1975) survey of insect abundance included 10 common species of crambids and the visit by Adamski and Mathis during March 12-22 of 1986 turned up three crambid species previously unrecorded from Aldabra. More extensive reviews of Aldabran entomological studies are given by Stoddart and Wright (1967), Stoddart (1971a: 1921), and by Cogan, *et al* (1971).

## GENERAL DESCRIPTION OF ALDABRA ATOLL

Much of the general information which follows is extracted from volume 260 of the *Philosophical Transactions of the Royal Society of London* (Series B, 1971) which deals entirely with the results of the Royal Society Expedition to Aldabra in 1967-68. A general review of Aldabra Atoll and its natural history may be found in the book by Beamish (1970).

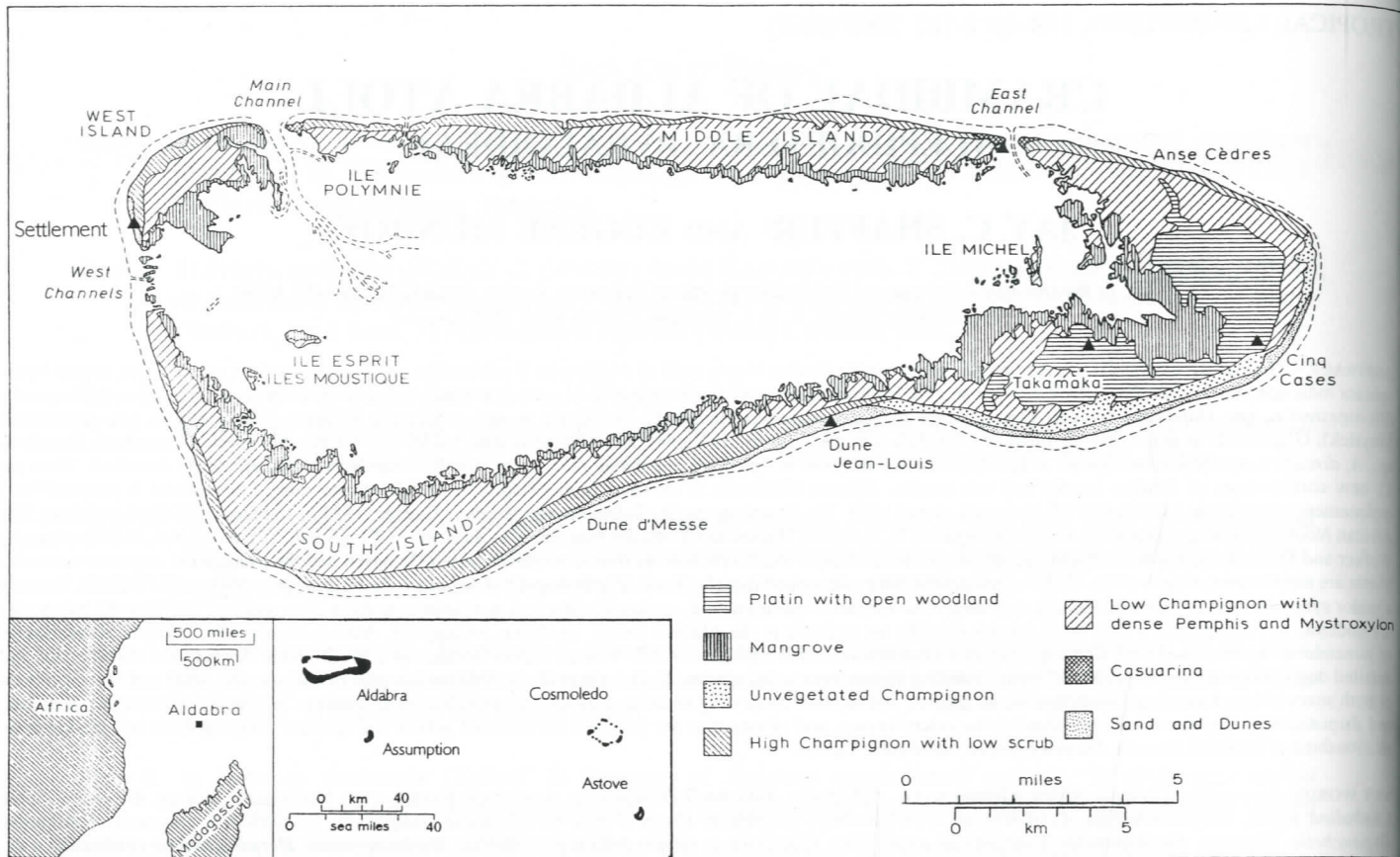
Aldabra lies in the western Indian Ocean at 9°24' south and

46°20' east, approximately 420 km northwest of Madagascar and 640 km east of Africa (Map 1). It is doubly unique in being the largest elevated coral atoll on earth and in being the only large atoll surviving essentially in its natural state. Despite its large size Aldabra is lacking in exploitable phosphate deposits and of any other resources attractive to human industry save that of science.

Aldabra along with Assumption to the south and Cosmoledo and Astove to the east comprise the Aldabra Group (Map 1). These four atolls together form the corners of a parallelogram roughly 40 x 120 km and elongated west northwest to east southeast, each atoll surmounting an ancient volcano, arising abruptly from the ocean floor 4 km below. All members of the group are elevated, but the other three present only a small fraction of the land area of Aldabra and have sustained significant human interference by way of plant and animal introductions, extinctions, and guano mining. Ecological disruption has been most severe on Assumption, which is reported to have the largest guano reserves in the western Indian Ocean (Stoddart, 1967: 56. This paper gives descriptions and further references to coral islands of the western Indian Ocean). A summary of scientific studies for islands of the Aldabra Group is given by Stoddart (1971a).

Aldabra itself (Map 1) is by far the largest of the group, extending approximately 34 km west to east, and 14.5 km and 8 km north to south near the west and east ends respectively. The center is occupied by a large and generally shallow lagoon connected to the sea with deep narrow tidal channels that divide the land rim into four very unequal islands. Numerous smaller islands populate the lagoon, particularly at the eastern and southwestern ends. The larg-





Map 1. Aldabra: location and main terrestrial habitats (after Stoddart, 1971a).

est and most diverse of these are Ile Esprit (0.34 km<sup>2</sup>) in the west and Ile Michel (0.40 km<sup>2</sup>) in the east. The lagoon is almost entirely fringed by mangrove forest, the most extensive stands occurring along the southeast end of the lagoon and on the southeast arm of Ile Picard (West Island).

The land area of Aldabra totals 155 km<sup>2</sup>. All exposed rocks are limestone (with some phosphate), the dry land forms being of two major types as recognized and named by Fryer (1911: 401-405). The *champignon* (after the mushroom-shaped rocks formed in the lagoon and tidal pools) is deeply pitted and solution-fretted. It displays an extraordinarily irregular surface which in many places can be traversed only with extreme difficulty and some risk of injury. The low *champignon* (Map 1) occupies a considerable proportion of the dry land surface and presents yet further difficulties as it is covered with a dense, tangled, nearly impenetrable scrub of *Pemphis acidula* Forst. Although it has been poorly explored, its botanical diversity appears to be low. Less area is occupied by the more seaward high *champignon* which forms an eight meter ridge around much of the atoll. This area is covered with mixed shrub of much greater diversity than in the low *champignon* area.

The *platin*, by contrast, provides a generally smooth pavement-like surface occupied in many places by open woodland. It comprises about one quarter of the land area of Aldabra and is almost entirely restricted to a broad arc in the interior of the east end of the atoll (proposed as the site of an airbase in the 1960s). There are also small areas of it near Settlement (in 1968 consisting of several occupied dwellings and other small buildings) (see Fig. A5). The surface crust of the *platin* permits the existence of numerous ponds ranging from temporary rainpools to larger semipermanent and permanent ones. These exhibit a considerable range of salinity from freshwater to hypersaline in a few cases. The division of major land forms into *champignon* and *platin* is an oversimplified view, though

most areas are clearly one or the other. A much less common and somewhat intermediate terrain called *pavé* consists of rough limestone with a relief of but a few decimeters.

Most of the atoll rim is formed of extremely dissected *champignon*, frequently with undercut cliffs. A single large beach extends 1.3 km along the west coast of Ile Picard, and there are occasional small pocket beaches (*anses*) elsewhere. An almost unbroken band of perched beach with occasional dunes ascending up to 18 m above sea level extends from Dune Blanc near the southernmost point of the atoll to Point Hodoul at the north-east end. Characteristic plants are *Sporobolus* R.Br. and *Sclerodactylon* Stapf grasses with scattered *Tournefortia* L. and *Guettarda* L. trees (Dune Jean-Louis and eastward).

Regular climatological records have been kept only since the Royal Society Expeditions of 1967, data prior to that time being extremely fragmentary. Farrow (1971) lists a mean annual total rainfall of 673 mm (26.5 in) thus placing Aldabra in the most arid region of the western Indian Ocean. Both annual and monthly rainfall are extremely variable. There is normally a six-month summer wet season from November through April alternating with a winter dry season extending May through October. January 1968, the first month of collecting by the senior author, was extremely atypical in having one-eighteenth of the average rainfall. Annual temperatures range from a winter minimum average of 22°C to a summer maximum average of 32°C, with a diurnal average range of 6.5°C. Strong southeast trade winds blow throughout the winter season from May through October. The monsoon occurs during the summer when winds blow less strongly and more variably, generally from the west northwest.

The unusually great diversity of plant and animal species of Aldabra result from its large land area, its elevation of some 5 m which protects most of it from inundation during storms, and its





Fig. A1. Panorama view to the east at Dune Jean Louis.



Fig. A2. View inland of typical "champignon" rock formation, from perched beach at Cinq Cases looking toward the sea.



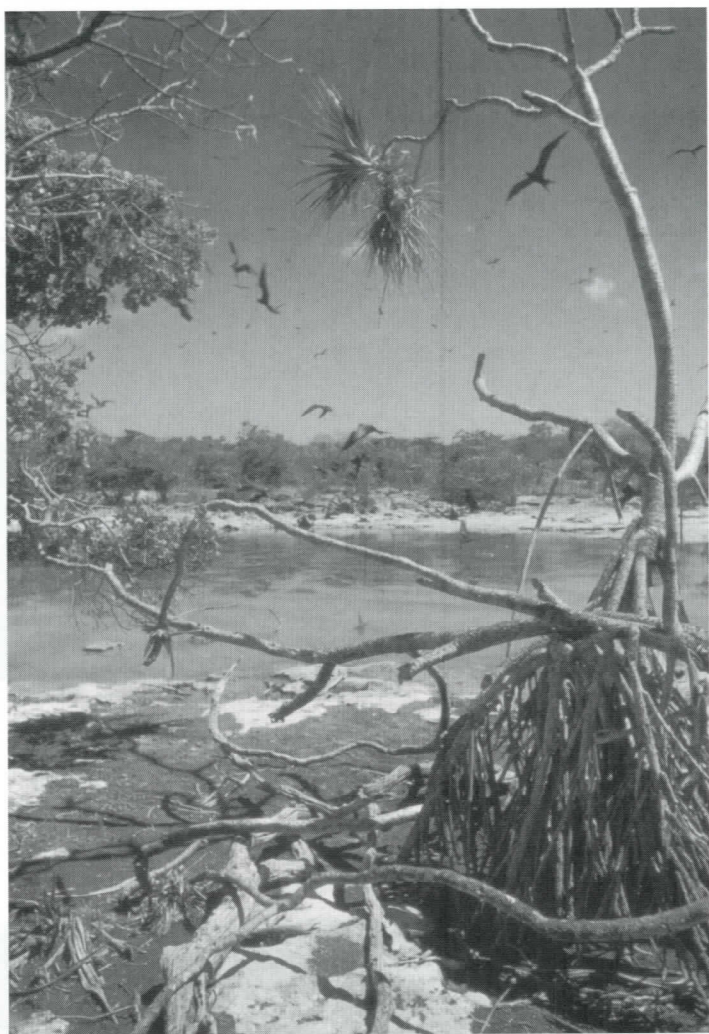


Fig. A3. Freshwater pool and diving frigate birds near Takamaka.

proximity to large land masses, particularly Madagascar, which is upwind with respect to the southeast trades. Renvoise (1971: 227) reports that about two thirds of the plants are of inland types in contrast to most coral islands where the majority of species are widely distributed plants typical of coastal habitats.



Fig. A4. West shore of Ile Picard (West Island) north of Settlement where sand beach gives way to undercut cliffs. Trees are *Casuarina equisetifolia*, a weedy invasive from Australia now widely distributed on Aldabra.

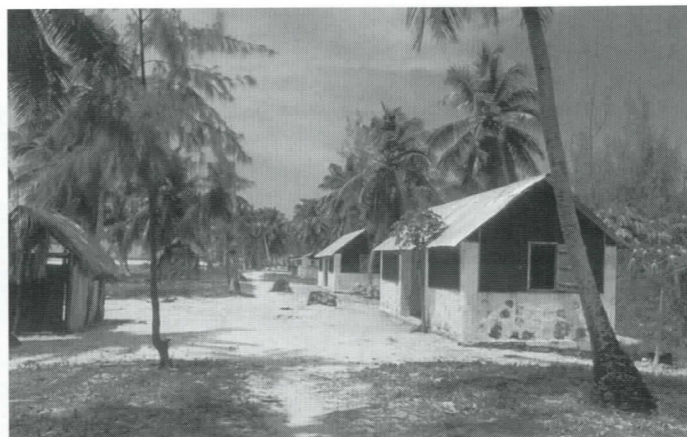


Fig. A5. Settlement, west shore of Ile Picard (West Island).

Species endemism is high in both plant and animal groups. Fosberg and Renvoise (1980: 5-6) list 272 angiosperms plus two pteridophytes for the Aldabra Group with 43 of the angiosperm species (16%) endemic, mostly to Aldabra itself. If one considers only the 185 angiosperm species thought to be indigenous the figure rises to 23%. Endemism is even higher among land birds, with about half being endemic species or subspecies. Cogan *et al* (1971: 319) examined records of approximately 500 species of Aldabra Group insects with "reliable biological and distributional data" and reported 38% endemic to the Aldabra Group, 23.2% endemic to Aldabra itself.

Considering its large size and tropical location, human disturbance has been minimal. This situation is due largely to the absence of exploitable quantities of phosphate and guano, but the paucity of soil and fresh water, the generally inhospitable terrain, and the distance from trades routes undoubtedly have also been important factors.

Aldabra has never had a permanent human population, but has been sporadically occupied by seychellois fishermen and hunters of turtles and giant tortoises for at least the last 200 years. Since the late 19th century the atoll has been leased for these purposes, with populations usually well under 100 individuals. The habitations have been mostly at the Settlement on Ile Picard, but with smaller settlements (long ago abandoned) and turtling huts elsewhere (for details see Stoddart, 1971b).

The ecological impact of these activities pales almost to insignificance when compared to the threatening proposal to build an airbase for use by the British and American military in 1966. Aldabra was under this threat when the Royal Society that year initiated a program of scientific study which continues today under the stewardship of the Seychelles Islands Foundation, though the airbase proposal has long since been abandoned in favor of Diego Garcia Island in the central Indian Ocean.

#### COLLECTING ACTIVITIES

The senior author's field work centered on four separate localities (Map 1), Settlement and 3 field camps, Takamaka, Cinq Cases, and Middle Island Camp. Most collecting was accomplished by the then traditional lamp and sheet method using tandem 15 watt fluorescent lamps, one blacklight and one daylight, powered by a portable electric generator. Collecting was carried out at Settlement during January 9-27 and on March 29 and 31. The blacklight was initially set up within the Settlement, then on Jan. 15 moved roughly 100 m east to the interface of the narrow band of *Casuarina* L. forest immediately inland from the Settlement and a broader expanse of



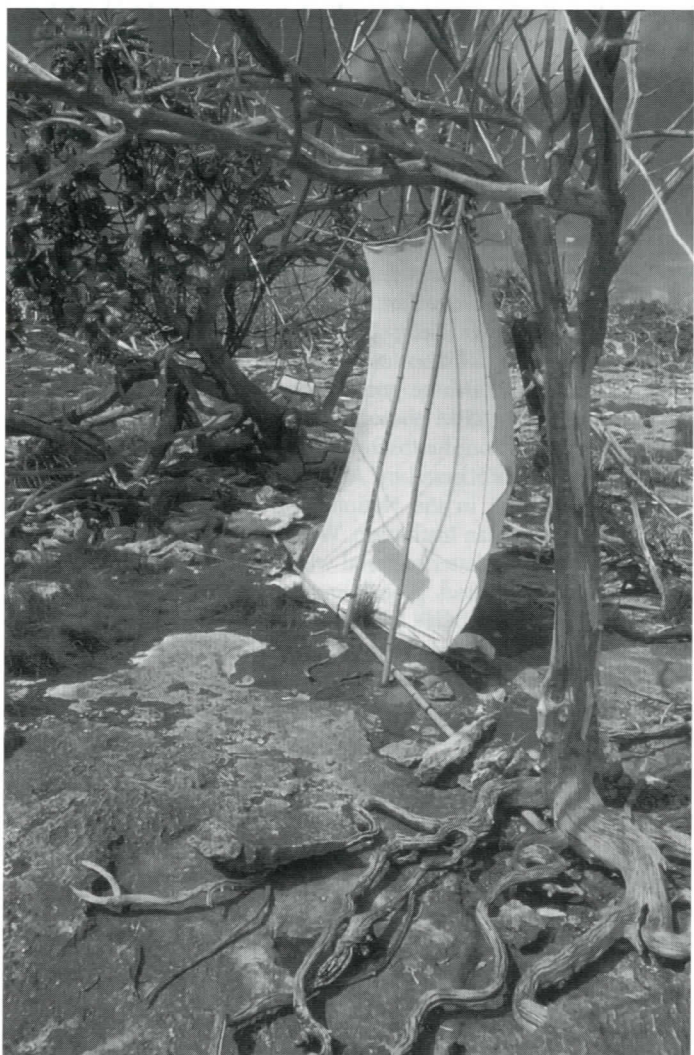


Fig. A6. Blacklighting at Cinq Cases. Note paucity of soil (dead tree in foreground was slid across rock surfaces into position to hang the sheet).

mixed shrub on high *champignon*. The latter site was within a few hundred meters of low *champignon* to the east and of the ocean beach to the west, and near enough to Settlement to pick up insects associated with garden plants, ornamentals, and locally introduced weeds. Despite the low rainfall in January most collecting nights produced good results, although the absence of new foliage in this dry period made hunting for larvae unproductive.

Takamaka was visited during the period of January 31 through February 21. Most collecting was done in mixed shrub on *platin* near the expedition camp. A few nights were spent collecting in the mangroves near the Takamaka "dock", near to the Takamaka Grove, and in the Takamaka Grove, the only locality for *Calophyllum* L. on Aldabra (see Fosberg, 1971: 220).

Collecting at Cinq Cases camp began on February 24, corresponding with the start of a period of frequent showers that broke the dry weather prevalent until then and stimulated a marked growth of new foliage. Hunting for larvae thereafter became quite productive. Blacklight collecting continued through March 9, with daily results being more variable than at any of the other sites. A few nights produced excellent results, but on other occasions collecting was frustrated by wind, rain showers, or by emergences of hordes of small Hemiptera or Coleoptera. The collecting site was similar to that at the Takamaka well, but somewhat more open and nearer to permanent pools.



Fig. A7. Author (JCS) at a takamaka tree (*Calophyllum inophyllum*) in Takamaka Grove. This small grove is the only known location of the tree on Aldabra, as well as the only grove of large trees on the island, other than mangroves.

Middle Island Camp, visited March 11-27, is at the extreme eastern end of Ile Malabar (Middle Island). Here the collecting sheet was set up in a narrow band of *Casuarina* L. forest along the north shore of the island adjacent to mixed shrub on high *champignon* and near to low *champignon*.

Dune Jean Louis along the south coast was visited on a single overnight trip on March 14. Due to constant wind blacklight collecting was extremely poor and only two crambid species were collected.

Although blacklight collecting was conducted in an opportunistic rather than random method, we believe that comparisons among the four localities visited are worthwhile, and a summary of collecting data by the senior author is given in Table 1. It is seen that Settlement and Takamaka present contrasts in species diversity. This is probably a fair comparison, for nearly as many days were spent collecting at Takamaka as at Settlement. The greater number of species from Settlement no doubt reflects the more extensive human impact there, particularly the presence of cultivated and adventive plants which act as hosts to pest and other wide ranging species. While the fewest species are recorded from Cinq Cases, this may reflect that there were only half as many good collecting nights there as at Takamaka. The relatively high number of species taken in 10 days of collecting at Middle Island is somewhat surprising.



Fig. A8. Dune Jean Louis, showing *Sclerodactylon* (grasses) and *Tournefortia* (trees).



This may be a true reflection of greater species diversity there, perhaps influenced by human interference or proximity to the sea and introductions, or it may be the result of greater overall abundance of adult moths on Aldabra following the period of wet weather which began in late February.

The number of days listed in Table 1 does not include those of poor collecting when few or no crambids were taken. The 20 days given for Settlement refer only to those by the senior author in January and two days in March of 1968. The total of 49 crambid species for Aldabra includes four from Settlement that were not taken by the senior author (one by M. Gerber in 1959 and three by D. Adamski during March 12-22 in 1986), the figures in parentheses represent the senior authors collections only.

Table 1. Comparison of Collecting Localities

Locality	Days (No.)	Species	Percentage
Settlement	20*	42 (38)*	85.7 (84.4)*
Takamaka	18	22	44.9
Cinq Cases	9	18	36.7
Middle Island	10	26	53.1

\*38 species collected by the senior author during 20 days collecting at Settlement represent 84.4% of 45 crambids taken by him in 1968.

Of the 19 crambid species (38.8% of total) taken at single localities, nine are represented by single specimens, and only five are represented by six or more specimens. It seems reasonable that at least some of these must occur at other localities. Furthermore, that 18.4% of the crambid species are represented by single specimens strongly suggests that further collecting should turn up additional species.

#### TAXONOMY AND ZOOGEOGRAPHY OF THE ALDABRA CRAMBIDAE

We have been fortunate in having available Legrand's (1965) comprehensive volume on the Lepidoptera of the Seychelles and Aldabra, as it formed an excellent basis for our work. Nonetheless, most faunal studies — Legrand's included — follow the taxonomy of the existing literature, which in some groups (e.g. birds, butterflies) is usually quite good, but for the many lesser known groups of insects and other invertebrates falls short of the modern standard. The Crambidae is one of the largest families of the Order Lepidoptera and unfortunately with a few notable exceptions (e.g. Bleszynski, 1965; Munroe, 1972) its taxonomy rests with Hampson's outdated revision (1898-99) published over 100 years ago. Given the difficulties of producing a taxonomically up-to-date faunal study, requiring not only the unraveling of species problems, but also the working out of correct generic relationships, it is not surprising that relatively few such works have been accomplished. The island faunal studies of Clarke (1971, 1986) (see below) and Zimmerman (1958, 1978) serve as excellent models of what can be accomplished.

The present paper covers 49 Aldabran crambid species in 44 genera, with 10 of the genera and six of the species newly described, and one species elevated from subspecies to full species rank. Of the 43 existing specific names, 15 (about 35%) are new combinations. The few crambid species found on other Aldabra Group atolls but not known to occur on Aldabra itself are not dealt with here. There are no Aldabra Group endemics that do not occur on Aldabra itself.

We have followed Minet (1981) in separating the traditional family Pyralidae into Crambidae and Pyralidae (*sensu stricto*) based on characteristics of the auditory organs. For the latter group

Legrand lists three species of pyralines, two endotrichines, and one galleriine (Legrand, 1965: 90-93) for Aldabra. The collection made by the senior author in 1968 includes 24 phycitine, one epipaschiine (Shaffer and Solis, 1994), and one peoriine (Shaffer, 1990) species. The Aldabra Pyralidae will be dealt with elsewhere.

We have herein illustrated male and female genitalia where both are known, and in the few cases where it was necessary to use extralimital specimens this is indicated in the figure legend. All included taxa are characterized. More extensive descriptions are provided for new taxa and the many included existing taxa heretofore inadequately described in the literature. Color terminology for the most part follows Kelly (1965), though for small structures difficult to compare with color charts and for a few brief descriptions we have used a more general terminology ("brown", "gray", "reddish", etc). The SEM photographs were taken with a Hitachi S-530 scanning electron microscope.

The specimens collected by Adamski in 1986 and by the senior author in 1968 are in the National Museum of Natural History (USNM), Smithsonian Institution, Washington, D.C. It is anticipated that a portion of the latter material will be exchanged for specimens of other Aldabra insect groups in the collection of the Natural History Museum (BMNH), in London, England.

Table 2 presents the faunal relationships of the 49 Aldabra crambid species. Each species has been assigned to one of the nine geographic categories. Some of the categories overlap, but this is necessary to keep their numbers small; e.g. some of the species listed as African occur also on islands of the western Indian Ocean, though not on Madagascar. Of the two oriental species, one exists also on the granitic Seychelles.

Very nearly 94% (46 species) of the Aldabra crambids fall into one of three categories: Paletropical and Cosmopolitan (38.8%), Ethiopian (30.6%), and Aldabra Group endemics (24.5%). Of the remaining three species, two are restricted to the smaller islands of the Western Indian Ocean and one is Oriental.

Table 2. Faunal Relationships of 49 Aldabra Crambid Species

Region	Number of Species (Percentage of total)	Subtotals
Paletropical	13 (26.5)	
Cosmopolitan	6 (12.2)	19 (38.8)
Aldabra (endemics)	9 (18.4)	
Other Aldabra Group (endemics)	3 (6.1)	12 (24.5)
African (mainland)	8 (16.3)	
Malagasy (non-African)	3 (6.1)	
African and Malagasy	4 (8.2)	15 (30.6)
Western Indian Ocean (only)	2 (4.1)	
Oriental	1 (2.0)	3 (6.1)

#### PALEOTROPICAL

Of the 13 species which occur in both the Ethiopian and Oriental Regions, at least five are also recorded from the Pacific, and many range northward well into the Palearctic Region. A number of these such as *Hellula undalis*, *Palpita unionalis*, *Herpetogramma licarsisalis*, and *Orphanostigma abruptalis* are wide ranging, frequently pest species that are established on many islands of the Indian and Pacific Oceans. Certainly some of these must have been introduced to Aldabra by human agency and it is conceivable that one or a few were taken as strays. Eleven of the 13 were taken at Settlement, but *Poliobotys ablaetalis* and *Palpita unionalis* are each represented by single specimens taken at Middle Island.

#### COSMOPOLITAN

Four of the six species are all well known pests of cultivated plants: *Omiodes indicata*, the "bean leaf webber," mainly on



legumes; *Hymenia perspectalis*, the "spotted beta webworm", on a variety of Chenopodiaceae and Amaranthaceae; *Diaphania indica* and *Spoladea recurvalis* on a great variety of plants. The cosmopolitan category is in fact a rather shaky one as the moths recognized as *O. indicata* and as *S. recurvalis* may both represent species complexes.

It is interesting that of the 19 Palearctic and Cosmopolitan species the only ones taken at Takamaka were the five which were common at all four collecting localities. Almost the same can be said of the Cinq Cases locality, the sole exception being *Crociodolomia pavonana*, represented by two specimens from Settlement and one from Cinq Cases. Most of these species may be on Aldabra as a result of human activity, Takamaka and Cinq Cases having been less impacted than Settlement and perhaps Middle Island.

All 18 were taken at either Settlement or Middle Island, 10 of these (about 56%) at both localities. Of the 18, 16 are recorded from Settlement, 12 from Middle Island, six from Cinq Cases, and five from Takamaka.

#### ETHIOPIAN

It is worth noting that nine of the 12 Aldabra crambids which occur on mainland Africa are known to be widely distributed there, in general ranging over the greater part of sub-Saharan Africa. This group, like the two above, shows wide dispersal abilities. Of the other two African species, *Herpetogramma juba* is newly described from Aldabra and so far known from South Africa by only two specimens. This species may well be far more widespread as it is part of a sibling complex currently masquerading in collections under the name *Psara bipunctalis*, a New World species formerly thought to be cosmopolitan. *Nausinoella aphrospila* was described from Congo and recorded from East Africa and the Comoro Islands. The species has been confused with *Nausinoe capensis* and it too may be widely misidentified in collections so that its true range is very imprecisely known.

Only three of the 49 Aldabra crambid species plus one subspecies are recorded from Madagascar and not from mainland Africa. *Condylorrhiza zyphalis* is known only from Madagascar and a single Aldabran specimen. Four subspecies of *Stenochora lancinalis* are described from the Comoro Islands, Mascarene Islands, Madagascar, and Aldabra, with the latter population being most similar to that on Madagascar. A fifth subspecies described from mainland Africa is more likely a separate species, though certainly very closely related to *S. lancinalis*. There are no Asian relatives. *Isocentris retinalis* and *Cirrhochrista oxylalis* are known only from Madagascar, the Comoro Islands, and Aldabra. *C. oxylalis* has close relatives in Africa, and in the case of *I. retinalis* there are related species of *Isocentris* in both Africa and Asia.

#### WESTERN INDIAN OCEAN

Two of the Aldabran crambids are restricted to lesser islands of the western Indian Ocean. Nothing is known of their hosts and immature stages. *Chabulina putrisalis*, is also found on Cosmoledo and the Comoro Islands, and the newly described *Synclera seychellensis* occurs as well on the granitic Seychelles. The latter species is part of a complex of closely related African and Asian species and its exact relationships remain to be determined.

#### ORIENTAL

Only one of the 49 crambid species is Oriental and not known from tropical Africa or Madagascar. *Noorda blitealis* ranges from southern India and Sri Lanka to Aden and the granitic Seychelles. Its host is a small tree, *Moringa oleifera* Lam., which is widely planted in the tropics, including at Settlement where the only

Aldabra specimens of *N. blitealis* were taken.

#### ENDEMICIS

Of the 49 Aldabra crambids nine (18.4%) are endemic to that atoll and an additional three species to the Aldabra Group, thus raising the figure for the Aldabra Group to 12 (24.5%). Endemicity for crambids is similar to that for indigenous angiosperms (23% for Aldabra Group) and the order Insecta (23.2% for Aldabra, 38% for Aldabra Group).

Given the proximity of Aldabra to Africa, Madagascar, and the Comoro Islands and considering the prevailing wind directions — from Madagascar in the winter and from the WNW in the summer — one would expect the relationships of endemics to be strongly Ethiopian. This anticipation is indeed the case for those endemics for which close relatives are known elsewhere, about seven of the 13 species, of which five show African and two or three show Malagasy affinities. *Lirabotys liralis* is closely related to the South African species *Botys prolausalis* and *Pyrausta rufitincta* (both herein transferred to *Lirabotys*); *Herpetogramma continualis* appears close *H. juba*, newly described from Aldabra and occurring also in South Africa; *Ommatobotys aldabralis* is close to the East African *O. ommatalis*; and *Chrysocatharylla agraphella* is probably most closely related to the South African *P. oenescentella*.

*Autocharis barbieri*, as Legrand indicated, is related to the Malagasy *A. seyrigalis*, but is even closer to an undescribed South African species. Of the two newly described *Autocharis* species, *discaalis* belongs with a mainland African group that includes *A. ecthoemata* (Hampson), and *linealis* with an Asian complex including *A. amethystina* Swinhoe. *Pagyda sounanalisis* is very close to the Malagasy *P. holoxanthalis*, and indeed may only be subspecifically different. *Glyphodella savyalis* is close to both the South African *G. flavibrunnea* and the Malagasy *G. vadonalis*, though the latter two appear closer to each other than to *savyalis* and so it is not clear from which region *savyalis* may have been derived. *Stenochora lancinalis aldabrensis*, discussed above, is an endemic subspecies whose closest relative appears to be the Malagasy *S. l. paulianalis*.

*Alytana aldabralis* is similar to specimens we have examined from both Africa and Madagascar and without a careful review of the genus one cannot say which relationship is closest. The nearest relatives of *Microgoshna laportei*, *Pessocosma prolalis*, and *Legrandellus fuscolarosalis* are not known to us, nor do we know of other species referable to the latter genus.

It is possible that some of the reputed endemics do in fact occur beyond the Aldabra Group of atolls, but we believe it unlikely that this could apply to more than a few of these species. Of those which are genuinely endemic there is the more difficult question as to whether each species arose on Aldabra itself or evolved elsewhere then spread to Aldabra and later became extinct elsewhere. The latter case would probably apply to but a few of the endemics at most, but can not be dismissed in light of the drastic western Indian Ocean insular habitat changes that surely must have accompanied sea level changes during the Pleistocene. We consider it very unlikely that any of the truly endemic crambids ever existed on Madagascar or mainland Africa.

The length of time which has been available for speciation on Aldabra is not known. Its volcanic origins are thought to date back to late Cretaceous or Eocene times though there is no information as to when volcanism on Aldabra ended (Stoddart, *et al*, 1971: 33) and, of course, no terrestrial biota can predate the last total submergence of the atoll, a date likewise unknown. Furthermore, few if any of the endemics are likely to have evolved during or survived a time when Aldabra existed as a low lying atoll with limited flora and



exposed to inundation by storms. The last major submergence is thought to have been only 32,000 to 38,000 years ago, though portions of the atoll have probably been above sea level for 100,000 years or more (Cogan *et al.*, 1971: 322).

#### COMPARISON WITH OTHER OCEANIC ISLANDS

There are few other oceanic islands whose crambid fauna is well enough known to permit useful comparisons with Aldabra. Two excellent and comprehensive studies by Clarke on Rapa (1971) and the Marquesas (1986) deal with islands very different from Aldabra and present instructive contrasts.

Rapa Island (Rapa Iti) is situated in the South Pacific at 27°37' south and 144°20' west and about 1240 km SSE of Tahiti. It is an isolated extinct volcano, extremely rugged and wet: Clarke (1971) gives 1963 rainfall of 2269.3 mm or 90". With a land area of 40 km<sup>2</sup>, only 26% that of Aldabra, Rapa has rugged topography with elevations up to 639m (2096 ft.). Rapa's extreme isolation has resulted in fewer numbers of crambid species, 17 (34.7%) of the Aldabra number. Rapa also has a higher percentage of endemics, there being nine species and two subspecies, for a total of 11 (64.7%) endemics. Aldabra and Rapa share three crambids in common: *Diasemiopsis ramburialis*, *Herpetogramma licarsisalis*, and *Spoladea recurvalis*, all widely dispersed species. Also, there are but three phycitine (Pyrilidae) species contrasted with 24 (unpublished data, see above) known to exist on Aldabra. The Lepidoptera fauna shows its closest relationship with the Australian faunal region and the nearest large land mass is New Zealand, approximately 3600 km to the WSW. The three endemic species of *Metasia* and the three of *Scoparia* may represent minor bursts of adaptive radiation.

The Marquesas Archipelago consists of a dozen elevated islands of volcanic origin situated between 7°50'S and 10°35'S latitude and 138°25'W and 140°50'W longitude, just over 1300 km NE of Tahiti. They are partly mountainous, with a maximum elevation of 1258 m (4130 ft.). In spite of extensive human interference by way of plant and animal introductions and clearing of forest, Clarke (1986) reports persisting areas of natural vegetation, especially at higher elevations. Clarke's work was essentially restricted to three islands

(including the two largest) which together comprise a land area of 738.15 km<sup>2</sup>, 4.76 times the land area of Aldabra. The total number of crambid species is 45 (84% endemic), similar to the Aldabra number but very different in composition. Clark (1986) lists 23 pyraustines (70% endemic) compared with 33 on Aldabra, 10 crambines (all congeneric and endemic), and 12 scopariines (all congeneric and endemic).

Table 3. Island Comparisons (data herein and Clarke, 1971, 1986).

Locality	Area km <sup>2</sup>	Crambid species	% Endemics (no. sp + ssp)	Flowering plant species
Aldabra Atoll	155	49	20.4% (9+1)	272
Rapa Id.	40	17	64.7% (9+2)	
Marquesas Is.	738	45	84% (38+0)	209

The far greater isolation of the Marquesas Islands has meant fewer immigrant species than on Aldabra. Also, the two bursts of cladogenesis seen in the Crambinae and Scopariinae and a third in the Pyraustinae (6 species of *Bradina*) are likely a consequence of opportunities for speciation on the archipelago, nothing quite like this having happened in the crambids on Aldabra. The 45 Marquesas species comprise but 18 genera compared with the 44 genera of Aldabra crambids. The number of species of flowering plants is not greatly different, 272 on Aldabra compared with 209 (Wagner, 1990) on the Marquesas Islands. By contrast, Wagner notes 108 pteridophyte species on the Marquesas vs only 2 reported by Fosberg and Renvoise (1980) for Aldabra.

#### MUSEUM ACRONYMS USED

BMNH	The Natural History Museum, London, England
MNHN	Muséum National d'Histoire Naturelle, Paris, France
MRAC	Musée Royal de l'Afrique Centrale, Tervuren, Belgium
NHRM	Naturhistoriska Riksmuseet, Stockholm, Sweden
RMNH	Rijksmuseum van Natuurlijke Historie (now Nationaal Natuurhistorische Museum), Leiden
USNM	National Museum of Natural History, Smithsonian Institution, Washington, D.C., U.S.A.



## LIST OF INCLUDED TAXA AND NOMENCLATURAL CHANGES

For species listed in new combination, previous genera referenced in this text are in parenthesis with the original genus listed first.

## Family CRAMBIDAE

- Subfamily Acentropinae (Nymphulinae, auct.)  
*Paraponyx fluctuosalis* (Zeller), 1852
- Subfamily Odontiinae  
*Autocharis discalis* n. sp.  
*Autocharis linealis* n. sp.  
*Autocharis barbieri* (Legrand), 1965 n. comb. (*Noorda*)
- Subfamily Noordinae  
*Noorda blitealis* Walker, 1859
- Subfamily Glaphyriinae  
*Hellula undalis* (Fabricius), 1781
- Subfamily Evergestinae  
*Crocidolomia pavonana* (Fabricius), 1794
- Subfamily Pyraustinae  
*Achyra coelatalis* (Walker), 1859 (*Dosara*)  
*Lirabotys* n. genus, *L. liralis* (Legrand), 1965 n. comb. (*Bradina*)  
*Stenochora lancinalis aldabrensis* (Viette), 1958 n. comb. (*Ischnurges*)  
*Pagyda sounanalis* Legrand, 1965  
*Pioneabathra* n. genus, *P. olesialis* (Walker), 1859 n. comb. (*Pionea*)  
*Isocentris retinalis* (Saalmüller), 1879
- Subfamily Spilomelinae  
*Notarcha digitalis* n. sp.  
*Pardomima zanclophora* Martin, 1955  
*Legrandellus* n. genus, *L. fuscolarosalis* (Legrand), 1965 n. comb. (*Pyrausta*)  
*Eurrhyarodes tricoloralis* (Zeller), 1852  
*Metasia perfervidalis* (Hampson), 1913 n. comb. (*Pyrausta*)  
*Microgeshna* n. genus, *M. laportei* (Legrand), 1965 n. comb. (*Stenia*)  
*Pessocosma prolalis* (Viette & Legrand), 1958 n. comb. (*Epipagis*)
- Ommatobotys* n. genus, *O. aldabralis* (Viette), 1958 n. comb. (*Nacoleia*, *Lamprosema*)  
*Poliobotys* n. genus, *P. ablactalis* (Walker), 1859 n. comb. (*Botys*, *Hapalia*, *Pionea*)  
*Diasemiopsis ramburialis* (Duponchel), [1834]  
*Hymenia perspectalis* (Hübner), 1796  
*Spoladea recurvalis* (Fabricius), 1775  
*Bocchoris inspersalis* (Zeller), 1852  
*Duponchelia fovealis* Zeller, 1847  
*Nausinoella* n. genus, *N. aphrospila* (Meyrick), 1936 n. comb. (*Nausinoe*, *Lepyrodes*)  
*Glyphodella* n. genus, *G. savyalis* (Legrand), 1965 n. comb. (*Diastictis*)  
*Chabulina* n. genus, *C. putrisalis* (Viette), 1958 n. comb. (*Diastictis*)  
*Synclera traducalis* (Zeller), 1852  
*Synclera seychellensis* n. sp.  
*Diaphania indica* (Saunders), 1851  
*Omiodes indicata* (Fabricius), 1775  
*Condylorrhiza zyphalis* (Viette), 1958 n. comb. (*Pyrausta*)  
*Stemorrhages sericea* (Drury), 1773  
*Cirrhochrsta oxylalis* Viette, 1961  
*Alytana* n. genus, *A. aldabralis* (Viette), 1958 rev. status, n. comb. (*Analyta*)  
*Palpita unionalis* (Hübner), 1796  
*Hodebertia testalis* (Fabricius), 1794  
*Herpetogramma licarsisalis* (Walker), 1859  
*Herpetogramma juba* n. sp.  
*Herpetogramma continualis* n. sp.  
*Marasmia poeyalis* (Boisduval), 1833  
*Orphanostigma abruptalis* (Walker), 1859  
*Hymenoptychis sordida* Zeller, 1852
- Subfamily Cybalomiinae  
*Thyridiphora furia* (Swinhoe), 1884
- Subfamily Crambinae  
*Chrysocatharylla agraphella* (Hampson), 1919
- Subfamily Schoenobiinae  
*Scirpophaga occidentella* (Walker), 1863



KEY TO CRAMBID SUBFAMILIES ON ALDABRA ATOLL<sup>1</sup>

1. Gnathos (or pseudognathos) of male genitalia strongly sclerotized, with distinct, posteriorly projecting median element; occiput with or without chaetosema . . . . . 2
  - Gnathos of male genitalia absent or very weakly sclerotized, or, if well sclerotized, represented only by a narrow transverse bridge without posteriorly projecting median element . . . . . 8
2. Vertex behind ocellus bearing a small chaetosema, composed of a round patch of fine, erect, somewhat divergent setae, shorter than surrounding scales . . . . . 3
  - Vertex behind ocellus without such a patch of setae, though often with a tuft of radiating scales in a corresponding position . . . . 5
3. Upperside of hind wing with a fringe of fine, erect, hair-like scales along stem of CuA; CuP of forewing absent; proboscis well developed; gnathos of male genitalia articulating with base of uncus; the two together forming a beak-like structure widely separated from valvae and vinculum by the long lateral elements of the tegumen; ventral part of vinculum without scale-like structures flanking juxta . . . . . Crambinae
  - Upperside of hind wing with at most a rudimentary fringe of hair-like scales at base of CuA, and in that case proboscis absent and CuP developed as a tubular vein in distal part of forewing; gnathos of male genitalia articulating with base of uncus, but not widely separated from valvae and vinculum . . . . . 4
4. Proboscis absent; vinculum of male genitalia with a pair of large scale-like structures flanking juxta . . . . . Schoenobiinae
  - Proboscis present; vinculum of male genitalia without scale-like structures flanking juxta . . . . . Acentropinae
5. Basal arms of gnathos (or pseudognathos) of male genitalia articulating at junction of uncus and tegumen . . . . . 6
  - Basal arms of gnathos fused with tegumen . . . . . 7
6. Costa of valve of male genitalia with digitate process . . . . . Cybalomiinae
  - Costa of valve of male genitalia entire . . . . . Evergestinae
7. Abdominal tympanic organs partly imbedded in metathorax; tympanic membrane facing posteriad; median process of gnathos of male genitalia much shorter than lateral elements; uncus simple, though laterally setose . . . . . Noordinae
  - Abdominal tympanic organs separate from metathorax; median process of gnathos of male genitalia as long as lateral elements; uncus bilobed, distally emarginate, laterally setose . . Odontiinae
8. Upperside of hind wing with narrowly spatulate scales scattered over posterior part; gnathos a sclerotized bridge . . . . . Glaphyriinae
  - Upperside of hind wing without scattering of spatulate scales; gnathos of male genitalia absent or very weakly sclerotized . . . 9
9. Praecinctorium weakly bilobed, lobes longitudinal, separating at an angle at distal edge of praecinctorium; underside of forewing in male usually with strap-like frenulum-hook from near base of subcosta, both sexes usually with retinaculum of stiff scales from behind cell near wing base<sup>2,3</sup>; male genitalia with valve nearly always bearing basally-directed clasper, this usually with prominent setae or scales (Fig. 117-126, see especially 126); female genitalia nearly always with corpus bursae bearing transversely-keeled rhomboid signum (Fig. 253, 257-262) . . . . . Pyraustinae
  - Praecinctorium strongly bilobed, lobes transverse, often protruding laterally between thorax and abdomen; underside of forewing in male without frenulum-hook, both sexes with retinaculum of stiff scales; male genitalia with clasper often absent, when present distally directed and lacking conspicuous setae or scales (Fig. 127-228, 231-237); female genitalia with signum various, but not rhomboidal (Fig. 263-332) . . . . . Spilomelinae

<sup>1</sup>This key is written for use with Aldabra Crambidae, and is not necessarily diagnostic for extralimital forms.

<sup>2</sup>Our use of the terms frenulum-hook and retinaculum follow Forbes (1926).

<sup>3</sup>In the Aldabra fauna the frenulum-hook is absent in *Isocentris* and *Pioneabathra*, and the retinaculum is absent in males of *Lirabotys* and *Stenochora*, where it is apparently displaced by a fovea. The male genitalia of *Isocentris* and *Pioneabathra* with their unusual valvular processes do not fit well within the Pyraustinae. A possible relationship with *Portentomorpha* Amsel, which has somewhat similar processes, should be investigated.



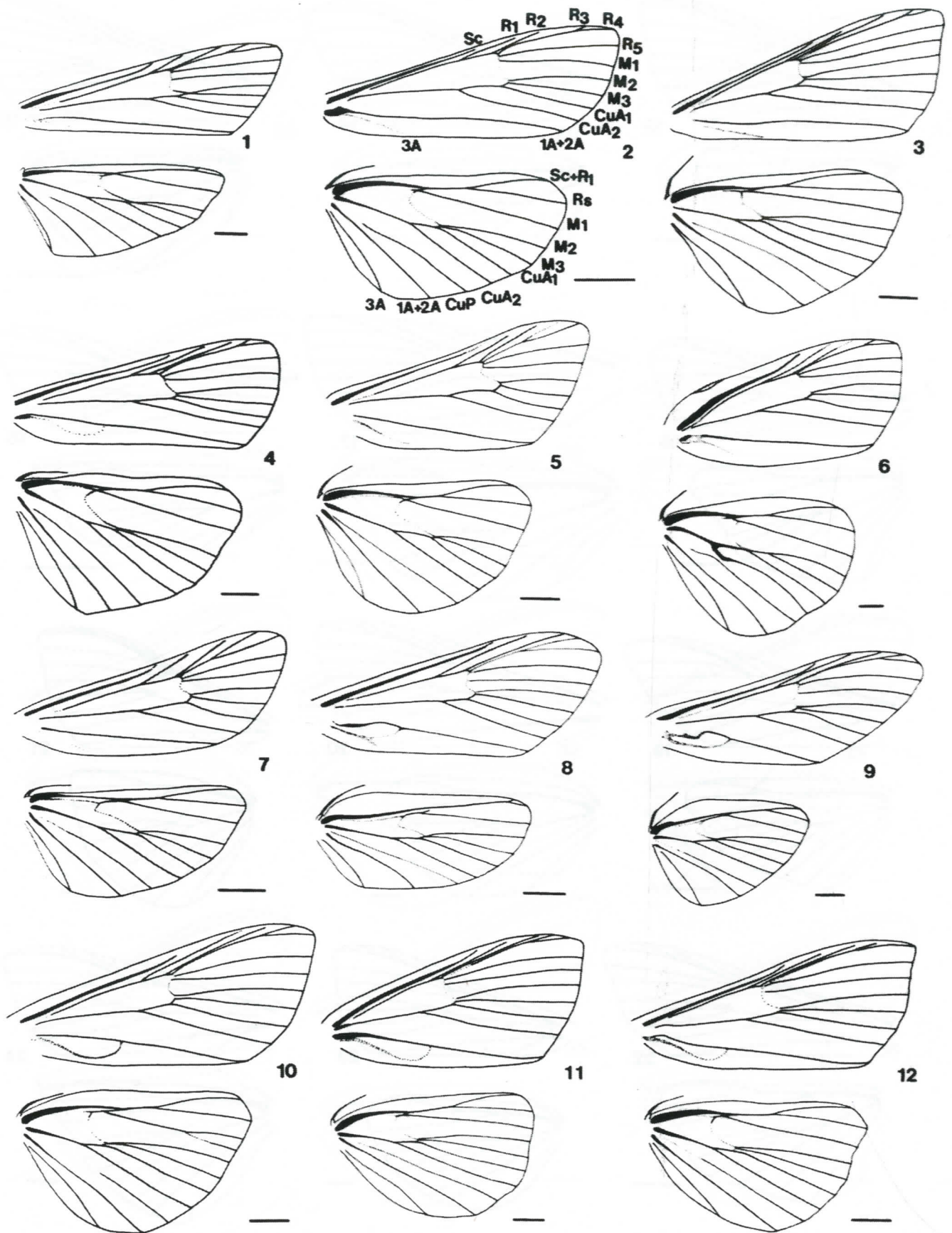


Fig. 1-12. Wing venation. 1, *Parapohnx fluctuosalis*; 2, *Autocharis barbieri*; 3, *A. linealis*; 4, *Noorda blitealis*; 5, *Hellula undalis*; 6, *Crocidolomia pavonana*; 7, *Achyra coelatalis*; 8, *Lirabotys liralis*; 9, *Stenochora lancinalis*; 10, *Pagyda sounanalis*; 11, *Pioneabathra olesialis*; 12, *Isocentris retinalis*. Scale bar = 1 mm.



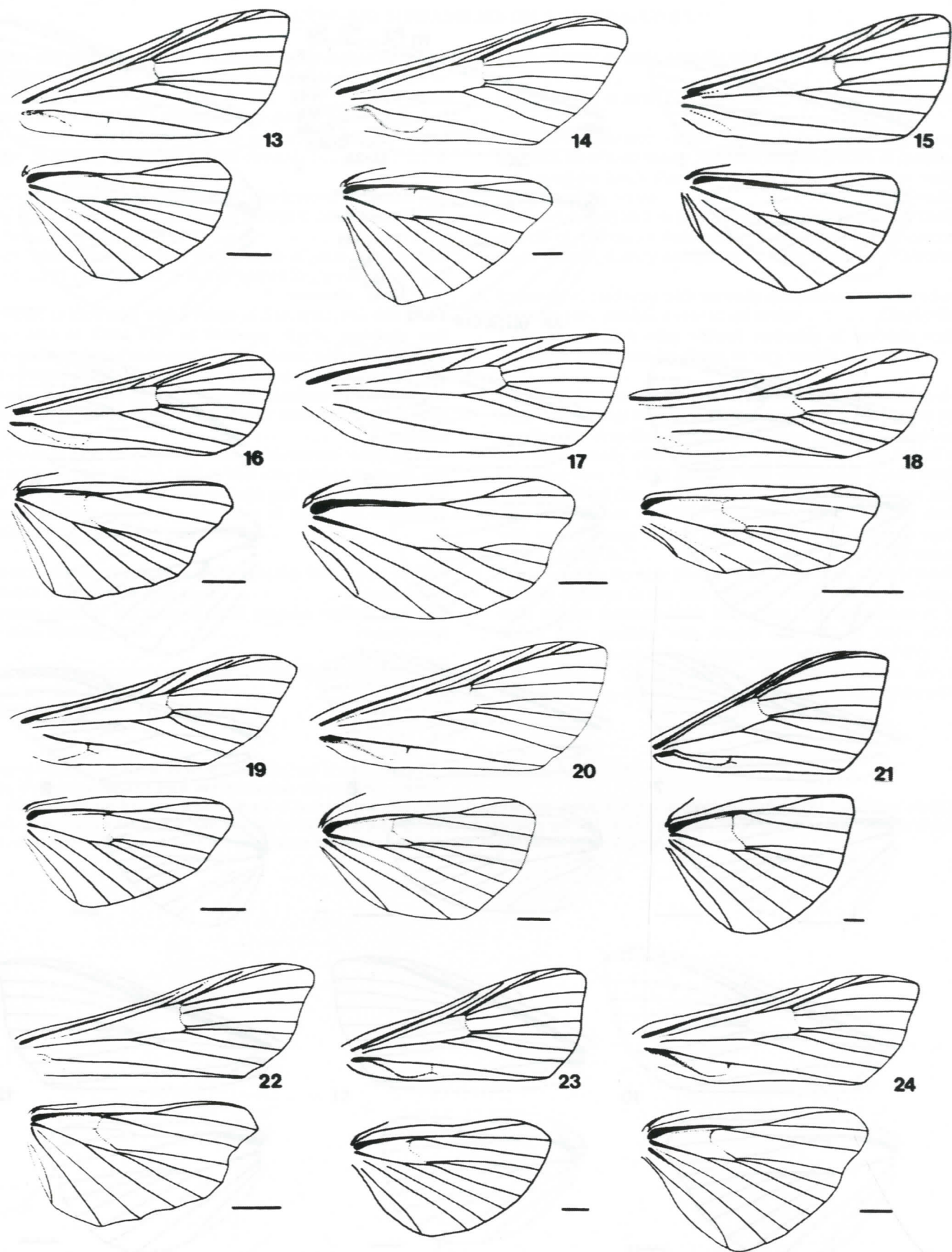


Fig. 13-24. Wing venation. 13, *Notarcha digitalis*; 14, *Pardomima zanclophora*; 15, *Legrandellus fuscularosalis*; 16, *Eurrhyarodes tricoloralis*; 17, *Metasia perfervidalis*; 18, *Microgeshna laportei*; 19, *Pessocosma prolalis*; 20, *Ommatobotys aldabralis*; 21, *Poliobotys ablactalis*; 22, *Diasemiopsis ramburialis*; 23, *Hymenia perspectalis*; 24, *Spoladea recurvalis*. Scale bar = 1 mm.



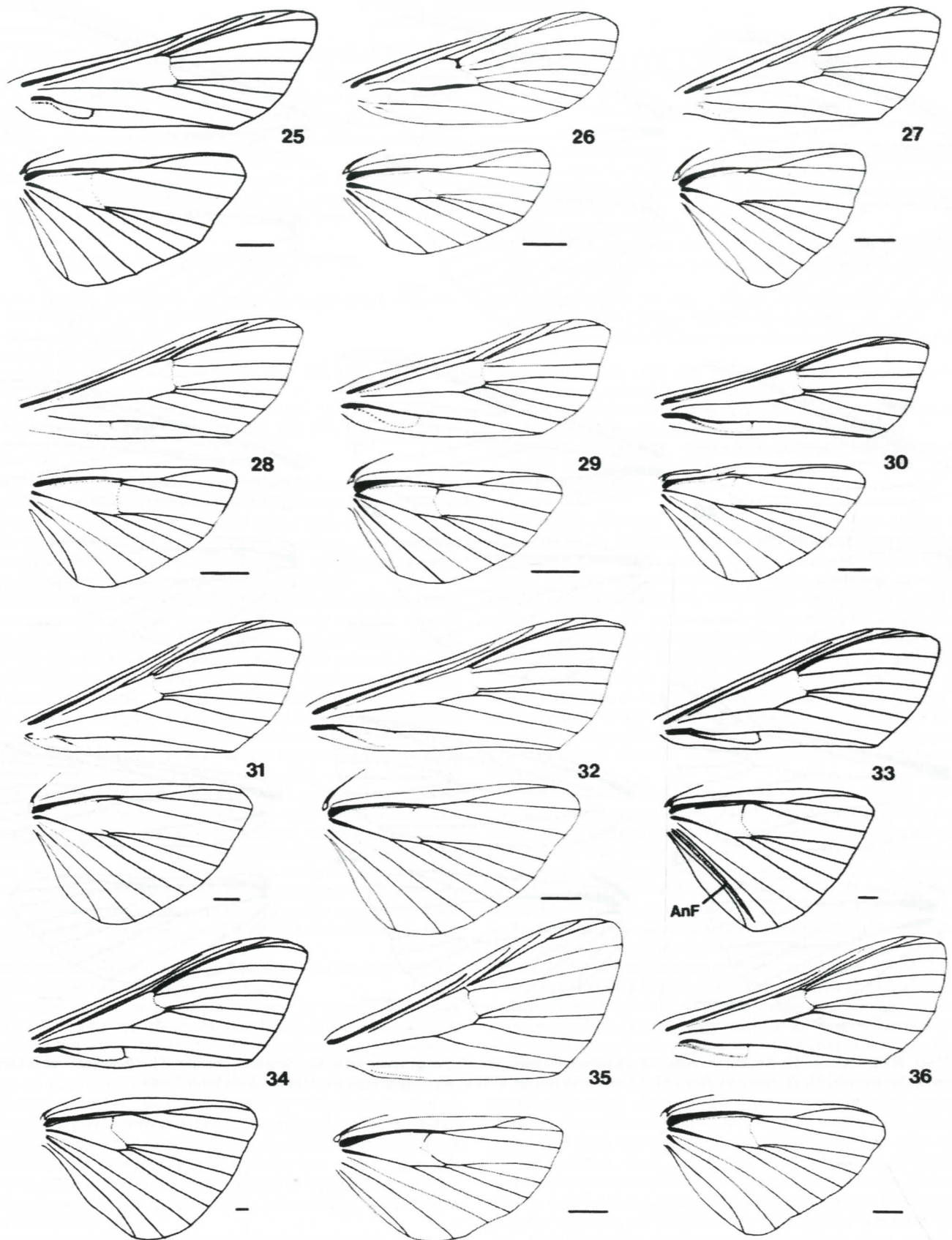


Fig. 25-36. Wing venation. 25, *Bocchoris inspersalis*; 26, *Duponchelia fovealis*; 27, *Nausinoella aphrospila*; 28, *Glyphodella savyalis*; 29, *Chabulina putrisalis*; 30, *Synclera seychellensis*; 31, *Diaphania indica*; 32, *Omiodes indicata*; 33, *Condylorrhiza zyphalis*; 34, *Stemorrhages sericea*; 35, *Cirrhochrista oxylalis*; 36, *Alytana aldabralis*. Scale bar = 1 mm.



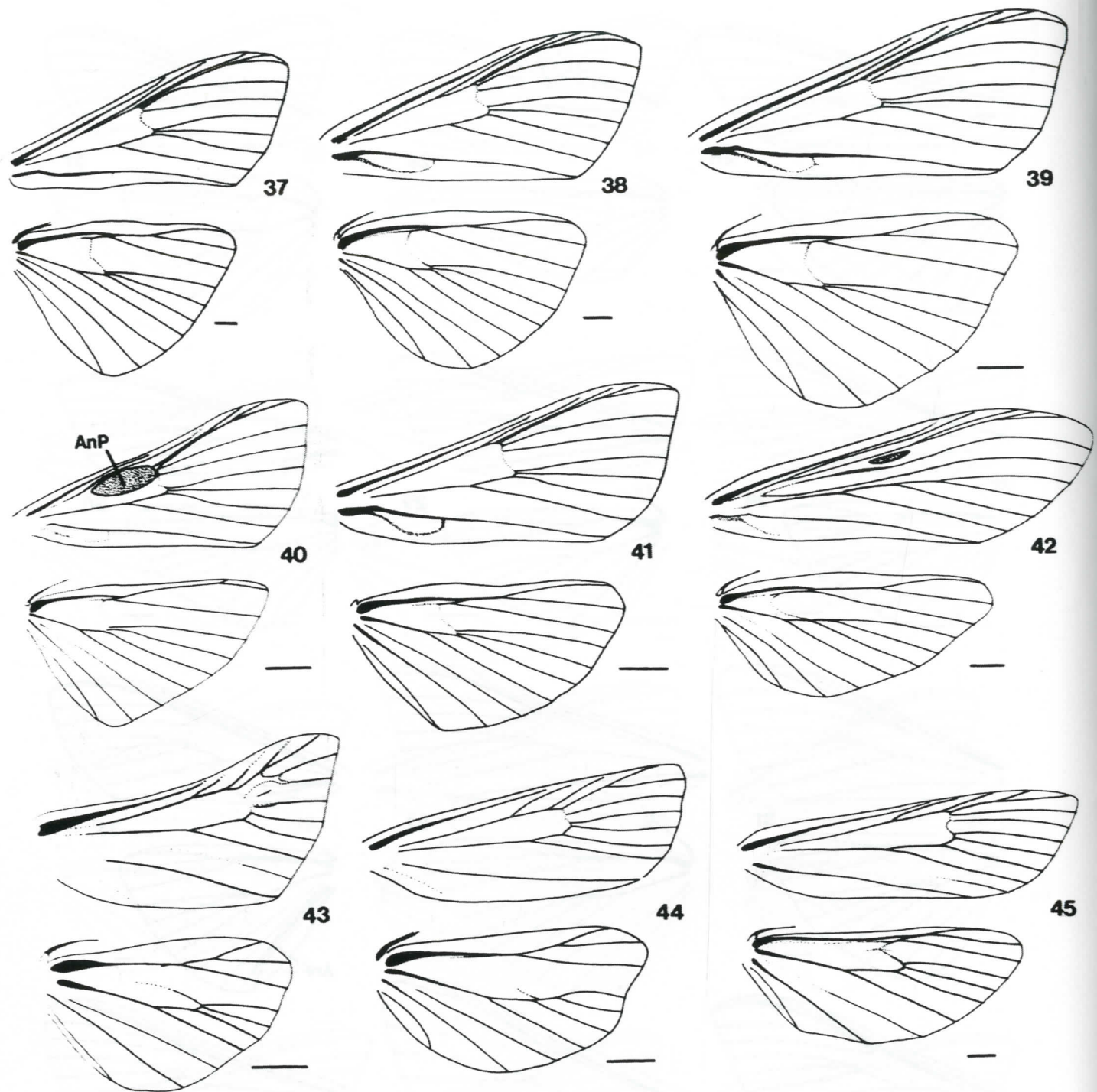


Fig. 37-45. Wing venation. 37, *Palpita unionalis*; 38, *Hodebertia testalis*; 39, *Herpetogramma juba*; 40, *Marasmia poeyalis*; 41, *Orphanostigma abruptalis*; 42, *Hymenoptychis sordida*; 43, *Thyridiphora furia*; 44, *Chrysocatharylla agraphella*; 45, *Scirpophaga occidentella*. Scale bar = 1 mm.



## Family CRAMBIDAE

For a synopsis of pyraloid families and subfamilies, including the more important literature references see Munroe and Solis (1999). Solis and Maes (2002) have published (too recently for us to have incorporated their arrangement into this paper) a phylogenetic analysis of the crambid subfamilies which differs somewhat from the arrangement we have followed herein.

**DIAGNOSIS.**— Praeincinctorium present, usually well developed; caisse tympanique open anteromedially; tympanum and conjunctiva meeting at distinct angle, not in same plane (Munroe and Solis, 1999).

## Subfamily ACENTROPINAE Stephens

Acentropidae Stephens, 1835 [1836]: 148; Speidel (as Acentropinae), 1981: 117.  
 Nymphulites Duponchel, [1845] 1844: 201.  
 Nymphulidi Stephens, 1850: 236.  
 Hydrocampidae Guenée, 1854: 146.  
 Hydrocampinae Ragonot, 1890: 445; Hampson, 1896: 187; 1897: 130.  
 Nymphulidae Swinhoe, 1900: 437.  
 Nymphulinae Fernald, in Dyar, [1903] 1902: 395; Klima, 1937: 57; Lange, 1956: 59; Munroe, 1972: 72; Minet, 1981: 267, 269, 275, 277; 1985: 84; Munroe and Solis, 1999: 246-247.

**DESCRIPTION.**— Slender, delicate, small to mid-sized crambid moths, with narrow wings, often marked with a system of bands more or less parallel to termen, and with long, slender legs. Labial palpus long, usually upturned; maxillary palpus various, but often prominent; eye large; ocellus usually well developed; proboscis usually fully developed; chaetosemata present; antennae prismatic or filiform, rarely laminate or pectinate.

Praeincinctorium simple, usually ending in a rounded transverse lobe; tympanic tergosternal sclerites generally long, rarely reduced; tympani coplanar, bordered by angled or rounded frames; spinulae usually present, more or less conical; tympanic processes dorsal, rarely reduced; tympanic cases considerably reduced; tympanic depressions variably developed; free part of sternite elongate with venulae secundae parallel or divergent.

Male genitalia with simple, arched tegumen of moderate proportions, its anterior and posterior margins thickened; vinculum U- or V-shaped, with simple, narrow lateral elements and carinate ventral element, the latter produced anteriorly into a short saccus; uncus long, narrow, digitate or triangular, not spinose dorsally; gnathos Y-shaped, median element narrow, usually about as long as gnathos, often with small dorsal spines; juxta various, often elongate and oblong or shield-shaped; valvae elongate, simple in outline, costa and sacculus slightly thickened but rarely bearing processes and then only in association with specialized setae, mesal surface with numerous setae, many pointing distad, but in apical area often patches or groups of stronger recurved setae, sometimes greatly hypertrophied and arising from sclerotized processes, mesal surface otherwise unarmed or with small subbasal processes.

Female genitalia various, often with well-developed armature on bursa, sometimes offering valuable diagnostic characters.

Early stages aquatic or semi-aquatic, larvae of some genera with tracheal or blood gills, pupae with the first 3 pairs of abdominal spiracles enlarged and situated on raised tubercles. Life histories of two general types; the larvae either casemakers feeding on higher plants in standing water or browsers on algae living under silk mats on rocks in highly oxygenated rapid streams or wave-agitated lakes. Larvae of *Nymphicula* Snellen are terrestrial, feeding on liverworts in moist, shaded places, but are casemakers and appear to have evolved secondarily from an ancestor with the first type of life history. The fern-feeding *Ambia* Walker and relatives, formerly included by Munroe (1972) and earlier authors in Nymphulinae, are now referred to the subfamily Musotiminae, but are not known from Aldabra (Minet, 1981, 1985).

The Acentropinae (formerly Nymphulinae) include about 70 recognized genera and several hundred described species. They occur in the temperate and tropical regions of all continents and on most continental islands, but have a scanty and irregular representation on oceanic islands, though one monotypic genus is endemic in the Marquesas Islands (Clarke, 1986), and

there are introduced species in Hawaii. The single species known from Aldabra is widespread elsewhere in the tropics.

## PARAPOYNX Hübner

*Parapoynx* Hübner, [1825]: 362; Lange, 1956: 92; Munroe, 1972: 102-104. Speidel, 1984: 76; Yoshiyasu, 1987: 136. Type-species *Phalaena stratiotata* Linnaeus, 1758: 529. Designated by Guenée, 1854: 269 [as *stratiotalis*, an unjustified emendation].  
*Parapoynx* [sic] Guenée, 1854: 268, misspelling.  
*Eustales* Clemens, 1860: 216. (Preocc. by *Eustales* Schoenherr, 1826 [Coleoptera]). Type-species *Eustales tedyuscongalis* Clemens, 1860: 216. By monotypy.  
*Sironia* Clemens, 1860: 219. (Preocc. Hübner, 1823, Nymphalidae). Type-species *Sironia maculalis* Clemens, 1860: 218, by monotypy.  
*Nymphaeella* Grote, 1880: 97. Type-species *Nymphaeella dispar* Grote, 1880: 97. By monotypy.  
*Hydreuretis* Meyrick, 1885: 435. Type-species *Hydrocampa tullialis* Walker, 1859: 462. By subsequent designation by Klima, 1937.  
*Microdracon* Warren, 1890: 478. Type-species *Oligostigma bilinealis* Snellen, 1876: 196-197. By subsequent designation, Munroe, 1992: 76.  
*Cosmophylla* Turner, 1908: 85-86. Type-species *Cosmophylla oxygramma* Turner, 1908: 86. By monotypy.  
*Nymphuaeela* Yoshiyasu, 1987: 136.

**DIAGNOSIS.**— The only nymphuline genus known from Aldabra. Easily recognized by the subfamily characters and the distinctive maculation.

**DESCRIPTION.**— Small, delicate moths with narrow elongate wings and usually with maculation consisting of bands parallel to termen. Frons rounded to somewhat flattened. Vertex not or little elevated. Labial palpus upturned, the first two segments with thick scaling, the third slender and acuminate. Maxillary palpus prominent, distal scaling moderately to strongly dilated. Proboscis well developed, scaled at base. Eye large, globular. Ocellus well developed, reduced (as in the Aldabra species) or absent. Antenna annulate, at least distally, somewhat thickened in male; dorsal surface scaled, ventral surface finely setose. Body slender, abdomen extending a little past anal angle of hindwing. Praeincinctorium long, ending in a rounded tuft of scales. Legs slender; foretibia with epiphysis; tibial spurs 0-2-4.

*Forewing* 2-1/2 to 3 times as long as wide; costa straight to 3/4 then arched to rounded apex; termen oblique, convex; tornus obtuse; posterior margin nearly straight. Discal cell narrow, about 3/5 as long as wing. Sc joining costa near middle of wing. R<sub>1</sub> from cell a short distance before anterior angle, ending on costa just beyond anterior angle. R<sub>2,4</sub> from anterior angle, R<sub>2</sub> stalked for a short distance with R<sub>3,4</sub>, R<sub>3</sub> stalked with R<sub>4</sub>, more than half length of latter; R<sub>4</sub> ending just before apex. R<sub>5</sub> from just behind anterior angle of cell, straight and not at all approximated to R<sub>2,4</sub>. Discocellular erect to behind middle of cell M<sub>1</sub>, then abruptly bent and strongly oblique distad for a short distance to the acute posterior angle of the cell. M<sub>1</sub> from well behind R<sub>5</sub>, straight and slightly divergent from the latter. M<sub>2</sub> and M<sub>3</sub> connate or arising close together from posterior angle of cell. CuA<sub>1</sub> from a short distance basad of posterior angle. CuA<sub>2</sub> from about 4/5 from base. CuP absent. CuP strong, nearly straight, ending just anterior to tornus. 2A short, straight, divergent from CuP.

*Hindwing* about twice as long as wide; costa about as long as posterior margin of forewing, almost straight; apex narrowly rounded; termen very shallowly excavated between M<sub>1</sub> and M<sub>2</sub>, then irregularly convex to anal angle. Anal angle obtuse. Anal margin straight. Frenulum single in male, trisetose in female. Sc+R<sub>1</sub> stalked with Rs nearly to apex. M<sub>1</sub> stalked with Rs as far as anastomosis. Discal cell about 3/5 length of wing. Discocellular strongly concave distad, posterior limb long and oblique, forming an acute posterior angle. M<sub>2</sub> and M<sub>3</sub> connate or close together at posterior angle of cell, their basal parts weakly approximated. CuA<sub>1</sub> from just basad of posterior angle. CuA<sub>2</sub> arising about 3/5 from base. CuP well developed except at base. 1A+2A and 3A well developed, the latter ending on anal margin near anal angle.

*Male genitalia* (Fig. 102-104) with uncus slender, rod-like, weakly



decurved. Gnathos a little shorter than uncus, with short lateral arms, and long, slender, rod-like, weakly upturned, median element, usually with a few dorsal denticles on distal part. Tegumen simple, with triangular lateral elements. Juxta more or less pentagonal, broader ventrally than dorsally. Vinculum with rectangular lateral elements, carinate median ventral element, produced anteriorly into an upturned saccus. Valve simple, 2 to 3 times as long as deep, with subparallel costal and ventral margins; costa with narrow tubular inflation; sacculus weakly inflated at base; terminal margin convex or oblique distad; one or more small digitate processes from dorsal side of sacculus subbasally; strong, but not specialized setae from apical part of costa. Aedoeagus cylindrical, somewhat curved, several times as long as wide, vas deferens entering side of aedoeagus at about 1/4 to 1/2 from base; vesica armed only with minute spicules.

**Female genitalia** (Fig. 243-244) with papillae anales high and narrow, with close-set fine setae; dorsally fused and produced posteriorly. Apophyses posteriores with slender, lunular vertical element and long slender shaft. Eighth tergite pentagonal. Apophyses anteriores slender, about as long as apophyses posteriores. Ostium narrow, unarmed. Ductus bursae slender, with a short sclerotized collar near ostium, the ductus seminalis entering distad of this. The ductus bursae expanding gradually into the thicker, tubular corpus bursae, the latter with a small, globular, distal expansion, and bearing a pair of spinulose signa, in the Aldabra species the signa round, impressed and heavily spinulose.

**BIOLOGY.**— Larvae on aquatic plants, leaf miners in early instars, then case makers; body armed with segmental tracheal gills, singly or in tufts, the pattern differing in different species.

**REMARKS.**— A genus with a moderate number of species, widespread in temperate and tropical regions. The single Aldabra species is known from Europe, Africa, Madagascar, Asia, and tropical America, and has been introduced by human agency into Hawaii. It is associated with rice and other aquatic plants.

*Paraponyx fluctuosalis* (Zeller)

(Fig. 1, 46, 102-104, 243-244)

*Nymphula fluctuosalis* Zeller, 1852: 27; Hampson, 1896: 193; 1897: 143; Shiraki, 1910: 128; Klima, 1937: 81; Pinhey, 1975: 76-77.

*Paraponyx* [sic] *linealis* Guenée, 1854: 271; Walker, 1859: 454.

*Oligostigma chrysippusalis* Walker, 1859: 432.

*Oligostigma obitalis* Walker, 1859: 432.

*Oligostigma curta* Butler, 1879b: 270.

*Nymphula luteivittalis* Mabilis, 1880: 26.

*Paraponyx* [sic] *fluctuosalis*; Hampson, 1891: 40; Zimmerman, 1958: 267-269, figs. 210-212; Inoue, 1982 I: 371. II: 243, pl. 44, fig. 39.

*Paraponyx fluctuosalis* (Zeller); Speidel, 1984: 84, pl. 2, fig. 31.

*Paraponyx* [sic] *oryzalis* Wood-Mason, 1885: 5-12, figs. 1-3b.

**DIAGNOSIS.**— Wings narrow; forewing in male with anterior part of termen erect, posterior part oblique; in female longer, with entire termen oblique and weakly convex, apex acute. Upper surface whitish buff, with irregular fuscous dusting from base to postmedial line; forewing with five oblique, fulvous, fuscous-bordered, transverse lines, the last (at termen) preceded by a distinct fuscous line; hindwing with basal and medial fuscous lines, postmedial fuscous-bordered fulvous band, subterminal fuscous line, and terminal fuscous-bordered fulvous band. Easily distinguished by narrow wings and banded pattern from other Aldabra Crambidae.

**DESCRIPTION.**— Frons rounded. Ocellus somewhat reduced. Scaling of head whitish buff, grey-tinged on vertex. Thorax above whitish buff, with sparse fuscous dusting and with diffuse fuscous transverse bands across anterior part of patagia, middle of thorax and tegulae, and near posterior end. Abdomen above whitish buff, with transverse fuscous and fulvous bands. Body beneath and legs whitish buff.

**Forewing** in female with apex more acute and termen more even and more strongly oblique than in male; upper side whitish buff, irregularly dusted with fuscous from base to postmedial band; diffuse, fuscous-bordered, fulvous, subbasal and antemedial bands, oblique basad from costa to posterior margin; a similar, but more distinct postmedial band, deflected distad around end of cell; more or less distinct fuscous dots at anterior and posterior angles of cell; a broad subterminal band, its distal fuscous border

wider and more diffuse than its basal one, parallel to termen as far as anal fold, there deflected basad and again distad; a fuscous line between subterminal and terminal bands; terminal band fulvous with narrow fuscous borders; fringe with strong fuscous basal line, followed by a light-buff zone, distal half darker grayish buff.

**Hindwing** above whitish buff; 1 to 3 strongly oblique fuscous lines across anterobasal field; fuscous-bordered fulvous subterminal band, intercalary fuscous line, and fuscous-bordered fulvous terminal band, as on forewing; fringe as on forewing, but distal area largely whitish grey.

**Male genitalia** with gnathos shorter than uncus. Valve obliquely truncate distally; sacculus without digitate subbasal process.

**Female genitalia** with signa round, impressed, strongly sclerotized, with dense armature of radiating spinules (Fig. 244).

**TYPE MATERIAL EXAMINED.**— None. Type localities: KwaZulu-Natal, South Africa (*fluctuosalis*); East India (*linealis*); China (*chrysippusalis*); Sri Lanka, Australia (*obitalis*); Hawaii (*curta*).

**EARLY STAGES.**— [Based on Hawaiian material] Eggs flat, yellowish, laid in small clusters on food plant. Young larva without gills, mining in tissues of host. Older larva with subdorsal, lateral and subventral rows of branched tracheal gills, living in portable cases made of fragments of the host plant. Pupa with sharp abdominal apex and with legs longer than abdomen, formed in a cocoon or case.

**DISTRIBUTION.**— Spain, Portugal, Sardinia, most of Africa south of the Sahara, east to India, southeast Asia, Japan, Australia, Hawaii, and Neotropics. Found in greenhouses in England.

Aldabra material: Settlement (19-21 Jan.) 9 ♀; (31 Mar.) 2 ♀; Takamaka (31 Jan.-1 Feb.) 4 ♀; Cinq Cases (9 Mar.) 1 ♀; Middle Island (13 Mar.) 1 ♀.

**HOSTS.**— The larvae are aquatic and feed on a variety of emergent grasses, sometimes becoming a pest on rice; also on water lily, *Nymphaea* [Nymphaeaceae].

**REMARKS.**— This widely distributed species may have arrived on Aldabra by overseas flight or by human agency. Its general occurrence suggests that it has readily adapted to local conditions. As rice and aquatic ornamentals such as water lilies do not seem to be grown on the atoll we think that arrival by natural means is more likely.

Subfamily ODONTIINAE Guenée, 1854

Hercynites Blanchard, 1840: 538.

Odontidae Guenée, 1854: 111.

Hercynidae Guenée, 1854: 147.

Titanii Marion, 1952: 268.

Odontiinae Munroe, 1956: 126; 1961: 5; 1972: 137; Munroe and Solis, 1999: 247.

**DESCRIPTION.**— Frons flat and oblique in Aldabra species, rounded or with variously shaped prominences in some exotic forms. Labial palpus porrect, or in exotic genera upturned or decurved. Maxillary palpus filiform or distally dilated with scales. Proboscis well developed in Aldabra forms, reduced in some exotics. Eyes normal or somewhat reduced. Ocelli present. Chaetosemata absent. Antennae dorsally scaled, ventrally pilose or setose, generally prismatic in male, filiform in female. Body usually robust. Legs various, but with fore-tibial epiphysis, one pair of mid- and two pair of hind-tibial spurs. Praeincinctorium simple or with a weak transverse lobe, variously tufted with scales distally.

**Male genitalia** with uncus bilobed, the lobes lightly sclerotized, separated by a shallow excavation posteriorly, laterally with even vestiture of fine anterodistally directed setae. Gnathos with lateral arms arising from sides of tegumen, converging posteriorly to join a finger-like or acuminate median element, the latter extending posteriorly to near end of uncus. Aedoeagus straight or curved, with or without cornuti. Juxta often prolonged beneath aedoeagus to form a trough-like anellus. In the tribe Eurrhypini, including the Aldabra forms, prominent scale-like sclerites present on each side of juxta, arising from ventral part of vinculum. Valva usually rounded distally, without clasper; mesal surface with radial striations and on distal part often with coarse or fine, basally directed setae. Eighth sternite modified in shape, bearing tufts of specialized scales or setae.



*Female genitalia* structure various. In Aldabra forms, ovipositor lobes small and with few, inconspicuous setae; apophyses posteriores with small triangular vertical bar and with slender but strongly sclerotized shaft, as long as bursae or nearly so; ostium narrow, unarmed; ductus bursae shorter than corpus bursae, narrow, with sclerotized, ventrally incomplete collar, and in some species a zone of small spines; ductus seminalis joining ductus bursae just distad of collar; corpus bursae roughly ovoidal, signa and spinules various.

**EARLY STAGES.**— Unknown for Aldabra species. Habits and food plants of larvae of extralimital Eurrhyni varied: seed feeders on Malvaceae [*Mimoschinia rufofascialis* (Stephens)] and mango, *Mangifera indica* L., Anacardiaceae [*Decelia terrosalis* Snellen]; in a silken tube at base of plants of *Genista*, *Cytisus*, and *Ononis* spp., Leguminosae [*Eurrhynis pollinalis* (Denis & Schiffermüller)]; and in a nest of webbed leaves on buckthorn, *Rhamnus frangula* L., Rhamnaceae [*Metrea ostreonalis* Grote].

The subfamily has several hundred species in about 80 genera widely distributed throughout the world. Like the subfamily, the tribe Eurrhyni is widely distributed. The Aldabra species have close relatives in Madagascar and continental Africa, and two out of the three also have near relatives in tropical Asia, Australia, Polynesia and Micronesia. Only one genus is known from Aldabra.

### AUTOCHARIS Swinhoe

*Autocharis* Swinhoe, 1894: 149. Type-species: *Autocharis fessalis* Swinhoe, 1887: 459. By original designation. Type-locality: Mhow, Madhya Pradesh, India.

**DIAGNOSIS.**— Small to midsize eurrhynine Odontiinae; labial palpus correct or weakly downcurved, usually considerably longer than head, smoothly scaled, distally acuminate; maxillary palpus with extended distal scale tuft; frons flat and oblique; eyes fully developed; forewings triangular, with weak scaletuft near middle of posterior margin; discal cell about half length of wing;  $R_2$  not stalked with  $R_{3+4}$ ; basal part of  $M_2$  and  $M_3$  approximated. Wings from base to postmedial line either semitransparent and yellowish, or grey dusted with black; space beyond postmedial line dark pink or fuscous, often contrasting; postmedial line, and antemedial line and discocellular spots if present, composed of somewhat raised black scales. Closely similar to *Pseudonoorda* Munroe, 1974, p. 32, in maculation and in the configuration of the valves and aedeagus of the male genitalia, but in *Pseudonoorda*  $R_2$  is stalked with  $R_{3+4}$ , and the moth is larger and more robust; the male genitalia have the sides of the uncus converging posteriorly, the juxta less strongly sclerotized and the median squamiform structures longer and recurved; in the female genitalia the ductus bursae has only a short sclerotized collar, and the corpus bursae has no signa and lacks the subbasal spined zone found in *Autocharis*.

**DESCRIPTION.**— Frons flat and oblique, almost wedge-shaped anteriorly. Maxillary palpus correct or weakly decurved, exceeding frons by more than length of head, smoothly scaled, third segment hidden in the pointed scaling of the second. Maxillary palpi prominent, distal scaling produced into an acuminate, anteriorly directed tuft, dorsally truncate in plane of frons. Proboscis slender, coiled, scaled at base. Gena unscaled. Eye large and globular. Ocellus conspicuous, directed dorsad, separated from eye by less than its own width. Antenna filiform, smoothly scaled dorsally, variously ciliate ventrally. Body slender, abdomen slightly exceeding anal angle of hindwing. Legs robust; outer tibial spurs shorter than inner.

*Forewing* subtriangular, variable in width; termen weakly to moderately convex; posterior margin with a weak scale tuft near middle; discal cell about half as long as wing or somewhat longer;  $R_1$  and  $R_2$  from cell;  $R_3$  and  $R_4$  stalked;  $R_5$  from anterior angle of cell, basally curved and approximated to  $R_{3+4}$ ; discocellulars weakly oblique and concave distad;  $M_1$  from a little behind anterior angle of cell;  $M_2$  and  $M_3$  from posterior angle of cell, their basal parts approximated;  $CuA_1$  from slightly basad of  $M_3$ ;  $CuA_2$  from cell at about 3/4 from base.  $CuP$  absent. 1A strong and straight, its base somewhat thickened. 2A arising from basal thickening of 1A, weak, but distally forming a closed loop with 1A at about 2/5 from base.

*Hindwing* 2.5 to 3 times as long as wide; costa almost straight; apex rounded; termen rounded, convexity slightly stronger at cell  $CuA_1$ ; anal angle rounded; anal margin straight.  $Sc+R_1$  anastomosed with  $Rs$  for 1/4 to

1/3 distance from end of cell to apex.  $M_1$  connate or very short-stalked with  $Rs$ . Cell less than half as long as wing; discocellular weak, concave distad, its posterior portion oblique.  $M_2$  and  $M_3$  arising close together from posterior angle of cell, their basal parts curved and approximated.  $CuA_1$  from a very short distance basad of  $M_3$ , basally very weakly approximated to it.  $CuA_2$  from cell at about 3/4 from base.  $CuP$  present, rather weak basally. 1A+2A and 3A present. Frenulum simple in male, multiple in female.

*Male genitalia* with uncus parallel-sided, distally bilobed, laterally setose. Gnathos with median element rod-like, somewhat shorter than uncus. Tegumen evenly arched. Juxta gladiate, dorsally acute or produced into a trough-like anellus. Vinculum ventrally bilobed, dorsally carinate and bearing scale-like armature. Valve longer than tegumen + uncus; costa strongly sinuate, inflated; distal margin oblique; sacculus weakly defined, distally with a setose patch; mesal face of valve with a shorter subcostal and a longer median ridge diverging from base. Aedeagus curved, tapering distad. Vesica with variable armature.

*Female genitalia* with ovipositor lobes small, weakly sclerotized, setae greatly reduced; apophyses anteriores and apophyses posteriores long and slender, ovipositor capable of considerable extension. Ostial chamber small, unarmed. Ductus bursae slender, straight, with trough-like sclerotization several times as long as wide. Ductus seminalis inconspicuous, from junction of ductus bursae and corpus bursae. Corpus bursae several times as long as ductus bursae, pyriform, finely spinulose, with a subbasal zone of coarser spines. One linear signum or two linear or round ones.

**EARLY STAGES.**— Unknown.

**REMARKS.**— The typical species group, represented in Aldabra by the new species *A. discalis* and *A. linealis*, ranges from continental Africa through the Malagasy and Indo-Australian regions as far as Micronesia and Samoa. *A. barbieri* represents a second group, restricted to Africa and the Malagasy region. Study of additional species may show that this second group merits generic status.

### KEY TO ALDABRA SPECIES OF AUTOCHARIS

1. Forewing gray with complex pattern of transverse bands (Fig. 47) ..... *barbieri*
- Forewing yellow, distally with reddish-brown transverse band (Fig. 48, 49) ..... 2
2. Reddish-brown band occupying distal 30% of forewing (Fig. 49); female genitalia with pair of small sclerotized discs on anterior half of corpus bursae (Fig. 250) ..... *discalis*
- Reddish-brown band occupying distal 20% of forewing (Fig. 48); female genitalia with midregion of corpus bursae bearing pair of linear, nodular, longitudinal ridges (Fig. 247, 249) ..... *linealis*

### *Autocharis discalis* Shaffer & Munroe, new sp.

(Fig. 49, 250, 251)

*Noorda ecthoemata*, Legrand, 1965 (not Hampson, 1913): 116. Misidentification.

**DIAGNOSIS.**— Forewing yellow with reddish-brown transverse band occupying distal 30% of forewing. Female genitalia with pair of small sclerotized discs on anterior half of corpus bursae.

**DESCRIPTION.**— Frons oblique; yellow, bordered anteriorly with white, and laterally with a contrasting white line on each side. Labial palpus about 2.7 times as long as eye diameter, outer sides reddish brown, slightly darker dorsally, abruptly white ventrally near base. Maxillary palpus 0.75 times as long as eye diameter, first and second segments obliquely ascending, third correct, dark reddish brown. Proboscis with white scales on basal portion. Antenna filiform, finely ciliate, scales light yellow. Eye diameter 0.7 mm. Ocellus conical, black with clear lens. Vertex uniformly light yellow. Occiput orange brown behind eye. Patagium and tegula yellow dorsally, laterally forming orange-brown line extending from behind eye to forewing costa. Thorax yellow dorsally, white ventrally. Foreleg white, with tibia and distal third of femur reddish brown. Mesothoracic leg white, tibia reddish brown on outer sides. Metathoracic leg white.

*Forewing* radius 7.5 mm; ground yellow; costa orange brown on basal



half, color gradually fading distally, not reaching transverse band; a few scattered dark scales on subcosta (posterior margin of costal band); distal 30% of forewing occupied by reddish-brown transverse band; proximal margin of band slightly sinuous and marked by prominent line of black scales; mid-region of transverse band bearing indistinct narrow transverse band of darker scales; fringe brown.

*Hindwing* ground white; outer margin bearing reddish-brown band, posterior half of its inner margin marked with black scales; distal two-thirds of CuA2 marked with yellow scales; terminal line pale brown, remainder of fringe light brown.

*Female genitalia* with apophyses nearly straight; apophyses anteriores bearing well developed dorsal triangular process on basal third; apophyses posteriores about 0.9 times as long as apophyses anteriores. Ostium unsclerotized. Ductus bursae membranous posteriorly; medially forming well sclerotized flattened tube, open along one side and three times as long as wide; membranous at junction with corpus bursae. Corpus bursae pear shaped, with ring of numerous small teeth near anterior end, teeth becoming minute anteriorly, ring ending abruptly posteriorly; bearing a single large subtriangular signum, about 0.3 times as long as corpus bursae, and two small equal sclerotized discs on opposite sides of anterior half of corpus bursae.

**HOLOTYPE**.— female, labeled: "Aldabra 2.XII. 1959 M. Gerber"; "303"; "Museum Paris Coll. H. Legrand"; "♀ genitalia on slide 1645 J. C. Shaffer"; "Holotype *Autocharis discalis* J. Shaffer & E. Munroe." [MNHN].

**OTHER MATERIAL EXAMINED**.— None, known only from holotype.

**DISTRIBUTION**.— Known only from Aldabra.

**REMARKS**.— The species has been misidentified as *Noorda ecthoemata* Hampson. It has as its closest relatives an African group of *Autocharis* species which properly includes *ecthoemata*, which we hereby transfer to that genus as *Autocharis ecthoemata* (Hampson), **new comb.**

*Autocharis linealis* Shaffer & Munroe, **new sp.**

(Fig. 3, 48, 107-108, 247-249)

**DIAGNOSIS**.— Forewing yellow with reddish-brown transverse band occupying distal 20% of forewing. Female genitalia with midregion of corpus bursae bearing pair of linear, nodular, longitudinal ridges.

**DESCRIPTION**.— Similar to *A. discalis* externally, differing in the reddish-brown transverse band occupying only the distal 20% of the forewing, and the same band in the hindwing being proportionally narrower as well.

*Male genitalia* with round patch of long hair-like scales at base of costa of valve. Costal margin broadly rounded, distal concavity occupying only one-fifth of valve length. A curved sclerotized ridge follows the costa from valve base to apex becoming tubular near apex and forming the center of a triangular apical extension of the valve; this ridge bears a small tuft of fine hairs about two-thirds distant from valve base. From near costa base a pair of unequal ridges forms a narrow 'V' in middle of valve; dorsal arm rather sharply set off, naked, extending about half way to valve apex; ventral arm longer, distally setose, directed toward but falling well short of ventro-distal margin of valve; valve surface naked between these arms, and half way to valve margin ventral to ventral (longer) arm. Juxta medially bearing conspicuous 'V' formed of two tight clusters of narrow distally expanded scales. Base of sacculus enveloped in finely striated membrane. Aedoeagus distally curved; about five times as long as maximum (subbasal) width.

*Eighth abdominal sternum* with posterolateral angles concave; posterior margin heavily sclerotized, sclerotization curving anteriorly inward near midline forming pair of stout hooks each bearing heavily sclerotized semilunar flange on its posteromedial angle; brush broad, about 8 scales, these restricted to lateral half of posterior margin of brush, scales unequal, longest laterally and tapering to shortest medially; small setose nodule between brush and concave posterolateral angle.

*Female genitalia* with ovipositor lobes very weakly sclerotized, broad intersegmental membrane permitting long extension of ovipositor. Apophyses long, slender, apophyses posteriores slightly longer than apophyses anteriores. Ostial chamber membranous, funnel shaped. Ductus bursae a well sclerotized tube; short, about twice as long as wide. Corpus bursae elongate, about three times as long as wide, narrowing posteriorly; midregion with pair of slender signa, each forming the arm of a 'U' (with connecting bottom

missing) and composed of irregular interlocking plates, each plate medially bearing a stout sharp-pointed inwardly directed tooth. Posterior to these signa corpus bursae bears complete band of well sclerotized longitudinal ridges, each terminating anteriorly in tiny, sharp-pointed, anteriorly-directed tooth, with five or six bands of similar smaller teeth anterior to band of ridges. Corpus bursae membranous posterior to ridges, then bearing smooth sclerotizations forming incomplete band, from which arises ductus seminalis, then short funnel-shaped membranous region leading to ductus bursae. Ductus seminalis enters corpus bursae through sclerotized invagination.

**TYPES**.— *Holotype* male, labeled: "Aldabra Atoll 9°24'S. 46°20'E Settlement 9 Jan. 1968 Jay C. Shaffer"; "Genitalia Slide By J. Shaffer USNM 57877"; "Autocharis linealis J. Shaffer & E. Munroe." [USNM]. *Allotype*.— female, labeled: "Aldabra Atoll 9°24'S. 46°20'E Settlement 19 Jan. 1968 Jay C. Shaffer"; "Genitalia Slide By J. Shaffer USNM 57878"; "Allotype Autocharis linealis J. Shaffer & E. Munroe." [USNM].

**OTHER MATERIAL EXAMINED**.— None, known only from these two types.

**DISTRIBUTION**.— Known only from Aldabra.

**REMARKS**.— *A. linealis* belongs to a group of *Autocharis* species which ranges from Samoa to Africa and includes *Autocharis amethystina* Swinhoe, 1894, described from India.

*Autocharis barbieri* (Legrand) **new comb.**

(Fig. 2, 47, 105-106, 245-246)

*Noorda barbieri* Legrand, 1965: 117, Plate 7, No. 7.

**DESCRIPTION**.— Forewing radius 7.0 mm; ground a complex mixture of brownish black, brown, and white scales; dividing wing into darker antemedial, postmedial, and lighter medial regions. Costal band brownish black, extending distally to postmedial line. Broken antemedial line of brownish black scales, scales raised in subcosta, radius, 1A+2A, and at posterior wing margin. Small tufts of raised black scales at upper and lower outer angles of cell, closing vein marked with raised white scales. Irregular postmedial band of raised scales, pure white and bordered distally by narrow line of brownish black. Ground distal to postmedial band dark grayish brown, with blotches of yellowish white.

*Male genitalia* with round patch of long hair-like scales at base of costa. Costal margin sinuate, distal concavity occupying two-fifths of valve length. Tuft of fine hairs immediately distal to crest of situation. Cucullus with sclerotized tube developed along margin, expanded at valve apex. V-shaped ridges as in *A. linealis*, but with ventral arm nearly reaching margin of valve. Modifications in juxta region as in *A. linealis*. Aedoeagus curved on distal half, slender, about six times as long as maximum (subbasal) width.

*Eight abdominal sternum* with posterolateral angles truncated; posterior margin with deep medial V-shaped notch, each side of notch bearing weakly sclerotized subequal flanges; brushes with about 6 scales extending across entire posterior margin.

*Female genitalia* with ovipositor lobes very weakly sclerotized, intersegmental membrane normal. Apophyses long and slender, apophyses anteriores equal in length to apophyses posteriores, straight, with anteriorly directed triangular plate on posterior third; posterior bent near middle. Ostial chamber membranous. Ductus bursae sclerotized, cylindrical, short membranous section joining corpus bursae. Corpus bursae ovoid elongate, about 2.5 times as long as wide; bearing straight, narrow longitudinal bar as long as width of corpus bursae, and prominent circle of sharp teeth around entrance to ductus bursae, teeth diminishing greatly in size with distance from circle and extending as tiny pimples over entire surface of corpus bursae. Ductus seminalis slender, from near posterior end of corpus bursae.

**TYPE MATERIAL EXAMINED**.— The species was described from a male holotype and five female paratypes, all from Aldabra. We have examined the female paratype labeled: "Paratype"; "♀"; "Museum Paris Coll. H. Legrand"; "Aldabra 28.XII. 1959 M. Gerber"; "Noorda barbieri Legrand"; "♀ genitalia on slide 1763 J. C. Shaffer." [MNHN].

**DISTRIBUTION**.— Known only from Aldabra. Settlement (10-27 Jan.) 7 ♂, 23 ♀; Takamaka (3-15 Feb.) 9 ♂, 7 ♀; Cinq Cases (29 Feb.- 9 Mar.) 10 ♂, 16 ♀; Middle Island Camp (16-25 Mar.) 17 ♂, 6 ♀.

**HOSTS**.— Unknown.



**REMARKS.**— Legrand separated *A. barbieri* from the Malagasian species *Noorda seyrigalis* Marion & Viette, 1956 on the basis of its smaller size and differing wing markings. This distinction is substantiated by differences in the male genitalia of the two species, viz: the presence in *N. seyrigalis* only of a blade-like ridge arising medio-dorsally on the valve, extending ventrally, and terminating as a sharp apex just beyond valve margin; a sinuate costa in *A. barbieri*; and a more bulbous base to the aedoeagus in *N. seyrigalis*. The two species are clearly congeneric and *N. seyrigalis* is hereby transferred to *Autocharis* in the Odontiinae. The closest relative of *A. barbieri*, however, is a yet to be described South African species of *Autocharis*.

#### Subfamily NOORDINAE Minet, 1980

##### NOORDA Walker

*Noorda* Walker, 1859: 978. Type-species *Noorda blitealis* Walker, 1859: 979. By monotypy. Type-locality: Sri Lanka.

*Epinoorda* Rebel, 1902: 103. Type-species *Epinoorda caradjae* Rebel, 1902: 103. By monotypy.

**DESCRIPTION.**— Frons with closely appressed scales. Labial palpus decurved; seen denuded, first segment 0.65 times as long as second; third slender, subcylindrical with distal half very slightly expanded, 0.80 times as long as second. Antenna shaft filiform and very finely ciliate in both sexes. Eye large. Ocellus well developed, black elliptical base contiguous with eye margin; lens clear, round, offset toward eye.

*Forewing* (Fig. 4) with costal margin straight on basal 3/4, apex rounded; posterior margin slightly concave.  $R_1$  from distal 4/5 of cell, somewhat sinuate;  $R_2$  and  $R_{3+4}$  arising separately from just before upper outer angle of cell, then contiguous for short distance, then gradually divergent;  $R_3$  stalked with  $R_4$  about 3/4 length of latter, common stalk from upper outer angle of cell;  $R_4$  terminating near wing apex;  $R_5$  from just below the angle, terminating just below apex.  $M_1$  from upper 1/3 of closing vein, straight;  $M_2$  from just above lower outer angle, very slightly convex;  $M_3$  from lower angle, slightly concave.  $CuA_1$  from just before the angle, concave;  $CuA_2$  from outer 7/10 of cell, concave.  $1A+2A$  centrally convex, distally straight to slightly concave.  $3A$  discernable with difficulty, looping into  $1A+2A$  at 2/5 from base of latter.

*Hindwing* with frenulum single in both sexes.  $Sc+R_1$  and  $R_s$  connate from just beyond upper outer angle of cell and for 2/5 free length of  $R_s$ .  $M_1$  from upper angle, straight.  $M_2$  and  $M_3$  from lower angle, contiguous for short distance, then divergent.  $CuA_1$  from just before lower angle,  $CuA_2$  from 5/7 distance from base; both very slightly concave.

*Tympanal structures* partly imbedded in thorax; praecinctorium reduced, unilobed (Munroe and Solis, 1999).

*Male genitalia* with uncus long, slender, thin and rolled into tube open along ventral midline; basal two-thirds of outer surface covered with long simple hairs. Gnathos small, consisting of transverse bar, tapering laterally, and small caudally directed digitate medial process. Juxta broad, poorly sclerotized, basally emarginate. Vinculum small, narrowly rounded. Valva broad, elliptical, apical half with four distinct patches of hairs; dorso-medial patch of long, curved, anteriorly directed hairs. Costa and sacculus not heavily sclerotized. Clasper with longitudinal ridge, terminating caudally at short transverse ridge bearing patch of small slender scales, each drawn out to fine filamentous tip. aedoeagus very slender, with lanceolate cornutus and distal patch of transverse simple setae.

*Female genitalia* with ovipositor lobes poorly developed, membranous, 8-9 intersegmental membrane highly extendable. Apophyses anteriores long, slender, straight; basal third with dorsal spine. Apophyses posteriores about three times as long as apophyses anteriores, posteriorly very slender. Ostium membranous. Ductus bursae with posterior third membranous; medially a very short lightly sclerotized section slightly longer than wide; anterior half membranous, gradually expanded anteriorly, and (except for short smooth posterior section) uniformly granular in appearance due to numerous minute pimples. Corpus bursae elongate, about 2.3 times as long as wide; somewhat C-shaped, convex surface with poorly defined longitudinal line along its

length, joining smooth lightly sclerotized plate near posterior of corpus bursae. An incomplete circle of small inwardly-directed spines around neck of corpus bursae. Ductus bursae from near posterior end of membranous anterior half of ductus bursae, the granularity of the latter extending a short distance onto ductus bursae.

##### *Noorda blitealis* Walker

(Fig. 4, 50, 109-111, 252)

*Noorda blitealis* Walker, 1859: 979; Moore, 1886, 354, Pl. 178, fig 11; Hampson, 1896: 414-415, fig 227; 1899: 221, fig 126; Maxwell-Lefroy, 1909: 520; Fletcher, 1914: 441-442, fig. 318; Legrand, 1965: 117; Minet, 1980: 79-84, fig. 1-5, 7, 11-12.

*Scopula subjectalis* Walker, 1865: 1472-1473.

*Argyria holocrossa* Meyrick, 1902: 176.

**DESCRIPTION.**— Frons white, bounded dorsally by pair of triangular medially directed lateral tufts of slightly raised dark-brown scales. Labial palpus with basal segment white; second and third dark brown, second slightly lighter basally. Maxillary palpus dark brown, medial band of lighter brown. Eye diameter 0.90 mm. Vertex dark brown anterior to and light brownish pink posterior to antennae. Patagium and tegula dark brown.

*Forewing* radius 10.0 mm; distinct spot of pure yellowish white in lower inner angle of wing; ground yellowish white on basal two-thirds of wing, densely set with brownish black scales, especially on basal third and posterior to apical bands. These scales also forming antemedial line (often indistinct), discal spot with adjoining thin line on closing vein of cell, and indistinct postmedial line posterior to  $CuA_2$ . Center of discal spot marked by several broad, shiny, metallic scales. Apical region marked by transverse bands of (basal to distal) moderate olive brown, narrow distinct band of brownish black, broader band of moderate olive brown, narrow band of metallic silvery scales, narrow terminal band of dark yellow. Fringe brown on basal third, silvery brown on distal two-thirds.

*Hindwing* with its basal two-thirds white translucent with bluish iridescence; distal third dark yellowish brown, darker lines of  $CuA_1$  and  $CuA_2$ , most pronounced on  $CuA_2$ . Inner margin light yellowish brown. Basal third of fringe light brown, distal two-thirds yellowish white.

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— *Noorda blitealis*, holotype female, labeled: "Ceylon, 57 48"; "♀ Pyralidae Brit. Mus. Slide No. 14305." [BMNH].

*Scopula subjectalis*, holotype female, labeled: "Holotype"; "Type"; "Deccan Dr Day"; "60.15 E.I.C."; "Scopula subjectalis Walk. Type"; "Pyralidae Brit. Mus. Slide No. 14306♀."

**DISTRIBUTION.**— Recorded from Aden, Aldabra, Seychelles, Sri Lanka, and southern India. Aldabra material: Settlement (12-27 Jan.) 2 ♂, 15 ♀.

**HOST.**— Both Fletcher (1914) and Maxwell-Lefroy (1909) report the larva feeding on horseradish tree (*Moringa oleifera* Lam.; Moringaceae), and give brief descriptions of the life history. Fosberg and Renvoise (1980: 97) record this small tree from Settlement, Middle Island, South Island, and Esprit, also noting that it is native to India, but planted widely throughout the tropics for its food value.

**REMARKS.**— The holotypes for *N. blitealis* and *N. subjectalis* match well and there is no reason to doubt they are conspecific. Both holotypes in the British Museum collection are females. In describing *N. subjectalis* Walker indicated he had only a male, though his description could equally well apply to a female and it seems most likely that he erred in determining the sex.

#### Subfamily GLAPHYRIINAE Forbes, 1923

Of the approximately 35 genera in this largely New World group only *Hellula* extends into the Eastern Hemisphere (Munroe, 1972: 195).

##### HELLULA Guenée

*Hellula* Guenée, 1854: 415; Munroe, 1972: 197-198. Type-species *Phalaena*



*undalis* Fabricius, 1781: 272. By original designation. Type-locality: Italy.  
*Oebia* authors, suppressed  
*Oebia* authors, suppressed  
*Phyratocosma* Meyrick, 1936a: 323. Type-species *Phyratocosma trypheropa* Meyrick, 1936a: 323. By monotypy.  
*Ashwania* Panji & Rose, 1977: 13. Type-species *Ashwania reniculus* Panji & Rose, 1977: 14. By original designation.

**DESCRIPTION.**— Frons round to somewhat flattened. Labial palpus obliquely ascending; all segments broadly scaled, clearly demarcated, diminishing from base to apex. Maxillary palpus short, upturned, subcylindrical, somewhat compressed. Proboscis well developed. Antenna shaft filiform and finely setose. Ocellus well developed, basal portion encircled and partly hidden by scales.

*Forewing* with  $R_1$  from distal 4/5 of cell;  $R_2$  arising separately from just before upper outer angle of cell. 3A not forming visible loop with 1A+2A.

*Genitalia.*— See discussion below.

**REMARKS.**— *Hellula* divides into 2 distinct groups on the basis of genital characters (see Munroe in Dominick *et al.*, 1972: 197-198). The group, including the Old World *H. undalis* (Fabricius), *H. hydralis* Guenée, and the New World *H. rogatalis* (Hulst) is characterized by having male genitalia with a subquadrate uncus, entire rounded valve, and an aedeagus with 3 large cornuti on the vesica. The female genitalia have the ductus bursae short and the corpus bursae partly sclerotized and unspined. In the second group, which contains only Neotropical species, the male genitalia have the uncus narrowly compressed, the valve with a distal triangular membranous zone, and the aedeagus with only small cornuti on the vesica. Female genitalia have the ductus bursae long with a ribbon-like sclerotization, and the posterior half of the corpus bursae armed with spines and sclerotized ridges.

#### *Hellula undalis* (Fabricius)

The cabbage webworm (Old World)

(Fig. 5, 51, 115-116, 254)

*Phalaena undalis* Fabricius, 1781: 272.  
*Pyralis (Nymphula) lunulalis* Costa, 1836: 204; Zeller, 1847: 582.  
*Scopariaalconalis* Walker, 1859: 827.  
*Leucinodes exemptalis* Walker, 1865: 1313.  
*Hellula undalis* (Fabricius); Moore, 1886: 355-356; Hampson, 1896: 373; 1898: 760, fig 87; Pagenstecher, 1907: 136; Maxwell-Lefroy, 1909: 519; Fletcher, 1910: 309; Fryer, 1912: 27; Fletcher, 1914: 437-438, fig 314; Vinson, 1938: 47; Capps, 1953: 46; Paulian and Viette, 1955: 182; Viette, 1957b: 181; 1958a: 10; Zimmerman, 1958: 35-38, figs. 20-21; Nazmi, 1963 [1964]: 213, fig 5; Legrand, 1965: 108; Pinhey, 1975: 73; Holloway, 1982: 358; Vári and Kroon, 1986: 90, 169.  
*Oebia undalis* (Fabricius); Shibuya 1928: 246-247; Klima, 1939b: 309-311; Ghesquiere, 1942: 169-170; Paulian, 1949: 350-351, fig 3.  
*Pionea geyri* Rothschild, 1915: 401.  
*Evergestis occidentalis* Joannis, 1930: 148.  
*Ashwania reniculus* Panji & Rose, 1977: 14.

**DESCRIPTION.**— Frons somewhat flattened, pale yellow; lateral margins with white lines that hook inward anteriorly, posteriorly extending between eye and antenna base, hooking inward posterior to antenna. Labial palpus with basal segment long, broadly scaled to give somewhat elliptical form, white at base and at apex, grayish yellow elsewhere; second segment triangular, about 3/4 as long as basal, maculation similar; third segment about 2/5 as long as basal, apically broadened, grayish yellow on outer side, white on inner side. Maxillary palpus very slender.

*Forewing* radius about 9 mm; ground pale orange yellow, maculation complex. Basal line white, angled sharply inward at base of cell and on 2A. Antemedial line white, sharply angled inward on radius, sharply angled outward just above cubitus and on CuP fold. Prominent white-bordered brown spot over closing vein of cell, centrally constricted, about 2.3 times as long as maximum width, angled outward toward lower angle of cell. Irregular white region extending distally and anteriorly from brown spot. Postmedial line white, uniform width, except broadened and triangular at

costa, angled inward sharply on  $R_5$ , then forming large curve and angled inward again on CuA<sub>2</sub>, here extending straight to inner wing margin. Ground somewhat lighter in center of region between postmedial line and outer wing margin. Terminal line white; brown spots between veins on outer wing margin. Fringe pale orange yellow on basal half; distal half basally white, distally orange yellow.

*Hindwing* nearly uniform light brown; terminal line incomplete, represented by brown markings on folds between  $R_s$  and  $M_1$ , between  $M_1$  and  $M_2$ , at CuA<sub>2</sub>, between CuP and 1A+2A, between 1A+2A and 3A.

*Male genitalia* with uncus subquadrate. Valve with ventral margin well rounded, costal margin distinctly concave and terminating in slender apical spine. Aedeagus with vesica bearing 3 large subequal cornuti, these about 0.45, 0.35, and 0.30 times as long as the aedeagus.

*Female genitalia* with ovipositor lobes narrow, each with numerous short setae on posterior half, scattered short setae on anterior half, and several long setae mostly near posterior margin; posterior margin with narrow sclerotized bar. Apophyses posteriores slender, somewhat expanded on basal third, sharply decurved at base. Apophyses anteriores strongest at basal third, there with well developed dorsal triangular process, tapering toward basal and distal ends. Eighth segment with numerous moderate setae over most of its surface, setae strongest and most numerous along posterior margin. Ostium simple. Ductus bursae short, with a few poorly developed transverse ridges, otherwise simple. Corpus bursae small, membranous, with single massive subcylindrical cornutus, posteriorly flared, anterior third tapering gradually to bluntly rounded apex; membrane posterior to signum minutely hispid; accessory sac from distal fourth of corpus bursae. Ductus seminalis from inflated membranous region near base of corpus bursae.

**TYPE MATERIAL EXAMINED.**— *Scopariaalconalis*, type female, labeled: Ceylon; "♀ Pyralidae Brit. Mus. Slide No. 14335"; TL: Sri Lanka.

*Leucinodes exemptalis*, lectotype male, hereby designated, labeled: "China"; "♂ Pyralidae Brit. Mus. Slide No. 14334"; TL: China.

*Pionea geyri*, type male, labeled: "Temassinin, Jan 23, 1914 (G. von Schweppenb.)"; "♂ Pyralidae Brit. Mus. Slide No. 14336"; TL: Algeria, Hoggar Mtns.

*Phalaena undalis*, not found. TL: Italy (Capps, 1953).

**DISTRIBUTION.**— Widely distributed throughout the tropical and subtropical regions of the Old World and the Pacific (Fiji, Hawaii, Norfolk Island). Records include Mauritius, Reunion, Comoros, Madagascar, and the Seychelles. Capps (1953) points out that New World records are misidentifications of *H. rogatalis* (Hulst) and doubts that *H. undalis* occurs in the Western Hemisphere. The Aldabra series consists of one male and two females from Settlement, 17-19 January.

**HOSTS.**— Recorded from a variety of crucifers [Brassicaceae], including cabbage, cauliflower, turnips, horseradish, kohlrabi, and broccoli; often becoming a serious pest.

**REMARKS.**— The only cruciferous plant species listed by Fosberg and Renvoise (1980: 39-40) for Aldabra is *Brassica niger* (L.), black mustard, a plant widely cultivated for table mustard and at one time on . . . all the islands in the Aldabra group but not recorded in recent years." At the time of its collection there were small garden plots at Settlement and the moth may have been established there on some cultivated crucifer. If so, its existence on Aldabra may have been very transitory.

#### Subfamily EVERGESTINAE Marion, 1952

**DIAGNOSIS.**— Similar to Pyraustinae, but with first segment of the porrect or obliquely ascending labial palpus longer than second. Male genitalia with well-developed, dorsally toothed pseudognathos; valve unarmed, or with a short digitate process near base; aedeagus bent at middle, vas deferens entering at bend. Female genitalia not with rhomboidal single signum, generally with a pair of round or oval, depressed, denticulate signa on opposite sides of corpus bursae. See also Munroe and Solis, 1999:249.

**DESCRIPTION.**— Moths of small to moderate size, with broad forewings, triangular or with costa strongly arched; hindwings broad. Frons rounded, flat and oblique, or variously prominent. Labial palpus porrect or obliquely upturned; scaling of segments well delimited; basal segment longer than second. Maxillary palpus prominent, distal scaling often dilated. Proboscis



well developed, scaled at base. Eye fully developed or reduced. Ocellus present. Chaetosema absent. Legs of moderate proportions; foretibial epiphysis present; tibial spurs 0-2-4. Praeincinctorium simple or weakly bilobed.

*Forewing* subtriangular; costa straight to near apex or more or less strongly arched. Sc free.  $R_1$  and  $R_2$  from discal cell.  $R_3$  and  $R_4$  stalked.  $R_5$  from anterior angle of cell, its basal part not approximated to  $R_{3+4}$ .  $M_1$  from just behind anterior angle. Discocellular oblique distad, almost straight or concave distad. Posterior angle of cell acute.  $M_2$ ,  $M_3$  and  $CuA_1$  from near posterior angle of cell, sometimes basally curved and approximated.  $CuA_2$  from basad of posterior angle. CuP absent.  $1A+2A$  fully developed.  $3A$  short and free. Frenulum hook present in male.

*Hindwing* broadly rounded or termen subangulate at  $M_3$ . Sc+ $R_1$  anastomosed with Rs for some distance beyond cell.  $M_1$  usually short-stalked with Rs. Discocellular usually with posterior part strongly oblique.  $M_2$ ,  $M_3$  and  $CuA_1$  arising close together near posterior angle of cell, often curved and approximated basally; sometimes  $M_2$  and  $M_3$  stalked, as in the Aldabra species.  $CuA_2$  from basad of posterior angle of cell. Base of Cu not pectinated. CuP well developed.  $1A+2A$  and  $3A$  present. Frenulum single in male, trisetose in female.

*Male genitalia* with uncus long, narrowly triangular, digitate, or deflected at tip. Pseudognathos with lateral arms articulated with base of uncus; median element long, slender, dorsally denticulate. Subscaphium present or absent. Transtilla strong laterally, complete or incomplete medially. Vinculum short, simple, deeply U-shaped or V-shaped, with at most weakly developed coremata. Valve simple in outline, with roughly parallel dorsal and ventral margins and obliquely convex or subtruncate terminal margin; costa and sacculus usually weakly inflated, unarmed; clasper usually absent, occasionally represented by a small digitate process, or, exceptionally, in the Neotropical genus *Trischistognatha* Warren, by a basally directed sickle-shaped process (Munroe, 1951, 1973). Aedoeagus cylindrical, bent, and often somewhat swollen in middle; vas deferens entering at flexure; vesica armed with fine spicules or more or less prominent cornuti, the latter often deciduous (Luquet, 1979).

*Female genitalia* with papilla analis high, narrow, densely setose, those of the two sides fused dorsally. Apophyses posteriores T-shaped, shaft slender, as long as or a little longer than vertical bar. Eighth tergite short. Apophyses anteriores somewhat longer than apophyses posteriores, and with a distinct triangular subbasal flange. Ostium unarmed. Ductus bursae slender, with a sclerotized collar in proximal region, followed by the entrance of the ductus seminalis. Corpus bursae small, globular, armed with a pair of large, round, depressed, spinulose signa.

**EARLY STAGES.**— Eggs flat, oval, laid on host leaves, often in overlapping masses. Larva often gregarious, feeding exposed or in webs on leaves, or boring into flower and leaf heads. Pupa in a silken cocoon, on or in the ground. Hosts mainly Brassicaceae, but known also from Portulacaceae and Euphorbiaceae.

**REMARKS.**— A subfamily of only a few genera and perhaps 100 species, widely distributed in temperate and tropical regions. The Aldabra genus and species are widely distributed in Africa and Asia, and range into the Pacific islands as far as Samoa. The species is a pest of crucifers and has probably been dispersed at least in part by man.

### CROCIDOLOMIA Zeller

*Crocidolomia* Zeller, 1852: 65. Type-species *Crocidolomia binotalis* Zeller, 1852: 66. By monotypy. Type-locality: South Africa.

*Godara* Walker, 1859: 546 (key), 808. Type-species *Pionea comalis* Guenée, 1854: 368. By subsequent designation by Klima, 1939b: 305.

*Pseudopisara* Shiraki, 1913:429-430. Type-species *Pseudopisara quadripunctata* Shiraki, 1913: 430. By original designation.

*Tchahbaharia* Amsel, 1951: 549. Type-species *Tchahbaharia dentalis* Amsel, 1951: 549. By monotypy.

**DIAGNOSIS.**— Forewing with costa strongly arched at base, weakly so medially, and again more strongly arched toward apex. Male with fold and scale tuft at base of costa, scale tuft on underside at retinaculum, and scale tuft on posterior margin. Hindwing rounded; cell short, male with subbasal

scale tuft on costa, cubital venation distorted and bearing a ridge on underside, bordering a basal fovea.

**DESCRIPTION.**— Frons somewhat flattened and oblique, smoothly scaled. Vertex with tufts of erect scaling. Labial palpus obliquely upturned; first segment curved, as long as second plus third, with deep, compressed anteroventral scaling, semicircular in profile; second segment with more slender scaling, slightly curved anteriorly; third segment still more slender, acuminate, porrect. Maxillary palpus long and prominent, considerably exceeding dorsal plane of labial palpus and of frons, distal scaling not or somewhat dilated. Proboscis well developed, scaled at base. Eye large, globular. Ocellus small but distinct, adjacent to dorsal margin of eye. Antenna filiform in both sexes; dorsal surface smoothly scaled, ventral surface short-pilose, slightly expanded in male. Body of moderate proportions; foreleg of male with shaggy scaling on coxa, femur, tibia, and basitarsus; midtibia of male with tuft or thick fringe of long scales; hind tibia of male bent and with a short conical tuft of scales at distal end. Legs of female without these modifications. Praeincinctorium transversely flattened and expanded, distally rounded.

*Forewing* about twice as long as wide; costa strongly arched at base and apically, less strongly so medially; apex rounded, subrectangular; termen weakly convex, erect anteriorly, bent in cell  $M_3$ , oblique posteriorly; tornus obtuse; posterior margin convex. Costa subbasally in male with small fold and prominent scale tuft, in female normal. Discal cell about 3/5 length of wing. Sc thickened basally, tapering to costa at 3/5.  $R_1$  from cell at 3/4, ending on costa at 4/5.  $R_2$  from anterior angle of cell, basally closely approximated to  $R_{3+4}$ .  $R_{3+4}$  from anterior angle of cell;  $R_3$  separating from  $R_4$  to end on costa a little basad of apex;  $R_4$  ending at apex.  $R_5$  from anterior angle of cell, almost straight, not approximated to  $R_{3+4}$ .  $M_1$  from just behind anterior angle of cell, straight and slightly divergent from  $R_5$ . Discocellular oblique distad, very slightly concave distad. Posterior angle of cell very weakly acute.  $M_2$  and  $M_3$  arising close together from posterior angle of cell, basally weakly curved and approximated.  $CuA_1$  from a little basad of posterior angle, basally slightly curved and approximated to  $M_3$ .  $CuA_2$  from cell at 3/5 from base. CuP absent.  $1A+2A$  straight, ending just anterior to tornus.  $3A$  short, arising from thickened common base with  $1A+2A$ , then diverging and ending before reaching posterior margin.

*Hindwing* about 1.5 times as long as wide, a little shorter than posterior margin of forewing. Costa weakly convex; apex rounded; termen convex, in male weakly excavated at  $CuA_1$ ; anal angle rounded; anal margin weakly convex. Discal cell about half length of wing. Sc thickened at base. Sc+ $R_1$  anastomosed beyond cell with Rs for about 1/4 length of latter.  $M_1$  from anterior angle of cell, not stalked with Rs. Discocellular erect anteriorly, curving gradually to acute posterior angle of cell.  $M_2$  and  $M_3$  stalked from posterior angle of cell.  $CuA_1$  from posterior angle of cell, not basally approximated to  $M_{2+3}$ .  $CuA_2$  from cell at about 3/5 from base; in male thickened and decurved almost to CuP, then deflected away from the latter and arched to termen; on underside of thickened basal part of  $CuA_2$  a ridge or process, and basad of it a large fovea. CuP well developed distally, weak at base.  $1A+2A$  and  $3A$  present. Frenulum single in male, multiple in female; distad of frenulum in male a tuft or comb of anteriorly directed scales.

*Male genitalia* characteristic of subfamily, with the following special features; uncus distally deflected and slightly expanded, bearing a few bifid spine-like setae and a pair of hooked distal spines; uncus with medial part compressed, dorsally serrate; transtilla with broad lateral elements, narrowing to a slender median bridge; juxta flask-shaped; valve several times as long as wide, distal margin convex and oblique from ventral margin to a narrowly rounded apex; a row of prominent, erect, dorsally directed setae from costa; aedoeagus swollen at middle; vesica with a few prominent cornuti.

*Female genitalia* characteristic of the subfamily, with the following special features: eighth tergite narrowly triangular; proximal part of juxta with irregularly contorted sclerotization; signa small, diameter about 1/5 that of corpus bursae.

**EARLY STAGES.**— Larvae so far as known leaf feeders on Brassicaceae and Capparidaceae.

**REMARKS.**— The Aldabra species is widely distributed from Africa through Asia to the islands of the western Pacific. As it is associated with cabbage and other cultivated crucifers, it is likely that part



of its range is the result of dispersal by humans. There are a few additional closely related species in the Indo-Australian region.

*Crocidolomia pavonana* (Fabricius)  
(Fig. 6, 52, 112-114, 255-256)

*Pyralis pavonana* Fabricius, 1794: 275-276.

*Crocidolomia pavonana* (Fabricius), Shaffer, et al, 1996: 188.

*Crocidolomia binotalis* Zeller, 1852: 66-67; Hampson, 1896: 372; 1898: 759; Maxwell-Lefroy, 1909: 519; Fletcher, 1910: 309; Fryer, 1912: 27; Fletcher, 1914: 437, fig 313; Janse, 1924: 487; Shibuya, 1928: 245-246; Vinson, 1938: 46; Klima, 1939b: 306-307; Vesey-Fitzgerald, 1941: 157; Ghesquiere, 1942: 167-168; Paulian, 1949: 347-350, figs. 1, 2, 5; Munroe, 1951: 161-163, fig 3; Viette, 1951: 15; Paulian and Viette, 1955: 182, fig 40; Janjua and Haque, 1958:141; Legrand, 1965: 107-108, Pl. 8, fig 3; Pinhey, 1975: 73, Pl. 8; Holloway, 1982: 359; Rose, 1983: 64-65, figs. 64-66; Vári and Kroon, 1986: 16, 168.

*Pionea comalis* Guenée, 1854: 368.

*Pionea incomalis* Guenée, 1854: 369.

*Nola triangularis* Shiraki, 1910: 144, pl. 30, fig. 4.

*Pseudopisara quadripunctata* Shiraki, 1913: 430.

*Tchahbaharia dentalis* Amsel, 1951: 549, figs. 42, 78-80.

**DESCRIPTION.**— Head and body above light buff; frons, vertex, thorax, and base of abdomen variegated with fuscous. Foreleg in both sexes banded with fuscous.

**Forewing** radius about 9-11 mm; above light buff, irregularly dusted with fuscous scales, especially on basal 2/3. Male with a prominent tuft of fuscous or fuscous and buff scales extending obliquely distoposteriad from costa near base. Antemedial line narrow, indistinct, fuscous, irregularly dentate and arcuate from costa at 1/3 from base to posterior margin at 2/3. Middle of posterior margin with a tuft of spatulate fuscous and white scales. Orbicular spot hardly discernible, adjacent to antemedial line in cell. Reniform spot divided into brown- or fuscous-bordered white spots at anterior and posterior angles of cell, connected by a brown or fuscous discocellular line. A broad, diffuse, oblique, brown, fulvous and fuscous shade from costa at 2/3 from base to before middle of termen, sometimes extending as far back as tornus. Postmedial line weak, light buff bordered basally and distally by narrow, indistinct, scalloped, fuscous lines, sometimes obscured by the dark oblique shade. A rhomboidal fuscous spot on costa adjacent to basal margin of postmedial band. Termen with a row of fuscous dots between veins and light-buff dots on vein ends. Termen fuscous, darker distally.

**Hindwing** above pale buff, with variable infuscation apically and terminally. Termen with variably developed black dots at vein ends (not between them as on forewing).

Underside of wings glossy whitish buff. Forewing with faint trace of dark postmedial line; fuscous terminal dots between veins, as above; fringe light fuscous, darker terminally. Hindwing with dark terminal dots on veins, fringe white; in male the palisade of scales on basal part of costa basally light fulvous, distally whitish buff.

**Male genitalia** with uncus elongate, slender, distally with lateral margins decurved and bearing long setae on lateral and dorsal surfaces; apex triangular, ventrally directed, sides with three transverse rows of scales, apex with pair of strongly curved hooks. Medial portion of pseudognathos long and slender, strap-like, hooked apically, ventral margin strongly serrate. Dorsal margin of valves with broad, strong setae; clasper absent. Juxta ovate, drawn out posteriorly. Aedoeagus with vesica bearing three large tapering cornuti and dense patch of tiny spines.

**Female genitalia** with ovipositor somewhat compressed, lobes short, deep, setose. Apophyses posteriores straight, slender; apophyses anteriores straight, with well developed dorsal triangular plate on basal half, twice as long as apophyses posteriores. Ostium funnel shaped, lightly sclerotized dorsally except on midline, membranous elsewhere. Corpus bursae not strongly sclerotized, bearing pair of rounded spinose signae near anterior end.

**TYPE MATERIAL EXAMINED.**— *Crocidolomia comalis*, lectotype male, hereby designated, labeled: "Ex Musaeo Arch. Guenée"; "Cotype"; "Type von comalis Gn."; "Paravicini Coll. B. M. 1937-383"; "Pyralidae Brit. Mus. Slide No. 14291 ♂" [BMNH].

**DISTRIBUTION.**— Southern to equatorial Africa, Madagascar, Mauritius, Seychelles, India, Ceylon, Southeast Asia, Taiwan, Australia. Aldabra material: Settlement (12, 27 Jan.) 1 ♂, 1 ♀; Cinq Cases (9 Mar.) 1 ♂.

**HOSTS.**— Recorded from a variety of cruciferous plants [Brassicaceae], particularly mustard, cabbage, radish, but also from *Lepidium sativum* and *Gynandropsis* [Capparidaceae]. Of the latter two plants, only *Gynandropsis* is recorded from Aldabra, being represented by *G. gynandra* (L.) Briq., but even this is known from one collection and not recently seen there. (Fosberg and Renvoise, 1980: 44). The moth may have been established on cultivated crucifers in the gardens at Settlement.

**REMARKS.**— This is the first record from Aldabra.

### Subfamily PYRAUSTINAE

**DIAGNOSIS.**— Tympanic organs with spinula and venulae atrophied; male mesothoracic tibiae with longitudinal groove bearing androconial scales; male forewings with subcostal retinaculum; tympanal organs with narrow fornix tympani; male genitalia with valve bearing sellae, medially directed clasper, and edita with modified setae; female genitalia with antrum of corpus bursae often spinose (adapted from Solis and Maes, 2002).

**REMARKS.**— A recent phylogenetic analysis of the Crambidae (Solis and Maes, 2002) indicates that the Pyraustinae and Spilomelinae are in fact widely separated within the family, not closely related as they have been traditionally treated.

### KEY TO ALDABRA GENERA OF PYRAUSTINAE

1. Male forewing with anal fovea, male hindwing with costal fovea ..... 2
- Forewing lacking anal fovea, hindwing lacking costal fovea ... 3
2. Forewing with distal margin not strongly oblique, about half as long as posterior margin; male genitalia with uncus bearing spatulate scales near base, its distal portion digitate, membranous, scaled (Fig. 121); female genitalia with ostial chamber bearing thorn-like lateral processes (Fig. 253); forewing orange yellow with variably developed reddish brown am & pm lines (Fig. 54-55) . . . . . *Lirabotys*
- Forewing with distal margin strongly oblique, about as long as posterior margin in male, about 2/3 as long in female (Fig. 9, 56); male genitalia (Fig. 122) with uncus bearing pair of large lobes; valve expanded distally, cluster of very long slender broadly hooked setae from near base of costa, clasper with distally directed furcate process; female genitalia without thorn-like lateral processes from ostial chamber, ductus bursae twisted in about 3 loose coils (Fig. 259); forewing with yellow ground and strong dark-pink pattern (Fig. 56) . . . . . *Stenochora*
3. Male genitalia with valve bearing posteriorly directed, recurved, long attenuate process extending far beyond costa . . . . . 5
- Male genitalia not as above; elongate, curved, nonattenuate flat setae (Fig. 122) may be present . . . . . 4
4. Male genitalia with uncus narrow, triangular; valve straight, somewhat narrow, parallel sided (Fig. 117); female genitalia with ductus seminalis from large sac-like membranous arch at posterior end of ductus bursae (Fig. 257); ductus bursae twisted into several coils; signum moderately keeled, its corners attenuated (Fig. 258); forewing yellowish brown and orange brown (Fig. 53) . . . *Achyra*
- Male genitalia (Fig. 125) with uncus with triangular base and clavate, densely scaled apex; valve widest at middle, ventral margin more strongly curved than dorsal margin; clasper (Fig. 126) paddle-shaped and bearing several large palmate basally directed scales; female genitalia (Fig. 261) lacking sac-like arch; with ductus bursae not twisted, signum (Fig. 262) rather deeply keeled; forewing yellow with somewhat diffuse narrow transverse bands (Fig. 57) . *Pagyda*
5. Male genitalia with valve complex, divided into 3 distinct lobes (Fig.



130); uncus with long slender hookshaped apical process; female genitalia with corpus bursae bearing large granular patch, but no rhomboid signum (Fig. 263); forewing uniformly yellow (Fig. 59) or with at most diffuse transverse lines (Fig. 58), discal spot absent

- ..... *Pioneabathra*  
 - Male genitalia with valve of one major lobe and curved clavate process extending posteriorly from costa base; uncus triangular, lacking special apical process (Fig. 133); female genitalia with corpus bursae bearing well developed rhomboidal signum (Fig. 265); forewing yellow with prominent discal spot and dark terminal band (Fig. 60) ..... *Isocentris*

### ACHYRA Guenée

*Achyra* Guenée, 1849: 404; Munroe, in Dominick *et al.*, 1976: 12, 45-48, 50, 54, 65, 66; Munroe, 1978: 499; Allison, 1981: 484; MA, 1987: 175 ff. Type-species: *Pyralis interpunctalis* Hübner, 1796: 11. Subsequent designation by Marion, 1957a: 83. *P. interpunctalis* is a junior subjective synonym of *P. nudalis* Hübner, 1796 (MA, 1987).

*Dosara* Walker, 1859: 828. Type-species: *Dosara coelatalis* Walker, 1859: 828-829. By original designation.

*Eurycreon* Lederer, 1863: 366, 376. Type-species *Pyralis nudalis* Hübner, 1796: (6): 11. Subsequent designation by Shibuya, 1928: 267.

*Tritaea* Meyrick, 1884: 341. Type-species *Scopula ustalis* Walker, 1865: 1477. By monotypy.

*Achiria* Sherborn, 1932: 2. Misspelling.

*Achyria* Sherborn, 1932: 3. Misspelling.

**DESCRIPTION.**— Frons conical. Labial palpus short, porrect. Maxillary palpus subcylindrical, moderate length, obliquely ascending and parallel to 2nd segment of labial. Proboscis well developed. Antenna shaft filiform in both sexes, cilia longer in male. Ocellus well developed, well separated from eye margin.

*Forewing* with  $R_1$  from cell about 3/4 distance to upper outer angle;  $R_2$  from very near to the angle;  $R_{3+4}$  from the angle, common stalk nearly equal in length to free portion of  $R_3$ ;  $R_5$  from just below the angle;  $M_2$  and  $M_3$  arising close together from lower outer angle,  $CuA_1$  well separated;  $CuA_2$  from about 2/3 distance from base; 1A+2A nearly straight; 3A poorly developed, from near base of 1A+2A, diverging.

*Hindwing* with  $Sc+R_1$  briefly separate from  $R_s$  at upper outer angle of cell, then anastomosed for about half distal free length of  $Sc+R_1$ ;  $M_1$  from the angle;  $M_2$  and  $M_3$  from point and lower outer angle; discocellular directed downward at base, then angled distally at about 90° and curving gently downward to lower outer angle;  $CuA_1$  from just below the angle;  $CuA_2$  from about 2/3 distance from base;  $CuP$  slightly curved; 1A+2A and 3A present, the former nearly straight.

*Male genitalia* with uncus narrow, triangular; laterally rather densely covered with long hair-like simple setae, these also extending over dorsal surface. Tegumen long, narrow. Transtilla present, medially divided or nearly so, with long ventral processes. Juxta a pair of well sclerotized longitudinal curved bars joined by weakly sclerotized medial region. Vinculum narrow, short; saccus small. Valve narrow, parallel sided; apical region rounded, bearing hair-like setae. Sella with ventrally-directed minutely spinose process. Editum bearing broad patch of dorsally directed long tapering flattened setae. Aedoeagus cylindrical; vesica with fine spine-like cornuti.

*Female genitalia* with ovipositor short. Ostial chamber sclerotized. Ductus bursae membranous but for variably sclerotized collar at posterior end; near posterior end a large sac-like arch from which arises ductus seminalis; remainder long, slender, coiled. Ductus bursae globular, membranous, bearing large rhomboid signum, and on opposite side a much smaller subquadrate one; small membranous accessory sac joined near anterior end.

**REMARKS.**— This is a world-wide genus of over a dozen species occurring widely in the tropics and extending into the warmer temperate regions. The related *Loxostege* Hübner is primarily holarctic with a few species in the Old World tropics. The two genera are separable based on the male genitalia, the uncus being apically narrowed - usually triangular or subtriangular - in *Achyra*,

broadly rounded and parallel sided in *Loxostege*.

### *Achyra coelatalis* (Walker)

(Fig. 7, 53, 117-118, 257-258)

*Dosara coelatalis* Walker, 1859: 828-829.

*Phlyctaenodes massalis* (in part), Hampson, 1896 (not Walker, 1859): 408; 1899: 211. Misidentification.

*Phlyctaenodes massalis* (in part), Pagenstecher, 1907 (not Walker, 1859): 137. Misidentification.

*Phlyctaenodes massalis* (in part), Fletcher, 1910 (not Walker, 1859): 311. Misidentification.

*Phlyctenodes* [sic] *massalis* (in part), Fryer, 1912 (not Walker, 1859): 28. Misidentification.

*Loxostege massalis* (in part), Ghesquiere, 1942 (not Walker, 1859): 181. Misidentification.

*Loxostege fredii* Amsel, 1961: 427, taf. VI, fig 239, text fig 109, **new syn.**

*Loxostege massalis* (in part), Legrand, 1965 (not Walker, 1859): 114; Vári and Kroon, 1986: 53, 169. Misidentification.

*Phlyctaenodes massalis* (in part), Pinhey, 1975 (not Walker, 1859): 74, Pl. 4. Misidentification.

*Achyra coelatalis* (Walker), Maes, 1987: 177.

**DESCRIPTION.**— Frons dark brown centrally, bordered ventrally and laterally by U-shaped band of light brown which extends posteriorly to join white marking at ocelli. Antenna shaft with cilia about 3/4 as long as segment width in male, somewhat less than 1/2 as long as segment width in female. Vertex dark brown anteriorly, posteriorly gradually lighter and more orange brown. Ocellus margined laterally and anteriorly with white.

*Forewing* radius 8 mm; colors showing considerable individual variation, ground varying from yellowish brown to orange brown. Yellow line on 1A fold near wing base and on cubitus, forming small spot at lower outer angle of cell. Irregular spot of brownish black on 1A fold posterior to cell, and smaller orbicular spot of same color in cell. Narrow irregular postmedial line of brownish black, bordered distally by yellow except in apical region. Conspicuous band between postmedial and terminal lines similar to ground color, but lighter. Terminal line brownish black, narrow, best developed at ends of veins. Fringe brownish gray. Frenulum hook well developed in male, absent in female; retinaculum well developed in both sexes.

*Male genitalia* with transtilla of 2 halves narrowly and weakly joined medially; each half consisting of dorsal triangular setose plate laterally joined to valve at costa base, and ventrally directed rather slender tapering incurved process. Valve not distally expanded, apex with rather dense mat of slender dorsally directed hairs. Sacculus inflated, well sclerotized on basal half, dorsal margin with strong concavity. Sella with about 10 long slender setae; ventral process hooked mediad, very finely setose. Aedoeagus tip with about two dozen fine scales, vesica armed with cluster of about two dozen slender rather short subequal spines.

*Female genitalia* with ductus bursae collar lightly sclerotized, unarmed. Corpus bursae with larger signum about 1/2 as long as corpus bursae; smaller signum just under 1/3 as long as larger, its inner surface very finely serrate. **TYPE MATERIAL EXAMINED.**— *Phlyctaenodes massalis*, holotype female, labeled: "Moreton Bay"; "57 1"; "Pyralidae Brit. Mus. Slide No. 14307." [BMNH].

*Dosara coelatalis*, holotype female, labeled: "Ceylon"; "57 48"; "Pyralidae Brit. Mus. Slide No. 14308." [BMNH].

**DISTRIBUTION.**— Tropical Africa, India, Ceylon. Aldabra material: Settlement (9-25 Jan.) 28 ♂, 86 ♀; (29-31 Jan.) 6 ♂, 18 ♀; Takamaka (31 Jan.- 18 Feb.) 19 ♂, 10 ♀; Cinq Cases (24 Feb.- 9 Mar.) 14 ♂, 32 ♀; Dune Jean Louis (14 Mar.) 1 ♂; Middle Island (18-25 Mar.) 24 ♂, 71 ♀.

**HOSTS.**— Unknown.

**REMARKS.**— Legrand records the species (misidentified as *massalis* Walker) also from Cosmoledo and Desroches. *Achyra massalis* is apparently restricted to the Australian faunal region.

The female genitalia of *A. massalis* differ from those of this species in having the collar at the posterior end of the ductus bursae more heavily sclerotized, an anteriorly directed digitate evagination about six times as long as wide origination from the anterior margin of that collar (this structure completely absent in *A. coelatalis*), the



larger signum somewhat smaller and with its arms more rounded.

A male specimen from Cape York, Queensland, JCS genitalia slide no. 2354, [QM] differs in details of the valve, notably the larger clasper and absence of the patch of densely set scale-like setae in the distal region of the sacculus, and the long compound spine-like cornutus as opposed to the nodular one in *A. coelatalis*.

We have examined specimens of *A. coelatalis* from Ghana, South Africa, Zimbabwe, Aldabra, India, and Sri Lanka and find no significant morphological differences among them. *Achyra coelatalis* and *A. massalis* were erroneously synonymized by Hampson (1896), their separate status later reestablished by Maes (1987).

#### *LIRABOTYS* Shaffer & Munroe, new genus

Type-species *Bradina liralis* Legrand, 1965:95, by present designation. Type-locality: Seychelles: Aldabra Atoll.

**DIAGNOSIS.**— In the male the membranous, long-scaled uncus, curiously shaped tegumen, shield-shaped juxta, and distally directed subcostal process of the valve are all unique apomorphies. In the female the thorn-like lateral diverticula of the ostial chamber are not duplicated in other genera that we have seen. The anal fovea of the forewing and the costal fovea of the hindwing are also unusual features.

**DESCRIPTION.**— Frons flat and strongly oblique; smoothly scaled, sides convergent; anterior margin truncate. Vertex about half length of frons, with radiating tufts of long slender scales. Labial palpus porrect exceeding frons by about length of head; first segment short, with compressed ventral scaling extending anteriorly beneath base of second; second segment with deeper, finer, compressed scaling, straight, very weakly ascending, about twice as long as first, with very weak anteroventral tuft; third segment porrect, about 2/3 length of second, scaling fusiform not deepened or compressed. Maxillary palpus prominent, weakly dilated with scales distally, somewhat exceeding plane of frons. Proboscis well developed, its base strongly scaled. Eye large, globular, each eye of male about as wide as frons. Ocellus small but distinct, separated from eye by about its own diameter, looking dorsolaterad. Antenna longer than forewing, slender; base unmodified; shaft distally annulate, basal part slightly thickened in male; ventral surface finely pilose, dorsal surface scaled. Body slender. Tegula in both sexes sparsely tufted with slender scales. Abdomen somewhat roughly scaled, posterior parts of segments laterally prominent. Legs moderately slender; outer spurs of male about half length of inner; mid-tibia without obvious hair-pencil or groove. Praecinctorium weakly bilobed.

*Forewing* about twice as long as perpendicular from tornus to costa; perpendicular meeting costa at about 2/3 from base, costa straight to beyond 3/4, then arched to subacute apex; termen convex oblique basad; tornal angle obtusely rounded; posterior margin convex near base, oblique on distal 2/3. Frenulum hook present on underside in male. Discal cell nearly 1/3 width and about 3/5 length of wing. Sc ending about 3/4 from base.  $R_1$  arising about 3/4 from base of discal cell.  $R_2$  from a little basad of anterior angle of cell.  $R_{3+4}$  from anterior angle, stalked about halfway to apex;  $R_4$  ending just anterior to apex.  $R_5$  from anterior angle, its base not approximated to  $R_{3+4}$ . Discocellular erect to posterior of  $M_1$ , then bent about 45° and oblique distad to posterior angle.  $M_1$  from well behind anterior angle, almost at mid-axis of cell.  $M_2$  and  $M_3$  from posterior angle of cell, bases separated by a short distance, basal parts weakly bent and approximated.  $CuA_1$  arising about 3 times as far from  $M_3$  as  $M_3$  from  $M_2$ .  $CuA_2$  from cell at 5/6 from base. CuP absent. 1A+2A thickened subbasally and bowed anteriorly in distal part of anal loop. 1A+2A joining 3A to form a loop about 1/3 length of posterior margin, and emitting a short spur posteriorly at about middle. In male membrane of wing domed dorsad to form a transparent fovea within anal loop. Male with frenulum hook; retinaculum not developed, apparently displaced by fovea.

*Hindwing* more than twice as long as wide; costa arched in basal part, oblique distally; apex rounded; termen convex from apex to CuP; anal area wide, a long section of termen between CuP and 2nd A parallel to Sc+ $R_1$ ; anal angle roundly obtuse; anal margin straight. Frenulum single in male, multiple in female. Costal area wide in both sexes, in male with a depressed fovea matching that of forewing in size and distance from base. Sc+ $R_1$ ,

nearly straight, anastomosing with Rs for most of distance beyond cell, separating very near apex. Rs and  $M_1$  stalked for a short distance beyond discal cell, separating very near apex. Rs and  $M_1$  stalked for a short distance beyond discal cell. Discal cell about half length of wing. Discocellular oblique basad to medium axis, then right-angled and more strongly oblique distad to posterior angle.  $M_2$  and  $M_3$  connate from posterior angle, basal part of  $M_3$  curved and approximated to that of  $M_2$ .  $CuA_1$  from just basad of end of cell, straight and not approximated to  $M_3$ .  $CuA_2$  from cell at about 5/7 from base. CuP complete, slender. 1A+2A thicker. 3A very slender.

*Male genitalia* with uncus membranous, with slender triangular median part and a pair of decurved lateral lobes, all with long feathery scaling. Tegumen with high posterior arch adjoining ventrally narrowing lateral sclerites; on each side of arch near junction with vinculum an oval lobe bearing a long tuft of posteriorly directed scales. Transtilla incomplete, consisting of a pair of thumb-like obliquely convergent elements. Juxta of reversed shield shape. Vinculum U-shaped, ventral part thickened, rounded, with median carina. Valve about twice as long as height of tegumen, about 1/3 as high as long; spread valves at about 30° to horizontal, straight; costa and ventral margin nearly straight and parallel; apex narrowly rounded; terminal margin erect, convex; distoventral angle broadly rounded. Costa narrow inflated, medial part supported by a tubular subcostal sclerotization. From base of this a weakly curved, finger-like, distally directed, sclerotized process. Underlying this a flattened clasper, arising dorsad of middle of sacculus and curving basad; its tip finely setose. Basad of this a fan-like process, probably bearing long scent-scales. Sacculus wide in basal third, narrowing in medial third, distally with an acute recurved process. Aedoeagus divided at tip; longer division with a short digitate distal process; vesica armed with a spine-like cornutus about half length of aedoeagus and with a slightly shorter obliquely truncate sclerite.

*Female genitalia* with ovipositor with erect, high, narrow, well-defined lobes, posteriorly with numerous fine setae, longest peripherally, the longest ones less than half height of valve. Apophyses posteriores with strong vertical bar, tapering dorsally and ventrally; shaft narrower than and about as long as vertical bar, bent and slightly widened basad of middle. Eighth tergite broad and short, triangular with narrowly rounded lateral angles, bearing 3 irregular rows of dorsal setae, the longest, most regular and most numerous on posterior margin. Apophyses anteriores about twice as long as and somewhat thicker than apophyses posteriores, with weak expansion and flexure at 1/3 from base. Ostium narrow, about 1/3 width of 7th sclerite; ostial chamber and basal part of ductus bursae sclerotized, the former expanding on each side into a blunt-tipped thorn-like process, that of the left side slightly longer than that of the right; sclerotized zone of ductus bursae evenly cylindrical, about twice as long as ostial chamber and 1/3 to 1/2 width of ostium; distal part of ductus bursae about twice as long as basal, weakly coiled, membranous, distal 2/3 densely and finely spinulose. Ductus seminalis not clearly seen, but probably entering on right side just anterior to sclerotized zone. Corpus bursae broadly ovoidal, about as long as ductus bursae, membranous, finely and evenly spinulose; signum well-defined, rhomboidal, strongly sclerotized, spinulose, transversely carinate, anterior part longer than posterior. No accessory sac visible.

**REMARKS.**— The type-species is so far as known endemic in Aldabra, but is closely related to *Botys prolausalis* Walker, 1859, and *Pyrausta rufitincta* Hampson, 1913, both described from South Africa: we transfer these two nominal species to *Lirabotys* as **new combinations**. Similar moths range as far north as Sierra Leone and Uganda on the mainland, with some variation of facies and structure. We do not attempt to deal here with the classification of the mainland representatives of the genus.

The female genitalia show the characteristic rhomboidal signum of the Pyraustinae, but neither male nor female genitalia come close to those of any described genus.

The wing pattern is not unusual for Pyraustinae, being approached in the widespread *Anania* Hübner, East Asian *Tenerobotys* Munroe and Mutuura, and the holarctic *Mutuuraia* Munroe, among other genera. Of these, the new genus resembles *Tenerobotys* in the shape of the signum of the female genitalia, but lacks the apomorphies noted above. The other two genera differ in additional characters of both male and female genitalia. The type-species is not closely



related to *Bradina* Lederer, with which it does not agree even in external characters, having  $R_2$  of the forewing free, not stalked with  $R_{3+4}$ . Consequently it would fall in Pyraustinae in Hampson's classification, not in Nymphulinae, where he placed *Bradina*. *Bradina* is now in the Spilomelinae.

*Lirabotys liralis* (Legrand), new comb.

(Fig. 8, 54-55, 119-121, 253)

*Bradina liralis* Legrand, 1965: 95, Pl. 6, no. 14.

**DESCRIPTION.**—Forewing radius 8.0 mm; ground brilliant orange yellow; marked with grayish reddish brown as follows: on basal 1/3 to basal 1/2 of costa, and with scattered scales of this color extending onto ground between costa and subcosta; antemedial line; short line on closing vein of cell; postmedial line, extends posterior to  $CuA_1$  then turning sharply basally and extending to  $CuA_2$ , at  $CuA_2$  turning sharply posteriorly and extending to inner wing margin; terminal line of seven dots on ends of veins; on fringe at apex and basal half of fringe elsewhere. Distal half of fringe white.

Hindwing white broadly along costal margin, ground yellowish white to pale yellow elsewhere; minute reddish brown spots on outer margin at ends of  $R_s$ ,  $M_1$ ,  $M_2$ ,  $M_3$ ,  $CuA_1$ , and  $CuA_2$ . Fringe white.

**TYPE MATERIAL EXAMINED.**—*Bradina liralis*, paratype male, labeled: "paratype" [red label]; "Aldabra 1.III-1956 H. Legrand"; illegible number; "Museum Paris Coll. H. Legrand"; "♂ genitalia on slide 1946 J.C. Shaffer" [MNHN].

Paratype female, labeled: "paratype" [red label]; "Aldabra 17.XII 1959 H. Legrand"; "164"; "Museum Paris Coll. H. Legrand"; "♀ genitalia on slide 1947 J.C. Shaffer" [MNHN].

**DISTRIBUTION.**—Endemic to Aldabra. Aldabra material: Settlement (9-19 Jan.) 3 ♂, 1 ♀; Takamaka (7, 18 Feb.) 2 ♂; Cinq Cases (9 Mar.) 1 ♂. In addition David Adamski collected 6 males and 3 females at Settlement, 12-22 Mar. 1986.

**HOSTS.**—Unknown.

**REMARKS.**—The moths are smaller than their congeners from the mainland and average lighter in color, with the hindwing whiter and more strongly contrasting than the forewing, and with the markings of the latter weaker. *L. liralis* is more strongly sexually dimorphic than the mainland series that we have examined, the termen of the forewing in the female being more erect, the ground more yellow, and the transverse lines weaker than in the male.

*STENOCHORA* Warren

*Stenochora* Warren, 1892: 298. Type-species *Rhodaria lancinalis* Guenée, 1854: 169. By original designation. Hampson (1899: 187) wrongly synonymized *Stenochora* and *Rectothyris* Warren under *Ischnurges*. *Ischnurges* and *Rectothyris* belong in the Spilomelinae. Type-locality: Mascarene Islands, probably Mauritius.

**DESCRIPTION.**—Frons flat and oblique, smoothly scaled, not prominent; anterior margin straight. Vertex shorter than wide; scaling rough and erect, extending anteriorly between bases of antennae. Labial palpus porrect, exceeding frons by less than length of head; 1st segment short, curved; 2nd twice as long, obliquely ascending, scaling compressed; 3rd porrect and acuminate, lying along dorsal side of scaling of 2nd. Maxillary palpus prominent, reaching plane of frons; distal scaling weakly expanded. Proboscis large, its basal scaling strong. Eye large, globular, not exceeding plane of vertex. Ocellus well developed, looking antero-latero-dorsad. Antenna with basal segment unmodified; shaft with basal part filiform, distal part with a raised scale row on dorsal surface of each segment; ventral sensory area smooth and finely pilose, somewhat enlarged in male. Body slender. Abdomen of male exceeding anal angle of hindwing by about width of wing, that of female by less than wing width. Legs long and slender, outer spurs shorter than inner.

Forewing with costa straight to 2/3 from base, then arched to apex; the latter acute, more so in male than in female; termen convex, oblique basad, more so in male than in female; tornus obtuse; posterior margin convex,

more strongly so in male. Underside in male with frenulum hook and scaled retinaculum, in female with retinaculum only. Perpendicular from tornus to costa in male less than 1/3 wing length and meeting costa at middle, in female more than 1.3 wing length and meeting costa at 3/5 from base. Discal cell about 3/5 as long as wing, narrowly separated from costa. Sc free, meeting costa at 3/4.  $R_1$  from cell at 2/3 from base, running close to  $R_2$ .  $R_2$  from near anterior angle of cell, closely apposed to  $R_{3+4}$ .  $R_{3+4}$  from anterior angle of cell,  $R_3$  and  $R_4$  separating at about 2/3 distance from cell to apex.  $R_5$  arising just behind  $R_{3+4}$ , basally curved and approximated to  $R_{3+4}$  for a very short distance.  $M_1$  from somewhat behind  $R_5$ . Discocellular erect from  $R_5$  to  $M_1$ , weakly concave and weakly oblique distad from  $M_1$  to  $M_2$ ,  $M_2$ ,  $M_3$ , and  $CuA_1$  equidistant around posterior angle of cell, their basal parts weakly curved and approximated.  $CuA_2$  from cell at about middle. CuP represented by a fold. 1A+2A strong, sinuate over anal loop, then straight, ending at tornus. 3A strong, forming a closed loop with 1A+2A at about 1/3 from base.

Hindwing as long as posterior margin of forewing; costa convex; apex subacute, narrowly rounded; termen evenly convex; anal angle rounded; anal margin convex. Perpendicular from anal angle to costa about 2/3 length of wing, meeting costa at 1/4 from base. Frenulum single in male, multiple in female. Discal cell about 1/3 as long as wing.  $Sc+R_1$  anastomosing with  $R_s$  for about 2/5 postcellular distance.  $R_s$  and  $M_1$  short-stalked. Discocellular concave distad, posterior limb long and strongly oblique.  $M_2$  and  $M_3$  almost connate from posterior angle of cell, their basal parts curved and approximated.  $CuA_1$  from just basad of posterior angle, more weakly approximated to  $M_3$ .  $CuA_2$  from cell at middle. CuP nearly straight, weak basally. 1A+2A and 3A present and tubular, each angled somewhat at 2/3 from base.

**Tympanic apparatus.** Praeincinctorium transverse, moderately bilobed. Tergopleural sclerite strongly sclerotized. Posterior venulae convergent, continuing line of anterior. Tympanic case open, globular. Frame narrow, acutely angled anteriorly, rounded posteriorly, slightly broadened mediolaterally, but without definite tympanic process. Spinula absent. Tympanic pouch about 1/3 as long as wide, those of the two sides separated by V-shaped base of praecinctorium. Posterior ridge straight, weakly sclerotized, interrupted medially.

**Male genitalia** with uncus arrow-shaped, about as long as greatest width; a basal shaft occupying about half length, parallel-sided, about half as wide as long; distal half forming a broad head, with flattened, anteriorly oblique and tapering lateral lobes, each distally recurved through 180° and continued as a spatulate process extending posteromesad parallel to distal margin of its dorsal part; dorsal surface of head densely clothed with long, narrow, flexible, flattened, distally bifid scales forming a flossy covering, laterally extending anteriorly beyond base of uncus. Tegumen long and somewhat Y-shaped, about 2.5 times as long as greatest width across basal arms; distal part tapering, with concave margins, at narrowest part about half as wide as base of uncus; basal arms strongly sclerotized, deeply bifurcate. Juxta a somewhat angular ovoid plate. Valve expanded distally to just over twice its basal width; distal half rather densely pilose, demarcated from sparsely setose basal half by a straight obliquely transverse ridge; clasper a strong narrow shaft arising from bulbous base, bearing irregular denticles, apex bifurcate; from base of clasper a sharp ridge, parallel to dorsal margin of valve and bearing three or four very large wide setae, each curving into a semicircle. Aedoeagus somewhat curved; vesica with a poorly defined semicylindrical plate about one-third as long as aedoeagus and bearing about eight to 10 subequal blade-like cornuti.

**Female genitalia** with ovipositor narrow, slightly concave, finely pilose; the vertical element uniformly slender, strong, somewhat concave; apophyses posteriores somewhat less than half as long as apophyses anteriores, base bulbous, joined to vertical element by slender bar; apophyses posteriores angled and broadened near base. Ostial chamber short, rectangular, moderately well sclerotized, its inner surface densely set with numerous minute triangular teeth; ductus bursae at base squarish, smooth, well sclerotized, similar to ostial chamber, but somewhat constricted, and with ductus seminalis from its anterior margin, remainder of ductus bursae very long, slender, coiled. Corpus bursae nearly spherical with somewhat smaller pear-shaped accessory sac; a single large narrowly rhomboidal signum set with numerous small laterally directed teeth.



*Stenochora lancinalis aldabrensis* (Viette), new comb.

(Fig. 9, 56, 122-124, 259-260)

*Ischnurges lancinalis aldabrensis* Viette, 1958b: 143-144; 1958c: 62; Legrand, 1965: 109, Pl. 9, no. 5; Frith, 1975: 212.*Ischnurges expeditalis* Fryer (not Lederer, 1863): 1912: 27. Misidentification.

**DESCRIPTION.**— *Forewing* radius 11.0 mm; ground dark pink, marked with large and small irregular spots of brilliant yellow, the larger spots bordered by narrow lines of dark red, medial and postmedial spots often joined in costal region; fringe pale yellow adjacent to spot in lower outer angle of wing, brown elsewhere. Frenulum hook present in male. Retinaculum well developed in female, absent in male, apparently displaced by fovea.

*Hindwing* translucent with yellow on veins and in anal region; brown color of apex extending more narrowly along wing margin to second anal; light yellow reniform spot between  $M_2$  and  $CuA_2$  bordered by poorly developed band of dark pink, especially on veins.

*Abdomen* yellowish white ventrally; laterally a mixture of yellow and dark pink; dorsally first two segments yellow with mixture of dark pink and white, remaining segments dark pink with sharply defined white spot middorsally on posterior margin of each segment.

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— *Ischnurges lancinalis aldabrensis*, paratype male, labeled: "Oc. Indiano, Aldabra, XI 1953; Isch. lancinalis aldabrensis n. subsp. Paratype P. Viette"; "Paratype"; "Museum Paris, Collection P. Viette"; "♂ genitalia on slide 1772 J.C. Shaffer" [MNHN].

**DISTRIBUTION.**— *I. l. aldabrensis* is endemic to Aldabra. Aldabra material: Settlement (12-27 Jan.) 8 ♂, 15 ♀; (29, 31 Mar.) 3 ♂, 9 ♀; Takamaka (3-18 Feb.) 3 ♂; Middle Island (19 Mar.) 1 ♀.

Distributions of the other four subspecies are: *S. l. comorensis* Viette, 1958b: 143 - Comoro Islands (type-locality, Moheli); *S. l. expeditalis* (Lederer), 1863: 372, Pl. 9, Fig 15 - Southeast and East Africa (type-locality, Port Natal); *S. l. lancinalis* (Guenée), 1854: 169 - Mascarene Islands (type-locality, probably Mauritius, see Viette, 1958b: 144); *S. l. paulianalis* Marion, 1954: 58-59 - Madagascar (type-locality, Ankarata Mtns.): The Aldabra subspecies appears to be most closely related to *paulianalis*. The African form is likely a different species and is deserving of further study.

**HOSTS.**— Unknown.

**PAGYDA** Walker

*Pagyda* Walker, 1859: 487. Type-species *Pagyda salvalis* Walker, 1859: 487. By monotypy. Type-Locality: Sri Lanka.

**DESCRIPTION.**— Labial palpus with second segment ascending, first and second with long, slender, porrect scales forming rhombus or broad brush; third surmounting brush, narrowly conical, porrect. Maxillary palpus subtriangular, extending slightly above labial.

*Forewing* with  $R_1$  arising at about 5/6 distance from base of cell, near and parallel to  $R_2$ ;  $R_2$  from just before upper outer angle, approaching and running extremely close to  $R_{3+4}$ , then diverging from distal half of latter;  $R_{3+4}$  from very near the angle, stalked portion about three times as long as free portion of  $R_3$ ;  $R_3$  from the angle;  $M_1$  from just below the angle, cu;  $M_2$  and  $M_3$  usually arising close together from lower angle, parallel for a short distance, then diverging;  $CuA_1$  from below the angle;  $CuA_2$  from about 3/4 distance from base of cell.  $CuP$  absent.  $1A+2A$  slightly curved;  $3A$  nontubular but well marked, forming a wide loop which joins  $1A+2A$  at 2/5 from base of latter.

*Hindwing* with  $Sc+R_1$  stalked with  $R_s$  about 1/3 free length of former;  $M_2$  and  $M_3$  from point at lower outer angle of cell or anastomosed for a very short distance, then diverging and nearly parallel at wing margin;  $CuA_1$  from just below the angle;  $CuA_2$  from 3/4 distance from base of cell.  $CuP$  weak on its basal half;  $1A+2A$  and  $3A$  tubular.

*Male genitalia* with uncus usually triangular (parallel sided with broadly rounded apex in one species), tapering to pointed or narrowly rounded apex, clavate in Aldabra species; distal half densely scaled, scales varying from long, slender, often bifurcate near tip, to short, broad, and bifurcate to base or nearly so, palmate in Aldabra species. Gnathos absent. Broadly H-shaped

sclerotization at base of tuba analis, with or without digitate medial process. Juxta variable, usually round or elongate; with strong arms in one species. Valve more or less parallel sided, usually bearing clasper of formed of fan-like array of elongate dorsocaudally directed scales, each scale itself fan-like, with several closely parallel branches on its distal half; this array of scales sometimes borne on an elevated process. Base of each valve with a hair pencil of long slender scales, exceeding valve in length, usually deciduous or semideciduous, somewhat persistent in Aldabra species. Aedoeagus cylindrical, cornuti present.

*Female genitalia* with ovipositor somewhat compressed, lobes rather delicate, narrow in most species. Ductus bursae long and slender to extremely slender, posterior end with sclerotized band. Corpus bursae moderate to rather small, with large rounded or rhomboid signum in most species; moderate to large accessory sac present, nearly as large as corpus bursae in some species. Ductus seminalis from ductus bursae.

*Pagyda sounanalisis* Legrand

(Fig. 10, 57, 125-127, 261-262)

*Pagyda sounanalisis* Legrand, 1965: 110, Pl. 7, No. 5.

**DESCRIPTION.**— *Forewing* radius 9-11 mm; ground strong yellow; transverse bands diffuse, orange yellow. Antemedial and medial lines complete; postmedial joining subterminal between  $CuA_1$  and  $CuA_2$  forming a 'Y'. Small orange yellow orbicular spot in cell. Very narrow orange-yellow terminal line. Frenulum hook present in male, partially hidden by retinaculum. Retinaculum present in both sexes.

*Hindwing* colors similar; antemedial, medial, and subterminal lines continuing onto hindwing, the latter two joining between  $CuA_1$  and  $CuA_2$  forming a 'Y'.

*Male genitalia* with uncus triangular basally, distally clavate and covered with small palmate scales, each with about five to seven digitate extensions; neck of uncus with a few slender forked setae. Sclerotization at base of tuba analis broadly H-shaped, incomplete, lacking medial process. Juxta rounded, anterior margin thickened somewhat, posterior margin shallowly cleft on midline. Valve broadest just basal of middle; clasper consisting of small pointed basal lobe and much larger postero-basally directed lobe, the latter spatulate and bearing about 10 to 13 slender palmate scales, each with about seven minute digitate extensions. Hair pencils somewhat persistent. Aedoeagus slender, cylindrical, about 5.2 times as long as maximum (basal) width, distally ornamented with numerous tiny cusps, each separated from its neighbors by at least its own basal width; vesica armed with long slender cornutus 4/5 as long as aedoeagus; a similar smaller cornutus lying parallel to first near its base and about 1/4 as long as aedoeagus.

*Female genitalia* with ovipositor somewhat compressed. Apophyses anteriores somewhat sinuate, about 1.5 times as long as apophyses posteriores, bearing short middorsal spur; posterior subquadrate basally, slender. Ductus bursae slender, tubular, about twice as long as corpus bursae, membranous anterior to sclerotized band, then forming flat well sclerotized tube, then membranous for about half its length, gradually becoming well sclerotized and curved near junction with corpus bursae; anterior half noticeably granular due to numerous minute slender spines on inner surface. Corpus bursae rounded, somewhat longer than wide, bearing single rhomboidal signum about half as long as corpus bursae. Signum about 7/10 as wide as long, with serrate ridge on long axis, and about 15 rows of fine teeth parallel to ridge. Teeth and ridge poorly developed along axis perpendicular to ridge; corpus bursae surface appearing granular due to numerous minute teeth. Accessory sac from near junction with ductus bursae. Ductus seminalis from middle of ductus bursae, bearing dense armament of minute needle-like spines.

**TYPE MATERIAL EXAMINED.**— Paratype female, labeled: "Paratype"; "176"; "Aldabra 28. XII 1959 M. Gerber"; "Museum Paris Coll. H. Legrand"; "♀ genitalia on slide 1651 J.C. Shaffer" [MNHN].

Paratype female, labeled: "Paratype"; "176"; "Aldabra 27. XI. 1959 M. Gerber"; "Museum Paris Coll. H. Legrand." [MNHN].

**DISTRIBUTION.**— Known only from Aldabra and nearby Cosmoledo (Paratype), Ile Menai. Aldabra material: Settlement (9-27 Jan.) 2 ♂, 4 ♀ (31 Mar.) 1 ♂; Takamaka (31 Jan.- 18 Feb.) 5 ♂, 6 ♀; Cinq Cases (24 Feb.- 9 Mar.) 8 ♂, 8 ♀; Middle Island (18, 21 Mar.) 1 ♂, 1 ♀. David Adamski



collected one female at Settlement, 12-22 Mar. 1986.

**HOSTS.**— Unknown.

**REMARKS.**— Legrand stated that the species is close to *P. holoxanthalis* Mabilie, 1881, a Malagasian species. A comparison of Aldabra specimens with Malagasian material determined as *P. holoxanthalis* reveals only minor differences, and the two populations are probably only subspecifically different. Unfortunately we have not been able to locate and examine the Mabilie type, which Viette and Fletcher (1968) list as 'not found.' So long as there is any doubt as to the application of Mabilie's name it is best to retain *P. sounanalis* for the Aldabra population, noting that it is probably only subspecifically different from the Malagasian population.

***PIONEABATHRA* Shaffer & Munroe, new genus**

Type-species *Ebulea olesialis* Walker, 1859: 748. By present designation. Type-locality: Congo.

**DIAGNOSIS.**— The three prominent valve processes, two spatulate and the medial one rod-like, of the male genitalia are unique to this genus as is the patch of deciduous scales on the sixth abdominal male tergum.

**DESCRIPTION.**— Frons oblique. Labial palpus with basal segment upturned, about 2/3 as long as second, somewhat inflated, ventrally rather strongly and evenly convex, dorsally strongly concave near base, very slightly so thereafter; second segment obliquely ascending, cylindrical, basally truncate, apex rounded; third segment porrect, 4/5 as long as second, cylindrical, apically pointed. Maxillary palpus 3-segmented, short, club-shaped. Antenna scapes separated by about their own width; shaft filiform in both sexes, male with ventral cilia nearly perpendicular to shaft axis and about as long as shaft width, female with ventral cilia oblique to shaft, tips hooked, extending above shaft surface by about 1/5 width of shaft, each segment ventrally with single oblique strong cilium about 3/5 as long as segment width; each segment on approximately basal 1/10 of shaft in both sexes with dorsal cilium nearly as long as shaft width. Ocellus separated from eye by about 1/5 its width, black peripheral portion covered by appressed white scales exposing only clear round center.

**Forewing** with costal margin very slightly concave centered above distal end of cell; apex rather sharply angled; outer margin nearly straight from apex to about  $M_2$ , convex from  $M_3$  to termen.  $R_1$  from distal 7/8 of cell, very slightly sinuous;  $R_2$  from very near outer angle, nearly straight;  $R_{3+4}$  contiguous with  $R_2$  for nearly half length of latter, basal 1/4 (approximately) of stalked portion rudimentary, free portion of  $R_3$  about 1/4 length of stalked portion from fork to cell,  $R_4$  reaching apex;  $R_5$  from upper outer angle, basal 2/5 straight, then curving downward, distal 1/4 straight.  $M_1$  from below the angle, nearly straight, very slightly sinuous;  $M_2$  from just above lower angle, basal 1/6 angled slightly upward, then curving slightly downward and extending nearly straight to outer wing margin;  $M_3$  from lower angle, basal 1/6 straight, then angled downward somewhat and extending nearly straight to margin.  $CuA_1$  from just before the angle, somewhat concave;  $CuA_2$  from distal 7/10 of cell, somewhat concave.  $1A+2A$  well developed, mostly straight, distal 1/4 concave, reaching outer margin just above termen;  $3A$  not tubular, straight and divergent from  $1A+2A$  for 1/4 length of  $1A+2A$ , then curving upward (here poorly developed) and joining  $1A+2A$  at just beyond 2/5 from base of  $1A+2A$ . Male with frenulum hook absent or nearly so. Retinaculum present in both sexes.

**Hindwing** with frenulum multiple in female. Costal margin convex on basal 3/8, then straight to near apex, apex broadly rounded, outer margin slightly concave centered on  $M_2$ .  $Sc+R_1$  strongly inflated at base, tapering to end of cell and curving downward somewhat, straight beyond cell where anastomosed with  $R_s$ , free portion convex, reaching apex. Free distal portion of  $R_s$  straight to outer margin.  $M_1$  straight from cell to outer margin. Cell about 3/8 as long as wide.  $M_2$  from just above lower outer angle, parallel to  $M_3$  for a short distance, then convex, straight near wing margin.  $M_3$  from lower outer angle, basal 1/10 straight, then curving downward, nearly straight to wing margin.  $CuA_1$  from just below the angle, straight and nearly parallel to  $M_3$  on about basal 1/15, then angled downward rather sharply, straight, distal half concave.  $CuA_2$  from distal 3/4 of cell, basal half straight, distal half distinctly concave.  $CuP$  rudimentary on basal 1/3, distal 2/3

tubular, slender, straight, distal 1/3 curving slightly downward.  $1A+2A$  strongest anal vein, yet slender, tubular, nearly straight.  $3A$  tubular, slender, basal 2/3 straight, distal 1/3 curving slightly inward.

Male genitalia with uncus terminating in slender hook. Valve with three large concave processes; posterior one spatulate, joined to base of costa by slender curved stem, convex surface of its expanded apical region bearing patch of fine hairs; medial process bearing long medially directed rod-like structure set at 90° to somewhat broader basal portion; anterior process spatulate, with numerous fine hairs on inner (concave) surface, its anterior margin with scattered strong long setae. Juxta cordate, posteriorly with deep rounded emargination. Vinculum with strong flange, shield-shaped, posterior margin deeply emarginate. Aedoeagus tapering posteriorly, 4.5 times as long as basal width; vesica with elongate nodule of long blade-like teeth, and patch of minute triangular teeth. Fifth and Sixth abdominal terga each with broad depression bearing numerous small deciduous scales. Eighth tergum with pair of long brush-shaped coremata.

**Female genitalia** with ovipositor short, finely setose. Apophyses posteriores short, slender; apophyses anteriores longer, slender anteriorly, broadening and triangular basally. Ostial chamber elongate-cordate, walls of thickened membrane. Ductus bursae slender, gradually broadening toward corpus bursae. Corpus bursae pear shaped; posterior half (except ventrally and on narrow middorsal band) bearing two large patches of minute ovoid scales, each scale centered on an irregular polygon; the polygonal pattern, but not the scales, extending over entire corpus bursae and onto ductus bursae. Small membranous accessory sac middorsally at anterior end of scale patches, this sac lacking polygonal pattern. Ductus seminalis slender, from middle of ductus bursae.

***Pioneabathra olesialis* (Walker), new comb.**

(Fig. 11, 58-59, 130-132, 263)

*Ebulea olesialis* Walker, 1859: 748.

*Pionea brevisalis* Walker, 1859: 759, new syn.

*Pionea holoxuthalis* Hampson, 1908: 484, new syn.

**DESCRIPTION.**— **Forewing** radius about 9.0 mm; ground uniformly strong yellow, transverse lines absent (Fig. 59) to barely perceptible in most specimens, distinct (Fig. 58) in minority of specimens examined from Aldabra. Where distinct these markings are diffuse, yellowish pink, and represented by: small dot at base of radius; antemedial line strongly curved outward in cell, basally posterior to cell; small spot enclosed by outward curve of antemedial line; large discal spot distal to cell, smaller spot posterior to lower outer angle of cell; postmedial line curved outward distal to cell; thin zig-zag line half way between postmedial line and outer wing margin.

**Genitalia** as described for the genus.

**TYPE MATERIAL EXAMINED.**— *holoxuthalis*, lectotype female, hereby designated, labeled: "Glorioso, 10. III. 06., Meade-Waldo 1906-162"; "type"; "Pyralidae Brit. Mus. Slide No. 14300"; "Lectotype *Pionea holoxuthalis* by J. Shaffer & E. Munroe" [BMNH].

Paralectotype female, labeled: "Comoro Is, Mayotta, 25 II. 06., Meade-Waldo 1906-162"; "Pyralidae Brit. Mus. Slide No. 14301"; "Paralectotype *Pionea holoxuthalis* by J. Shaffer & E. Munroe" [BMNH].

**DISTRIBUTION.**— K. Maes (pers. com) reports the species to be common from West Africa to East Africa and in some parts of southern Africa, also in Sri Lanka. Known also from the Comoro Islands, Gloriosa, and Aldabra. Aldabra material: Settlement (9-27 Jan.) 18 ♂, 34 ♀ (29, 31 Mar.) 1 ♂, 3 ♀; Takamaka (31 Jan.— 19 Feb.) 1 ♂, 7 ♀; Cinq Cases (24 Feb.— 9 Mar.) 1 ♂, 4 ♀; Middle Island (16-25 Mar.) 8 ♂, 25 ♀.

**HOSTS.**— Unknown.

**REMARKS.**— We thank K. Maes (pers. com.) for his opinion, based on his own research and adopted here, that *P. olesialis*, *P. brevisalis* and *P. holoxuthalis* are all conspecific. In his original description of *P. holoxuthalis* Hampson lists four specimens in the type series, one female from the Comoro Islands and three females from Gloriosa. We have not seen the other two specimens from Gloriosa.



*ISOCENTRIS* Meyrick

*Isocentris* Meyrick, 1887: 232. Type-species *Endotricha rhodophilalis* Walker, 1865: 1311. Subsequent designation by Hampson, 1896: 385 (cited as *filalis* Guenée; see Fletcher and Nye, 1984: 76). Type-locality: South Hindostan [India].

**DESCRIPTION.**— Frons oblique. Labial palpus with basal segment upturned, 4/5 length of second; second segment obliquely ascending, nearly 3 times as long as wide, with strong scale tuft dorsally near apex; third segment porrect, ovate, not quite half as long as second, with long slender scales together with similar ones on second segment forming broad brush. Maxillary palpus short, club shaped. Male antenna shaft with dorsal cilia near base about half as long as segment width, ventral cilia nearly twice as long as segment width; dorsal cilia of female about 2/3 as long as segment width, ventral cilia about 1/3 as long as segment width. Ocellus with black peripheral portion mostly covered by small appressed scales; separated from eye by about half its width.

*Forewing* with costal margin slightly concave centered on distal 1/4 of cell; outer margin slightly concave between apex and  $M_3$ , straight to slightly concave between  $M_3$  and termen, lesser concavities on outer margin between veins. Subcosta only slightly thickened at base.  $R_1$  from distal 7/8 of cell, closely parallel, but not contiguous, to  $R_2$ , then gradually diverging.  $R_2$  from very near upper outer angle, straight.  $R_{3+4}$  from upper outer angle, rudimentary on basal 1/6 of stalked portion, basal 1/2 to 2/3 of stalked portion contiguous with  $R_2$ ; free portion of  $R_4$  2/3 as long as common stalk.  $R_5$  from upper outer angle, somewhat sinuous basally, then slightly convex to outer margin.  $M_1$  1/4 down from upper angle, very slightly sinuous on basal 1/3.  $M_2$  from just above lower outer angle, basal 1/4 straight to very slightly concave, distal 3/4 slightly convex.  $M_3$  from lower angle, bent slightly downward at 1/4 out from base.  $CuA_1$  from just below the angle, bent slightly upward at 1/4 out from base.  $CuA_2$  from distal 3/4 of cell, very slightly concave throughout.  $1A+2A$  not basally expanded, concave near base and on distal 1/3, straight in middle.  $3A$  non-tubular, but readily discernible throughout, gradually diverging from  $1A+2A$ , looping up and joining  $1A+2A$  at about 1/3 out from base of latter.

*Hindwing* with female frenulum multiple. Costal margin rather strongly convex centered just beyond upper outer angle of cell, concave centered just before separation of  $Sc+R_1$  and  $R_s$  from common stalk.  $Sc+R_1$  strongly inflated basally, gradually tapering, joining  $R_s$  just beyond upper outer angle of cell, stalked for about 2/5 free length of  $R_s$ ; free distal portion of  $Sc+R_1$  strongly curved, free distal portion of  $R_s$  nearly straight, terminating at wing apex.  $M_1$  slightly concave on basal 1/3, distal 2/3 very slightly convex. Discocellular tubular near upper end, then rudimentary, then angled sharply outward and downward to lower outer angle.  $M_2$  from just above lower outer angle, rudimentary near base, slightly convex throughout.  $M_3$  from lower angle, rudimentary at base, basal 1/5 straight, then turned downward, distal 4/5 straight to very slightly concave.  $CuA_1$  from just before the angle, angled downward rather sharply at 1/10 from base, then straight to wing margin.  $CuA_2$  from distal 4/5 of cell, essentially straight.  $CuP$  rudimentary on basal 1/2, distal 1/2 tubular, but very slender; distal 1/2 angled downward somewhat, otherwise straight.  $1A+2A$  strong, nearly straight.  $3A$  tubular, but slender, basal 1/2 straight, distal 1/2 gradually curving toward inner margin.

*Male genitalia* with uncus triangular, margin distinctly sclerotized and appearing as a thin tube forming an inverted "V", rounded near apex; apex bearing short, free, digitate process. Juxta lyre-shaped. Valve having both surfaces covered with long narrow semideciduous scales. Costal margin fused with tegumen. Valve complex, with three prominent processes: the anterior-most a short, stout, thumb-like process, posteriorly directed and apically bearing about a dozen long, slender, posteriorly directed setae; a dorso-posterior slender curved process, distally clavate, and bearing long slender setae; a medio-posterior slender spine, posteriorly directed, its distal half sharply reflexed anteriomedially. Cucullus extending beyond costa, weakly sclerotized. Aedoeagus slender, tapering distally, seven times as long as basal width; vesica bearing minute, slender teeth; cornutus absent.

*Female genitalia* with ovipositor lobes high, short, weakly sclerotized. Apophyses posteriores short, slender, straight; apophyses anteriores stronger, about twice as long as apophyses posteriores, angled on distal 2/5. Ostial chamber membranous, funnel shaped, inner surface covered with numerous closely-set, minute, sharp spines; terminating anteriorly in smooth sclerotized

band slightly longer than wide. Ductus bursae a slender tube about as long as corpus bursae, near latter expanded and bearing accessory sac. Corpus bursae round, inner surface studded with tiny rounded protuberances, each with a tight cluster of minute dots; a single large rhomboid signum, about 3/5 as long as corpus bursae, its corners much rounded, inner surface covered with rows of fine serrations. Ductus seminalis from posterior end of ductus bursae.

*Isocentris retinalis* (Saalmüller)

(Fig. 12, 60, 133-134, 264-265)

*Agrotera retinalis* Saalmüller, 1879: 304-305; Hampson, 1898: 630; Marion, 1956: 232.

*Hyalobathra argentifilalis* Hampson, 1908: 480-481.

*Hyalobathra retinalis* (Saalmüller); Klima, 1939b: 357; Vári and Kroon, 1986: 75, 169; Viette, 1990: 96.

*Isocentris retinalis* (Saalmüller); Marion, 1956: 233, 235, fig 7.

**DESCRIPTION.**— *Forewing* radius 7.5-9.5 mm; ground brilliant orange yellow; marked with grayish reddish brown as follows: a pair of round spots near wing base, one on costa very near to base and the second along inner wing margin and more distal to base; thin antemedial line; thin medial line joining transversely elongate discal spot with white center; thin postmedial line extending posteriorly only to  $CuA_1$ ; close pair of subterminal lines separated by white band; and on fringe. Distal half of fringe white in two regions: between apex and  $M_{2,3}$  fold, and between  $CuA_{1,2}$  fold and  $1A+2A$ . Male with frenulum hook absent. Retinaculum present in both sexes.

*Hindwing* ground as above; antemedial, medial, and subterminal lines continued from above; basal dots and postmedial line absent.

**TYPE MATERIAL EXAMINED.**— None.

**DISTRIBUTION.**— Madagascar (type-locality), Comoros (Marion, 1956), and Aldabra. Aldabra material: Takamaka (31 Jan.–18 Feb.) 2 ♂, 1 ♀; Qing Cases (1, 3 Mar.) 2 ♀; Middle Island (16-25 Mar.) 24 ♂, 61 ♀.

**HOSTS.**— Unknown.

**REMARKS.**— We have not examined the holotype of *I. retinalis*, but have compared Aldabra specimens with a male and female from Madagascar and found no essential differences. The male holotype of *I. argentifilalis* (not examined) was described from Mayotta, Comoro Islands.

## Subfamily SPILOMELINAE

## KEY TO ALDABRA GENERA OF SPILOMELINAE

1. Male genitalia with uncus absent (Fig. 165); black moths with large white spots on wings (Fig. 75) . . . . . *Bocchoris*  
- Male genitalia with uncus present; wings various . . . . . 2
2. Male genitalia with apex of uncus bearing dense cluster of small lanceolate, often bifurcate (this discernible only with high magnification; e.g. Fig. 228), scales (e.g. Fig. 135, 140, 143, 151, 155, 200); hair-like setae present (e.g. Fig. 200) or absent . . . . . 9  
- Male genitalia with uncus nude, or if scales present these very slender, hair-like or strap-like, never lanceolate . . . . . 3
3. Male genitalia with uncus nude (Fig. 128, 146) or at most with a few small scattered setae . . . . . 4  
- Male genitalia with uncus bearing numerous hair-like setae (e.g. Fig. 177, 212) or uncus bifurcate and with two clusters of very slender strap-like setae (Fig. 138) . . . . . 5
4. Male genitalia with uncus about 1.3 times as long as basal width, strongly tapering with distal half digitate and somewhat weakly sclerotized; valve with clasper very short, straight, rod-like (Fig. 128); wings yellow with diffuse bands, dark spots on costa & discocellular vein (Fig. 61) . . . . . *Notarcha*  
- Male genitalia with uncus about as long as basal width, triangular, hood-like, apex pointed, strongly sclerotized; clasper long, tapering,



- curved (Fig. 146); wings dark brown with complex of white spots (Fig. 68-69) ..... *Pessocosma*
5. Male genitalia with uncus bifurcate, apex of each ramus with fan-like cluster of long slender straplike distally recurved scales; valve apex acute (Fig. 138); very small (5 mm wing radius) yellowish-brown moths (Fig. 63) ..... *Legrandellus*
- Male genitalia with uncus single and slender, with hair-like setae; valve apex rounded; mostly larger, wings various ..... 6
6. Male genitalia with apical region of uncus pod-shaped, surmounted on and set at right angle to long slender basal stalk; (Fig. 177, 179); small moth (wing radius ca. 7-8 mm) ..... 7
- Male genitalia with uncus triangular or clavate, not as above; larger moths (wing radius ca. 10 mm) ..... 8
7. Forewing yellowish brown with two large white spots, lacking distinct transverse markings (Fig. 78) ..... *Glyphodella*
- Forewing with a complex pattern of white and grayish-brown transverse markings (Fig. 79) ..... *Chabulina*
8. Male genitalia with apical process of uncus clavate; valve very broadly rounded, about 4/5 as wide as long, inflated (Fig. 203); wings white, forewing with strongly contrasting dark lines (Fig. 86) ..... *Cirrhochrasta*
- Male genitalia with uncus rather narrowly triangular, apically subdigitate and clothed with fine setae; valve moderately narrow (Fig. 212, 216, 220); wings light yellowish or brownish with variably developed transverse lines (Fig. 90-93) *Herpetogramma*
9. Male genitalia with uncus bifurcate (Fig. 143, 225, 231) ..... 10
- Male genitalia with uncus various, but never bifurcate ..... 12
10. Forewing with  $R_2$  well separated from  $R_{3+4}$ ; hindwing with  $M_{2+3}$  short stalked (Fig. 17); small moths (wing radius about 6 mm) with orange yellow markings, antemedial & postmedial bands narrow, diffuse (Fig. 66-67) ..... *Metasia*
- Forewing with  $R_2$  very closely parallel to, contiguous or stalked with  $R_{3+4}$ ; hindwing  $M_2$  and  $M_3$  arising close or from point, but not stalked; larger (wing radius ca. 8-9 mm), with similar color, with distinct antemedial & postmedial lines (Fig. 40-41) ..... 11
11. Male genitalia with valve apex deeply emarginate, ventral side bounded with a uniform slender well sclerotized tube; saccus blunt (Fig. 224); Aldabra species with pustule in forewing cell of male (Fig. 40, 94; cf. female, Fig. 95) ..... *Marasmia*
- Male genitalia with valve apex rounded, distal half with weakly sclerotized longitudinal region, but not emarginate; ventral side not uniformly tubular; saccus acute (Fig. 231); forewing unmodified (Fig. 96) ..... *Orphanostigma*
12. Male genitalia with apical portion of uncus expanded, more or less spatulate or clavate, arising from slender smooth tapering stalk which is usually elongate (e.g. Fig. 135, 183), more rarely short (Fig. 236), but always narrowly tubular between base and apex 19
- Male genitalia with uncus various, but never with smooth narrow tubular section joining base and apex ..... 13
13. Male genitalia with uncus wider than long, very broadly rounded apically and broadened toward base; valve extremely narrow (Fig. 151); wings light yellow, forewing with purplish black along costa and in apical region (Fig. 70) ..... *Ommatobotys*
- Male genitalia with uncus not wider than long, usually distinctly longer than basal width; valve moderately narrow (Fig. 212) to very broadly rounded (Fig. 205); wings various ..... 14
14. Male genitalia with uncus broadly rounded, more or less parallel sided; valve narrow, ventral margin with strong medial triangular projection (Fig. 140); small moths (wing radius 5-8 mm), wings with mottled pattern of dark fuscous and lead-colored reflections (Fig. 64) ..... *Eurrhyarodes*
- Male genitalia with uncus usually not both broadly rounded and parallel sided; ventral margin of valve without distinct lateral projection; size and wings various ..... 15
15. Male genitalia with apical process of uncus pad-like, elliptical, densely and uniformly set with small lanceolate scales; valve of moderate width, not broadly rounded, midregion with stout teeth, apex narrowly rounded (Fig. 175); wings yellowish brown with translucent spots (Fig. 77) ..... *Nausinoella*
- Male genitalia with apical process of uncus various, but not both elliptical and pad-like; valve with or without stout teeth, if stout teeth present then valve broadly rounded; wings various .... 16
16. Male genitalia (Fig. 157) with valve elliptical, of moderate width, not broadly rounded, simple, lacking spine-like processes; blackish moths with complex white bands and dashes, wing radius ca. 7 mm (Fig. 72) ..... *Diasemiopsis*
- Male genitalia with valve broadly rounded (Fig. 162, 205, 211), armed or unarmed; maculation and size various ..... 17
17. Male genitalia with uncus small, apex dome shaped; valve without teeth or spines (Fig. 162); blackish moths with white longitudinal bands on wings (Fig. 74) ..... *Spoladea*
- Male genitalia with uncus triangular or constricted; valve armed with teeth or spines; light colored moths, hindwing, at least, mostly white ..... 18
18. Male genitalia with uncus triangular; valve with short to moderate sized teeth (Fig. 205); hindwing much lighter than forewing (Fig. 87) ..... *Alytana*
- Male genitalia with uncus cordate at base, medial lateral processes separated from base by constricted stalk; valve armed with long spines (Fig. 211); forewing and hindwing similar, uniformly pale yellow with narrow irregular light brown antemedial & postmedial bands (Fig. 89) ..... *Hodebertia*
19. Male genitalia with valve strongly truncated, rhomboidal with distal margin nearly equal in length to dorsal and ventral margins (Fig. 148); small (4-5 mm wing radius) light orange yellow moths (Fig. 65) ..... *Microgeshna*
- Male genitalia with valve not truncated, or if truncated (Fig. 171) then valve much longer than wide; mostly larger (>5 mm wing radius) moths, color various ..... 20
20. Male genitalia with valve truncated, about 3 times as long as length of distal margin, parallel sided (Fig. 171); male forewing with fovea in cell; small (about 6-8 mm wing radius) blackish moths (Fig. 76) ..... *Duponchelia*
- Male genitalia with valve broadly or narrowly rounded apically, never truncated; mostly larger moths, almost always with wing radius over 8 mm; fovea usually absent ..... 21
21. Male genitalia with apical pad of uncus bearing well separated apical and basal patches of lanceolate scales; hair-like setae also present (Fig. 194, 200) ..... 22
- Male genitalia with apical pad of uncus bearing a single undivided patch of lanceolate scales on its dorsal surface; hair-like setae present or absent (e.g. Fig. 183, 192, 197, 209) ..... 23
22. Large (wing radius ca. 25-30 mm) green moths (Fig. 85); male antenna shaft with knot ..... *Stemorrhages*



- Small or moderate sized (wing radius ca. 10 mm) moths, Aldabra species golden brown (Fig. 83); male antenna lacking knot . . . . . *Omiodes*
23. Male genitalia with valve bearing spine-like process or processes on its distal half (Fig. 182, 188-189, 191, 208) . . . . . 24
- Male genitalia with valve lacking spine-like processes, or spine-like process or processes present on basal half (Fig. 235) or center (Fig. 135) of valve only . . . . . 26
24. Wings hyaline with complex pattern of brownish transverse lines and cells (Fig. 80-81) . . . . . *Synclera*
- Wing maculation simple, white ground with spots or wide dark borders . . . . . 25
25. Male with prominent anal tuft of hair-like scales; female without anal tuft; male genitalia with prominent process extending dorsad from sacculus of valve; female genitalia with ostium in deep emargination of 7th sternite, flanked anteriorly and laterally by a thickened area; wings almost uniformly white (Fig. 88) . *Palpita*
- Both male and female with anal tuft of spatulate scales; male genitalia without prominent dorsal process from sacculus; female genitalia without emargination or thickening of 7th sternite; forewing with broad dark border along costal and outer margins defining central white triangle, hindwing white with broad dark border along outer margin (Fig. 82) . . . . . *Diaphania*
26. Male genitalia with valve narrower, bearing short central spine (Fig. 135), or with long and shorter spines near base of valve (Fig. 235) . . . . . 27
- Male genitalia with valve rather broadly rounded, lacking conspicuous spine-like structures (Fig. 159, 196) . . . . . 28
27. Male genitalia with valve bearing short central spine, valve apex narrowly rounded (Fig. 135); forewing yellowish with rather complex pattern of transverse lines (Fig. 62); male abdomen of normal length . . . . . *Pardomima*
- Male genitalia with valve bearing long and shorter spines near base, valve apex more broadly rounded (Fig. 235); wings nearly uniformly yellowish brown with a few diffuse transverse bands, in male very slender (Fig. 97) and with complex modification of veins and scaling in area of cell, male abdomen very long and slender . . . . . *Hymenoptychis*
28. Male genitalia with stalked section of uncus strongly developed and curved by about 45°, tegumen trapezoidal in lateral view (Fig. 197), dorsal half of valve membranous and strongly inflated (Fig. 196); rather large (wing radius ca. 15 mm) yellowish moths with transverse lines and discal spot on closing vein of cell (Fig. 84) . . . . . *Condylorrhiza*
- Male genitalia with stalked section of uncus straight (Fig. 161) or weakly developed (Fig. 155), tegumen not trapezoidal in lateral view, dorsal half of valve not membranous and inflated; moths large or small, grayish yellow or black with white spots . . . . . 29
29. Male genitalia with valve somewhat constricted on basal and distal thirds, basal third with foliate transverse process (Fig. 155); wings rather uniformly grayish yellow with darker antemedial and postmedial lines; wing radius ca. 14 mm (Fig. 71) . . . *Poliobotys*
- Male genitalia with valve rather uniformly rounded, basal half with sharply angled very low narrow ridge (Fig. 159); wings black with large and small white spots; wing radius ca. 10 mm (Fig. 73) . . . . . *Hymenia*

External features commonly used in generic keys to moths such as development of the frons, palpi, antennae, and wing venation for the most part show only subtle variation among genera of Spilomelinae and are difficult to use. The species in different crambid genera

occurring on Aldabra are nearly all quite distinct on the basis of color pattern, and where similar patterns exist the male genitalia show distinct differences.

Colors used in the above keys are overall approximations and often less precise than those given in the descriptions which follow.

### NOTARCHA Meyrick

*Notarcha* Meyrick, 1884: 310; Shaffer and Munroe, 1989a: 248.

*Haritala* Moore, 1886: 311. Unnecessary replacement name for *Notarcha* Meyrick, 1884. Type-species *Zebronia cassusalis* Walker, 1859: 477. By original designation. Because Meyrick did not designate a type-species for *Notarcha* and because the code requires *Notarcha* and *Haritala* to have the same type-species, *cassusalis* is the type of *Notarcha*. Type-locality: KwaZulu-Natal, South Africa.

**DESCRIPTION.**—Frons rounded, not prominent, smoothly scaled. Vertex about as long as frons, with dense vestiture of erect scales. Labial palpus upturned, reaching or exceeding plane of vertex; first and second segments about equal in length, with compressed scaling, slightly produced in front to form a rounded carina on each segment, separated by a notch between; third segment shorter, with compact cylindrical scaling. Maxillary palpus distinct but small, not reaching tip of second segment of labial palpus, scaling not expanded distally. Proboscis well developed, scaled at base. Eye large, globular. Ocellus well developed, directed distodorsad, adjacent to eye. Antenna filiform in both sexes; dorsal surface smoothly scaled; ventral surface short-ciliate. Body compact, abdomen slightly exceeding anal angle of hindwing. Tegula with scaling reaching posterior margin of thorax. Legs short, compact, without special modifications; outer tibial spurs somewhat shorter than inner. Praecinctorium transversely flattened, distally bilobed but not greatly expanded.

Forewing twice to 2.5 times as long as wide; costa straight or weakly sinuous to beyond middle, then increasingly arched to obtuse apex; termen straight and weakly oblique basad from apex to  $M_3$ , bent between  $M_3$  and  $CuA_2$ , thence oblique to the obtuse tornus; posterior margin weakly convex. Sc free, ending on costa at about 2/3 from base. Discal cell about half as long as wing.  $R_1$  from cell at about 5/6 from base.  $R_2$  from anterior angle of cell, closely apposed for some distance to  $R_{3+4}$ . The latter also arising from anterior angle;  $R_3$  and  $R_4$  stalked about 2/3 distance from cell to apex,  $R_4$  ending at apex.  $R_5$  from just behind anterior angle, weakly curved but not basally approximated to  $R_{3+4}$ .  $M_1$  from a short distance behind  $R_5$ , straight and somewhat divergent from the latter. Discocellular weakly concave and weakly oblique distad.  $M_2$ ,  $M_3$ , and  $CuA_1$  from close together at posterior angle of cell, their basal parts weakly curved and approximated.  $CuA_2$  from cell at about 4/5 from base.  $CuP$  represented only by a fold.  $1A+2A$  strong and straight, ending at tornal angle.  $3A$  basally approximated to  $1A+2A$ , then diverging and bent to meet it at right angles just basad of middle of  $1A+2A$ . Frenulum hook absent; scaled retinaculum present.

Hindwing about as long as posterior margin of forewing; less than twice as long as wide; costa with a weak obtuse angulation basad of middle; apex rounded; termen straight and weakly oblique basad from  $R_s$  to cell  $M_2$ , there curved to  $CuA_1$ , then more strongly oblique to  $CuP$ ; anal angle rounded; anal margin nearly straight. Frenulum single in male, multiple in female. Discal cell less than half as long as wing.  $Sc+R_1$  anastomosed with  $R_s$  for about 1/3 distance from discocellular to apex.  $R_s$  and  $M_1$  stalked for a short distance from anterior angle of cell. Discocellular very slender and weak, erect from anterior angle of cell to its mid-axis, there bent, then oblique distad to the acute posterior angle.  $M_2$ ,  $M_3$ , and  $CuA_1$  arising close together around posterior angle, their basal parts weakly curved and approximated.  $CuA_2$  from cell at about 2/3 from base.  $CuP$  obsolescent basally, becoming stronger toward middle of wing, fully developed distally.  $1A+2A$  and  $3A$  well developed.

Male genitalia with uncus subtriangular, about 1.5 times as long as its basal width; sides weakly convex, converging posteriad to a narrow, rounded, truncate, or weakly excavated apex. Tegumen longer than its height or width, its sides weakly convex and converging posteriad to align with sides of uncus; dorsally a patch of slender modified scales with large sockets near each posterolateral angle; each of these sockets supported by a sclerotized rod arising from outer margin of a transverse sclerotized band



dorsal to juxta. Transtilla with triangular, setose lateral elements, continued mesad by sclerotized bands, meeting at a membranous suture in midline. Juxta shield-shaped. Vinculum with narrow, weakly sinuate, lateral elements, and rounded, only slightly expanded, ventral element, the latter with a weak anteromedian carina. Corema simple, dependent from lateral element of vinculum. Valve about twice as long as wide, set obliquely, much exceeding tip of uncus; costal and ventral margins almost straight to beyond middle, then curving to the evenly rounded terminal margin; costa basally with inflation and subcostal flange, fine setae dispersed on whole costal area; clasper spike-like, extending distoventrad from a triangular sclerite near base; sacculus weakly inflated, bearing a low dorsal flange ending in a point. Aedeagus irregularly tubular; vesica bearing two or more strong cornuti.

*Female genitalia* with ovipositor with high, narrow, densely and rather evenly setose lobes, not produced at dorsal angle. Apophyses posteriores T-shaped, the vertical and longitudinal elements about equal in length, both slender but strongly sclerotized, nearly straight, longitudinal element with only traces of expansion. Eighth tergite rectangular, several times as wide as long, with a prominent transverse bar of heavier sclerotization; a few scattered setae near middle of posterior margin. Apophyses anteriores somewhat longer than apophyses posteriores, and with a strong rhomboidal expansion at about 1/4 from posterior end, consisting of dorsal and ventral triangular flanges. Ostium wider than long, unarmed. Ostial chamber small, unarmed except for minute spinulosity. Ductus bursae narrow, tubular, with a trough-shaped sclerotized collar of varying length. Corpus bursae large and oval, densely scobinate, otherwise unarmed.

**HOSTS.**— Larvae so far as known leaf-tiers on Malvaceae.

**REMARKS.**— This genus is closely related to *Pleuroptya* Meyrick, *Ulopeza* Zeller, and *Lygropia* Lederer, but differs in the broadly rounded valve, the at most barely excavated tip of the uncus, and the small simple median element of the vinculum. The genus has a number of species distributed through the tropics and subtropics of both hemispheres.

The Aldabra species belongs to a complex, most of which was included by Hampson in his concept of "*Lygropia*" *quaternalis* (Zeller). We have described elsewhere (Shaffer and Munroe 1989a) the type of *quaternalis*. The Aldabra species is clearly distinct from heretofore named species.

***Notarcha digitalis* Shaffer & Munroe, new sp.**

(Fig. 13, 61, 128-129, 266-267)

*Haritala quaternalis*, Legrand, 1965 (not Zeller, 1852): 105. Misidentification.

**DIAGNOSIS.**— Similar to *quaternalis*, but lacking dark medial spot of first segment of labial palpus, with ovipositor lobes less densely setose, and with prominent heavily sclerotized digitate sac extending anteriorly from ductus bursae. In *quaternalis* a somewhat similar sac extends posteroventral from corpus bursae (Shaffer & Munroe, 1989a: Fig. 13).

**DESCRIPTION.**— Frons smooth, covered with appressed yellow scales; labial palpus upturned, first two segments yellow, darker on inner (dorsal) half of female, third cylindrical and dark brown with lighter apex. Maxillary palpus slender, cylindrical, brown, apex yellow. Proboscis with basal portion bearing yellow scales. Female antenna filiform finely ciliate, each segment with single dorsal and ventrolateral pair of long cilia; scales light yellow. Eye diameter 0.6 mm; black. Ocellus conical; black with clear lens. Vertex and occiput yellowish white to white; patagium and tegula a mixture of orange yellow, yellow, and white.

*Forewing* radius 7.5 mm; bearing four subequal dark brown elliptical spots; the first (basal) on costa and separated from wing base by about its own width, the second on costa at 1/4 from base, the third (discal spot) at outer margin of cell and about twice as large as others, the fourth on costal margin at 3/5 from base. Ground yellow, marked with diffuse transverse bands of darker yellow; three short bands on basal half of forewing, the first descending from the first spot and separated from wing base by its own width; the second from between the first and second spots; the third from just distal to second spot; a fourth band descends from upper outer angle of cell along distal side of discal spot, at lower outer angle it is joined by

longitudinal band extending half way to outer wing margin, then angled sharply anteriorly to costal margin just distal to outermost costal spot. Outermost band broad, narrowed or broken near  $CuA_2$ .

*Hindwing* with three bands, the first descending from third of forewing, the second 4-shaped, the third similar to outer band of forewing.

*Male genitalia* with aedeagus (Fig. 129) bearing pair of massive spine-like cornuti, nearly equal, each slightly over half length of aedeagus.

*Female genitalia* (Fig. 266) with ductus bursae heavily sclerotized, complex, mostly smooth but with two granular patches formed of numerous minute, slender, sharp-pointed spines. Posterior patch forming band around end of ductus bursae; second patch occupying membranous ventral midregion of ductus bursae; third patch near junction with corpus bursae, larger, conspicuous, very irregular, formed of spines 3-4 times longer than those elsewhere; heavily sclerotized digitate sac (Fig. 267) extending anteriorly from third patch. Corpus bursae about 1.5 times as long as wide, posteriorly bearing small bulbous projection from which arises ductus seminalis.

**TYPES.**— *Holotype*, labeled: "Aldabra Atoll 9°24'S, 46°20'E Settlement 25 Jan. 1968 Jay C. Shaffer"; "Genitalia Slide By J. Shaffer USNM 57881"; "Holotype *Notarcha digitalis* Shaffer & Munroe.

*Paratypes* ( $\delta$ , 4 $\sigma$ ), all same data as holotype except date:  $\delta$ , 18 Jan. 1968 (abdomen lost);  $\sigma$  10 Jan.; 2  $\sigma$ , 18 Jan. 1968 (one USNM slide 58161);  $\sigma$ , 20 Jan. 1968 (USNM slide 57880). All labeled "Paratype *Notarcha digitalis* Shaffer & Munroe".

**DISTRIBUTION.**— Eastern and southern Africa (see below), Aldabra.

**HOSTS.**— Unknown.

**REMARKS.**— We have examined specimens from Congo (Elizabethville) and South Africa (KwaZulu-Natal) which appear to be conspecific with *N. digitalis*. K. Maes (pers. com.) reports the species to be common in East Africa.

*Notarcha* is a large genus with many undescribed species and deserving of extensive study. See Shaffer and Munroe (1989a) for descriptions and illustrations of the named African species.

**PARDOMIMA** Warren

*Pardomima* Warren, 1890: 477-478; Martin, 1955: 505. Type-species *Borys amyntusalis* Walker, 1859: 662. By original designation. Type-locality: Sri Lanka.

**DESCRIPTION.**— Frons rounded, smoothly scaled. Vertex with erect tufts of scales. Labial palpus upturned, smoothly scaled; second segment twice as long as first; third shorter, at most half as long as second, blunt or acuminate. Maxillary palpus short, ascending, scaling not distally dilated. Proboscis long, coiled, scaled at base. Eye large, globular. Ocellus present. Antenna filiform, distal 2/3 with a pair of spines on each segment, medial segments with additional small spines. Body slender. Tip of abdomen exceeding anal angle, more so in male. Legs slender; foretibia with epiphysis; midtibia with one pair of spines, hindtibia with two; midfemur in some extralimital species expanded and having a hair-tuft in a groove. Praepectinotum prominent, strongly bilobed.

*Forewing* with costa straight to 4/5 from base, then arched to narrowly rounded apex, subacute in male, subrectangular in female; termen oblique basad, more strongly so in male than female, bent at  $CuA_1$  and more strongly oblique to the obtuse tornus; posterior margin nearly straight, slightly convex subbasally. Sc free.  $R_1$  from cell at 4/5 from base.  $R_2$  from near end of cell, closely apposed to  $R_{3+4}$  about half-way to apex.  $R_3$  and  $R_4$  stalked more than half-way to apex;  $R_4$  ending at apex.  $R_5$  from just behind anterior angle of cell, basally curved but scarcely approximated to  $R_{3+4}$ . Discal cell a little more than half as long as wing; discocellulars vertical, almost straight.  $M_1$  from somewhat behind  $R_5$ , not approximated to it.  $M_2$ ,  $M_3$ , and  $CuA_1$  from close together around posterior angle of cell, their basal parts curved and approximated.  $CuA_2$  from cell at 5/6.  $CuP$  represented by a fold.  $1A+2A$  strong, straight except for a subbasal deflection, ending at tornus.  $3A$  forming a closed loop with  $1A+2A$ , about 2/5 length of wing. Underside of wing without frenulum hook, but with scaled retinaculum.

*Hindwing* subtriangular, about as long as posterior margin of forewing; costa weakly arched basad of middle; apex subacute, fairly narrowly rounded; termen variably curved, most strongly at  $CuA_1$ ; anal angle



rounded; anal margin weakly convex. Sc+R<sub>1</sub> anastomosed with Rs for a short distance beyond discal cell. Rs and M<sub>1</sub> stalked for a short distance. Discal cell about 1/3 length of wing. Discocellular erect and straight. M<sub>2</sub> and M<sub>3</sub> from posterior angle of cell, their basal parts curved and approximated. CuA<sub>1</sub> from just basad of posterior angle, its extreme base weakly approximated to base of M<sub>3</sub>. CuA<sub>2</sub> from cell at 5/6 from base. CuP basally weak, tubular on distal 2/3; 1A+2A and 3A present. Frenulum single in male, multiple in female.

*Male genitalia* with uncus longer than tegumen, slender, constricted medially, thickened in terminal part and with a dense dorsal and terminal coating of dark, anteriorly directed, bifid spines. Tegumen longer than high, its lateral parts broadly triangular. Gnathos absent. Subscaphium hardly sclerotized. Juxta subquadrate, weakly sclerotized. Vinculum shallow, of rather simple U-shape. Corema large, with twisted, specialized scales. Valve large, tip extending far beyond tip of uncus, shape and armature differing among the species. Aedoeagus clavate, cornuti various.

*Female genitalia* with ovipositor lobes high and narrow, with dense array of fine setae. Apophyses posteriores with shaft and vertical bar slender, of about equal length. Apophyses anteriores a little longer and thicker. Ostium narrow. Ductus bursae several times length of apophyses, much narrower than long, variously sclerotized and expanded near ostium. Ductus seminalis joining ductus bursae not far from ostium. Corpus bursae globular, with large crescentic signum.

**EARLY STAGES.**— Larvae, possibly of the Aldabra species, have been recorded as feeding on leaves of coffee in Uganda (Hargreaves, 1928: 34, cited by Martin, 1955: 507).

**DISTRIBUTION.**— The genus includes a number of species distributed through the Old World tropics. The African species have been monographed by Martin (1955), but the Indo-Australian species remain to be revised.

*Pardomima zanclophora* Martin  
(Fig. 14, 62, 135-137, 268)

*Pardomima zanclophora* Martin, 1955: 514-515; 1956b: 189-190; Legrand, 1965: 105, pl. 8, no. 15; Frith, 1975: 212; Pinhey, 1975: 71; Vári and Kroon, 1986: 94, 169.

**DESCRIPTION.**— *Forewing* radius about 10-11 mm; maculation somewhat variable. A light orange yellow color prevails at wing base, on costal band, posterior to 1A+2A on basal third of wing, in center of discal spot, and is seen as fine tracing on veins traversing clear areas of wings. Broad moderate yellowish brown band along outer margin of wing, more narrow bands of same color at wing base, and forming basal, antemedial, medial, and postmedial lines. Basal mark joining basal band on Sc, basal band with short distal branches on Sc and 1A+2A; antemedial band with distal fork from Cu to Sc, broadly joined to medial band posterior to 1A+2A; medial band forming large subquadrate discal spot, its posterior branches joining antemedial and postmedial bands; postmedial band joining broad marginal band between M<sub>1</sub> and M<sub>3</sub>. Medial band from Sc, all other bands from costal margin. Areas between veins (except on costal and marginal bands, and posterior to 1A+2A) scaled but translucent with bluish iridescence.

*Hindwing* with continuation of antemedial, medial, and marginal bands, the latter two connected near wing margin; bluish iridescent between bands as in forewing; veins very finely traced with light yellow.

*Male genitalia* with valve subovate, with narrowly rounded apex, with tufts of scales on mesal surface near middle of costa, near apex, and on basal part of clasper; distal part of clasper bearing a slender acuminate process. Aedoeagus with single slender rod-shaped cornutus, at apex hooked in form of sickle.

*Female genitalia* with ductus bursae asymmetrical near posterior end and with broad lateral pouch on right side.

**TYPE MATERIAL EXAMINED.**— *Holotype*, male, labeled: "Suna, S. Kavirondo, Jan. 1932 (W. Feather)" [Kenya]; "Pyralidae Brit. Mus. Slide No. 14339" [BMNH].

*Allotype*, female, labeled: "Suna, S. Kavirondo, Jan. 1932 (W. Feather)"; "Pyralidae Brit. Mus. Slide No. 14338" [BMNH].

**DISTRIBUTION.**— Martin (1955) lists the species from Congo, Mozambique, Tanzania, Kenya, Grand Comoro, Madagascar, Ethiopia, and southwest Arabia. Legrand (1965) reports it from Aldabra and Assumption.

Aldabra material: Settlement (9-25 Jan.) 25 ♂, 41 ♀, (29-31 Mar.) 3 ♂, 18 ♀; Takamaka (1-19 Feb.) 1 ♂, 4 ♀; Middle Island (16-18 Mar.) 3 ♀.

**HOSTS.**— Unknown.

*LEGRANDELLUS* Shaffer & Munroe, new genus

Type-species *Pyrausta fuscolarosalis* Legrand, 1965: 115-116. By present designation. Type-locality: Seychelles: Aldabra Atoll.

**DIAGNOSIS.**— The form of the uncus, deeply bifurcate with its terminal cluster of numerous long slender distally hooked scales, is unique to this genus.

**DESCRIPTION.**— Frons oblique. Labial palpus very slender, about 1.6 times as long as eye diameter, porrect in male, upturned in female. Maxillary palpus cylindrical, about 3/5 as long as eye diameter, obliquely ascending to just beyond middle of eye. Antenna filiform and finely ciliate in both sexes; cilia about 1/5 as long as segment width. Eye diameter about 0.5 mm. Ocellus well developed, round, laterally directed, very nearly tangent to side of eye and separated from antenna by about twice its own diameter.

*Forewing* with costal margin slightly concave between base and distal end of R<sub>1</sub>, then convex to apex; outer margin straight between R<sub>5</sub> and M<sub>2</sub>, then rather evenly curved to tornus; inner margin straight to very slightly concave between tornus and distal end of 3A. R<sub>1</sub> from cell at 5/6 distance to end of cell; R<sub>2,4</sub> from very near to upper outer angle, R<sub>2</sub> leaving R<sub>4</sub> at just over 1/3 length of latter, R<sub>3</sub> leaving at 3/5 length of R<sub>4</sub>, R<sub>4</sub> reaching costal margin just before apex. R<sub>5</sub> from upper angle, nearly straight. Discocellular concave. M<sub>2</sub> from lower outer angle, hooked upward at base, continuing nearly straight. M<sub>3</sub> from just below the angle. CuA<sub>1</sub> from about 9/10 distance from base of cell. CuA<sub>2</sub> from about 7/10 that distance. 1A+2A very slightly sinuous, concave on basal third, convex in middle, more strongly concave near tornus.

*Hindwing* with frenulum single in both sexes. Costal margin sinuous, slightly concave on basal 1/4, convex near middle, then slightly concave, finally arched toward apex. Outer margin mostly smoothly rounded, very slightly concave between CuA<sub>1</sub> and CuP. Inner margin convexity centered on just distal to 3A. Subcosta sinuous, convex at cell, concave between cell and fork with Rs. Rs stalked with Sc+R<sub>1</sub> for nearly half length of free portion of Rs. M<sub>1</sub> very closely parallel to Sc+Rs in cell, divergent and straight distal to cell. M<sub>2,3</sub> stalked for 1/3 free length of M<sub>2</sub>; from lower outer angle of cell. CuA<sub>1</sub> from just below the angle, curved downward at base, then straight to wing margin. CuA<sub>2</sub> from 7/10 distance to end of cell, nearly straight. CuP tubular on distal 1/3. 1A+2A slightly concave on basal 1/3, then straight. 3rd A short, nearly straight, basally anastomosing with 1A+2A.

*Male genitalia* with uncus tapering, at apex narrowly rounded, deeply bifurcate, bearing cluster of about 30-40 laterally directed slender scales, each scale about 2/3 uncus length, its distal end strongly curved, broadened, somewhat spatulate. Gnathos a transverse band, in center about 1/7 as wide as total length; much narrowed laterally. Juxta somewhat elliptical, well sclerotized only on ventrolateral margins. Vinculum narrow, V-shaped; saccus narrowly rounded. Valve with costa concave, strongly inflated basally; sacculus inflated, dorsally bounded by well sclerotized, narrow, smooth carina; harpe with membranous transverse ridge, bearing several long setae, separated from carina of sacculus by narrow smooth depression, extending from base of valve to clasper; clasper heavily sclerotized, subquadrate, dorsal process digitate, curving dorsally, sharp-pointed, with single subapical cilium, ventral process similar but transversely directed. Aedoeagus about six times as long as wide, basal third angled somewhat; a single carinal cornutus, slender, about half aedoeagus length, with small papilla at 1/6 distance from its distal end; a second similar but poorly developed cornutus closely parallel to first; third cornutus only 1/10 aedoeagus length, mostly weakly sclerotized, but stout hook at distal end; vesica with numerous minute short spines, some arising from triangular bases, others from broadly rounded ovate bases.

*Female genitalia* with ovipositor compressed, lobes narrow, tapering both dorsally and ventrally, finely setose. Apophyses anteriores about 1.5 times as long as apophyses posteriores, straight; dorsal triangular process at 1/3 from base; smaller similar ventral process at 1/4 from base. Apophyses



posteriores more slender, abruptly angled dorsally at 1/3 from base. Eighth segment collar with nearly straight row of about 7 short setae on dorsal half and at 1/3 distance from posterior margin; elsewhere devoid of setae. Ostium large, flat, subquadrate; in some specimens with a few prominent setae. Ductus bursae sclerotized and funnel shaped posteriorly, otherwise membranous and finely scobinate. Corpus bursae small, round; smooth but for indistinct signum (fig. 269 arrow, 270) formed of a dorsocaudal patch of rounded to pentagonal or hexagonal scales, each with minute papilla in its center. Ductus seminalis from middle of ductus bursae.

**REMARKS.**— The genus is thus far known only from the single Aldabra species.

We are pleased to name this genus in honor of Henry Legrand in recognition of his pioneering work on the Lepidoptera of the Seychelles.

*Legrandellus fuscolarosalis* (Legrand), new comb.

(Fig. 15, 63, 138-139, 269-270)

*Pyrausta fuscolarosalis* Legrand, 1965: 115-116, pl. 7, no. 6.

**DESCRIPTION.**— Frons of male white, light brown laterally anterior to eye; of female light brown, brown laterally anterior to eye. Labial palpus of male with basal segment light brown on outer side, white ventrally and ventrally on outer side; second segment similar, but with darker band at apex; third segment light brown on basal half, white on distal half. Female similar, but a somewhat darker shade of brown, lacking band at apex of second segment, and apex of third segment light brown rather than white. Maxillary palpus with basal segment white; distal segment brown on basal third, darker distally, distal third white. Vertex white in male, light brown in female. Occiput brown, with white scales middorsally in male. Patagium and tegula light brown.

**Forewing** radius 5 mm. Ground moderate yellowish brown; antemedial, postmedial, terminal lines dark yellowish brown. Antemedial line convex, of uniform or nearly uniform width, not prominently developed, but complete. Postmedial line complete, width similar to antemedial and uniform; angled inward very slightly from costa to  $M_1$ , then outward to  $M_3$ , then inward slightly to  $CuA_2$ , convex between  $CuA_2$  and inner wing margin. Terminal line of same width as others, inconspicuous. Fringe white at apex, along outer margin light brown on basal third of scales, brown on distal third. Prominent triangular spot on costal margin just interior to postmedial line; spot white in male, yellowish white in female.

**Hindwing** ground nearly uniformly moderate yellowish brown, white on basal 3/4 of costal margin. Fringe on outer margin light brown on basal third, brown on distal 2/3 of scales. Strong fringe of white hair-like scales along inner wing margin.

**Genitalia** as described for the genus.

**TYPE MATERIAL EXAMINED.**— Paratype male, labeled: "♀" [sex undetermined]; "Paratype" [red printed label]; "Aldabra 25. XII. 1959 M. Gerber"; "289"; "♂ genitalia on slide 1764 J. C. Shaffer"; "Museum Paris Coll. H. Legrand."

Paratype female, labeled: "♀"; "Paratype" [red printed label]; "Aldabra 27. XI. 1959 M. Gerber"; "Museum Paris Coll. H. Legrand"; "♀ genitalia on slide 2185 J. C. Shaffer" [MNHN].

**DISTRIBUTION.**— Endemic to Aldabra. A single female was taken at Settlement, Jan. 20, 1968.

**HOSTS.**— Unknown.

*Eurrhyarodes* Snellen

*Eurrhyarodes* Snellen, 1880: 215-216. Type-species *Eurrhyarodes stibialis* Snellen, 1880: 216. By monotypy. Type-locality: East Indies.

*Molybdanthe* Meyrick, 1884: 293 (key), 309. Type-species *Botys bracteolalis* Zeller, 1852: 30. By monotypy.

**DESCRIPTION.**— Frons rounded or somewhat flattened, with shining lead-colored scales. Vertex with erect scale tufts. Labial palpus obliquely ascending, first and second segments broadly scaled, with angular tufts anterodistally, third with compressed, cylindrical scaling. Maxillary palpus prominent, its scaling compact or somewhat expanded. Proboscis well

developed, scaled at base. Eye globular, surrounded by scales. Ocellus present. Antenna filiform, dorsally scaled, alternate scale-rows raised, ventrally ciliate; length of ventral setae varying with species and sex. Body short, slender, tip of abdomen somewhat exceeding anal angle of hindwing. Legs short; foretibia with epiphysis; midtibia with one, hindtibia with two pairs of spurs, outer shorter than inner. Praecinctorium well developed, distally transversely flattened and distinctly bilobed.

**Forewing** narrow, length about four times width; costa straight to about 7/8, then arched to obtuse apex at  $R_5$ ; termen faintly scalloped, straight and slightly oblique basad to  $M_3$ , then evenly rounded to obtuse tornal angle just behind  $CuP$ ; posterior margin weakly sinuate. Male without frenulum hook, but with retinaculum of strong scales; typically, though not in the Aldabra species, with a scale-covered subapical fovea on forewing.  $Sc$  running close to costa, ending on it just basad of end of discal cell.  $R_1$  from cell at 5/6.  $R_2$  from cell just basad of anterior angle, diverging slightly from  $R_{3+4}$ ; the latter from anterior angle;  $R_3$  and  $R_4$  separating about half-way from cell to apex.  $R_5$  from anterior angle, straight and not approximated to  $R_{3+4}$ . Discocellular almost straight and erect, very slightly concave and oblique distad.  $M_1$  from 1/3 distance from anterior to posterior angles of cell.  $M_2$  and  $M_3$  from close together near posterior angle;  $CuA_1$  from a little basad of posterior angle; these three veins weakly curved and approximated basally.  $CuA_2$  from cell at 3/4 from base.  $CuP$  represented by a fold.  $1A+2A$  strong, weakly decurved subbasally.  $3A$  weak, joining  $1A+2A$  at 1/3 from base to form a closed loop.

**Hindwing** a little longer than posterior margin of forewing, about twice as long as wide; costa very weakly sinuate to end of  $Sc+R_1$ , there obtusely angled and oblique distad to obtuse apex at end of  $R_5$ ; termen weakly scalloped and sinuate, perceptibly excavated between  $M_1$  and  $M_2$ , strongly convex between  $M_2$  and  $CuA_1$ , then less so to rounded anal angle at  $1A+2A$ ; anal margin almost straight for most of its length.  $Sc+R_1$  anastomosed with  $R_5$  for about 1/3 distance beyond discal cell.  $R_5$  and  $M_1$  stalked for a short distance. Cell anteriorly about 1/3, posteriorly about 1/2 length of wing. Discocellular strongly concave distad, anteriorly erect, posteriorly strongly oblique. Cell  $M_1$  twice as wide as cell  $R_5$  and three times as wide as cell  $M_2$ . Veins  $M_2$  and  $M_3$  from posterior angle of discal cell, their basal parts strongly curved and approximated.  $CuA_1$  from just basad of posterior angle, less strongly curved and approximated to  $M_3$ .  $CuA_2$  from cell at 2/3 from base.  $CuP$ ,  $1A+2A$  and  $3A$  all well developed. Frenulum of male simple, from a short papilla; that of female double.

**Male genitalia** with uncus short, broadly rounded; distal part of dorsal surface densely set with small, dark-pigmented, spine-like scales. Gnathos and transtilla absent. Juxta subrectangular, rounded ventrally. Tegumen arched. Vinculum various, but without prominent saccus. Valve with straight, tubularly inflated costa; apex more or less narrowly rounded; sacculus inflated to middle of ventral margin, variously armed; ventral margin produced at or near end of sacculus. Clasper various in shape, projecting over ventral margin of valve near end of sacculus. Aedoeagus cylindrical, with various armature of cornuti.

**Female genitalia** [based on holotype of *E. tricoloralis*] with ovipositor somewhat compressed. Apophyses anteriores 1.75 times as long as apophyses posteriores. Ostial chamber membranous, greatly thickened except along middorsal and midventral lines, thickening extending onto ductus bursae. Ductus bursae short, 2.7 times as long as deep, U-shaped in cross section, well sclerotized anteriorly and bearing minute slender spines on anterior 2/5. Corpus bursae ovoid, broadest anterior of center, twice as wide as long, dorsally and ventrally with slightly curved longitudinal ridges running about 2/5 length of corpus bursae; absent on anterior 2/5, and posterior 1/5 of corpus bursae. Spines of ductus bursae continuing onto posterior 1.5 of corpus bursae, except near ductus seminalis. Ductus seminalis from posterior end of corpus bursae near ductus bursae.

**EARLY STAGES.**— Unknown.

**REMARKS.**— This genus has only a few known species, but they are widely distributed in the tropics of the Old and New Worlds.

*Eurrhyarodes tricoloralis* (Zeller)

(Fig. 16, 64, 140-142, 271)

*Botys tricoloralis* Zeller, 1852: 31-32.

*Eurrhyarodes tricoloralis* (Zeller); Hampson, 1896: 264; 1898: 626; Shibuya,



1928: 181; Tams, 1935: 275; Vinson, 1938: 44; Klima, 1939a: 37; Ghesquiere, 1942: 121; Legrand, 1965: 99; Pinhey, 1975: 69, pl. 8; Vári and Kroon, 1986: 88, 169; Mathew & Menon, 1989: 78, pl. 1, fig. 6, pl. 4, fig. 3.

**DIAGNOSIS.**—Wing radius 5-8 mm, with yellow body and wings bearing characteristic conspicuous dark fuscous markings with areas of shining lead-colored reflections. While unlikely to be confused with any other species now recorded from Aldabra, *E. tricoloralis* has close relatives in Asia, Africa and America, and specimens of unusual appearance collected in the future should be dissected for examination of genitalia. In particular, males with a subapical fovea on the forewing are almost certain to belong to other species.

**DESCRIPTION.**—*Male genitalia* with apical portion of valve wider than sacculus. Sacculus with evenly sinuous dorsal margin, bearing a prominent distally directed spine near the distal end of its dorsal margin. Clasper strongly sclerotized, its posterodistal margin forming a ridge extending ventrally as a long sharp cusp. Vesica armed with minute scattered cusps, a single spine nearly as long as diameter of aedeagus, and dense bundle of large tapering spines.

*Female genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**—Holotype female, labeled: "Caffra-ria."; "219"; "*Botys tricoloralis*" [Zeller's handwriting]; "Riksmuseum Stockholm"; "♀ genitalia on slide 1796 J. C. Shaffer" [NRS]. In his original description Zeller indicates the type-locality as "...terra Natalensi" [KwaZulu-Natal, South Africa].

**DISTRIBUTION.**—Widely distributed on mainland Africa and recorded from Mauritius and the Seychelles. Records from the Indo-Australian region are misidentifications of a close relative very similar to *E. tricoloralis*. The Aldabra series consists of 2 males taken at Settlement on March 29 and 31, 1968.

**HOSTS.**—Unknown.

**REMARKS.**—Hampson (1896) lists *Isopteryx abnegatalis* Walker, 1859 and *Eurrhyarodes confusalis* Warren, 1896 as synonyms of *tricoloralis*. We have examined the holotype male of *confusalis* (BMNH pyralidae genitalia slide no. 14290) from Khasis Hills, Assam, India and two male syntypes of *abnegatalis* (BMNH pyralidae genitalia slide nos. 14288 and 14289) from Sri Lanka. These three specimens agree in all essential details, but differ from the Aldabran male in having a minute spine (Fig. 337) at the apex of the sacculus rather than a much larger subapical one (Fig. 140) seen in specimens of *E. tricoloralis*. Genitalia of the Aldabra male match those of one from the granitic Seychelles (J. Shaffer genitalia slide no. 1759, MNHN) and of six examined from Africa (Kenya, Uganda, Zambia, South Africa). The holotype of *E. tricoloralis* matches female specimens examined from Angola, Uganda, and the granitic Seychelles. We reinstate *Eurrhyarodes abnegatalis* (Walker) as a separate species with *E. confusalis* (Warren) as a junior synonym.

#### METASIA Guenée

*Metasia* Guenée, 1854: 251; Hampson, 1896: 421; 1899: 236-237. Type-species *Pyralis suppannalis* Hübner, [1823]: 187-190. Designated by Hampson, 1896: 421.

*Clasperia* Hartig, 1952: 35 (as a subgenus of *Metasia*). Type-species *Botys ophialis* Treitschke, 1829:90. By original designation.

*Hystrixia* Hartig, 1952: 37 (as a subgenus of *Metasia*). Type-species *Metasia younesalis* Chrétien, 1915: 295. By monotypy.

**DESCRIPTION.**—Frons oblique, with smooth scaling. Labial palpus with second segment obliquely ascending, third porrect; palpus of male triangular in lateral view due to broad scaling toward apex of second segment; somewhat more narrow in female. Maxillary palpus narrowly conical, expanded distally, extending to just dorsal of labial palpus. Proboscis with appressed basal scaling. Antenna filiform, basal segment compressed, about same width as basal portion of shaft; in male basal segments of shaft about as long as wide, pilose, cilia about 1/6 as long as segment width; posterior surface with a single cilium, about 1/3 to 1/2 as long as segment width in

male; female with basal segments of shaft about 2/3 as wide as in male, absolute length of cilia similar to male. Ocellus well developed, laterally directed, separated from eye by about its own diameter and by strongly appressed scales that extend to anterior and posterior of ocellus. A strong raised tuft of scales projects prominently upward from behind ocellus. Eye large, smooth, globular, extending to plane of vertex.

*Forewing* less than half as wide as long; costal margin slightly concave. Discal cell about 1/2 length of wing, discocellular vestigial to absent. Sc reaching costa just beyond cell. R<sub>1</sub> arising from outer 1/5 of cell; R<sub>2</sub> stalked for about 1/2 its length; R<sub>3</sub> stalked with R<sub>4</sub> about 4/5 length of latter; R<sub>2+4</sub> from very near upper outer angle of cell; R<sub>5</sub> from the angle; M<sub>1</sub> from just below the angle; M<sub>2</sub> from above lower outer angle; M<sub>3</sub> from the angle; CuA<sub>1</sub> from just before the angle; CuA<sub>2</sub> from outer 1/4 of cell; 1A+2A very weakly sinuate, arching downward from base, then upward toward middle of wing, then nearly straight, finally arching upward and ending at tornal angle. 3A weakly developed, apparently forming open loop, not joining 1A+2A, ending at 2/5 distance from wing base to tornal angle.

*Hindwing* just over half as wide as long. Costa sinuate, a pronounced concavity between cell and fork of Sc+R<sub>1</sub> and Rs. Cell about 2/5 length of wing, discocellular vestigial to absent. Sc+R<sub>1</sub> and Rs fully anastomosed between cell and fork at about 1/3 distance from cell to apex; Rs ending at apex. M<sub>1</sub> from free portion of Rs near upper outer angle of cell, straight; M<sub>2</sub> from just above lower outer angle to short stalked with M<sub>3</sub>, angled downward at basal 1/4, then straight to termen; M<sub>3</sub> from lower outer angle, angled downward at basal 1/4, then straight to termen; CuA<sub>1</sub> also from lower outer angle, angled downward near base, then straight; CuA<sub>2</sub> from outer 1/4 of cell, straight to termen.

*Male genitalia* with uncus broad basally, rather abruptly constricted to about 1/6 basal width at middle region; apex deeply bifurcate, each lobe spatulate, its dorsal surface densely set with numerous narrowly lanceolate scales. Transtilla absent. Juxta cordate, shallowly emarginate posteriorly, with pair of somewhat indistinct parasagittal tubes or ridges on posterior half. Vinculum V-shaped, about 2.3 times as long as maximum width, anterior end bluntly triangular in outline. Valve broad basally, narrowed beyond sacculus; costa tubular for nearly 2/3 dorsal length of valve, flared basally, then narrow and tapering distally; sacculus inflated basally, distal 2/3 with carina separating membranous ventral margin provided with patch of stiff setae from inner smooth sclerotized band devoid of setae; sacculus with minute sharp teeth at apex, and beyond a larger well sclerotized spatulate process; cucullus rather broadly rounded. Tegumen about as long as broad. Aedeagus cylindrical.

*Female genitalia* with ovipositor lobes narrow, each with terminal row of very densely set fine setae, subterminal row of similar but well spaced setae, and an anterior row of about a dozen very long setae interspersed with shorter ones; surface of ovipositor lobe set with numerous rather uniformly distributed minute setae. Apophyses posteriores slender, nearly straight, slightly thickened toward base, then tapering to base, about 2/3 as long as apophyses anteriores; apophyses anteriores slender, basal half straight, then somewhat downcurved. Ductus bursae extremely short. Corpus bursae pear shaped.

#### *Metasia perfervidalis* (Hampson), new comb.

(Fig. 17, 66-67, 143-145, 272)

*Pyrausta perfervidalis* Hampson, 1913: 33.

*Pyrausta prostygalis* Hampson, 1913: 34, new syn, new comb.

**DESCRIPTION.**—Frons light yellowish brown, dorsally bordered laterally by conspicuous white line which extends posteriorly between antenna and eye, then hooks inward behind antenna. Labial palpus with basal segment white; second segment white ventrally on basal third, moderate yellowish brown laterally; third segment moderate yellowish brown. Maxillary palpus white on inner and posterior surfaces, moderate yellowish brown on outer and anterior surfaces. Basal segment of antenna white anteriorly, dark brown on inner surface, brown elsewhere. Vertex and occiput dorsally brilliant orange yellow. Appressed scales around ocellus white to yellowish white. Occiput moderate yellowish brown laterally. Patagium and tegula brilliant orange yellow, yellowish pink to brown anterior to wing base.

*Male forewing* radius 5-6 mm; ground of male brilliant orange yellow;



costa brown on basal 2/3 of wing, becoming lighter distally, darker where transverse lines reach costal margin, an island of yellow on basal 1/4 of wing bounded by brown on costa, Sc, wing base, and antemedial line. Antemedial line extending obliquely outward from costal margin to CuP fold, then obliquely inward to 1A+2A, then diffuse, but essentially straight to inner wing margin; dark brown between costal margin and Sc, light reddish brown posterior to Sc. Medial line forming small transverse discal spot on discocellular, brown bordered with light reddish brown; line light reddish brown from discal spot to inner wing margin, concave between cell and 1A+2A, straight to margin beyond 1A+2A. Postmedial line brown between costal margin and radius, then light reddish brown to inner wing margin; line poorly developed, rather straight, bulging outward somewhat around  $M_3$ . Ground a nearly even mixture of brilliant orange yellow and light reddish brown scales distal to antemedial line and posterior to 1A+2A, also distal to postmedial line, except near apex.

*Female forewing* with costal band of dark yellowish brown between costal margin and Sc, somewhat lighter distally. Ground brilliant orange yellow between wing base and antemedial line, and between medial and postmedial lines; a mixture of brilliant orange yellow and light reddish brown scales between antemedial and medial lines. Antemedial line dark yellowish brown, extending obliquely outward to CuP fold, then obliquely inward to 1A+2A, then obliquely outward to inner wing margin. Medial line dark yellowish brown forming transverse elliptical discal spot on discocellular, extending obliquely inward posterior to cell, then obliquely outward to 1A+2A, then obliquely inward to inner margin; medial and antemedial lines together forming hourglass figure. Postmedial line dark yellowish brown, angled inward on fold between  $M_1$  and  $M_2$ . Terminal line dark yellowish brown; ground between postmedial and terminal lines rather uniform moderate yellowish brown.

*Male hindwing* ground brilliant orange yellow. Well marked antemedial and medial lines of light reddish brown to dark yellowish brown. Apical region moderate yellowish brown.

*Female hindwing* with broad bands of moderate yellowish brown along costal and outer margins; antemedial and medial lines of moderate yellowish brown, broad. A large patch of brilliant orange yellow between antemedial and medial lines, a smaller patch distal to medial line. Ground basal to antemedial line with indistinct round yellowish spot bounded by moderate yellowish brown.

*Male genitalia* with aedoeagus about 5 times as long as wide; vesica with pair of small nodular subequal cornuti, the smaller with 3 strong triangular teeth, the larger with 3 similar large teeth and several smaller ones, the teeth of each cornutus lying roughly in the same plane; near the larger cornutus lies a somewhat larger unarmed nodule of well sclerotized membrane; vesica with moderate sized patch of minute triangular teeth, and opposite, a similar sized patch of tiny papilliform processes formed of folded membrane.

*Female genitalia* with eighth tergum with about a dozen setae on posterior margin, and several others scattered over its surface, mostly dorsal to level of apophyses and on posterior half of tergum. Ostial chamber somewhat conical, formed of folds of moderately well sclerotized membrane, with ventral half a ring at its posterior end. Ductus bursae membranous, joining corpus bursae dorsally near its posterior end. Corpus bursae with posterior 1/3 bearing irregular rows of small sharp teeth giving it a granular aspect, these absent immediately around ductus seminalis and in larger island of smooth membrane on dorsal surface of corpus bursae; toward signum teeth become scale-like, finally appressed and presenting a 'paving stone' pattern around signum; anterior 1/3 of corpus bursae smooth, unarmed. Signum transverse, nearly twice as long as wide, slightly constricted in middle; nodular, covered with numerous fine erect bluntly-pointed lamella.

**TYPE MATERIAL EXAMINED.**— *Pyrausta perfervidalis*, holotype female, labeled: "Nairobi Plains, Kikuyu, B.E. Africa, R. Crawshaw, 1900-151, 5 V. 1900"; "Pyralidae Brit. Mus. Slide No.14302" [BMNH].

*Pyrausta prostygialis*, holotype male, labeled: "E. Transvaal, White River, May 1909, A. T. Cooke, 1909-290"; "Pyralidae Brit. Mus. Slide No. 14318" [BMNH].

**DISTRIBUTION.**— We have examined material in the British Museum (Natural History) from Gambia, Nigeria (Zungeru), Kenya (Nairobi), and Malawi (Mt. Mlanje). The Aldabra series consists of four specimens: Settlement (19 Jan.) 1 ♀; Takamaka (15, 19 Feb.) 2 ♂. David Adamski took

one male at Settlement, 12-22 Mar. 1986.

**HOSTS.**— Unknown.

**REMARKS.**— Hampson described *M. perfervidalis* and *M. prostygialis* in the same paper and from unique female and male specimens. The greater area of dark color on the female wings as contrasted with those of males produces a conspicuous sexual dimorphism, and it is not surprising that Hampson considered then separate species considering the minimal material available to him. We have associated the sexes in three separate localities by examination of material from Aldabra, Malawi (Mt. Mlanje), and Nigeria (Zungeru). We have chosen the name *M. perfervidalis* for this species as it has page precedence and because the female genitalia provide good specific characters.

#### **MICROGESHNA** Shaffer & Munroe, new genus

Type-species *Stenia laportei* Legrand, 1965: 96-97. By present designation.

Type-locality: Seychelles: Aldabra Atoll.

**DIAGNOSIS.**— The subrhomboid valve of the male genitalia with its sacculus concavity and parallel digitate process is unique to this genus.

**DESCRIPTION.**— Frons oblique. Labial palpus short, about 1.5 times as long as eye diameter; second and third segments perfect to obliquely ascending, not reaching frons. Maxillary palpus cylindrical, obliquely ascending above labial to about the level of frons tip. Proboscis well developed. Antenna filiform, basal segment somewhat enlarged and compressed; male with shaft hirsute, cilia somewhat appressed, about twice as long as segment width; female with numerous shorter cilia about half as long as segment width, row on inner side of shaft formed of cilia on alternating segments, each about as long as segment width. Ocellus well developed, nearly round, separated from eye by about half its own width.

*Forewing* costa somewhat concave to junction with  $R_2$ , then convex to apex. Sc reaching costal margin about half way to apex;  $R_{2+4}$  stalked, from just before upper outer angle of cell,  $R_2$  branching off about 1/6 distance from cell to apex,  $R_3$  at about 3/5 distance to apex,  $R_4$  reaching costal margin before apex;  $R_5$  from upper outer angle, curving upward very slightly. Discocellulars very weak, best developed below  $M_1$ .  $M_1$  from about 2/5 distance from top of cell, straight but for very slight downward bend in middle.  $M_2$  from lower outer angle of cell, very slightly sinuate, curving upward from cell, then downward, then very slightly upward near termen.  $M_3$  also from lower angle, very nearly straight.  $CuA_1$  from before the angle, very slightly sinuate.  $CuA_2$  from well before the angle, equidistant from  $CuA_1$  throughout its length. 1A+2A nearly parallel to cubitus along basal half of cell, curving rather strongly downward along distal half of cell, then nearly parallel to inner margin before reaching tornus. 3A short, very poorly developed, not tubular, diverging from 1A+2A.

*Hindwing* narrow, 2.6 times as long as wide. Costa convex over upper outer angle of cell, then slightly convex to junction with Sc+ $R_1$ . Discocellular weakly developed, straight down for about 1/3 its length, then straight and oblique to lower outer angle. Sc+ $R_1$  forking from  $R_s$  at 7/10 distance from cell to apex;  $R_s$  reaching apex.  $M_1$  stalked with Sc+ $R_s$  for about 1/6 its length.  $M_2$  from lower outer angle, curving very slightly upward, then straight to termen.  $M_3$  from below  $M_2$  origin, curving slightly upward, then straight, and slightly upward again approaching termen.  $CuA_1$  from very near  $M_3$  origin, nearly straight.  $CuA_2$  from 5/7 distance to distal end of cell, nearly straight. CuP tubular for about distal 1/3. 1A+2A normal, tubular. 3A about 1/3 length of CuP. Anal region narrow.

*Male genitalia* with uncus with distal portion slender, nearly tubular, expanded into broadly spatulate apical region, nearly circular in outline and on posterior half of dorsal surface bearing dense patch of minute lanceolate scales. Valve obliquely truncate; costa tubular; sacculus with rugose concavity and parallel digitate process. Aedoeagus slender, about 10 times as long as wide; vesica with slender triangular cornutus bearing two rows of minute broad teeth.

*Female genitalia* with ovipositor lobes wide and short, finely setose. Ostial chamber anteriorly rugose and somewhat bulbous. Ductus bursae slender, heavily sclerotized, smooth. Corpus bursae elongate, tapering posteriorly, girdle of about 16 small triangular teeth around anterior portion,



posterior end of corpus bursae with sclerotized ring and numerous fine sharp spines. Ductus seminalis from ring at posterior end of corpus bursae.

***Microgeshna laportei* (Legrand), new comb.**

(Fig. 18, 65, 148-150, 273-274)

*Stenia laportei* Legrand, 1965: 96-97, pl. 7, no. 2.

**DESCRIPTION.**— Labial palpus with basal segment white, second segment dark yellowish brown on basal 2/3, light yellowish brown on distal 1/3, third segment dark yellowish brown. Maxillary palpus with base and apex light yellowish brown, middle dark yellowish brown. Proboscis with moderate yellowish brown scales near base, then white scales extending to about length of labial palpus. Vertex concave between and just anterior to antenna, convex posterior to antenna; pale orange yellow. Occiput pale orange yellow dorsally, moderate yellowish brown laterally. Patagium and tegula pale orange yellow dorsally to moderate yellowish brown laterally.

**Forewing** radius about 4.5 mm. Ground mostly light orange yellow; semilunar white spot between antemedial and medial lines in cell, larger elliptical white spot between these lines posterior to cell, the two white spots separated by longitudinal line of light orange yellow centered on cubitus. Wing marked with complex pattern of dark brown lines and bands. Longitudinal dark brown band on radius from wing base to postmedial line, giving rise to about eight short branches to costa along length of wing. Basal band broad, extending about 1/10 length of wing, its distal margin extended in inner wing margin, band with irregular lighter spot in its center. Subbasal line complete to inner wing margin, nearly straight. Antemedial band very broad, extending posteriorly to 1A+2A, forming round dark brown spot with somewhat lighter center between cell and 1A+2A; broadest in cell, here with longitudinal subelliptical spot of light orange yellow. Medial band interrupted by longitudinal line of light orange yellow on cubitus; anterior portion formed of three transverse lines on or near discocellulars, the medial line dark orange yellow, two outer lines dark brown; posterior portion consisting of nearly straight dark brown line extending obliquely inward from origin of CuA<sub>2</sub> to inner wing margin and a second short slender dark brown line extending obliquely outward from lower outer angle of cell about half way to tornus. Postmedial line about 4/5 distance to termen, narrow.

**Hindwing** nearly white at base, antemedial and medial lines well defined, a short line midway between them near inner wing margin. Apex brown, inclosing two somewhat lighter areas.

**Genitalia** as described for the genus.

**TYPE MATERIAL EXAMINED.**— Paratype male, labeled: "Paratype"; "♂"; "Aldabra 16. XI. 1959 M. Gerber"; "257"; "Museum Paris Coll. H. Legrand"; "♂ genitalia on slide 1952 J. C. Shaffer" [MNHN].

Paratype female, labeled: "Paratype"; "♀"; "Aldabra 30. XI. 1959 M. Gerber"; "257"; "Museum Paris Coll. H. Legrand"; "♀ genitalia on slide 1953 J. C. Shaffer" [MNHN].

**DISTRIBUTION.**— Known only from Aldabra. Material examined: Settlement (18, 19 Jan.) 2 ♀; Takamaka (31 Jan.— 19 Feb.) 12 ♂, 22 ♀.

**HOSTS.**— Unknown.

**PESSOCOSMA** Meyrick

*Pessocosma* Meyrick, 1884: 300-301. Type-species *Lepyrodus iolealis* Walker, 1859: 466. By monotypy. Type-locality: Australia.

**DESCRIPTION.**— Frons rounded, weakly flattened, scaling rather rough. Vertex short, with erect tufts of slender scales. Labial palpus porrect, exceeding frons by about length of head; first segment short, curved; second segment taking up most of length, slightly oblique dorsad, vestiture fairly compact, of normal scales, subcylindrical, weakly compressed; third segment with scaling well demarcated from that of second, short, porrect, acuminate. Maxillary palpus conspicuous, obliquely porrect, not attaining plane of frons, scaling not distally expanded. Proboscis large, coiled and conspicuous, scaled for a considerable distance at base. Ocellus well developed, looking dorsad, separated from eye by about its own diameter. Antenna filiform, with raised scale rows dorsally, sparsely ciliate ventrally in male, more densely short-ciliate in female. Body compact. Legs slender, outer spurs

about half length of inner in both sexes. Praeincinctorium strongly bilobed. Abdomen extending beyond anal angle of hindwing.

**Forewing** about three times as long as wide; costa basally convex for a short distance, then straight to about 5/6, then rounded to the subrectangular apex; termen straight and oblique to M<sub>3</sub>, there bent and more strongly oblique to the obtuse tornal angle; posterior margin straight and oblique from tornus to a convex subbasal flexure. Sc ending on costa a little beyond middle. R<sub>1</sub> from cell a little basad of anterior angle, reaching costa at about 5/7 from base. R<sub>2</sub> from just basad of anterior angle, well separated from R<sub>1</sub>, but closely apposed for some distance to R<sub>3+4</sub>; R<sub>3+4</sub> arising from anterior angle of cell, R<sub>3</sub> and R<sub>4</sub> separating at a little less than halfway from cell to apex, R<sub>4</sub> ending on costa basad of apex; R<sub>5</sub> from anterior angle of cell, basally flexed toward R<sub>3+4</sub> but not approximated to it. M<sub>1</sub> from just behind R<sub>5</sub>, relatively straight and diverging from it. Discocellular obtusely angled medially, anterior part a little less oblique than posterior. M<sub>2</sub>, M<sub>3</sub> and CuA<sub>1</sub> increasingly spaced beginning at posterior angle of cell; CuA<sub>2</sub> from cell at 3/4. CuP represented by a fold. 1A+2A strong and straight, ending at tornal angle. 1A+2A meeting 3A at about 2/5 its length from base to form a broad closed loop, with a weak free spur distally. Both sexes without frenulum hook, but with scaled retinaculum.

**Hindwing** about as long as posterior margin of forewing, about half as wide as long. Costa weakly arched; apex rounded; termen very slightly excavated between apex and cell M<sub>2</sub>, flexed at M<sub>3</sub>, and weakly and obliquely convex to beyond CuP; anal angle rounded; anal margin weakly convex. Discal cell less than half length of wing. Sc+R<sub>1</sub> anastomosed with Rs beyond cell for about 1/3 distance from cell to apex. Rs and M<sub>1</sub> stalked for a very short distance beyond cell. Discocellular erect anteriorly, posteriorly concave and moderately oblique distad. M<sub>1</sub> and M<sub>2</sub> from posterior angle of cell, weakly approximated basally. CuA<sub>1</sub> from a little behind posterior angle, straight and not approximated to M<sub>3</sub>; CuA<sub>2</sub> from cell at about 2/3 from base. CuP well developed, weak at base; 1A+2A and 3A well developed, 1A+2A ending before and 3A after anal angle. Frenulum strong, single in male, multiple in female.

**Male genitalia** with uncus 1.5 to 2.0 times as long as wide, subtriangular, more or less rounded at tip, rim thickened, sides weakly convex, dorsum without spines or scales. Gnathos absent. Subscaphium broad, weak, strap-like Transtilla wide laterally, tapering to a narrow medial junction. Juxta small, spade-shaped, with rounded ventral margin, and bilaterally emarginate dorsal margin with sharp median and lateral angles. Vinculum low, short, somewhat excavated laterally to accommodate coremata; saccus hardly developed, rounded to subobtusate in outline. Valve with costa, apex and ventral margin forming an evenly rounded oval outline; costa tubularly inflated and sclerotized to apex; clasper large, strongly sclerotized, claw-like, decurved to about ventral margin; sacculus fairly wide on basal half of valve, ending at a sharp, weakly acute angulation, followed by a concave terminal margin, converging rapidly to ventral margin of valve; mesal surface of valve densely clothed with fine setae. Aedoeagus cylindrical, 6 or 7 times as long as wide, semimembranous, with strap-like sclerotization of dorsal margin; cornuti various.

**Female genitalia** [not examined for type-species] with ovipositor lobes high, narrow, oblique, dorsally fused, posterior surface with vestiture of fine short setae; apophyses posteriores with fine oblique vertical element, the dorsal limb longer than the ventral, shaft slender, 1.5 to 2.0 times as long as vertical bar. Eighth tergite well sclerotized, rectangular, anterior margin laterally emarginate. Apophyses anteriores slender, a little longer than apophyses posteriores. Ostial chamber small, membranous, opening to a narrow, irregularly sclerotized ductus bursae. Corpus bursae elongate, pyriform, membranous and minutely spinulose, set asymmetrically on ductus bursae, with an anterolateral diverticulum bearing opening of ductus seminalis, and with a sclerotized, transversely attenuate signum thickly set with strong spinules.

**EARLY STAGES.**— Unknown.

**REMARKS.**— This genus corresponds to Hampson's Section 1B of *Sameodes* Snellen, 1880, and in fact appears to be the sister group of that monotypic genus. *Sameodes* has the discal cell of fore- and hindwings proportionally shorter and wider, and has a strong lobe at the middle of the costa of the hindwing. In addition, in the male the costa of the forewing has a strong lobe near the middle; and the mid tibia has a swelling on outer side before middle, a flexure near



middle, the outer medial spur minute, and the terminal spurs replaced by a tuft of scales. The male genitalia have the uncus more elongate (about 3 times as long as wide), its rim substantially widened distally, the transtilla wide medially, the saccus truncate, with prominent coremata, and the valve narrow and distally truncate, with the costal reinforcement distinctly expanded distally and also with a small subterminal lobe on mesal surface, with clasper relatively short and slender, and with sacculus distally tapering, not angulate. A number of these characters are clearly apomorphic. Apparent apomorphies of *Pessocosma* include the short wide uncus, the evenly rounded outline of the valve (costa sinuous in related genera), the somewhat hypertrophied clasper, and the distal angulation of the sacculus.

So far as is known to us, *Pessocosma* includes the present species and the 3 species included by Hampson (1899), viz. *P. peritalis* (Walker, 1859), from India and Sri Lanka, *P. bistigmalis* (Pryer, 1877), from China, and *P. iolealis* (Walker, 1859), from Australia. Of these, *P. bistigmalis* resembles *P. prolalis* in having two digitate cornuti on the vesica, but differs in having about double the wingspan and in absence of sexual dichromatism, as well as in details of the maculation. The vesica of *P. iolealis* has a group of small cornuti and one somewhat larger one; *P. peritalis* is closely similar to *P. iolealis* in maculation, but we have not examined its male genitalia.

***Pessocosma prolalis* (Viette & Legrand), new comb.**

(Fig. 19, 68-69, 146-147, 275-276)

*Epipagis prolalis* Viette and Legrand, 1958, *In* Viette 1958c: 62-64; Legrand, 1965: 108; Frith, 1975: 212.

**DESCRIPTION.**—Forewing radius about 8 mm; ground grayish brown, costa with four segments of pale orange yellow on its distal half. Hindwing ground similar. Both sets of wings with complex of white spots, these forming bands on hindwings, more extensively developed in males than in females (Fig. 68, 69).

**Male genitalia** with aedeagus bearing two cornuti, one distal and dorsal, the other proximal and ventral; each cornutus consisting of a strong thorn-like distal portion and a less well defined somewhat plate-like proximal portion very nearly equal in length to distal portion. Distal cornutus lying contiguous with proximal, about one-quarter length of aedeagus; proximal cornutus about two-fifths length of aedeagus.

**Female genitalia** as described for the genus.

**TYPE MATERIAL EXAMINED.**—Paratype female, labeled: "Oc. Indiano, Aldabra, XI 1953"; "Epipagis prolalis n. sp. Paratype P. Viette"; "Paratype"; "Museum Paris"; "♀ genitalia on slide 1762 J. C. Shaffer" [MNHN].

**DISTRIBUTION.**—Known only from Aldabra and Cosmoledo (Menai). Aldabra material: Settlement (9-25 Jan.) 9 ♂, 41 ♀ (29, 31 Mar.) 7 ♀; Takamaka (31 Jan.–19 Feb.) 13 ♂, 20 ♀; Cinq Cases (24 Feb.–9 Mar.) 42 ♂, 50 ♀; Middle Island (16-22 Mar.) 12 ♂, 12 ♀.

**HOSTS.**—Unknown.

**OMMATOBOTYS Shaffer & Munroe, new genus**

Type-species *Nacoleia ommatalis* Hampson, 1912: 626. By present designation.

Type-locality: Takaunga (or Takaungu), British East Africa [Kenya].

**DIAGNOSIS.**—This genus is erected for a compact group of Afrotropical species, of which one is found on Aldabra. Though included in the composite genus called *Nacoleia* Walker or later *Lamprosema* Hübner by Hampson, the species of *Ommatobotys* are very different in genital structure from *Lamprosema lunulalis* Hübner or *Nacoleia murcusalis* Walker [= *N. rhoealis* (Walker)], the type-species of those two genera, as well as from the type-species of the nominal general synonymized by Hampson. The male genitalia in particular do not closely resemble those of any other genus known to us. The short wide uncus is somewhat like that of *Eurrhyarodes*, but the absence of a clasper, the long slender valve, the dorsally bifid and

spined juxta and the low wide vinculum are unlike those of *Eurrhyarodes* or of other genera we have examined. In the female the large oval corpus bursae with long narrow signum is distinctive. Externally, the thickened and compressed antenna of the male is characteristic, and the wing maculation is unlike that of any other genus.

**DESCRIPTION.**—Frons rounded, with smooth, matt scaling. Vertex with distinct tufts of erect scaling. Labial palpus upturned, reaching slightly beyond dorsal plane of head; basal segment short, second segment somewhat longer, both with compressed, not very deep scaling, without strong division; third segment about 3/5 length of second, cylindrical, distally pointed, scaling smooth and well marked off from that of second. Maxillary palpus reaching about end of second segment of labial palpus, scaling cylindrical, not distally dilated. Proboscis long, rather slender, with strong basal scaling. Eye large, smooth, globular, extending dorsad of plane of vertex. Ocellus prominent, laterally directed, separated by less than its width from eye. Antenna about 2/3 length of forewing; basal segment enlarged, cylindrical, in male almost touching basal segment of opposite side, in female separated by less than segmental diameter; shaft compressed in male, with sensory surface expanded and ventrally carinate, filiform in female; in both sexes dorsal surface smoothly scaled, ventral surface densely short-pilose. Body fairly slender; abdomen exceeding hindwing by about depth of latter in male, only slightly exceeding in female. Legs slender, smoothly scaled; outer subapical hindtibial spur in male minute; outer apical spurs in male and all outer spurs in female about half length of inner. Praeincinctorium with distinct divergent lobes, but lobes not very large.

**Forewing** less than half as wide as long; costa weakly arched at base, then straight to about 3/4, and again arched to apex; the latter roughly right-angled, very narrowly rounded; termen convex, weakly oblique; tornus obtuse; posterior margin rather strongly convex near base. Male without frenulum hook. Discal cell narrow, a little more than half length of wing. Sc reaching costa at about 2/3 from base. R<sub>1</sub> arising from cell at about 2/3 length of latter from base. R<sub>2</sub> from apex of cell, basally approximated to R<sub>3+4</sub>; the latter also from apex of cell, R<sub>3</sub> and R<sub>4</sub> separating at about 3/5 of distance from cell to wing apex. R<sub>5</sub> arising just posterior to origin of R<sub>3+4</sub>, basally straight and not approximated to R<sub>3+4</sub>. Discocellulars weak, concave distad, posterior angle of cell farther from base than anterior angle. M<sub>1</sub> from discocellular a little behind R<sub>5</sub>. M<sub>2</sub> and M<sub>3</sub> from posterior angle of cell, CuA<sub>1</sub> from just basad of it; these three veins basally curved and weakly approximated. CuA<sub>2</sub> from cell, at 3/5 of its length from base. CuP absent. 1A+2A strong, straight, ending at tornal angle. 3A forming a closed loop with 1A+2A at about 1/3 from base.

**Hindwing** about half as wide as long. Costa weakly convex before middle; apex rounded; termen very weakly sinuate; anal angle broadly rounded; anal margin convex. Frenulum strong, simple in male, double in female. Sc+R<sub>1</sub> strong, anastomosing with R<sub>s</sub> beyond cell for a moderate distance; R<sub>s</sub> stalked with M<sub>1</sub> for a short distance beyond anterior angle of discal cell. Discal cell about 2/5 length of wing. Discocellular weak, anteriorly erect, obtusely angled at midline of cell, posterior part strongly oblique and weakly concave distad. M<sub>2</sub> and M<sub>3</sub> from point at posterior angle of cell; and CuA<sub>1</sub> from just below the angle, curved and weakly approximated basally. CuA<sub>2</sub> from cell at 2/3 from base. CuP weak basally, stronger distally. 1A+2A and 3A well developed.

**Male genitalia** with uncus broad, shorter than its width; posterior margin convex, with a narrow posterior band of small, short, close-set, bifid, dark-pigmented, dorsal spinules, the band tapering to a point on each side; lateral margins weakly concave, basolateral angles produced. Tegumen short dorsally, lateral elements simple, rather long in relation to height. Gnathos represented by a pair of slender processes from basal angles of uncus. Transtilla cord-like, medially narrowly arched. Juxta ventrally rounded, dorsally bifid into a pair of apposed, acutely pointed processes, each with one or two terminal spines. Vinculum short, wide, shallow. Valve long, narrow, weakly sinuate, irregularly tapering to a narrowly spatulate tip; costa inflated for about 2/3 length; a rather dense group of short fine setae on center of valve beyond costal inflation; sacculus about 1/4 length of valve, with one or two short dorsal prominences distally. Aedeagus straight, cylindrical, about seven times as long as wide; vesica finely spinulose.

**Female genitalia** with ovipositor higher than wide; lobes with numerous very short setae on posterior surface, and with a single marginal row of much longer setae. Apophyses posteriores with dorsal part of vertical



element short, slender, pointed; shaft slender, shorter than vertical element, ventral part longer, ventrally weakly expanded. Eighth tergum short, deep; anterior margin curving laterally to meet posterior margin in a point; surface without obvious setae. Apophyses anteriores slender, more than twice as long as apophyses posteriores, slender, sinuate, tapering to a point anteriorly; obtusely angled and bearing a sharp dorsal angular process at about 1/3 from base. Ostium about 1/3 width of 7th segment, with short, wide dorsal lip and narrow ventral lip. Ostial chamber cup-shaped, sclerotized. Ductus bursae short, narrow, sclerotized, with a small expansion in middle. Corpus bursae large, oval, membranous, with a narrow double signum extending its whole length on one side.

**EARLY STAGES.**— Unknown.

*Ommatobotys aldabralis* (Viette), new comb.

(Fig. 20, 70, 151-154, 277-278)

*Nacoleia aldabralis* Viette, 1958b: 135; Legrand, 1965: 103, pl. 8, no. 9.

*Lamprosema aldabralis* (Viette); Frith, 1975: 212.

**DESCRIPTION.**— *Forewing* radius 11 mm; costal band of light yellowish brown interrupted by bands of purplish black near base, and at 1/4 and 3/4 distance from base to apex; ground light yellow, line of three variable round to subtriangular purplish black spots extending between costal band and light yellow ground from wing base to just beyond cell; center spot with round central silvery spot, distal spot with elongate to bar-shaped central silvery spot. Narrow purplish black postmedial line extending posteriorly to fold between  $CuA_1$  and  $CuA_2$ , there angled sharply and extending basally in fold, then angled posteriorly and extending to posterior margin at about 2/3 distance from base. Narrow light yellow line separating postmedial line from subapical triangle of purplish black; triangle with two light yellow spots near outer wing margin, one double with lobes centered on  $M_1$  and  $M_2$ , the second centered on  $M_3$ .

*Hindwing* ground light yellow; often translucent, except in deeper yellow band along wing margin, due to semideciduous nature of scales. Purplish-black markings as follows: elliptical spot in middle of discocellular and similar spot between  $1A+2A$  and  $3A$  about 2/3 distance from wing base, round spot of similar size between  $CuP$  and  $1A+2A$  and separated from wing margin by its own diameter, thin and incomplete transverse posterior line between  $M_1$  and  $M_2$  continuing less conspicuously to just beyond  $CuA_1$  where it angles sharply toward wing base and after a break reappears as transverse spot between  $CuA_2$  and  $CuP$ , prominent apical spot mostly separate from wing margin but connected just anterior to  $M_1$  and similarly between  $M_2$  and  $M_3$ , a small triangular spot on outer wing margin in fold between  $M_3$  and  $CuA_1$ .

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— Paratype female, labeled: "Oc. Indiano, Aldabra, XI 1953"; "Nacoleia aldabralis n. sp. ♀ Paratype P. Viette"; "Paratype"; "Museum Paris"; "♀ genitalia on slide 1761 J. C. Shaffer" [MNH].

**DISTRIBUTION.**— Known only from Aldabra (type-locality) and nearby Assumption. Aldabra material: Settlement (17-29 Jan.) 2 ♂, 21 ♀ (29, 31 Mar.) 8 ♀; Takamaka (31 Jan.— 19 Mar.) 6 ♂, 11 ♀; Cinq Cases (8, 9 Mar.) 1 ♂, 1 ♀; Dune Jean Louis (14 Mar.) 3 ♂; Middle Island (19-25 Mar.) 6 ♂, 17 ♀.

**HOSTS.**— Unknown.

**REMARKS.**— Viette said that *O. aldabralis* is distinguished from *O. ommatalis* Hampson, 1912: 626 by the complete absence of transverse bands on fore- and hindwings and of markings on the hindwings, though in his description he mentions a postmedial line on the anterior part of the forewing and various reduced markings on the hindwing. In the specimens at hand there is always a postmedial band on the anterior part of the forewing, and in several the line is complete, though slender. On the hindwing there are markings in all specimens, but none has more than widely separated traces of the postmedial line, which is uninterrupted in both the holotype and the paratype of *O. ommatalis*. The costal region of the forewing appears darker and more contrasting than in *O. ommatalis* and the yellow ground color is deeper and more opaque. The male

genitalia are closely similar in the two; there are minor differences in the shape of the valve and juxta, but these may be individual. *O. aldabralis* is plainly at least subspecifically distinct; without more thorough study of mainland series we do not feel justified in changing the status proposed by Viette.

We hereby transfer *ommatalis* Hampson, 1912 to our new genus *Ommatobotys*. new comb.

*POLIOBOTYS* Shaffer & Munroe, new genus

Type-species *Botys ablactalis* Walker, 1859: 660-661. By present designation. Type-locality: Sri Lanka.

**DIAGNOSIS.**— The filamentous uncus stalk of the male genitalia is unique among those genera with a patch of deeply bifurcate scales on the expanded apex of the uncus.

**DESCRIPTION.**— *Frons* oblique. Labial palpus similar in both sexes, porrect, about twice as long as eye diameter, second segment deeply scaled and rhomboidal, third fusiform. Maxillary palpus with basal half obliquely ascending; distal half angled sharply at about 90°, directed anteriorly or anteromedially. Antenna similar in both sexes, filiform, cilia extremely short, dorsally each segment with a single erect cilium about 0.4 times as long as segment width. Ocellus well developed, round, black with prominent clear lens, nearly tangent to eye margin.

*Forewing* with costa somewhat convex near middle of cell, strongly convex distally beyond cell; outer margin straight to very slightly concave between apex and  $M_3$ , convex between  $M_3$  and tornus; veins nearly evenly spaced where joining outer margin; inner margin concave on at least outer half, and very slightly so on basal third. *Sc* parallel and rather closely approximate to cell, beyond cell angled slightly toward costa.  $R_1$  from distal 1/4 of cell, very closely approximate and only very little divergent from cell.  $R_2$  from very near to upper outer angle of cell, tangent to  $R_{3+4}$  for at least half its length, then very gradually diverging.  $R_{3+4}$  from the angle, rather strongly arced, stalked for nearly 2/3 its length, the free fork of  $R_4$  reaching apex.  $R_5$  from just below the angle, tangent to base of  $R_{3+4}$  for about same length as discocellular, then diverging strongly and extending nearly straight to outer margin.  $M_1$  from upper sixth of closing vein of cell; only very slightly arced, nearly straight to end of cell.  $M_2$  from just above lower angle; nearly straight on basal 1/8, then gently arcing to outer margin.  $M_3$  from lower angle, straight on basal 1/8, then angled rather abruptly downward and extending straight to outer margin.  $CuA_1$  from just below the angle, very near base arcing slightly downward and extending to outer margin.  $CuA_2$  from outer 2/7 of cell, nearly straight to outer margin.  $1A+2A$  inflated basally, then angled sharply downward, nearly straight, slightly convex in middle.  $3A$  tubular on about basal half, forming narrow loop and joining  $1A+2A$  on basal 1/3 of latter.

*Hindwing* with single frenulum in both sexes; costal margin rather strongly convex in middle; outer margin convex about  $R_s$ , concave between  $R_s$  and  $M_3$ , convex to tornal region; broadly rounded at tornus; distal 2/3 of inner margin convex, basal 1/3 concave. Base of  $Sc+R_1$  well inflated, gradually tapering to near upper outer angle of cell, there angled downward slightly and anastomosing with  $R_s$ , the two fused for about 1/3 length of cell, then diverging,  $Sc+R_1$  arcing upward gradually, distally nearly parallel with costal margin, terminating at apex.  $R_s$  slender, but tubular along upper margin of cell, beyond discocellular anastomosed shortly with  $M_1$ , then briefly free again before joining  $Sc+R_1$ ; free end beyond fork with  $Sc+R_1$  extending nearly straight to outer margin.  $M_1$  from upper outer angle, slightly concave and uniformly so to outer margin. Discocellular non-tubular but distinct, extending straight down to middle of cell, then angled sharply outward, continuing straight to lower outer angle.  $M_2$  from just above lower outer angle, angled upward and straight on basal 1/6, then curving downward slightly, extending straight to outer margin.  $M_3$  from the angle, straight for nearly 1/10 its length, then curving downward and extending nearly straight to outer margin.  $CuA_1$  from just below the angle, very slightly convex.  $CuA_2$  from outer 4/5 of cell, very slightly concave uniformly along its length.  $CuP$  slender, tubular on distal 2/3.  $1A+2A$  well developed, very nearly straight, slightly convex.  $3A$  well developed, basal 1/4 straight, distal 3/4 convex.

*Male genitalia* with uncus basally triangular, extremely thin, tapering to



filamentous stalk enveloped in folded membrane (difficult to discern) and bearing broadly expanded apical plate; plate nearly flat, somewhat convex dorsally, 2/3 as long as wide, distal margin broadly rounded, basal margin triangular; dorsal surface of plate densely set with numerous prominent flat scales, each bifurcate nearly to base, the branches parallel to very slightly divergent, the free end truncate. Juxta poorly developed. Vinculum with saccus elongate, apically rounded, about twice as long as wide. Valve rather broadly rounded at apex; costa well inflated basally, distally tubular, curved; sacculus strongly inflated; clasper a narrow transverse blade-like ridge, set in depression, somewhat concave on basal side, convex on distal side. Tegumen well developed, inverted U-shaped. Aedeagus very slender, curved at base, width nearly uniform, about 15 times as long as wide; cornutus long, slender, about 2/5 length of aedeagus.

*Female genitalia* with ovipositor compressed, lightly sclerotized; each lobe finely setose on posterior margin, irregular row of about 8-10 moderately strong setae along anterior margin. Apophyses anteriores slender, about 1.3 to 1.8 times as long as apophyses posteriores; apophyses posteriores slender, slightly to moderately strongly upturned. Ventral portion of 8th segment collar wedge-shaped in lateral view, tapering posteriorly, delimited by straight horizontal fold on either side of segment. Ostial chamber very small, funnel shaped. Ductus bursae about 1.75 times as long as corpus bursae, extremely slender on posterior half, wider and funnel-shaped at junction with corpus bursae; smooth and devoid of ornamentation, except funnel region often with minute stippling. Corpus bursae round, with minute stippling, best developed on posterior half; two diffuse patches of irregular scales, each scale about as long as wide, pointed. Ductus seminalis extremely slender, from center of ductus bursae.

***Poliobotys ablactalis* (Walker), new comb.**

(Fig. 21, 71, 155-156, 279-280)

*Botys ablactalis* Walker, 1859: 660-661.

*Hapalia ablactalis* (Walker); Ghesquiere, 1942: 187.

*Pionea ablactalis* (Walker); Paulian and Viette, 1955: 186.

*Pionea ablactis* [sic] (Walker); Legrand, 1965: 115; Pinhey, 1975: 240, pl. 9.

*Udea ablactalis* (Walker); Vári and Kroon, 1986: 5, 170.

**DESCRIPTION.**— Frons light grayish yellowish brown; bordered on either side by conspicuous white line; anteriorly line angled 90° medially along anterior margin of frons, continuing about 1/3 distance to body midline; posteriorly line continued as arc around outer side of antenna socket. Labial palpus white ventrally and ventrally on outer side except near apex, second segment light grayish yellowish brown elsewhere on outer side, third segment light grayish yellowish brown. Maxillary palpus brown on basal half and ventrally on distal half, white dorsally on distal half. Proboscis scaling light brown to white. Antenna scape brown, mixed with white posteriorly, anterior surface with solid white line which ascends onto inner side of shaft, there soon greatly narrowed and discernable only on basal half dozen segments; shaft dorsally marked by alternating brown and light brown transverse stripes. Vertex, patagium, and tegula light grayish yellowish brown.

*Forewing* radius 13-15 mm. Ground light grayish yellowish brown, lines dark grayish yellowish brown. Antemedial line straight or very nearly so, extending from anterior margin of cell to inner wing margin, angled somewhat posterolaterally. Discocellular marked by conspicuous narrow dark brown line. Transverse posterior beginning on costa, but indistinctly marked anterior to R<sub>3+4</sub> stalk, extending with very slight outward curvature to M<sub>2</sub>, curving inward to fold between CuA<sub>1</sub> and CuA<sub>2</sub>, extending basally in fold to below outer angle of cell, there turning posteriorly and intersecting CuA<sub>2</sub>, thereafter extending to inner wing margin; transverse posterior bordered on its distal side by negative shadow, diffuse line slightly lighter than ground color. Terminal line dark brown, conspicuous, sharply set off from ground. Fringe uniformly light brown, but at apex dark brown and joining anterior end of terminal line.

*Hindwing* light grayish yellowish brown, lighter between 3A and inner wing margin. Discocellular marked by conspicuous narrow dark brown line, rather sharply angled outward as it follows discocellular. Transverse posterior dark grayish yellowish brown; extending from Sc+R<sub>1</sub> to fold between M<sub>1</sub> and M<sub>2</sub>, thereafter angled outward and strongly convex, turning basally again posterior to CuA<sub>1</sub>, intersecting CuA<sub>2</sub> below and somewhat

distal to lower outer angle of cell, thereafter extending posteriorly to inner wing margin at about 2/3 distance from wing base to tornus; negative shadow effect similar to that along transverse posterior of forewing. Terminal line on outer wing margin, dark brown, conspicuous, sharply set off from ground. Outer margin fringe uniformly white. Inner margin with fringe of slender white scales, especially long on distal 2/3 of wing margin.

*Male genitalia* with valve relatively narrow. Cornutus tip visibly multiple at high magnification, appearing frayed.

*Female genitalia* with posterior half of corpus bursae with pair of scale patches, scales absent between patches; corpus bursae elsewhere with minute stippling, but no scales.

**TYPE MATERIAL EXAMINED.**— Lectotype male, hereby designated, labeled: "Lecto type"; "Ceylon", "57 48" [reverse side]; "Pyalidae Brit. Mus. Slide No. 4495 ♂"; Lectotype *Botys ablactalis* Walker det. M. Shaffer, 1988" [BMNH].

**DISTRIBUTION.**— A widespread paleotropical species recorded from Africa, Madagascar, India, Ceylon, East Indies, and Australia. Ghesquiere records it from Mozambique to Cameroon and the Ivory Coast. The Aldabra material consists of a single male taken at Middle Island, 19 March 1968.

**HOSTS.**— Ghesquiere reports the larvae feeding in the flowers of *Spathodea campanulata* Beauv. [Bignoniaceae] in Congo, and in the flowers and inflorescences of ornamental *Buddleia* [Loganiaceae] in Kenya. Neither genus is known to occur on Aldabra.

***DIASEMIOPSIS* Munroe**

*Diasemiopsis* Munroe, 1957: 166. Type-species *Hydrocampa ramburialis* Duponchel, [1834] 1833: 343. By original designation. Type-locality: Corsica [France].

**DESCRIPTION.**— Frons oblique, somewhat flattened. Labial palpus obliquely ascending, about 1.8 times as long as eye diameter, third segment correct and exposed, not hidden in vestiture of second. Maxillary palpus short, not approaching middle of frons; scale tuft nearly cylindrical, somewhat expanded distally.

*Forewing* cell between 1/2 and 3/5 length of wing, distally truncate. Sc extending to distal end of cell. R<sub>1</sub> from well before upper angle of cell; R<sub>2</sub> from near the angle, closely approximate to R<sub>3+4</sub> for about 1/3 its length; R<sub>3+4</sub> from the angle, stalked less than half free length of R<sub>3</sub>; R<sub>3</sub> from just below angle, nearly straight. M<sub>1</sub> at 2/5 distance from upper to lower angle; M<sub>2</sub> from just above lower angle; M<sub>3</sub> from the angle. CuA<sub>1</sub> and M<sub>2</sub> essentially equidistant from angle; CuA<sub>1</sub> curving downward for almost half its length, then angling somewhat upward and extending nearly straight to outer wing margin; CuA<sub>2</sub> from 2/3 distance from base of cell, nearly straight. 1A+2A angled rather sharply downward near base, then straight for about 1/4 its length, then gradually angled downward, then continuing nearly straight to tornus. 3A weakly developed, not tubular, short, angled sharply downward.

*Hindwing* about twice as long as wide; apex at Rs; cell less than half length of wing. Sc+R<sub>1</sub> and Rs anastomosed for about 1/3 length of free portion of Rs. Discocellular strongly bent in middle, upper third perpendicular to M<sub>1</sub>, lower third extending outward and downward. M<sub>2</sub> from discocellular just before lower angle of cell; M<sub>3</sub> and CuA<sub>1</sub> from the angle; CuA<sub>2</sub> from 3/5 distance from base of cell. Outer margin scalloped between veins, markedly concave between Rs and M<sub>3</sub>.

*Male genitalia* with uncus with basal portion broad, rounded; distal portion sharply set off, slender, expanded and spatulate at apex, its dorsal surface bearing roughly two dozen spines arranged approximately in three rows, the distal row being largest and most distinct, basal row being smallest; each spine bifurcate to base, apex of each ramus bearing short cilium visible only with high magnification. Vinculum with ventral portion a nearly straight bar, bearing tiny median nipple. Juxta about 2.5 times as long as broad, ventral portion rhomboidal, dorsal part linguiform. Valve ovoidal, costa tubular, heavily sclerotized, arched, basal 1/3 nearly devoid of setae; ventral margin densely set with numerous short, stiff, appressed and dorsally directed setae from base to apex, otherwise unmodified. Aedeagus subcylindrical, about 8 times as long as wide; vesica bearing numerous lanceolate cornuti.

*Female genitalia* generally rather simple in structure. Ovipositor lobe



moderately setose. Eighth segment collar without obvious modification. Ostial chamber membranous. Ductus bursae about equal in length to corpus bursae. Corpus bursae ovoid, with slender ribbon-like signum. Ductus seminalis from posterior half of ductus bursae.

*Diasemiopsis ramburialis* (Duponchel)

(Fig. 22, 72, 157-158, 281-282)

- Hydrocampa ramburialis* Duponchel, [1834] 1833: 343, pl. 233, fig. 6.  
*Diasemia ramburialis* (Duponchel); Guenée, 1854: 234; Hampson, 1896: 411; Maxwell-Lefroy, 1909: 520; Forbes, 1923: 558; Pierce and Metcalf, 1938: 23, pl. 13; Ghesquiere, 1942: 181; Viette, 1949c: 324; Paulian and Viette, 1955: 185; Marion, 1957: 86.  
*Isopteryx melaleucalis* Walker, 1859: 402.  
*Diasemia reconditalis* Walker, 1866: 1325.  
*Diasemia leucophaealis* Walker, 1866: 1326.  
*Diasemiopsis ramburialis* (Duponchel); Munroe, 1957: 166, figs. 11, 12; Hannemann, 1964: 304 (224), figs. 224-224d; Clarke, 1971: 77, fig. 72, pl. 9h (see Clarke for more extensive synonymy); Palm, 1986: 274-275, plate 8, fig. 37, map 215; Vári and Kroon, 1986: 74, 169.

**DESCRIPTION.**—Frons a mixture of black and white, black predominating. Labial palpus on outer side white ventrally on basal half, elsewhere a mixture of brown and white. Maxillary palpus with ring of white scales near base, then dark brown to black, lighter at apex. Tongue with light brown scales. Antenna scape nearly black, with mixture of white; shaft prominently marked with alternating bands of black and white; cilia about 2.5 times as long as segment width in male, about 0.6 times in female. Ocellus well developed, round, separated from eye by about its own diameter. Vertex rough scaled, grayish brown between antennae, slender light yellowish brown scales just posterior to antennae bases, broad white along middorsal line near occiput, broad grayish brown mediad and posteromedial of ocellus. Occiput with slender yellowish-brown scales. Patagium dark brown with light brown to white posterior border of large, broad scales. Tegula anteriorly with small moderately broad black scales; posterior scales sharply set off from these, white with moderate brown tips, broad, becoming increasingly larger posteriorly, posteriormost scales large and fan-like. Coxa with inner and outer sides dark brown sprinkled with pale orange yellow, apical scales mostly pale orange yellow; forefemur similar but lighter on outer side and lacking lighter color at apex; fore tibia pale yellow on outer side, dark brown on inner side with patches of pale orange yellow, pale orange yellow at apex; foretarsus uniformly pale orange yellow on outer sides, inner sides pale orange yellow with small patches of dark brown. Midcoxa brown on outer side, white along posterior margin, tuft of white scales at apex; midfemur pale yellow on outer side, dark brown on inner side; midtibia pale yellow on outer side, inner side pale yellow with about five rather uniform dark brown bands, also dark brown at basal and apical ends, spurs pale yellow on outer sides, brown to dark brown on inner sides; midtarsus rather uniformly pale yellow, with a few scattered small brown spots. Hindcoxa brown with tuft of white scales at apex; hindfemur brown, hindtibia and hindtarsus nearly uniformly pale yellow. Mesoscutum black with contrasting white transverse band; mesoscutellum black, posterior border an arc of white; metathorax dorsally black with posterior border an arc of white.

*Forewing* radius about 7 mm; ground dark brown with complex pattern of contrasting white bands, mostly very short and incomplete; transverse posterior well developed form costal margin to  $M_2$ , interrupted there, continuing again from  $CuA_1$  to very near to  $1A+2A$ , shortly interrupted, then as a small nearly round spot continuing from near  $1A+2A$  to inner wing margin (see Fig. 72). Fringe white; dark brown at apex, between  $M_2$  and  $CuA_1$ , at  $CuA_2$ , and tornus.

*Hindwing* dark brown with contrasting white banding pattern. Basal band narrow; subbasal band broad, of uniform width; medial band broad, widest near costal margin, tapering toward inner margin; bands between subbasal and medial, and distal to medial incomplete, mostly very short. Fringe white, dark brown at  $R_s$ , between  $M_3$  and  $CuA_1$ , at  $CuA_2$ ,  $CuP$ ,  $1A+2A$ , and in fold between  $1A+2A$  and  $3A$ .

*Male genitalia* with aedeagus with vesica bearing: patch of minute cusps and a few small spines; blade-like cornutus about 1/4 length of aedeagus, in Aldabra specimen (but not in type) distally bifurcate into pair

of triangular cusps; band of about two dozen distally directed lanceolate cornuti, subequal, most about 1/10 length of aedeagus, the single largest one about 1/5 length of aedeagus.

*Female genitalia* with apophyses slender; apophyses posteriores about 4/5 length of apophyses anteriores, base very slender and hooked ventrad; anterior with basal 1/3 straight, horizontal, then with small dorsal cusp and anterior 2/3 straight and abruptly angled anteroventrally. Ductus bursae membranous near ostium, its inner surface set with numerous minute spines, each about 4-6 micrometers long, but difficult to discern; anteriorly this membranous section joins short incomplete sclerotized collar slightly longer than wide and slightly flared posteriorly; very short membranous region joins collar to anterior half of ductus, anterior half rather heavily sclerotized, smooth, devoid of setae except near ductus seminalis, side opposite entrance to corpus bursae inflated forming broadly-curved rather flat sac. Corpus bursae membranous; signum on posterior half of corpus bursae, a long, slender, U-shaped, subserrate carina, beginning near ductus bursae and extending to just beyond middle of corpus bursae on opposite side; region on either side of signum rather sparsely set with fine spines, each about 8 micrometers long; corpus bursae devoid of spines or setae elsewhere. Ductus seminalis from very near to posterior end of sclerotized anterior half of ductus bursae; membranous.

**TYPE MATERIAL EXAMINED.**—Holotype male, labeled: "TYPE" [red label]; "hydrocampa Ramburialis"; "ex coll. P. Rambur ex coll. P. Mabille coll. R. Oberthur"; "Hydrocampa ramburialis Dup. Hist. nat. Lepidopt. France, 8(2), p. 343 1881 (P. Viette 9-1953)"; "♂ genitalia on slide 2180 J.C. Shaffer" [MNHN].

**DISTRIBUTION.**—Cosmopolitan? Aldabra material: Settlement (31 Mar.) ♂; Middle Island (16 Mar.) ♂, (25 Mar.) 2 ♀.

**HOSTS.**—Unknown. Oddly, there appear to be no references to any host plant in the literature, a fact also noted by Clarke (1971). The Clarks failed to rear it on Rapa despite their extensive rearing work there.

**REMARKS.**—The question as to whether this is a single cosmopolitan species or a species complex needs to be investigated. There is, for example, considerable variation in the rather complex armature of the vesica of the aedeagus.

### HYMENIA Hübner

- Hymenia* Hübner, [1825] 1816: 361; Druce, 1895: 256; Forbes, 1923: 544; Klima, 1939a: 30-34. Type-species *Pyrallis perspectalis* Hübner, 1796: 18. Designated by Moore, [1885] 1884-1887: 293. Rose, 1983: 58. Type-locality: Uncertain, perhaps North America (the species is not found in Europe).  
*Zinckenia* Zeller, 1852: 55. Type-species *Zinckenia primordialis* Zeller, 1852: 56. Subsequent designation by Hampson, 1896: 262 (as *perspectalis* Hübner; see Fletcher and Nye, 1984: 162).

**DESCRIPTION.**—Frons rounded. Labial palpus showing little sexual dimorphism; upturned; first segment rather strongly convex ventrally; second more slender, about 1.6 times as long as first; third slender, elongate, just over half as long as second. Maxillary palpus cylindrical, upturned. Male antenna strongly modified basally; scale expanded distally by cup of strong scales enclosing base of shaft; shaft basally swollen, with large rounded excavation directed anteromedially; more distally shaft narrowed and somewhat angled; shaft finely and densely ciliate, the cilia about 1/3 as long as segment width. Female antenna with scape similar, but smaller; shaft somewhat enlarged basally, otherwise unmodified, filiform, finely and densely ciliate, the cilia about 1/5 as long as segment width. Ocellus well developed, not hidden by scales.

*Forewing* with costal margin straight over most of its length; outer margin slightly concave between  $R_5$  and  $M_3$ , nearly straight between  $CuA_1$  and  $2A$ .  $R_1$  from distal 4/5 of cell;  $R_2$  from just before upper outer angle, nearly straight, at base separate from stalk of  $R_{3+4}$ , then contiguous for an equal length, then gradually diverging;  $R_{3+4}$  from upper outer angle, free portion of  $R_3$  about 2/3 as long as stalk;  $R_5$  from just below the angle, directed somewhat upward near base, then curved downward and continuing slightly sinuous to outer margin. Upper half of closing vein angled slightly inward, lower half angled more sharply outward to lower outer angle of cell.  $M_1$  from middle of upper portion of closing vein, angled upward very slightly near base, otherwise nearly straight;  $M_2$  from just above lower



angle, directed somewhat downward, curving gradually upward and nearly straight to outer margin;  $M_3$  from lower angle, nearly straight to outer margin.  $CuA_1$  from just below the angle, turned downward just beyond base, concave to outer margin;  $CuA_2$  from distal 3/4 of cell, straight on basal 1/3, concave on distal 2/3.  $1A+2A$  nearly straight, distal half slender;  $3A$  relatively poorly developed, loop joining  $2A$  at 2/5 distance from base.

*Hindwing* with female frenulum multiple. Costal margin convex just distal to upper outer angle of cell, concave just beyond separation of  $Sc+R_1$  and  $Rs$ ; outer margin rather strongly concave between  $M_1$  and  $M_2$ , convex centered on  $CuA_1$ .  $Sc+R_1$  sinuate, concave where joined with  $Rs$ ; joined with  $Rs$  about 1/9 free length of latter.  $M_1$  straight, slender, short-stalked with  $Rs$  from upper outer angle. Discocellular rudimentary, dorsal 1/3 directed straight downward, ventral 2/3 angled sharply outward to lower angle of cell.  $M_2$  from lower outer angle, nearly uniformly convex over its length;  $M_3$  from directly below the angle, its basal 1/5 parallel to  $M_2$ , then angled downward, diverging, straight to outer margin.  $CuA_1$  from just below origin of  $M_3$ , parallel to it for very short distance, then angled downward and continuing slightly concave to outer margin;  $CuA_2$  from distal 2/3 of cell, its basal 1/3 straight, distal 2/3 very slightly concave. Basal 1/2 of  $CuP$  vestigial, distal 1/2 tubular, very slender, nearly straight.  $1A+2A$  tubular, slender, basal 1/3 straight, distal 2/3 first curving inward, then outward near wing margin.  $3A$  tubular, slender, basal 1/3 slightly concave, distal 2/3 markedly convex.

*Male genitalia* with uncus stalk long and slender, sparsely and finely setose throughout; apex spatulate, dorsal surface convex and densely set with numerous anteriorly-directed slender scales, each bifurcate about half its length. Juxta elongate, slender, V-shaped. Valve broad, subelliptical, about twice as long as wide; costa rather uniformly tubular over most of its length; sacculus with margin broadly hollowed near base, smooth, bearing a few setae distally. Aedeagus subcylindrical, about 7 times as long as wide, most heavily sclerotized dorsally and as ring near distal end; cornutus a slender rod nearly half as long as aedeagus, thickened and sharply hooked at posterior end.

*Female genitalia* with ovipositor lobes short, finely setose. Apophyses anteriores slender, about 2.5 times as long as apophyses posteriores; apophyses posteriores very slender, straight. Ostial chamber simple, membranous. Ductus bursae smooth and membranous on posterior 2/3, anterior 1/3 well sclerotized, smooth, fluted, membranous at junction with corpus bursae. Anterior 3/4 of corpus bursae round, about twice as long as wide, posterior 1/4 constricted, smooth, membranous, near ductus bursae heavily sclerotized forming irregular fluted funnel-like process. Round anterior 3/4 of corpus bursae with straight, slender, shallow, carinate signum, nearly transverse and about half as long as corpus bursae width, its inner side bearing several rows of rounded serrations, their apices directed away from center of signum, teeth near center smaller and laterally directed; midline of signum lacking serrations. Signum centered on round area of corpus bursae marked by fine pattern of lines forming minute pentagons or hexagons, often irregular. Corpus bursae opposite signum with broad incomplete band of rather regularly spaced minute ovoid processes, each with single sharp point; this band about half as long as total length of corpus bursae, and extending transversely about half way around corpus bursae. Ductus seminalis slender, membranous; from shallow side of irregular sclerotized funnel at posterior end of corpus bursae.

### *Hymenia perspectalis* (Hübner)

(Fig. 23, 73, 159-161, 283-284)

*Pyralis perspectalis* Hübner, 1796: 18, pl. 16, fig 101.

*Zinckenia primordialis* Zeller, 1852: 56-57.

*Spoladea animalis* Guenée, 1854: 226.

*Spoladea exportalis* Guenée, 1854: 227.

*Desmia rinthonalis* Walker, 1859: 932.

*Hymenia phrasiusalis* Walker, 1859: 944.

*Zinckenia perspectalis* (Hübner); Hampson, 1896: 262; 1898: 623; Schaus, 1940: 332; Lima, 1968: 258.

*Hymenia perspectalis* (Hübner); Druce, 1895:256; Chittenden, 1914: 1-11, figs. 1-3, Pl. I-IV; Klima, 1939a: 33; Ghesquiere, 1940: 118-119; Forbes, 1923: 544-545; Marion, 1954: 44; Paulian and Viette, 1955: 174; Viette, 1957b: 178; 1990: 96; Munroe in Hodges, *et al*, 1983: 73; Rose, 1983: 58, figs. 28-30; Stehr, 1987: 479, fig 26.21a-d.

**DESCRIPTION.**— Frons black, lateral margins sharply outlined by yellowish white. Labial palpus laterally with basal segment yellowish white, black spot dorsally at apex; second segment yellowish white on basal half and on tuft below base of third, black elsewhere; third black. Maxillary palpus yellowish white with pair of black bands on basal half. Antenna with scape black, yellowish white on outer side, but for medial black stripe; shaft scales varying moderate brown to black. Vertex with fan of yellowish-white scales extending anteriorly from between antennae, medial tuft of brown to black scales posterior to antenna. Occiput yellowish white laterally, dark brown to black dorsally. Patagium, tegula, and dorsum of thorax uniform in color, varying brown to black.

*Forewing* radius about 10 mm; ground dark brown to black. Antemedial band narrow, poorly developed in some specimens, white, varying convex to irregular. Medial band of white spots, incomplete; in some specimens only represented by large elliptical spot in cell, near but not touching discocellular, and by a second more distal spot between  $CuA_2$  and  $1A+2A$ ; a third smaller often inconspicuous spot between  $1A+2A$  and inner wing margin. Postmedial band extending from costa to  $M_2$ ; pale yellow between costa and  $R_{3+4}$ , white elsewhere. Two or 3 small white spots astride  $M_3$  and distal to postmedial band. Fringe black, white just above middle of outer margin and just above tornus.

*Hindwing* ground as in forewing; wedge-shaped medial band from  $M_1$  to near inner angle of wing, narrowing posteriorly, a pair of short distal extensions astride  $CuA_1$ . Fringe black, white line following base, white spot in fold between  $M_1$  and  $M_2$ , also on outer half of fringe between  $CuA_{1,2}$  fold and  $CuP$ .

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— None.

**DISTRIBUTION.**— Widespread throughout the New and Old World tropics and subtropics, including Madagascar (Marion 1954:44) and Reunion (Viette, 1957b:178). Legrand does not list it for the granitic Seychelles. The Aldabra material consists of a single female taken by D. Adamski at Settlement, 12-22 March, 1986.

**HOSTS.**— Known as the "spotted beet webworm" the species is a well known pest of beet, sugar beet, chard (all *Beta vulgaris* L.) and spinach (*Spinacia oleracea* L.) [Chenopodiaceae]. It is listed from *Achyranthes*, *Alternanthera* [Amaranthaceae] and several mostly weedy composites: *Eclipta prostrata* (L.)L. (= *E. alba*), *Eleutheranthera ruderalis* (Sw.) Sch.-Bip. (= *E. ovata*), *Melanthera aspera* (Jacq.) L.C.Rich. ex Spreng. (= *M. canescens*), *Synedrella nodiflora* (L.) Gaertn., and *Wedelia trilobata* (L.) Hitchc. (= *W. carnosa*) [Asteraceae]. See Chittenden (1914: 1-11) for description of life history, occurrence on beets, chard and ornamental plants, and for associated insects; also Ghesquiere (1940: 118-119), Lima (1968: 258), Stehr (1987: 479).

Fosberg and Renvoise (1980: 239) list *Achyranthes aspera* L. for Aldabra, including West Island; (p. 170) *Melanthera biflora* (L.) Wild in Kirikia from but 2 collections at Cinq Cases; and (p. 171) *Synedrella nodiflora* as an abundant weed at Settlement, but of apparent recent introduction and presumably unknown there in 1968.

**REMARKS.**— Differences in the maculation of Old versus New World specimens suggested that these populations may be different species. We have compared genitalia of both sexes of specimens from Aldabra, Africa, Florida, Ecuador, and Peru and find no significant differences. Externally, the African specimens examined exhibit a uniformly black ground color whereas those from Florida and South American have a more brownish ground, and have the postmedial band of both wings, but most notably the hindwings, bordered distally with a somewhat diffuse band of light brown. Among 75 Neotropical specimens examined [USNM] this light brown band was variably developed, usually distinct, occasionally indistinct, and absent in 2 of the 75. While variability within putative *H. perspectalis* needs further investigation, at present we see no reason to consider this anything but one species.

### *SPOLADEA* Guenée

*Spoladea* Guenée, 1854: 224. Type-species *Phalaena recurvalis* Fabricius, 1775: 644. By subsequent designation by Shibuya, 1928: 178. Rose, 1983: 58.



Type-locality: East Indies.

*Hymenia* Hübner, of authors, in part.

**DESCRIPTION.**—Frons rounded; labial palpus upturned, third segment long, distinct and acuminate; maxillary palpus short, with transversely flattened scaling; eye large; proboscis well developed; antenna filiform, normal in female, thickened at base in male, with first segment enlarged and sulcate; body fairly robust; praecinctorium prominently bilobed.

**Forewing** triangular;  $R_1$  from considerably before apex of cell;  $R_2$  closely apposed to  $R_{3+4}$ ; stalk of  $R_3$  and  $R_4$  moderately long;  $R_5$  from a little behind apex of cell, not approximated to  $R_{3+4}$ ; discocellular weakly oblique;  $M_1$  from somewhat behind  $R_5$ ;  $M_2$ ,  $M_3$  and  $CuA_1$  from posterior angle of cell, basally approximated to one another;  $CuA_2$  from cell at 3/4;  $1A+2A$  straight;  $3A$  forming large and complete anal loop, joining  $1A+2A$  at 2/5 distance from base.

**Hindwing** with apex fairly sharp, termen curved and weakly sinuated.  $Sc+R_1$  and  $R_5$  briefly anastomosed;  $R_5$  stalked with  $M_1$ ; cell less than half length of wing; discocellular angled at middle of cell, anterior part erect, posterior part outwardly oblique;  $M_2$ ,  $M_3$  and  $CuA_1$  from posterior angle of cell, strongly approximated basally;  $CuA_2$  from cell at 2/3;  $CuP$  present, somewhat weak basally;  $1A+2A$  and  $3A$  present.

**Male genitalia** with uncus short and rounded; tegumen broadly domed; gnathos a narrow bridge; juxta dorsally bifid, ventrally pointed; vinculum fairly wide, bearing a large mid-ventral triangular appendage; corema large and bearing complex scale tufts; valve broadly rounded, costa inflated, and with a curved sclerotized ridge extending ventrad; aedeagus with weak sclerotization except for distal region and a narrow lateral strap.

**Female genitalia** with ovipositor lobes narrow, moderately setose. Apophyses posteriores slender, short; vertical bar well developed, extending vertically over central 7/10 of ovipositor, slightly shorter than apophyses posteriores. Apophyses anteriores strongly developed, somewhat sinuate, about 2.6 times as long as apophyses posteriores. Ostial chamber membranous. Ductus bursae mostly membranous, unarmed, but for smooth, sclerotized, incomplete collar where joining corpus bursae. Corpus bursae abruptly narrowed posteriorly, elsewhere round and about twice as long as wide; anterior half of corpus bursae membranous, irregularly plicate, unarmed but for a small, round, lightly sclerotized plate bearing a single small, very narrow, finely serrate, transverse signum (Fig. 286, 287) nearly 1/5 as long as corpus bursae width; posterior third of corpus bursae covered with closely parallel plications (Fig. 288, center; Fig. 290) and numerous long slender spines (Fig. 288, right half); center of corpus bursae with dark band of densely set shorter spines (Fig. 286, right half; Fig. 288, left half). Ductus seminalis slender, membranous, from narrowed posterior end of corpus bursae.

**EARLY STAGES.**—Larvae so far as known are leaf-webbers, chiefly on Amaranthaceae.

### *Spoladea recurvalis* (Fabricius)

(Fig. 24, 74, 162-163, 285-290)

*Phalaena recurvalis* Fabricius, 1775: 644.

*Phalaena Pyralis fascialis* Cramer, 1782: 236, pl. 398, fig 0.

*Phalaena angustalis* Fabricius, 1787: 22.

*Phycis recurvella* Zincken, 1818: 143.

*Hydrocampa albifacialis* Boisduval, 1833: 119, Pl. 16, fig 1.

*Spoladea animalis* Guenée, 1854: 226.

*Spoladea recurvalis* (Fabricius); Guenée, 1854: 225, pl. 8, fig. 5; Clarke, 1971: 69-70, figs. 66, 67, Pl. 9g; Rose, 1983: 58, figs. 25-27; Clarke, 1986: 50-52, figs. 34, 35, 277g (see Clarke for extensive synonymy); Stehr, 1987: 478, fig. 26.215a-d.

*Hymenia recurvalis* (Fabricius); Walker, 1859: 396; Shibuya, 1928: 179, Pl. 7, fig. 12; Tams, 1935: 274; Klima, 1939a: 31; Zimmerman, 1958: 52, figs. 37-40; Batra and Bhattacharjee, 1960: 128-130; Nazmi, 1963: 205, 216, fig 7; Legrand, 1965: 98-99; Frith, 1975: 212; Holloway, 1982: 358; Palm, 1986: 275, plate 8, fig. 42, map 216; Vári and Kroon, 1986: 74, 169; Mathew and Menon, 1988: 79, figs. 7, 22.

*Zinckenia fascialis* (Cramer); Hampson, 1896: 262, fig 158; 1898: 623; Maxwell-Lefroy, 1909: 516; Fryer, 1912: 25; Pinhey, 1975: 69, Pl. 6.

*Hymenia exodias* Meyrick, 1904: 130.

*Nacoleia ancylosema* Dognin, 1909: 93.

**DESCRIPTION.**—Frons rounded; scales appressed, complexly and variably colored, light yellowish pink laterally, anterior half mostly yellowish white, large bilobed spot of reddish brown or brown anterior to antennae, lobes extending anteriorly as pale yellow and converging toward proboscis base. Labial palpus upturned, third segment essentially vertical; basal segment yellow to pale yellow with brown spot dorsally at apex; second segment yellow to pale yellow on basal 2/3, distal 1/3 brown; third segment brown. Maxillary palpus brown basally, light yellow to white distally. Proboscis scaling light yellowish or pinkish brown to brown. Male antenna with scape modified, distally expanded, cup-like, distally with tuft of broad inwardly-curved scales on inner side; scape with somewhat diffusely defined vertical band of white to yellowish brown on anterior side, inner side brown, outer side brown on anterior half, lighter on posterior half and posterior side; female scape unmodified, coloration similar to male; shaft expanded and notched near base in male, filiform and finely ciliate distally, filiform and finely ciliate throughout in female. Ocellus well developed, separated from eye by nearly its own width. Vertex with erect bright yellow scales. Occiput bright yellow laterally, brown dorsally. Patagium and tegula rather uniform brown or orange brown.

**Forewing** radius about 9-12 mm; ground varying from dark brown to moderate yellowish brown; medial band white, yellowish white over cubitus and between  $1A+2A$  and inner wing margin; band beginning in cell at radius, broadening, with spur between  $CuA_1$  and  $CuA_2$ , outwardly rounded between cell and  $1A+2A$ , more narrow and of uniform width between  $1A+2A$  and wing margin; white band bordered with dark brown on both inner and outer sides. Postmedial band extending from costal margin to  $M_2$ , of rather uniform width, curving inward very slightly; yellowish white between costa and  $R_{3+4}$ , white elsewhere, bordered on both sides with dark brown. Pair of small white subtriangular spots astride  $M_3$ , distal to and below postmedial band. Fringe brown, white spots between  $M_1$  and  $M_2$ , and at  $CuP$  fold.

**Hindwing** ground similar to that of forewing. Medial band continued onto hindwing extending from  $Sc-Rs$  base to fork to fold between  $1A+2A$  and  $3A$ , band white with yellow tracing over veins extending through it, rather uniformly broad between  $M_1$  and  $CuA_2$ , then somewhat narrowed and with inward curve centered on  $1A+2A$ ; band bordered rather broadly on both sides with dark brown. Terminal line dark brown, vary narrow; fringe with very narrow white line at base, then broad dark brown band interrupted by white on fold between  $M_1$  and  $M_2$  and between  $CuA_2$  and  $CuP$ , distal half of fringe white from apex to fold between  $CuP$  and  $1A+2A$ .

**Genitalia** as described for the genus.

**TYPE MATERIAL EXAMINED.**—Clarke (1971) reports the type of *recurvalis* (type locality: East Indies) as lost, and that of *fascialis* (type locality: Japan) as "lost?"

**DISTRIBUTION.**—Cosmopolitan. The species was common at all four major collecting sites on Aldabra. Settlement (9-18 Jan.) 11 ♂, 26 ♀; (29, 31 Mar.) 2 ♂, 5 ♀; Takamaka (31 Jan.–3 Feb.) 2 ♂, 2 ♀; Cinq Cases (9 Mar.) 3 ♀; Middle Island (13-25 Mar.) 12 ♂, 38 ♀.

**HOSTS.**—The species feeds on a great variety of plants, especially Amaranthaceae, and is frequently a serious pest. Some recorded hosts are: artichoke, beets, carrot, cotton, corn, cucumber, eggplant, spinach, tomato, *Achyranthes*, *Amaranthus*, and *Coleus*.

Amaranth listed for Aldabra by Fosberg and Renvoise (1980) are: *Achyranthes aspera* L. (herbe sergent, pp. 238-239) a plant found locally over much of the atoll; *Amaranthus dubius* Mart. ex Thell., and *A. viridis* L. (pp. 242-243), the former only at Settlement, the latter almost exclusively there.

**REMARKS.**—This reputed cosmopolitan pest has an extensive literature, and only a few selected references are given above. Clarke (1971) gives further synonymy and incorporates an extensive list of references. The specific status of New World populations needs to be investigated.

### *BOCCHORIS* Moore

*Bocchoris* Moore, [1885] 1884-1887: 271; Hampson, 1896: 281; 1898: 649-650; Rose & Kirti, 1986: 63-64. Type-species *Borys inspersalis* Zeller, 1852: 33. By original designation. Type-locality: South Africa.



**DESCRIPTION.**— Frons oblique. Labial palpus showing little sexual dimorphism, about 1.5 times as long as eye diameter; basal segment upturned (viewed denuded), second obliquely ascending, third porrect; second segment about 1.3 times as long as basal, third short, ovate, about 1.3 times as long as maximum width and about 1/5 as long as second segment. Maxillary palpus cylindrical, obliquely ascending, not reaching end of frons. Proboscis well developed. Male antenna shaft conspicuously ciliate, cilia nearly twice as long as segment width; female shaft about 2/3 as wide as male, finely ciliate, cilia about 1/3 as long as segment width. Ocellus well developed; long axis oblique to eye margin, nearly tangent anteriorly. Male with rather massive brush of very numerous fine hairs between fore- and midcoxae, brush reaching end of coxa.

**Forewing** slender, about 3 times as long as maximum depth; costal margin somewhat concave in middle; outer margin between  $R_5$  and  $M_2$  straight and angled inward rather strongly, then curving inward from  $M_3$  to 2A. Tonal angle at 1A+2A, sharp. Inner margin about 3/4 length of costal, distal 1/2 rather strongly concave.  $R_1$  from distal 9/10 of cell, very slightly sinuous;  $R_2$  from half way between  $R_2$  and upper outer angle, at base separate from stalk of  $R_{3+4}$ , then contiguous for nearly half length of  $R_2$ ;  $R_{3+4}$  from the angle, stalk just over twice as long as free length of  $R_3$ , slightly convex;  $R_5$  from about as far below the angle as  $R_2$  is before the angle, nearly straight on basal 2/3, distal 1/3 curving downward somewhat.  $M_1$  from 1/3 distance from upper to lower angles, nearly straight, but somewhat concave on basal half, convex on distal half;  $M_2$  from lower angle, basal half straight, distal half curved downward slightly;  $M_3$  from just below the angle, basal third straight, then curved downward, distal 2/3 straight to outer margin. Origin of  $CuA_1$  from cell separated from that of  $M_3$  by about same distance as separates origins of  $M_2$  and  $M_3$ , angled downward just beyond base, very slightly concave to margin;  $CuA_2$  from distal 4/5 of cell, very slightly concave throughout. 1A+2A extending straight outward at base, then angled rather sharply downward and slightly sinuous throughout, distal 1/4 very close to inner wing margin; 3A loop meeting 1A+2A at 1/3 from base of latter.

**Hindwing** with female frenulum multiple; costal margin quite strongly concave near separation of  $Sc+R_1$  and  $Rs$ ; outer margin strongly convex centered on  $Rs$ , short straight section centered on  $M_1$ , concave between  $M_1$  and  $M_2$ , convex between  $M_2$  and  $CuA_2$ , slightly concave between  $CuA_2$  and  $CuP$  and between  $CuP$  and 1A+2A.  $Sc+R_1$  and  $Rs$  stalk about 2/5 length of free portion of  $Sc+R_1$ ; free portion of  $Sc+R_1$  on its distal half close and nearly parallel to costal margin; free portion of  $Rs$  essentially straight.  $M_1$  very short stalked with  $Rs$  at origin, free portion straight. Discocellular not sharply angled in middle, dorsal portion straight, ventral portion gradually curving to lower angle.  $M_2$  from lower angle, very slightly convex throughout;  $M_3$  from below but nearly same point as  $M_2$ , basal 1/7 straight, then curved down slightly and straight to wing margin.  $CuA_1$  from very near to  $M_3$ , turned downward, then nearly straight to wing margin;  $CuA_2$  from distal 4/5 of cell, straight to very slightly concave.  $CuP$  curving inward, very slender, tubular only on distal half; 1A+2A well developed throughout, curving very slightly inward; 3A slender, tubular, basal 1/3 straight, distal 2/3 curving inward.

**Male genitalia** with uncus absent. Subscaphium well developed as a slender sclerotized band. Gnathos absent. Juxta simple, subquadrate, about twice as long as wide, weakly sclerotized dorsally, broadest about 1/3 from dorsal end. Vinculum with well developed saccus of moderate length. Valve broad, apex rounded; costa vertical near base, then rounded through 90° angle and distally horizontal, strongly sclerotized at base, tapering distally, at base joined to transtilla. Transtilla digitate, each half extending dorsad and mediad to body midline. Sacculus moderately inflated, soon tapering distally to point. Center of valve with broad patch of slender hairs, and toward base a circlet of about 6 hairs on minute tubercle. Costa with row of moderately stiff setae, single, if irregular, near base, wider and multiple toward apex. Apex with dense patch of inwardly-curved setae. Tegumen broad and box-like, slightly longer than high. Aedoeagus tapering, about 3 times as wide at distal end as at bluntly rounded proximal end, width irregular over its length. Two large spine-like cornuti; the larger nearly 1/3 length of aedoeagus, heavily sclerotized, basal 2/3 foliate, irregular, fluted, distal 1/3 a stout spine hooked inward at about 90° to basal portion; smaller cornutus a somewhat curved blunt tapering spine about 1/7 aedoeagus length. On its distal half each side of aedoeagus bears a large patch of numerous fine

needle-like distally-directed spines.

**Female genitalia** with ovipositor lobes narrow, moderately setose, ventral half rather strongly concave in lateral view. Apophyses anteriores curving markedly upward in middle, gradually tapering over its entire length; about twice as long as apophyses posteriores. Apophyses posteriores slender; generally straight, though somewhat irregular. Ostial chamber formed of thickened membrane, bilobed and appearing posteriorly emarginate; each lobe bearing numerous minute tapering sharp-pointed spines. Ductus bursae at ostial chamber bearing incomplete irregular, smooth sclerotized collar about 2.5 times as wide as long; region immediately anterior to collar and nearly same length as collar smooth and unarmed but for small irregular sclerotized plate near origin of ductus seminalis; anteriorly armored with numerous minute triangular teeth about as long as basal width; junction with corpus bursae gradual, not sharply marked. Corpus bursae round, about 2/3 as wide as long; most of inner surface armed with numerous minute sharp spines, these larger on posterior half and giving it a granular appearance; signum a large inwardly-directed spine beginning in neck of corpus bursae as heavily sclerotized infold gradually increasing in width and depth anteriorly, at middle of corpus bursae culminating in large hollow spine; entire surface of signum covered with minute truncated serrations. Ductus seminalis slender, from just anterior to collar of ductus bursae.

### *Bocchoris inspersalis* (Zeller)

(Fig. 25, 75, 164-170, 291-292)

*Botys inspersalis* Zeller, 1852: 33.

*Bocchoris inspersalis* (Zeller); Moore [1885]: 272; Joannis, 1894: 436; Hampson, 1896: 284; 1898: 654; Pagenstecher, 1907: 133; Fletcher, 1910: 304; Janse, 1924: 485; 1928: 83, 84, fig 1; Marion, 1954: 44; Paulian and Viette, 1955: 176; Munroe, 1958: 516; Pinhey, 1975: 70; Rose & Kirti, 1986: 64, figs. 1-3; Mathew & Menon, 1988: 82, figs. 11, 24.

*Desmia afflictalis* Guenée, 1854: 191, Pl. 5, fig 4.

*Aediodes bootanalis* Walker, 1865: 1298-1299.

*Diastictis inspersalis* (Walker); Klima, 1939a: 85; Ghesquiere, 1942: 129; Legrand, 1965: 101, Pl. 10, fig 4; Vári and Kroon, 1986: 45, 169.

**DESCRIPTION.**— Frons black along anterior margin and anterior to antenna bases, white along lateral margins, elsewhere varying from mostly white (Aldabra specimens) to mostly black. Labial palpus with ventral half pale yellow to white, dorsal half black, demarcation line sharp and horizontal; third segment porrect, conical, nestled atop and not hidden by second, gray basally, lighter toward apex and contrasting with second. Maxillary palpus black, light band toward base. Proboscis scales white. Antenna with basal segment black but for contrasting vertical white band on anterior surface; shaft scales black on basal half, gradually white on distal half of shaft. Vertex with fan of yellow scales radiating anteriorly from between antennae, strong tuft of black scales between and posterior to antennae extending to occiput; lateral white of frons extending between eye and antenna base and hooking behind antenna base. Occiput black laterally and dorsally, with contrasting tuft of yellow scales from eye margin just below ocellus. Patagium and tegula black. Thorax black dorsally, with large median elliptical to semilunar white spot on metathorax. Pectus with broad pale-yellow apron covering bases of forecoxae. Forecoxa black anteriorly, white at apex; forefemur mostly black, subapical white spot; fore tibia apically white, with mixture of black and white elsewhere, epiphysis white basally, black distally; foretarsal segments dark brown to black, each with white band at base and apex. Midthorax laterally with black patch of scales anteriorly, and larger tuft of white scales beneath forewing base. Midcoxa black with tuft of white laterally and yellowish white apically; outer side of midfemur black at base, apex, and on middle third, basal and distal thirds white; midtibia black, white at apex; midtarsus similar to foretarsus. Hindthorax laterally black on anterior half, white transverse band on posterior. Hindcoxa dark brown to black, yellowish white tuft at apex; outer side of hindfemur black on basal 2/3, white on distal 1/3; hindtibia and hindtarsus similar to midtibia and midtarsus. Abdomen mostly black dorsally, segments 2-7 with narrow white posterior border, widest on 2nd segment, frequently poorly developed on others; 5th segment with prominent white spot anteromedially; black ventrally, all segments but 7th with broad white transverse band on posterior half.

**Forewing** radius about 9-10 mm; ground black with seven white spots of



somewhat variable shape and development; small spot half way between wing base and orbicular; a second very small spot distal and anterior to first; third spot (orbicular) extending posteriorly about to CuP fold, distally to discocellular, this the largest forewing spot; fourth spot small, between CuA<sub>2</sub> and 1A+2A; fifth spot is second largest, only slightly smaller than orbicular and half way between it and wing apex; sixth small, triangular, on costa anterior to fifth and in some specimens joined to it by narrow stalk; seventh small, between M<sub>2</sub> and M<sub>3</sub>. Fringe black, conspicuous white spots at apex and at tornus.

*Hindwing* ground black, large white spot near base and half way between base and apex; conspicuous white band from CuA<sub>2</sub> to anal angle; small white spot between M<sub>2</sub> and M<sub>3</sub>. Fringe black, conspicuous white spots at apex and between CuA<sub>2</sub> and 1A+2A. Both fore- and hindwings show somewhat more intense black ground and slightly smaller white spots in females.

*Male genitalia* with aedeagus with curve of larger cornutus embracing small tightly packed cluster of about two dozen or fewer heavily sclerotized ovate projections radiating more or less from central point; this feature variably developed, relatively quite small in some specimens, the two Aldabra specimens exhibiting extremes in development (Fig. 168, 170).

**TYPE MATERIAL EXAMINED.**— *B. inspersalis*, lectotype male, hereby designated, labeled: "Caffra-ria"; "450 86"; "Riksmuseum Stockholm"; "♂ genitalia on slide 2211 J. C. Shaffer"; "*Botys inspersalis* Lectotype by J. Shaffer & E. Munroe".

*D. afflictalis*, holotype female, labeled: "TYPE"; "Muséum Paris Abyssinie Schimper 1850"; "430 50"; "*Desmia afflictalis* Gn. Delt. et Pyral., 1854, p. 190 (P. Viette XI-1952)"; "♀ genitalia on slide 2214 J. C. Shaffer" [MNHN].

*A. bootanalis*, comparison based on color photograph of holotype. The abdomen is lost. [BMNH].

**DISTRIBUTION.**— Common throughout subsaharan Africa, also recorded from the Comoro Islands, Madagascar, Mauritius, granitic Seychelles (Mahe), Sri Lanka, Bhutan, China, Burma, Java, and Japan. The Aldabra series consists of two males taken at Settlement, 12-22 March, 1986 by David Adamski.

**HOST.**— Ghesquiere reports the larvae living on *Telanthera versicolor* Rebel [Amaranthaceae]. *Telanthera* R.Br. is a synonym of *Alternanthera* Forsk., a single species of which Fosberg and Renviose record from Assumption only, although they do list five other species of Amaranthaceae from Aldabra.

**REMARKS.**— Comparison of the genitalia of the two Aldabra males with those of a few specimens from mainland Africa, Sri Lanka, and Japan show differences in the shape of homologous cornuti among representatives among the different localities. It would require examination of much more extensive material to show whether these differences are significant, and as we think they are likely at most to be of subspecific value, we have not undertaken this as part of the present study.

#### DUPONCHELIA Zeller

*Duponchelia* Zeller, 1847: 588; Hampson, 1897: 191; Marion, 1957: 85-86.

Type-species *Duponchelia fovealis* Zeller, 1847: 588. By monotypy. Type-locality: Italy (Sicily).

**DESCRIPTION.**— Frons rounded to somewhat concave. Labial palpus upturned; short, about 1.25 times as long as eye diameter; basal about 3/5 length of second; third short, rounded. Maxillary palpus very short. Proboscis well developed. Antenna shaft filiform and finely ciliate in both sexes; in male cilia about 1/4 as long as segment width; in female shaft about 3/4 as thick as in male, cilia about 1/5 as long as female segment width. Eye large. Ocellus well developed, contiguous with eye margin.

*Forewing of female* with costal margin straight on basal 3/4, distally rounded. Cell half wing length. R<sub>1</sub> from distal 1/7 of cell, at relatively large angle. R<sub>2+4</sub> stalked, from upper angle of cell; R<sub>2</sub> separating at 1/3 from cell; R<sub>3</sub> and R<sub>4</sub> separating at 2/3 from cell. R<sub>5</sub> from immediately below the angle, somewhat sinuate, weakly developed at base. M<sub>1</sub> from about 1/4 down from upper angle, weakly developed at very base. Closing vein angled sharply

outward just below origin of M<sub>1</sub>. M<sub>2</sub> from above lower angle, somewhat sinuate. M<sub>3</sub> short stalked with CuA<sub>1</sub>, from lower angle. CuA<sub>2</sub> from before the angle. 1A+2A nearly straight. 3rd A very weakly developed, and only basally, not forming loop with 2nd A.

*Forewing of male* similar, but with fovea in cell. Radius in cell thickened in region of upper outer angle. Posterior vein of cell (cubitus) thickened. 1A+2A rather strongly curved distally.

*Hindwing* with female frenulum double. Venation similar in both sexes. Cell about 2/5 wing length. Sc+R<sub>1</sub> and R<sub>s</sub> stalked about 1/2 free length of R<sub>s</sub>, R<sub>s</sub> reaching apex. M<sub>2</sub>, M<sub>3</sub>, and CuA<sub>1</sub> arising separately from lower angle of cell. CuA<sub>2</sub> from distal 1/3 of cell.

*Male genitalia* with uncus with distal portion slender, tubular; apex spatulate, its dorsal surface densely covered with minute lanceolate scales. Valve truncate; costa tubular; strong spine developed from near base of costa, distally directed, hooked dorsally near apex; second spine from near tip of first, medially directed, its distal half dorsally directed and sharp pointed; third spine smaller, straight, arising ventrally to second.

*Female genitalia* with ovipositor lobes very narrow, finely setose. Apophyses posteriores straight, very slender; apophyses anteriores curved, broadened at basal third, about 1.75 times as long as apophyses posteriores. Ostium weakly sclerotized, unmodified. Ductus bursae tubular, moderately well sclerotized, unarmed. Corpus bursae small, membranous, unarmed, surface smooth. Ductus seminalis from near posterior end of corpus bursae.

#### Duponchelia fovealis Zeller

(Fig. 26, 76, 171-174, 293)

*Duponchelia fovealis* Zeller, 1847: 588; Hampson, 1897: 191; Ghesquiere, 1942:

199; Agenjo, 1952: 134; Marion, 1957: 85; Viette, 1958a: 11; Vári and

Kroon, 1986: 36, 169; Trematerra, 1990: 41-51, figs. 1-9.

*Stenia canuialis* Milliere, 1869: 16, Pl. 95, figs. 5-7.

*Hymenia griseata* Butler, 1875: 415.

*Duponchelia fovealis floeschialis* Legrand, 1965: 95-96.

**DESCRIPTION.**— Frons brownish black. Labial palpus with basal segment white with medial spot of light reddish brown to brown; second and third segments brownish black. Vertex brownish black between and anterior to antennae; transverse row of slender pale yellow scales posterior to antennae. Occiput brownish black behind eye, dorsally with brown scale tufts. Patagium and tegula brownish black.

*Forewing* radius 5.5-8.5 mm; ground black on costal band and distal to postmedial line, perceptibly lighter toward outer wing margin with small black triangles on margin between veins; ground elsewhere a mixture of black and light orange yellow. Light orange yellow markings as follows: small diffuse spot on radius near wing base, similar spot in anal angle at wing base; fine straight antemedial line from cell directly posteriorly to inner wing margin; small spot in center of cell; rather well marked postmedial line forming prominent spot on costa, convex above and below M<sub>1</sub> fold, at CuA<sub>1</sub>, angled sharply basally and less well developed to M<sub>3</sub>-CuA<sub>1</sub> fork, then posteriorly to inner wing margin, convex posterior to CuP fold. Mixture of black and light orange yellow scales forming large diffuse irregular spot distal to cell and extending into distal loop of postmedial line. Double reniform black spot immediately distal to cell, single round black spot below center of cell and between CuP fold and 1A+2A.

*Hindwing* ground a mixture of black and light orange-yellow scales; lighter basally, darker distally; light orange yellow postmedial line somewhat less prominent than on forewing; diffuse small black triangles on wing margin between veins.

*Male genitalia* with aedeagus slender, curved, pair of subconical processes aside distal end, each with rounded tip bearing about half dozen setae; vesica with numerous minute triangular cusps.

*Female genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— *S. canuialis*, *D. fovealis*, types lost. *H. griseata*, holotype female, labeled: "75 64 Natal"; "Pyralidae Brit. Mus. Slide No. 14321" [BMNH].

**DISTRIBUTION.**— A common and widespread species recorded from Europe and Asia Minor to southern Africa. Aldabra material: Settlement (10-23 Jan.) 1 ♂, 4 ♀; (29 Mar.) 1 ♀; Takamaka (4-19 Feb.) 2 ♂, 11 ♀; Cinq Cases (9 Mar.) 1 ♀; Middle Island (11-25 Mar.) 32 ♀.



**HOSTS.**— Ghesquiere (1942: 199) reports the larvae feeding on ovaries and petals of fallen flowers of *Baikiaea robynsii* Ghesq. [Leguminosae], and has reared larvae in spoiled oranges. Trematerra (1990) reports the species as a serious pest of *Lisianthus* and *Eustoma grandiflorum* (Raf.) Shinn [both Gentianaceae] crops in northern Italy. Its host on Aldabra is not known. Fosberg and Renvoise (1980) list no species of Gentianaceae, but do record numerous genera and species of legumes on Aldabra, *Baikiaea* not among them.

**REMARKS.**— Legrand described the *floeschlalis* subspecies from Cosmoledo and Aldabra based on the lesser wingspan (15 mm) as compared with material from France and Kenya (18-20 mm), and on its more narrow forewings.

***NAUSINOELLA* Shaffer & Munroe, new genus**

Type-species *Nausinoe aphrospila* Meyrick, 1936b: 11-12. By present designation. Type-locality: Congo.

**DIAGNOSIS.**— The wing pattern is superficially similar to that of *Lepyrodes* (type-species: *L. geometralis* Guenée) and *Nausinoe* (type-species: *Phalaena pueritia* Cramer), but the male genitalia of these three genera while sharing a similar rounded, densely scaled uncus are otherwise distinctly different. In *Nausinoella* the basal half of the valve is broad and parallel sided; the distal half triangular, tapering to a narrowly rounded apex; the mesal surface with numerous strong spines. In *Lepyrodes* the valve is greatly expanded distally and divided by a strong transverse ridge into a strongly sclerotized basal portion and a distal membranous portion. Strong spines are absent, there being a single small rounded tooth on the transverse ridge and a somewhat similar one just beyond the apex of the sacculus. In *Nausinoe* the valve is elongate elliptical, its apex broadly rounded, with a single small, somewhat serrate, transverse ridge on its basal third.

**DESCRIPTION.**— Frons flat and almost horizontally oblique, finely and smoothly scaled, about as long as vertex; anterior margin almost straight medially, but narrowly rounded at lateral angles. Vertex with rather fine scaling in erect tufts. Labial palpus porrect, exceeding frons by less than length of head; first segment weakly curved, with compressed, radiating scaling; second segment about as long as first, straight and very weakly ascending, with compressed scaling produced from ventrodorsal angle in an acute tuft; third segment somewhat shorter, acuminate, short-scaled, lying along dorsal surface of tuft of second. Maxillary palpus small, but almost reaching dorsal plane of frons and labial palpus; distal scaling distinctly expanded. Proboscis well developed, scaled at base. Gena naked. Eye large and globular, in both sexes a little wider than anterior margin of frons. Ocellus well developed, looking dorsad, separated from eye by less than its own width. Antenna in both sexes slender, filiform, about as long as forewing; dorsal surface smoothly scaled, ventral surface finely and evenly pilose. Body slender; abdomen exceeding anal angle of hindwing. Legs slender, smoothly scaled; outer tibial spurs much shorter than inner, especially in male. Praecinctorium strongly bilobed, each lobe projecting laterally beyond pleuron.

**Forewing** about 2.7 times as long as wide; costa straight to about 4/5 from base, then arched to weakly obtuse apex; termen oblique basad, evenly convex; tornal angle obtuse; posterior margin weakly convex in basal half. Sc free, ending on costa at 3/5 from base. Discal cell a little less than 3/5 length of wing. R<sub>1</sub> from cell at 2/3 from base. R<sub>2</sub> from just basad of anterior angle of cell, its basal part parallel but not closely apposed to R<sub>3+4</sub>. The latter from anterior angle; R<sub>3</sub> and R<sub>4</sub> stalked more than half-way from cell to apex, both ending on costa before apex. R<sub>5</sub> from just behind anterior angle of cell, its basal part curved, but not approximated to R<sub>3+4</sub>. M<sub>1</sub> from about 1/3 width behind anterior angle. Discocellular weak, straight between R<sub>3</sub> and M<sub>1</sub>, concave between M<sub>1</sub> and M<sub>2</sub>. M<sub>2</sub>, M<sub>3</sub>, and CuA<sub>1</sub> from close together at posterior angle of cell, their basal parts weakly curved and approximated. CuA<sub>2</sub> from cell at 4/5 from base. CuP represented by a fold. 1A+2A straight, ending at tornal angle. 3A weak, basally apposed to 1A+2A, then diverging and recurved to meet 1A+2A at right angles at about 2/5 from base. Male without frenulum hook, but with anteriorly directed retinaculum of stiff scales from underside of wing; both sexes with tufts of scales extending under wing base from costa and patagium.

**Hindwing** as long as posterior margin of forewing, about 2/3 as wide as long; costa weakly arched near middle; apex rounded; termen very weakly

concave at cell M<sub>1</sub>, bent at vein M<sub>2</sub>, then straight or gently convex to the rounded anal angle; anal margin convex. Discal cell about 1/3 length of wing. Sc+R<sub>1</sub> anastomosed with R<sub>s</sub> for about 1/4 distance from cell to apex. R<sub>s</sub> and M<sub>1</sub> with very short stalk from anterior angle of cell. Discocellular very weak, weakly concave. M<sub>2</sub>, M<sub>3</sub>, CuA<sub>1</sub>, and CuA<sub>2</sub> from posterior angle of cell; basal parts of M<sub>2</sub> and M<sub>3</sub> strongly, of M<sub>3</sub> and CuA<sub>1</sub> more weakly, curved and approximated. CuP weak at base, well developed distally. 1A+2A present, straight, ending anal angle; 3A ending behind anal angle. Frenulum simple in male, multiple in female.

**Male genitalia** with uncus shorter than tegumen or height of valve, about twice as long as wide, with divergent sides, evenly rounded apex; dorsal surface domed, heavily set with dark-pigmented, anteriorly directed, deeply bifid spines. Tegumen simple, higher than long, with smoothly arched sides. Subscaphium strap-like, arising from an ill-defined transverse bridge. Transtilla strongly sclerotized but narrow, composed of tapering lateral arms, meeting in midline. Juxta not observed. Vinculum shallow and rounded. Valve about three times as long as high, distal half somewhat angled dorsad, narrower than basal half, and tapering distad to a rounded apex; costa broadly but weakly inflated; sacculus broadly inflated and with dorsal ridges and spines at vertex, basally directed, thorned ridge at middle of mesal surface defining thickened decked zone occupying distal half of valve; mesal surface of apical area densely set with spine-like scales. Aedoeagus slightly sinuate, strongly sclerotized, tapering from an expanded, rounded base to a pointed tip; vesica unarmed.

**Female genitalia** with ovipositor lobes high, short, membranous, evenly clothed with short fine setae, and with a peripheral single row of well-spaced longer setae. Apophyses posteriores with vertical bar narrow dorsally, wider and longer ventrally, weakly sclerotized; longitudinal bar of about the same length, narrow but strongly sclerotized, tapering slightly from base to middle, then weakly curved dorsad. Eighth tergite trapezoidal, its ventrolateral portions transversely rugose and clothed with specialized scales, its posteromedial portion with a small number of short fine setae. Apophyses anteriores about twice as long as apophyses posteriores, arising from ventral edge of a small semicircular excavation in anterior margin of eighth tergite; basally narrow, curving dorsad to a sinuate expansion at 1/4 from base; dorsal and ventral margins of expansion each with a small acute process; distal 3/4 of apophyses slender though strongly sclerotized, gently arched dorsad. Ostium wide, bordered by wide, short, strongly but smoothly sclerotized, transversely sulcate eighth sternite and the weakly and diffusely sclerotized seventh sternite. Ductus bursae narrow, about twice as long as apophyses anteriores, membranous, finely denticulate; corpus bursae small, membranous, inner surface denticulate, collapsed in the two specimens examined.

**EARLY STAGES.**— Unknown.

***Nausinoella aphrospila* (Meyrick), new comb.**

(Fig. 27, 77, 175-176, 294)

*Nausinoe aphrospila* Meyrick, 1936b: 11-12; Klima, 1939b: 300; Ghesquiere, 1942: 165.

*Lepyrodes capensis*, Fryer, 1912: 27 (not Walker, 1865: 1344). Misidentification. *Nausinoe capensis*, Viette, 1958c: 62; Legrand, 1965: 107, Pl. 8, No. 5; Frith, 1975: 212 (not Walker, 1865: 1344). Misidentification.

**DESCRIPTION.**— Labial palpus triangular, outer side white on basal half along ventral margin, light yellowish brown elsewhere. Antenna scape and pedicel white anteriorly, light brown on inner and outer sides, yellowish white posteriorly; shaft filiform in both sexes, white posteriorly and on inner side. Vertex light brown, slightly darker along white lateral border. Occiput light yellowish brown laterally, yellowish white dorsally. Pectus white. Patagium and tegula a mixture of white and light orange yellow scales. Male with ovoid shield-shaped scale tufts on sides of mesothorax, mostly of broad white scales, with narrow dorso-medial light yellowish-brown scales. Metathorax light orange yellow anterodorsally, white posterodorsally. Dorsum of anterior abdominal segments (usually segments 1-3) moderate orange yellow anteriorly and extending posteriorly as pair of triangles on either side of midline; white elsewhere.

**Forewing** radius (see discussion below) 7.0-12.5 mm. Ground light yellowish brown, with about seven translucent spots, each with narrow internal white border about one scale wide, and broader external dark brown



border, usually with scattered black scales, especially on distal borders of spots. Veins marked with white scales within the spots. Group of 2-4 spots about 1/5 distance from wing base; two in inner angle of cell, a third and larger spot between cell and 1A+2A; the fourth a white or partly translucent irregular spot extending from 1A+2A to inner wing margin. First large spot centered on cubitus at or just basal to origin of CuA<sub>2</sub>, the spot constricted, but not divided, along cubitus. Second large spot distal to lower outer angle of cell, extending from CuA<sub>1</sub> to 1A+2A. Third large spot distal to cell, extending from R<sub>5</sub> to, or nearly to, M<sub>3</sub>. Outer spot transverse, extending from R<sub>3</sub>-R<sub>4</sub> fork to CuA<sub>1</sub>, constricted and frequently divided into smaller spots by R<sub>5</sub>, M<sub>1</sub>, M<sub>2</sub>, and M<sub>3</sub>.

*Hindwing* ground light yellowish brown, with four large translucent spots, marked as in forewing. Basal spot triangular, occupying basal angle of wing, transiting cubitus white-scaled, transiting 1A+2A brown scaled; posterior to 1A+2A white. A pair of large elliptical spots distal to cell, anterior one from Rs to M<sub>3</sub>; posterior one from CuA<sub>1</sub> to 1A+2A; spot white and not translucent between 1A+2A and wing margin. Outer irregular spot from Rs to CuA<sub>1</sub>.

Outer margins of fore and hindwings brownish black; fringe white, distally narrowly marked with light yellowish brown. Ground of fore and hindwings marked with numerous short narrow transverse brown lines, these most prominent along costal margin of forewing.

*Male genitalia* with sacculus with vertex bearing posteriorly (distally) directed broad-based triangular spine, dorsal margin near vertex with 2-4 stout subequal dorsally directed spines, the larger ones more distal and strongly angled basally, the shorter ones more basal and triangular; thorned ridge with a single massive apically hooked basally directed spine, dorsal to its base a short prominence bearing 3-5 small heavily sclerotized basally directed triangular spines.

*Female genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— Holotype male, labeled: "TYPE N. aphrospila" [black bordered orange label]; "Musée du Congo Ruanda: Usambara 7-1934 A. Becquet"; "M4886"; "R. Det. V 3154"; "♂ genitalia on slide 2167 J. C. Shaffer" [MRAC].

Paratype, not examined, labeled: "Usambara, Belgian Congo, AB., 6.34" [Meyrick's handwriting]; "Meyrick Coll. B.M. 1938-290"; "Abdomen missing"; "aphrospila Meyr" [Meyrick's handwriting]; "Nausinoe aphrospila Meyrick 1/1 E. Meyrick det. in Meyrick Coll" [BMNH].

**DISTRIBUTION.**— Eastern Congo, East Africa, Comoro Islands, Aldabra. Aldabra material: Settlement (9-27 Jan.) 5 ♂, 10 ♀; (31 Mar.) 5 ♀; Takamaka (31 Jan.-19 Feb.) 12 ♂, 8 ♀.

**HOSTS.**— Unknown.

**REMARKS.**— We have compared the Aldabra series with the holotype and 6 other central African specimens in the collection of the Musée Royal de l'Afrique Centrale [MRAC]. Both groups exhibit moderate variability in wing maculation and show minor variation in valve armature of the male genitalia. The two groups differ significantly only in regard to size, with females averaging larger than males in both groups. Among the African specimens examined the median wing radius was 10 mm for 4 males (9.5, 10, 10, 10.5) and 12 mm for 3 females (12, 12, 12.5). Among Aldabra specimens the median wing radius was 7.5 mm for 17 males and 9 mm for 23 females. We note the difference, but in the absence of correlating differences see no justification for assigning separate specific or subspecific status for the Aldabra population.

#### *GLYPHODELLA* Shaffer & Munroe, new genus

Type-species *Diastictis savyalis* Legrand, 1965: 101-102. By present designation.  
Type-locality: Seychelles: Aldabra Atoll.

**DIAGNOSIS.**— Male genitalia similar to *Chabulina*, to which it is related (see Remarks section under that genus), differing in several details, principally in the presence of a strong sagittal keel on the distal expansion of the uncus (keel absent in *Chabulina*), the curved clasper (straight in *Chabulina*), and the absence of a sharp angle at the middle of the ventral margin of the valve (present in *Chabulina*).

**DESCRIPTION.**— Frons oblique, somewhat rounded. Labial palpus

upturned, basal segment 5/6 as long as second, second with straight dorsal surface, third subelliptical, half as long as second and in line with it; scaling semilunar. Maxillary palpus well developed, cylindrical, extending above labial palpus. Antenna filiform in both sexes, cilia about 1/3 as long as segment width in male, about 1/5 in female. Ocellus well developed, exposed, no part of it hidden by scales, separated from eye by about 2/3 its own width.

*Forewing* with costal margin slightly concave over basal 2/3 of its length, then uniformly rounded to apex; apex distinct; outer margin between apex and M<sub>2</sub> straight to very slightly concave, then curving inward evenly to tornus; inner margin nearly straight, very slightly concave near tornus. R<sub>1</sub> from distal 8/9 of cell, nearly straight; R<sub>2</sub> arising contiguous to stalk of R<sub>3+4</sub>, contiguous on basal 2/5 of its length, nearly straight; R<sub>3+4</sub> from upper outer angle, stalk twice length of free portion of R<sub>3</sub>, R<sub>4</sub> to just above apex; R<sub>5</sub> from just below the angle, basally curved. M<sub>1</sub> from upper 1/4 of cell, curved downward very slightly at base, very slightly sinuous; M<sub>2</sub> from just above lower angle, weakly convex over its length; M<sub>3</sub> from lower angle, convex over its length. CuA<sub>1</sub> from before the angle, slightly concave; CuA<sub>2</sub> from distal 7/8 of cell, slightly concave. 1A+2A sinuous, rather strongly convex in middle; 3A loop elongated, reaching 1A+2A at 2/5 distance from base of latter.

*Hindwing* with female frenulum multiple; costal margin moderately sinuous; outer margin rather evenly rounded, somewhat concave between CuA<sub>1</sub> and CuP. Sc+R<sub>1</sub> and Rs stalked for just over half free length of Sc+R<sub>1</sub>; free portion of Rs straight. Discocellular gently curved, not angled; lower angle of cell not extended beyond upper. M<sub>1</sub> straight; M<sub>2</sub> from immediately above lower outer angle, convex; M<sub>3</sub> from lower angle, parallel to M<sub>2</sub> at base, then curved downward, extending straight to wing margin. CuA<sub>1</sub> from near the angle, curved downward at base, then straight; CuA<sub>2</sub> from distal 4/5 of cell, very slightly concave throughout. CuP vestigial on basal 3/5, distal 2/5 tubular, thin; curved in middle; 1A+2A well developed, convex throughout; 3A well developed, distal half strongly curved.

*Male genitalia* with uncus with basal half a simple smooth, narrow tube-like stem, very little attenuated in middle; distal expansion well sclerotized, set at 90° to basal stem, tapering to apex, morphologically ventral surface smooth and basally with a strong sagittal keel, morphologically dorsal surface moderately setose, the setae fine and no longer than depth of distal expansion. Gnathos absent. Transtilla complete. Subscaphium narrow, well sclerotized. Juxta slender, about three times as long as wide; broadened basally. Valve subrhomboidal; costa strongly arched subbasally, tubularly reinforced to near apex; ventral margin broadly angled at about middle of valve; sacculus well sclerotized, sclerotization continuing distally as broad plate, curving somewhat dorsad, terminating abruptly at clasper; clasper narrowly digitate, distally directed, curving ventrally. Aedoeagus about 9 times as long as wide; dorsally irregular, well sclerotized, membranous elsewhere; vesica with cluster of 1 or 2 dozen claw-like cornuti (Fig. 181), length varying from about 10 to somewhat over 50 micrometers.

*Female genitalia* with ovipositor lobes narrow. Apophyses anteriores about 1.4 times as long as apophyses posteriores, mostly straight, dorsal process at base; posterior crooked. Ostial chamber flattened, tapering, about 1.4 times as long as basal width; inner surface rather densely set with minute inwardly-directed spines, each about 10-12 micrometers long. Ductus bursae with narrow, elongate sclerotized collar at ostial end, then somewhat shorter membranous section, then finely scobinate bulbous midregion; anterior section narrowed, set with minute (about 2-3 micrometers wide) rather widely separated scobinations, then broadly expanded into corpus bursae. Corpus bursae round, surface finely marked with minute irregularly and variably hexagonal pattern, each hexagon roughly 12 micrometers wide and bearing central nodular or cusp-like armament. Signum moderately well developed, short, slightly curved (anteriorly concave, posteriorly convex), transverse, about 1/5 as long as corpus bursae width; bilobed, each lobe nodular, bearing numerous cusps radiating from center of each lobe; lobes narrowly separated by central region bearing only minute cusps. Ductus seminalis from membranous portion of ductus bursae.

#### *Glyphodella savyalis* (Legrand), new comb.

(Fig. 28, 78, 179-181, 295-296)

*Diastictis savyalis* Legrand, 1965: 101-102, Pl. 7, No. 1; Frith, 1975: 212.



**DESCRIPTION.**—Forewing radius about 8 mm; ground moderate yellowish brown, darker around large spots; large basal and small indistinct basal spots of brilliant orange yellow; large medial and postmedial spots of hyaline white with bluish iridescence; veins marked with yellow where they enter, leave, or border these large spots; brilliant orange yellow wedge on curve of costal margin beyond postmedial spot.

*Hindwing* ground hyaline white with bluish iridescence; costal margin yellowish white, dark brown discal spot extending to  $CuA_2$  and bordered with yellow on  $CuA_2$ ; outer wing margin bordered with narrow brown, and broad brilliant orange yellow, bands; terminal line brown; minute yellow spots where veins leave hyaline area; small yellow spot with darker center on  $1A+2A$  in hyaline region.

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**—Holotype male, labeled: "TYPE [red label]"; "Aldabra 30. XI. 1959 H. Legrand"; "280"; "♂"; "Diastictis savyalis n.sp. type H. Legrand"; "Diastictis"; "Diastictis savyalis Legrand Mem. Mus. nat. Hist. nat. 1966 (n.s.) A37 (1965) p 101"; "♂ genitalia on slide 2318 J. C. Shaffer" [MNHN].

Paratype male, labeled: "Aldabra 29. XI. 1959 M. Gerber"; "087"; "Museum Paris, Coll. H. Legrand"; "♂ genitalia on slide 1770 J. C. Shaffer" [MNHN].

Paratype male, labeled: "paratype" [red label]; "Aldabra 28. XI. 1959 H. Legrand"; "280"; "♂ genitalia on slide 2316 J. C. Shaffer" [MNHN].

**DISTRIBUTION.**—Known only from Aldabra. Aldabra material: Settlement (11-27 Jan.) 1 ♂, 7 ♀; (31 Mar.) 1 ♀; Takamaka (1-18 Feb.) 5 ♂, 5 ♀; Cinq Cases (9 Mar.) 2 ♀; Middle Island (19-20 Mar.) 3 ♂, 3 ♀.

**HOSTS.**—Unknown.

**REMARKS.**—As Legrand (1965: 102) noted, this species is very close to the Malagasian *Diastictis vadonalis* Viette (1958b:126). The two species are readily distinguished externally by the much greater area of white on the hindwing of *G. savyalis*, here only partially divided by a transverse brown bar extending broadly over the discocellular and terminating on  $CuA_2$ . In *D. vadonalis* this bar is broader and extends posteriorly to connect with the broad marginal band, thus dividing the white ground into basal and postmedial regions. In the forewing the white antemedial line seen in *D. vadonalis* is absent or poorly developed in *G. savyalis*, and the subterminal line and the small white spot between the two large white spots are less well developed in *G. savyalis*. Finally, the forewing ground color of *G. savyalis* is more yellowish and the hindwing border orange yellow rather than brown as in *D. vadonalis*. We were unable to find any significant differences in the male genitalia of the two species. There do exist minor differences in the signa, the variability of which should be investigated when more females of *D. vadonalis* become available for study. Our comments are based on a comparison of *G. savyalis* with the holotype [JCS slide no. 2320, MNHN] and allotype [JCS slide no. 2319, MNHN] of *D. vadonalis*.

In his original description Viette placed *D. vadonalis* near to *Bocchoris flavibrunnea* Hampson (1898: 651; pl. 49, Fig. 30), described for KwaZulu-Natal, South Africa. Based on an examination of Hampson's holotype we find the two species to be extremely close. The only external differences we did find are that, as Viette notes, *D. vadonalis* lacks the yellow tint in the hindwing border of *B. flavibrunnea* and has a smaller notch in the section connecting this border with the discocellular band. Clearly, *G. savyalis* is the most distinct of the three. The male genitalia [BMNH pyralid slide no. 14337] of *B. flavibrunnea* are also very close, the clasper differing slightly, though this could be individual variation. It would be useful to compare larger samples of the African and Malagasian species to sort out individual vs. geographic variation.

Based on the great similarity among all three species as described above we hereby transfer *flavibrunnea* Hampson and *vadonalis* Viette to *Glyphodella*, new combinations.

### *CHABULINA*, Shaffer & Munroe, new genus

Type-species *Diastictis putrisalis* Viette, 1958b: 124. By present designation.

Type-locality: Comoro Islands: Grand Comoro.

**DIAGNOSIS.**—Similar to *Glyphodella*, the male genitalia differing principally in that the distal expansion of the uncus bears a smooth (rather than keeled) surface; also the valve bears a straight (rather than curved) clasper, and a sharp angle on mid-region of ventral margin.

**DESCRIPTION.**—Frons flat and oblique. Vertex short, with erect tufts of tine scales. Labial palpus upturned to plane of frons; second segment with long, fine, parallel, compressed scaling anteroventrally, forming a broadly convex outline in front; third segment short and erect, with triangular anterior scale tuft, lying along dorsal margin of scaling of second segment. Maxillary palpus projecting slightly dorsad of plane of frons, distally with slightly expanded circular tuft of scales. Proboscis well developed, coiled, scaled for a short distance at base. Eye large, globular, not as wide as frons. Ocellus well developed, adjacent to dorsal margin of eye, looking dorsad. Antenna filiform, smoothly scaled above, ciliated below, the setae longer and more numerous in male than in female. Legs slender, outer tibial spurs shorter than inner. Praecinctorium strongly bilobed. Male with well developed anal tuft.

*Forewing* about 3 times as long as wide; costa weakly convex for a short distance at base, then very weakly excavated, then convex from about 5/6 from base to the slightly obtuse apex; termen a little oblique, weakly indented at  $M_1$ , weakly convex to  $CuA_2$ , then oblique to obtuse ternal angle; posterior margin convex. Discal cell a little more than half length of wing.  $R_1$  from a little basad of anterior angle of cell;  $R_2$  from anterior angle close to  $R_{3+4}$  and approximated to it for a short distance, then diverging;  $R_3$  and  $R_4$  stalked more than half-way to apex, both ending on costa before apex;  $R_5$  not approximated to  $R_{3+4}$ , arising from discocellular distinctly behind anterior angle of cell, ending on termen well behind apex;  $M_1$  almost straight, arising a little behind  $R_5$  and well separated from it; middle discocellular short, erect, weakly concave distad;  $M_2$ ,  $M_3$  and  $CuA_1$  arising close together at posterior angle of cell, their bases weakly curved and approximated;  $CuA_2$  from cell at 5/6 from base;  $CuP$  reduced to a fold;  $1A+2A$  almost straight, ending at ternal angle;  $3A$  basally stalked with  $1A+2A$ , then diverging, and recurving to meet  $1A+2A$  at right angles 2/5 from base. Frenulum hook absent; scaled retinaculum present.

*Hindwing* about as long as posterior margin of forewing; costa weakly convex; apex rounded; termen oblique to  $M_3$ , curved to  $CuA_1$ , oblique to behind  $CuP$ ; anal angle rounded; anal margin weakly convex.  $Sc+R_1$  anastomosed with  $R_s$  beyond cell for a short distance;  $R_s$  not stalked with  $M_1$  beyond discocellular;  $M_1$  from a little behind angle of cell; cell about 2/5 length of wing; discocellular weakly concave distad, the posterior part a little more oblique distad than the anterior.  $M_2$ ,  $M_3$  and  $CuA_1$  from posterior angle of cell, their basal parts weakly curved and approximated.  $CuA_2$  from cell at 3/4.  $CuP$ ,  $1A+2A$ , and  $3A$  fully developed,  $1A+2A$  stronger than the other two. Frenulum strong and single in male; female frenulum with two bristles.

*Male genitalia* with uncus with slender, weakly arched stem, attenuated in middle, and with straight, lanceolate, less strongly sclerotized distal expansion, recurved at an acute angle anteroventrad, and with a sparse coating of long slender scales on its morphologically dorsal surface. Tegumen about as long as uncus, triangular in lateral aspect, smoothly arched. Gnathos absent. Transtilla complete. Subscaphium narrow, well sclerotized. Juxta fairly small, subquadrate, about 1.5 times as long as wide. Vinculum short, shallow, ventrally carinate, without saccus. Valve subrhomboidal; costa strongly arched subbasally, tubularly reinforced to near apex; ventral margin obtusely angled into terminal margin at about middle of length of valve; sacculus narrowly but heavily sclerotized, continued on terminal margin as a membranous thickening; clasper strong, straight, claw-like, oblique distad, arising from an oblique subbasal ridge; mesal face of valve with a scattering of strong setae, densest distally and ventrally. Aedoeagus weakly sclerotized, dorsal margin reinforced by a sclerotized strap; vesica without cornuti, but with a patch of minute sclerotized scales.

*Female genitalia* with ovipositor lobes very narrow, finely setose. Apophyses slender, straight; apophyses anteriores slightly thickened basally, about 1.6 times as long as apophyses posteriores. Ostial chamber membra-



nous dorsally, moderately sclerotized ventrally. Ductus bursae comprised of a short sclerotized ring posteriorly and a somewhat longer and broader membranous tube anteriorly. Corpus bursae round, neck long and tapering; signae weakly developed as a small closely-set pair of finely denticulate hemispherical indentations; corpus bursae surface marked with fine hexagonal or similar but irregular pattern. Ductus seminalis slender, from membranous portion of ductus bursae.

**EARLY STAGES.**— Unknown.

**REMARKS.**— This genus, as is easily seen from the wing pattern and from the configuration of the male genitalia, is a member of the complex of genera centering on *Glyphodes* Guenée, which differs in its much larger size, in the complex and irregular vaulting of the tegumen, among many other features. Within this complex it is closest to an unnamed genus which will contain *Asopia onychinalis* Guenée, 1854, which shares the same unusual shape of the uncus, but which has the scaling of the labial palpus much shorter, the second segment having a narrowly rhomboidal profile. Other related genera are *Glyphodella* Shaffer & Munroe (described above), *Synclera* Lederer, 1863, and *Chabula* Moore, [1866], all of which have substantial differences in the shape of the uncus.

The type-species is the only member of the genus whose structure has been well investigated, but we also place here *Hydrocampa tenera* Butler, 1883, from Sulawesi, which becomes *Chabulina tenera* (Butler, 1883), **new comb**, as well as an unnamed species or subspecies from the mainland of Africa which has been misidentified in collections as "*Glyphodes*" *tenera*, but which in fact is closer to *putrisalis*.

***Chabulina putrisalis* (Viette), new comb.**

(Fig. 29, 79, 177-178, 297-298)

*Diastictis putrisalis* Viette, 1958b: 124-125; Legrand, 1965: 101.

**DESCRIPTION.**— *Forewing* radius about 7 mm; ground a complex mixture of white and dark grayish brown (see Fig. 79), the latter mostly in two broad bands, one medial, the other along outer wing margin; white area between these bands marked with irregular band of pale orange yellow narrowly bordered on either side with dark grayish brown.

*Hindwing* ground white, dark grayish brown represented as medial band, narrow postmedial line, and broad band along outer wing margin.

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— Holotype male, labeled: "Isole Comore, Grande Comore, IX 1953"; "TYPE"; "Museum Paris, C. Prola recolt."; "Diastictis putrisalis n. sp. Holotype P. Viette"; "♂ genitalia on slide 1649 J. C. Shaffer" [MNHN].

**DISTRIBUTION.**— Recorded from Grande Comoro, Cosmoledo (Menai), and Aldabra. Aldabra material: Settlement (9-25 Jan.) 2 ♂, 18 ♀; Takamaka (31 Jan.—19 Feb.) 1 ♂, 2 ♀. David Adamski collected a male and a female at Settlement, 12-22 March, 1986.

**HOSTS.**— Unknown.

**SYNCLERA Lederer**

*Synclera* Lederer, 1863: 274 (key), 444. Type-species: *Eudiotis traducalis* Zeller, 1852: 54. Subsequent designation, Moore [1886]: 315. Type-locality: South Africa.

**DESCRIPTION.**— External characters. Frons flat and oblique, smoothly scaled. Vertex as long as frons, with tufts of slender erect scales. Labial palpus obliquely upturned to plane of frons; scaling of first two segments compressed, rectangular in outline, about 2/3 as deep as combined length of these segments; third segment short, with acuminate scale-tuft extending nearly whole length of distal margin of scaling of second segment. Maxillary palpus prominent, its scaling weakly expanded distally, ending in plane of frons and distal margin of labial palpus. Proboscis well developed, prominent, its basal margin scaled. Eye large and globular. Ocellus present, looking laterodorsad, situated close to eye behind antenna base. Antenna filiform in both sexes; dorsally scaled, ventrally ciliate; alternate scale-rows

on distal part of shaft raised. Body of moderate proportions; abdomen not strongly tapering, in male with dense protruding anal tuft of dark scales, in female without such a tuft. Legs slender, but not unusually long; foretibia with epiphysis; tibial spurs 0-2-4; outer spurs shorter than inner; mid and hind femora shallowly grooved on ventral surface. Praecinctorium strongly bilobed, the evenly rounded tip of each lobe protruding laterally.

*Forewing* subtriangular, width 0.33 to 0.4 times length; costa straight to about 4/5 from base, then arched to rectangular apex; termen straight and weakly oblique basad to  $M_3$ , thence rounded to obtuse tornal angle; posterior margin weakly convex in basal 3/5. Discal cell a little over half as long as wing. Sc ending on costa somewhat distad of end of discal cell.  $R_1$  from cell about 3/5 from base.  $R_2$  from just basad of anterior angle of cell, closely apposed for some distance to  $R_{3+4}$ . The latter from anterior angle of cell.  $R_3$  and  $R_4$  separating a little more than halfway from anterior angle to apex, the free parts weakly divergent;  $R_3$  ending well basad of apex,  $R_4$  just behind apex.  $R_5$  from anterior angle of cell, straight and not at all approximated to basal part of  $R_{3+4}$ . Discocellular erect from  $R_5$  to  $M_1$ , then weak, convex distad, and only slightly oblique to posterior angle of cell; the latter weakly acute.  $M_1$  from a little behind  $R_5$ , straight and weakly divergent from it.  $M_2$ ,  $M_3$  and  $CuA_1$  closely grouped at posterior angle of cell, their basal parts curved and approximated.  $CuA_2$  from cell at about 5/6 from base.  $CuP$  reduced to a fold.  $1A+2A$  thickened basally and somewhat deflected subbasally, ending at tornus.  $3A$  weak, basally apposed to  $1A+2A$ , then curved to form a closed loop with it at about 2/5 from base. Frenulum hook and costal fold lacking in male; a retinaculum of stiff scales from behind cubital fold in both sexes.

*Hindwing* about half as wide as long, about as long as posterior margin of forewing; costa weakly lobed in middle; apex narrowly rounded; termen evenly convex; anal angle rounded; anal margin straight. Discal cell about 3/8 as long as wing; discocellular weak, almost erect, weakly concave distad, bending more strongly just before acute posterior angle.  $Sc+R_1$  anastomosed with  $R_s$  for a short distance beyond end of cell.  $M_1$  stalked for a short distance with  $R_s$  from anterior angle of cell.  $M_2$ ,  $M_3$ , and  $CuA_1$  from posterior angle of cell, their basal parts curved and approximated,  $M_2$  and  $M_3$  more strongly so than  $M_3$  and  $CuA_1$ .  $CuA_2$  from cell at about 3/4 from base.  $CuP$ ,  $1A+2A$ , and  $3A$  present and of about equal strength. Frenulum simple in male, multiple in female.

*Male genitalia* with uncus nearly twice as long as tegumen, for most of its length slender, rod-like and dorsally arched, but its distal part weakly expanded and dorsally armed with dark-pigmented spines in a posteriorly convergent double crest. Gnathos absent. Tegumen irregularly trapezoidal in lateral aspect, longer than high, its posterior margin strengthened by a thick sclerotized rod. Subscaphium slender and strap-like, supporting ventral wall of anal tube. Transtilla complete, formed of lateral triangular elements narrowly joined in midline. Juxta about three times as high as wide, somewhat X-shaped, bifid dorsally and ventrally. Vinculum with each lateral element forming an irregular sclerotized band, median element forming a short triangular saccus. Valve with costa inflated, antemedially arched, supported by a subcostal ridge extending to the rounded apex; terminal margin oblique, nearly straight; posteroventral angle obtusely rounded; ventral margin nearly straight; an acute process on subcostal ridge near base; clasper thorn-like and nearly straight, arising from near ventral end of a posteriorly oblique ridge running across middle of valve; sacculus inflated, sclerotized, tapering from base to near ventrodorsal angle, where it is slightly widened and dorsally ridged. Aedoeagus cylindrical, about six times as long as wide; vesica with armature of cornuti differing strikingly from one species to another.

*Female genitalia* with papilla analis high and narrow, with short, dense setae on posterior surface, longest peripherally. Apophyses posteriores with shaft a little longer than vertical bar. Eighth tergite tapering laterally; a row of fine setae along posterior margin but no anterior patch of setae. Apophyses anteriores longer than apophyses posteriores and with narrowly rhomboidal subbasal expansion. Ostial chamber funnel-shaped, more or less sclerotized. Ductus bursae about twice as long as corpus, its posterior half variously contorted, expanded and sclerotized, depending on species, its anterior half membranous. Corpus bursae flask-shaped, finely scobinated, bearing a pair of large, oval, depressed, sclerotized, spinulose signa, separated by a longitudinal fold.

**EARLY STAGES.**— Unknown.



**REMARKS.**— This genus belongs to the *Diaphania* group (see remarks under *Stemorrhages*), and is closely related to *Glyphodes* and *Chabula*. It includes a considerable number of species from the tropics and subtropics of both hemispheres. Most of these species have been confused in the past with *S. traducalis*. Two species have been found on Aldabra, the true *S. traducalis*, which is also widely distributed in Africa, the Near East, Réunion and Mauritius, and a new species, known only from the Seychelles, including Aldabra.

#### KEY TO ALDABRA SPECIES OF *SYNCLERA*

1. Hindwing with upper inner branch of postmedial line distinctly offset at fork (Fig. 81, arrow); hind tarsal segments lacking distinct apical bands; male genitalia with vesica of aedeagus bearing numerous short (not over 1/5 aedeagus length) spine-like cornuti (Fig. 184, 185); female genitalia with posterior 1/2 of ductus bursae heavily sclerotized, twisted, lacking diverticulum (Fig. 299) . . . . . *seychellensis*
- Hindwing with upper inner branch of postmedial line but little offset at fork (Fig. 80, arrow); hind tarsal segments with apical bands; male genitalia with vesica of aedeagus bearing 5 long (1/5 to 1/2 aedeagus length) spine-like cornuti only (Fig. 186, 187); female genitalia with posterior 1/2 of ductus bursae with large membranous sac-like diverticulum (Fig. 300) . . . . . *traducalis*

#### *Synclera traducalis* (Zeller)

(Fig. 80, 186-190, 300)

*Eudiotis traducalis* Zeller, 1852: 54.

*Pagoda traducalis* (Zeller); Hampson, 1896: 272 (part); 1898: 636 (part); Klima, 1939a: 56 (part); Paulian and Viette, 1955: 175 (part); Janjua and Haque, 1958: 140 (part); Pinhey, 1975: 69, Pl. 8 (part); Mathew & Menon, 1989: 78, pl. 1, fig. 5.

*Synclera traducalis* (Zeller); Fletcher, 1910: 302 (part); Viette, 1957b: 178 (part); Nazmi, 1963: 243-245, fig 23; Vári and Kroon, 1986: 87, 170.

*Spilomela retinalis* Lederer, 1857: 100-101.

*Salbia achatinalis* Guenée, 1863: 61.

**DESCRIPTION.**— Frons oblique; central disc of light yellow about half as wide as frons and tangent to its anterior margin, bordered by white elsewhere. Labial palpus ascending to middle of eye, third segment short; anteroventrally directed scales from all segments forming smooth semilunar plate, first and third segments white, second brown but for adjacent and equal pair of diffuse pale yellow triangles. Maxillary palpus short, reaching third segment of labial palpus; basal third brown, distal third white. Proboscis strong, scales orange yellow. Male antenna scapes closely approximate, separated by slender brush of anteriorly directed light yellow scales; each scape much enlarged basally, anteriorly emarginate at base, white; shaft dorsally white to light yellow with each segment bearing a single perpendicular cilium about 2/3 as long as segment width, ventrally with numerous fine cilia, each about half as long as segment width. Female antenna similar to male, scapes somewhat less enlarged and more widely spaced; shaft somewhat more slender, cilia as in male, but ventral cilia only about 1/3 segment width. Eye diameter about 0.65 mm. Ocellus well developed, elliptical, black with clear lens laterally directed. Vertex with cranium flat to somewhat depressed; scales hair-like, light yellow. Occiput with lateral and dorsolateral scale tufts white, light yellow dorsally. Patagium orange yellow on anterior half, white on posterior. Tegula orange yellow, white near wing base. Coxae and ventral surface of thorax generally white; forefemur light orange yellow, white ventrally; foretibia light orange yellow on basal half, distal half yellowish brown with white apical band; foretarsus light orange yellow; midfemur white, subapical band of light orange yellow; midtibia white, pale orange yellow on outer side, apical band of orange yellow; midtarsus pale orange yellow; hindfemur white, pale orange yellow at apex; hindtibia white, lower surface with inconspicuous brownish marking at base of upper spur and conspicuous yellowish brown band at lower spur; hindtarsus white to pale yellow, with conspicuous brown apical marking on inner side of first three segments.

*Forewing* radius 10-12 mm, females slightly larger than males. Ground hyaline white, with yellow tracing on:  $R_5$ ,  $M_1$ ,  $M_2$ ,  $M_3$ , cubitus,  $CuA_1$ , and  $CuA_2$ . Basal band of orange yellow and yellowish brown, joined to subbasal by light yellow bar along inner wing margin, elsewhere separated from it by white band. Subbasal band yellowish brown, beginning at costa and shortly forming circle or hook open anteriodistally, enclosing disc of orange yellow, yellowish brown band continuing posteriorly from circle to  $1A+2A$ , there forking, inner fork offset toward base and extending to inner wing margin, there curved inward slightly and joining basal band via yellow bar; outer fork triangular, offset distally, reaching inner margin; area between forks white to inner margin. Subbasal and antemedial bands separated by white above cubitus, orange yellow on costa, by hyaline white between cubitus and  $1A+2A$ , by white between  $1A+2A$  and inner margin. Antemedial line straight, set obliquely outward toward inner margin, inner and outer sides narrowly bordered with orange yellow above cubitus, bordering color expanded at costa; antemedial brown on costa and between cell and  $2A$ , with some brown in cell, largely yellowish brown above cubitus and entirely so below  $1A+2A$ ; at inner wing margin antemedial gives rise to oblique yellowish brown spur which joins lower outer brown border of claviform spot on  $1A+2A$ . Antemedial bordered distally by narrow yellow line on costa, by white between costa and cell, by hyaline white in cell and between cell and  $1A+2A$ , by large elliptical yellowish white spot posterior to  $1A+2A$ . Orbicular and claviform spots orange yellow, bordered basally and distally by brown lines extending from costa to  $1A+2A$  and connected by transverse brown lines on cubitus and  $1A+2A$ , orbicular spot somewhat narrowly joined to similar larger spot between cell and costa. Medial band bordered basally by narrow orange yellow line on costa, by broad white band between costa and cell, by hyaline white in cell and between cell and  $1A+2A$ , by orange yellow, then white at inner wing margin. Midregion of medial band orange yellow, broad between costa and upper outer angle of cell, abruptly much narrowed over discocellulars, ending at lower outer angle of cell; inner leg a mixture of yellowish brown and brown scales between costa and lower outer angle, there extending obliquely inward to inner wing margin, brown between cell and  $CuP$  fold, yellowish brown between  $CuP$  fold and inner margin; outer leg similar in color, at lower outer angle extending obliquely outward, at  $CuA_2$  much broadened to near tornal angle, along inner margin extending basally half way to inner leg; inner and outer legs separated by hyaline white between cell and  $CuP$  fold, by yellow between  $CuP$  fold and  $1A+2A$ , between  $1A+2A$  and inner margin separated by white basally and yellow distally. Angle between outer leg of medial band and subterminal band bisected by yellowish brown and brown postmedial line arising on  $1A+2A$ , ascending and curving outward to meet subterminal between  $M_1$  and  $M_2$ ; postmedial forking where crossing  $M_2$ , giving rise to upper branch ascending and curving outward, meeting costa at about 2/3 distance from medial to subterminal bands; lower branch separated from subterminal band by obovoid cell extending from  $M_2$  to  $1A+2A$ , hyaline white and bordered with yellow on upper and outer sides, the cell divided by traces of yellow on  $CuA_1$  and  $CuA_2$ ; a similar more irregular cell between upper fork and subterminal band extends from  $M_2$  to costa, divided by yellow traces on  $R_5$  and  $M_1$ , traces much broadened distally, this upper cell white to orange yellow between costa and  $R_4$ , hyaline white elsewhere. Subterminal band broad, yellowish brown with irregular white markings. Terminal line brown, narrow. Fringe pale brown on distal 3/5, light brown on basal 2/5 but for very narrow line of pale brown at base.

*Hindwing* ground hyaline white, white along costal margin. Narrow elliptical spot of light yellow bordered with brown on discocellulars, the brown extending posteriorly as a nearly straight line angled very slightly inward to just before  $1A+2A$ , then angled slightly outward, on fold between  $1A+2A$  and  $3A$  line offset basally, continuing yellowish brown to  $3A$  at inner wing margin. Short yellowish brown bar extends basally from inner margin midway between  $1A+2A$  and  $3A$ , bar set in triangular field of white bounded by wing margin, inner line, and fold near  $1A+2A$ . Postmedial line brown, arising from subcosta distal to fork with  $R_5$ , extends posteriorly, forking between  $M_2$  and  $M_3$ , outer branch curving outward and meeting subterminal band between  $M_1$  and  $M_2$ ; line broadens and forks again between  $CuA_2$  and  $CuP$ , the inner fork ascending straight to  $M_2$ - $M_3$  divergence, there terminating in point; posterior to  $CuA_2$  line broad, triangular, pointed and terminating at tornus, yellowish brown, brown on inner margin above  $1A+2A$ . Subterminal band broad, brown above  $R_5$ ,



elsewhere yellowish brown with irregular white markings. Terminal line brown, extending from above apex to between CuP and 1A+2A. Fringe as in forewing.

**Male genitalia** with juxta basally expanded, broadly rounded, ventrally emarginate; dorsally slender, tapering. Vinculum with saccus triangular, apex pointed. Valve broadly rounded apically; costa tubular throughout, basal third strongly curved, base with pair of nearly parallel inwardly directed triangular processes; sacculus basally inflated, gradually tapering distally, bearing widely scattered setae, patch of about a dozen short setae on distal 1/5; short mound about twice as long as high between sacculus and valve angle, this bearing several short setae; narrow transverse ridge at 3/5 distance from valve base, ventrally bearing irregular digitate process, caudally directed, about 4/5 as long as ridge. Aedoeagus weakly sclerotized ventrally except apically; vesica with parallel cluster of four or five unequal long slender cornuti (Fig. 187), ranging from 20% to 55% length of aedoeagus, the smallest sometimes extremely slender.

**Female genitalia** with ovipositor lobes short, posterior margin rather densely set with short slender setae, subterminally with intermediate setae and row of about a dozen long slender setae; lobe surface densely set with minute setae, each only a few micrometers long. Apophyses posteriores very slender; nearly straight, basal half slightly sinuous. Apophyses anteriores nearly twice as long as apophyses posteriores, slender, dorsal triangular process on basal half. Ostial chamber well sclerotized, triangular. Basal half of ductus bursae membranous, rugose dorsally with large triangular blind sac; anterior half smooth, covered with minute scobinations. Corpus bursae with pair of parallel equal signae, each about four times as long as wide and 2/3 as long as corpus bursae; each bearing numerous flat scales, each scale with a single stout triangular tooth laterally directed, these largest among periphery of signum; corpus bursae surface near signae with paving stone pattern of minute scales, each about a dozen micrometers wide, elsewhere corpus bursae surface with wrinkled pattern on same scale as scales, but scales not discernable. Ductus seminalis from near posterior end of ductus bursae, near ostial chamber.

**TYPE MATERIAL EXAMINED.**— *E. traducalis*, lectotype male, hereby designated, labeled: "Type" [round label, red bordered]; "XI.X"; "Caffr."; "*Synclera traducalis* Z.C.54. retinalis Led. Wz. 1857 p.100. univocalis Wkr.499."; "Zell. Coll. 1884"; "♂ *Pyrallidae* Brit. Mus. Slide No. 6092" [BMNH].

*S. retinalis*, type not found. Whalley (unpublished manuscript) notes: "Possibly in collection of O. Bang-Haas, Dresden." Type-locality: Beirut, Lebanon.

*S. achatinalis*, lectotype female, hereby designated, labeled: "Reunion"; "Ex. Musaeo Ach. Guenée"; "Paravicini Coll. B.M. 1937-383."; "♀ *Pyrallidae* Brit. Mus. Slide No. 6191" [BMNH].

**DISTRIBUTION.**— Widespread over tropical Africa from South Africa to Senegal, throughout eastern Africa north to Egypt, Israel, Lebanon, Syria, Saudi Arabia, and Cyprus; also from Reunion, Mauritius, and Rodriguez. We believe Asian and Western Hemisphere listings to be misidentifications. Aldabra material: Cinq Cases (9 Mar.) 1 ♂; Middle Island (16-18 Mar.) 6 ♀.

**HOSTS.**— Unknown.

**REMARKS.**— Males from Aldabra have five cornuti in the aedoeagus. K. Maes (pers. comm.) notes that males from Kenya have only four cornuti.

***Synclera seychellensis* Shaffer & Munroe, new sp.**

(Fig. 30, 81, 182-185, 299)

*Synclera univocalis* Legrand, 1965 (not Walker, 1859). Misidentification.

**DIAGNOSIS.**— Externally very similar to *S. traducalis*, with the following differences noted: in the hindwing the upper inner branch of the postmedial line is offset basally at the fork, distinctly more so than in *S. traducalis* and *S. univocalis* (compare Fig. 80-81); the hindtarsal segments lack the distinct apical bands of *S. traducalis*.

**Male genitalia** similar to *S. traducalis*, differing in the cornuti. Vesica with tight cluster of 4 or 5 rather stout spine-like cornuti, each about 7-8 times as long as its basal width and nearly 1/5 as long as aedoeagus; also a single row of about 16-20 shorter and longer more slender spines (Fig.

185).

**Female genitalia** similar to *S. traducalis*, differing in form of ostial chamber and posterior half of ductus bursae. Short midregion of ductus bursae membranous, rugose; posterior half smooth, well sclerotized, twisted, anteriorly forming blind sac; posterior 1/6 of sclerotized portion longitudinally and obliquely shallowly folded, flaring at posterior end, no demarcation with ostial chamber.

**TYPES.**— *Holotype* male, labeled: "Aldabra Atoll 9°24'S, 46°20'E Settlement 31 March 1968 Jay C. Shaffer"; "Genitalia Slide By J.Shaffer USNM 57859"; "*Holotype Synclera seychellensis* Shaffer & Munroe" [USNM].

*Paratypes*, 3 males, same locality data as holotype; Settlement, 10 Jan. (slide USNM 57856), 27 Jan. (slide USNM 57857); Takamaka Camp, 31 Jan. (slide USNM 57858); 3 females, Settlement, 10 Jan (slide USNM 57860), 17 Jan. (slide USNM 57862), 20 Jan. (slide USNM 57861); all labeled: "Paratype *Synclera seychellensis* Shaffer & Munroe" [USNM].

**OTHER MATERIAL EXAMINED.**— D. Adamski collected four males and a female at Settlement, 12-22 March 1986 (USNM slides 57837 male, 57838 female). Conspecific material from the granitic Seychelles (Legrand collection, MNHN) was examined from Mahe, Beau Vallon (J.Shaffer slides 1805 male, 1918 male, 2181 female) and Silhouette (J.Shaffer slides 1806, 2182, 2183; all females). These specimens are somewhat lighter in color than the Aldabra ones, but this could perhaps be attributed to the condition of the specimens.

**DISTRIBUTION.**— Known only from Aldabra (see above) and the granitic Seychelles.

**HOSTS.**— Unknown.

**REMARKS.**— It is not surprising that Legrand misidentified this species as *S. univocalis* as the two are extremely similar in maculation and color, distinguished externally mainly by *S. univocalis* lacking the extreme jog on the inner branch of the hindwing postmedial line characteristic of *S. seychellensis*. The application of the name *S. univocalis* itself is uncertain as the genitalia of the holotype have never been examined and the specimen has suffered extensive damage. According to M. Shaffer (pers. com.) both the abdomen and head are lost and the legs are damaged. A color slide taken by one of us (EGM) shows considerable vertigris, but with the head and abdomen intact and the wing pattern clearly discernable. Hopefully a thorough study of the Sri Lanka *Synclera* species will result in association of the type with complete specimens and permit recognition of the species, but that study is beyond the scope of this paper.

*S. seychellensis* is a member of a complex of very similar species and its taxonomic and zoogeographic relationships within this group remain to be elucidated.

**DIAPHANIA** Hübner

*Diaphania* Hübner, 1818: 20. Type-species *Diaphania vitalis* Hübner, 1818: 20, Pl. 18, figs. 101, 102. By subsequent designation by Klima, 1939b: 237.

*Eudiotis* Hübner, 1823: 24. Type-species *Pyrallis lucernalis* Hübner, 1796: 20, Pl. 17, fig 108. By subsequent designation by Westwood, 1840: 106.

*Diaphania* Stephens, 1829: 46; nec Hübner, 1818.

*Phakellura* Guilding, 1830: 206. Type-species *Phalaena hyalinata* Linnaeus, 1767: 874. By monotypy.

*Sestia* Snellen, 1875: 235. Type-species *Sestia oleosalis* Snellen, 1875: 236. By subsequent designation by Kirby, 1878: 184 (cited as *deosalis*, misspelling).

**DESCRIPTION.**— External Characters. Frons flat and oblique, smoothly scaled. Vertex about as long as frons, with narrow erect scales, forming tufts. Labial palpus obliquely upturned; scaling of first two segments compressed, its anterior margin broadly rounded, forming an obtuse porrect angle near distal end of second; third segment short, with very short, porrect scale tuft extending a short distance anteriorly along dorsal edge of scaling of second segment. Maxillary palpus well developed, reaching plane of frons and end of labial palpus; distal scaling weakly expanded, forming an obliquely compressed tuft. Proboscis long and coiled, scaled at base. Eye large, globular. Ocellus prominent, looking distodorsad, separated from eye by less than its width. Antenna with basal segment barrel-shaped, little



enlarged, without obvious modifications; shaft filiform, smoothly scaled dorsally, short-setose ventrally; middle segments sexually modified in a few American species, but not in the Aldabra representative. Body slender; abdomen tapering to a tip extending somewhat beyond anal angle of hindwing, and with a prominent expansible terminal brush of distinctly spatulate scales present in both sexes, though larger in the male. Legs of moderate proportions; epiphysis present; tibial spurs 0-2-4, outer spurs shorter than inner. Praecinctorium strongly bilobed.

*Forewing* subtriangular, width about 0.4 times length; costa straight to about 4/5 from base, then arched to subacute, narrowly rounded apex; termen straight and oblique basad to  $M_3$ , there weakly bent and more strongly oblique and weakly convex to obtuse ternal angle; posterior margin straight from tornus to near base, then arched to base. Sc free, ending on costa at about 3/4 from base. Discal cell about half as long as wing.  $R_1$  from cell at about 3/4 from base.  $R_2$  from just basad of anterior angle of cell, closely apposed for about half its length to  $R_{3+4}$ . The latter from anterior angle of cell;  $R_3$  and  $R_4$  separating a little more than halfway to apex;  $R_4$  ending on apical curve.  $R_5$  from anterior angle of cell, basally curved and approximated to  $R_{3+4}$ .  $M_1$  from a little behind anterior angle, nearly straight, not approximated to  $R_5$ . Discocellulars straight from anterior angle to  $M_1$ , concave and weakly oblique distad from  $M_1$  to posterior angle of cell.  $M_2$ ,  $M_3$ , and  $CuA_1$  closely grouped at posterior angle of cell, their basal parts curved and approximated.  $CuA_2$  from cell at about 3/4 from base. CuP represented only by a fold.  $1A+2A$  thickened and slightly inflated at base, nearly straight to ternal angle.  $3A$  basally apposed to  $1A+2A$ , then diverging and recurving to join  $1A+2A$ , forming a loop about 0.4 times as long as  $1A+2A$ . Male without frenulum hook, but a retinaculum of stiff scales present in both sexes.

*Hindwing* subtriangular, about 0.65 times as wide as long; anterior margin obtusely angulate before middle, forming a shallow prominence; apex narrowly rounded; termen weakly arched at  $M_3$ , almost straight and oblique basad anterior to flexure, again almost straight, but more strongly oblique from flexure to the rounded anal angle; anal margin convex. Frenulum prominent, simple in male, multiple in female. Discal cell about 1/3 length of wing. Sc+ $R_1$  anastomosed with Rs for about 1/5 its postcellular length. Rs and  $M_1$  stalked for a short distance from the anterior angle of the cell. Discocellular weak, concave distad, its anterior part oblique basad, its posterior part somewhat more strongly oblique distad to the short but acute posterior angle.  $M_2$ ,  $M_3$ , and  $CuA_1$  closely grouped around posterior angle of cell, their basal parts weakly curved and approximated.  $CuA_2$  from cell at about 4/5 from base. CuP,  $1A+2A$ , and  $3A$  present.

*Male genitalia* with uncus about 1.5 times as long as tegumen, slender, with rod-like shaft, hooked at base then gently arched ventrad; distal part weakly expanded dorsad and laterad, dorsal and dorsolateral surfaces densely covered with short, dark-pigmented, mostly bifid, scale-like spines. Gnathos absent. Subscaphium strap-like, fused to ventral wall of anal tube, arising from a transverse, lunular, basal sclerite. Tegumen longer than deep, transversely arched; lateral elements smooth, dorsally and ventrally somewhat convex in profile, anteriorly truncate, with anteriorly directed projection at anterior angle articulating with vinculum, and posteriorly truncate at base of uncus; lateral elements bounded by a thickened, sclerotized rim all around, dorsal parts of arms converging posteriorly to base of uncus and framing a median dorsal depression. Transtilla formed of narrowly triangular elements, their apices barely joining in midline. Juxta weakly sclerotized, roughly quadrate. Vinculum somewhat shoe-shaped in lateral aspect, a short dorsal element on each side joining tegumen to a longer, trough-shaped, median, longitudinal element, upturned anteriorly and with a short blunt process on each side posteriorly. A pair of large, heavily scaled coremata arising from vinculum. Valve subtriangular to subrhomboidal; costa strongly arched subbasally, then almost straight to rounded apex, tubularly inflated; distal and ventral margins at an obtuse angle (in the Aldabra species) or collinear; mesal surface with a variously shaped, dorsally directed process from near base; a small, sparsely setose tubercle near posteroventral angle of this process; a narrow subcostal flange parallel to costa; ventrad of this a wide smooth plate appressed to surface of valve; from this a distally oblique, sclerotized ridge, angled to join sacculus, and bearing a slender, acuminate, usually dorsally bent spine at the angulation; sacculus with a narrow, sclerotized, dorsal ridge, with weakly sinuate dorsal margin, bearing a number of erect setae. Aedoeagus cylindrical, several

times as long as wide, weakly sclerotized except for a band along dorsal margin and restricted distal sclerotization; vesica variously spinulose and folded.

*Female genitalia* with ovipositor with high, narrow lobes, bearing short setae over most of posterior surface and longer peripheral ones. Vertical bar of apophyses posteriores slender, shaft slender, but a little longer and more heavily sclerotized. Eighth tergite trapezoidal, with short inconspicuous setae. Apophyses anteriores about twice as long as apophyses posteriores, with triangular or rhomboidal subbasal expansion. Ostial chamber simple, membranous. Ductus bursae variable in width; a ventrally incomplete sclerotized collar just proximal to junction of seminal duct; ductus and corpus bursae spinulose, heavily and densely so in the Aldabra species; corpus bursae small, rounded, with ill-defined, bilobed or bipartite, depressed signum.

**HOSTS.**—The larvae are borers or leaf folders, so far as known mainly on Cucurbitaceae, but the Aldabra species is reported from Malvaceae, Leguminosae, Amaranthaceae, and Solanaceae as well.

**REMARKS.**—The species of this genus are for the most part easily recognized by the characteristic pattern of dark borders on a white or ochreous ground (though some species or variants have the wings totally fuscous), as well as by the presence of anal tufts of spatulate scales in both sexes and by features of male and female genitalia. Of the 70 or so described species, all but two are confined to the New World. The single Aldabran species is widespread and abundant in the tropics and subtropics of the Old World, but also occurs, though less commonly and more sporadically, in tropical and subtropical America. Its distribution is reminiscent of that of the butterfly *Hypolimnas misippus* (Linnaeus), though the close relatives of the latter are paleotropical, not neotropical. The second Old World species, *D. holophaealis* (Hampson, 1900, p. 74), from Christmas Island, Indian Ocean, is one of those with uniformly fuscous wings. Its genitalia have not been investigated, and it is possible it will prove to be only a melanic population of *D. indica*.

### *Diaphania indica* (Saunders)

(Fig. 31, 82, 191-193, 301-303)

- Eudiopetes indica* Saunders, 1851: 163-164, figs. 5-7; Moore, 1886 [1884-1887]: 324; J. de Joannis, 1894: 436.  
*Eudiopis capensis* Zeller, 1852: 52-53.  
*Phakellura gazoralis* Guenée, 1854: 297.  
*Phakellura zygaenalis* Guenée, 1854: 297.  
*Phakellura curcubitalis* Guenée, 1862: 64.  
*Phacellura indica* (Saunders); Meyrick, 1886: 223.  
*Glyphodes indica* (Saunders); Hampson, 1896: 360; 1898: 738; Pagenstecher, 1907: 135; Maxwell-Lefroy, 1909: 518; Fletcher, 1910: 309; Fryer, 1912: 27; Fletcher, 1914: 435-436, fig 312; Pinhey, 1975: 72, Pl. 6.  
*Glyphodes intermedialis* Dognin, 1904: 129.  
*Palpita indica* (Saunders); Vinson, 1938: 45-46; Vári and Kroon, 1986: 44, 169.  
*Diaphania indica* (Saunders); Klima, 1939b: 237, 239-241; Ghesquiere, 1942: 157-158; Anonymous, 1960: 47; Mathur and Singh, 1963: 131-132, figs 32-37; Holloway, 1982: 364; Clarke, 1986: 78-81, figs. 53, 280a (See Clarke for extensive reference list. The economic and biological literature for this species is extensive.)  
*Diaphana* [sic] *indica* (Saunders); Marion, 1954: 46; Paulian and Viette, 1955: 180-181; Viette, 1957b: 180; 1958a: 9; Legrand, 1965: 105-106; Clavijo, 1990: 61-67.  
*Margaronia indica* (Saunders); Shibuya, 1928: 236-237; Tams, 1935: 282; Janjua and Haque, 1958: 140; Nazmi, 1963 [1964]: 218-220, fig 8.

**DESCRIPTION.**—*Forewing* radius about 18 mm; ground of both fore- and hindwings together forming conspicuous triangle of hyaline white with bluish iridescence, costal margin of forewing and outer margins of both wings with broad moderate yellowish brown bands.

*Male genitalia* [based on USNM slide 55496, from Mwanza, Tanzania] with aedoeagus about 8 times as long as wide, proximal end expanded, distal end with heavily sclerotized midventral keel joined only at its proximal end; vesica smooth, unarmed but for patch of numerous extremely minute sharp triangular teeth, and prominent proximal rugose band which



on high magnification is resolved as a carpet-pile-like patch of closely set scale-like processes.

*Female genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**—None. See Clarke, 1986, p. 80 and also Clavijo, 1990, pages 64-65 for information regarding the types of *indica* and its synonyms.

**DISTRIBUTION.**—Throughout the tropical regions of the Old World and the Pacific. More recently (Anonymous In FAO, 1960) it has been reported from Florida, U.S.A. and tropical America. Reports include Madagascar, Mauritius, Reunion, and the granitic Seychelles. Aldabra material: Settlement (17, 27 Jan.) 2 ♀; (31 Mar.) 3 ♀; Middle Island (17 Mar.) 1 ♀.

**HOSTS.**—The larvae are well known as pests of a variety of cultivated plants, particularly Cucurbitaceae, but also cotton [Malvaceae], eggplant [Solanaceae], beets [Amaranthaceae], and soybeans [Leguminosae]. Legrand lists *Achyranthes aspera* L. [Amaranthaceae]; Paulian and Viette list *Trichosanthes palmata*, *T. anguina*, *Lagenaria* sp., *Luffa cylindrica*, *L. acutangula*, and *Momordica sinensis* [all Cucurbitaceae].

Of these plants Fosberg and Renvoise (1980) record the following for Aldabra. *A. aspera* var. *fruticosa* (Lam.) Boerlage is listed as widespread, but usually local (pp. 238-240). One species of *Trichosanthes*, *T. cucumerina* L., 'snake-gourd,' was cultivated at Settlement (p. 144), as were *Lagenaria siceraria* (Molina) Standley, 'bottle gourd' (p. 142), and *Momordica charantia* L. (pp. 142-143). Of these only *Achyranthes* is listed for Middle Island where a single moth was taken. Most of the cucurbits are recorded only from cultivated plots at settlement (where 5 moths were collected), and none are listed for Middle Island.

**REMARKS.**—See Clavijo, 1990 for a systematic study of *D. indica* and its relatives.

### OMIODES Guenée

- Lonchodes* Guenée, 1854: 354. Preocc. (Gray, 1835 [Orthoptera]).  
*Omiodes* Guenée, 1854: 355. Type-species *Omiodes humeralis* Guenée, 1854: 356. By subsequent designation, Shibuya, 1928: 203. Type-locality: Haiti.  
*Spargeta* Lederer, 1863: 277, 406. Type-species *Spargeta balatialis* Lederer, 1863: 407. By monotypy.  
*Coenostola* Lederer, 1863: 275, 408. Type-species *Botys origoalis* Walker, 1859: 681. By subsequent designation, Shibuya, 1928: 203.  
*Hedylepta* Lederer, 1863: 279, 409. Type-species *Asopia vulgalis* Guenée, 1854: 202. By subsequent designation, Moore, [1885]: 276.  
*Deba* Walker, 1866: 1494. Type-species *Deba surrectalis* Walker, 1865 [1866]: 1495. By monotypy.  
*Phycidicera* Snellen, [1880] 1892: 71. Type-species *Phycidicera manicalis* Snellen [1880] 1892: 72. By monotypy.  
*Pelecyntis* Meyrick, 1884: 292, 315. Type-species *Pyrausta absistalis* Walker, 1859: 311. By monotypy.  
*Charema* Moore, 1888: 218. Type-species *Charema noctescens* Moore, 1888: 218. By original designation.  
*Loxocreon* Warren, 1892: 432. Type-species *Salbia continuatalis* Wallengren, 1860: 175. By original designation.  
*Merotoma* Meyrick, 1894: 460. Type-species *Botys dairalis* Walker, 1859: 698. By monotypy.

**DESCRIPTION.**—External characters. Frons flat and oblique, smoothly scaled. Vertex about as long as frons, with erect tufts of long slender scales. Labial palpus obliquely ascending; scaling of first and second segments compressed, expanding to an angle at about middle of second segment, and broadly truncate at end of second; third segment small and with a short anteriorly directed scale tuft. Maxillary palpus prominent, reaching plane of frons, but its distal scaling not or little expanded. Proboscis well developed, scaled at base. Eye large, globular. Ocellus well developed, separated from eye by about its own diameter. Antenna filiform or in some species with sexual modifications in male, scaled dorsally, setose or fasciculate ventrally. Legs moderately proportioned or robust, in some species with distortions or androconial tufts. Abdomen tapering in male, blunt in female. Praeincinctorium strongly bilobed, the lobes protruding laterally. Male with prominent anal tuft of scales.

*Forewing* subrectangular; in Aldabra species about 2.5 times as long as wide; costa straight to 4/5 from base, then arched to rectangular apex; termen almost straight and weakly oblique basad from apex to cell  $M_3$ , there

flexed and more strongly oblique basad as far as tornus; posterior margin weakly sinuate, basal 3/4 convex. Sc free, ending on costa at 3/5 from base. Discal cell a little over half as long as wing.  $R_1$  from discal cell at about 3/4 from base.  $R_2$  from anterior angle, closely apposed for nearly half its length to  $R_{3+4}$ . The latter from anterior angle,  $R_3$  and  $R_4$  stalked about 2/3 distance from cell to apex,  $R_4$  ending at apex.  $R_5$  from just behind anterior angle of cell, its basal part not approximated to  $R_{3+4}$ . Discocellular concave distad between  $R_5$  and  $M_1$ , again concave and slightly oblique distad between  $M_1$  and  $M_2$ , the latter section very weak.  $M_1$  from a little behind  $R_5$ .  $M_2$ ,  $M_3$ , and  $CuA_1$  arising close together at posterior angle of cell, their basal parts curved and approximated.  $CuA_2$  from cell at 3/4 from base.  $CuP$  represented by a fold.  $1A+2A$  almost straight from base to tornus.  $3A$  with basal part thickened and approximated to  $1A+2A$ , then diverging and curving to form a loop with  $1A+2A$  at about 1/3 from base. Male without frenulum hook; both sexes with retinaculum of stiff scales.

*Hindwing* about as long as posterior margin of forewing, length about 1.7 times width. Costa nearly straight; apex rounded; termen weakly excavated between apex and  $M_3$ , then increasingly curved around anal angle; anal margin nearly straight.  $Sc+R_1$  anastomosed with  $R_s$  for a short distance beyond discal cell. Cell about 2/5 length of wing.  $M_1$  stalked for a short distance with  $R_s$ . Discocellular concave and oblique distad.  $M_2$ ,  $M_3$ , and  $CuA_1$  from posterior angle of cell,  $M_2$  and  $M_3$  strongly,  $M_3$  and  $CuA_1$  weakly approximated basally.  $CuA_2$  from cell at 2/3.  $CuP$  present, rather weak at base.  $1A+2A$  and  $3A$  present. Frenulum single in male, multiple in female.

*Male genitalia* with uncus about as long as costa of valve; basal part forming a slender shaft, arched dorsad; distal part enlarged and decurved, more or less as long as shaft, flattened and ovate, with posteriorly converging subdorsal and sometimes lateral crests of hair-like setae, arising from a dorsal patch of setae at base of enlargement and ending in a ventral patch at apex, the extreme apex attenuated and turned dorsad. Tegumen about as long as shaft of uncus; dorsally arched and medially depressed; lateral parts roughly triangular about as deep as long, margins not thickened, ventrally extended into a boot-shaped process articulating with vinculum. Gnathos absent. Subscaphium long and strap-like, attached to ventral surface of anal tube. Transtilla strong, with tapering lateral elements and arched median junction. Juxta subrectangular, higher than wide, with rounded corners. Vinculum shallower than tegumen; ventral region produced anteriorly into a triangular, medially carinate saccus. Valve about half as deep as long; costa arched, tubularly inflated; apex and terminal margin broadly rounded; ventral margin somewhat convex; sacculus narrow, tapering distad to a point; near its distal end joining a tapering, distally concave dorsally directed bar; the latter giving off a curved, thorn-like, distally directed clasper near its junction with sacculus. Aedoeagus about as long as valve, tapering distad, containing in the Aldabra species a single spine-like cornutus.

*Female genitalia* with ovipositor with high, narrow, densely setose lobes, dorsal part not produced. Apophyses posteriores T-shaped, vertical bar and horizontal shaft each about equal in length to height of ovipositor, and each slender, almost straight, without pronounced expansion or irregularity, except for a small, tooth-like, ventral, subbasal process on the shaft. Eighth tergite trapezoidal, with general scattering of short setae; anterior margin excavated on each side at origin of apophyses anteriores. The latter a little thicker than apophyses posteriores and more than 1.5 times as long, weakly sinuate, and with weak subbasal thickening. Eighth sternite triangular, moderately sclerotized. Ostium narrow, unarmed. Ostial chamber cup-shaped, membranous. Ductus bursae long, slender, membranous, with a short cylindrical collar, open ventrally, near its basal end. Corpus bursae small, oval or globular, finely scobinate, with a small, depressed signum.

**EARLY STAGES.**—Larvae leaf webbers and tiers on a wide variety of plants.

**REMARKS.**—This genus contains 74 species worldwide (Gentili and Solis, 1998: 471), widely distributed in the warmer regions of both hemispheres. In the past, the larger species have mostly been placed in *Phostria* Hübner or *Phryganodes* Guenée, following Hampson, and the smaller ones in *Lamprosema* Hübner or *Nacoleia* Walker, but the type-species of these nominal genera are not closely related to *Omiodes*. The single species found in Aldabra is a widely distributed pest of cultivated crops. For a discussion of the New



World species of *Omiodes* see Gentili and Solis (1998).

*Omiodes indicata* (Fabricius)

(Fig. 32, 83, 194-195, 304)

- Phalaena indicata* Fabricius, 1775: 640.  
*Nacoleia vulgaris* Guenée, 1854: 202, Pl. 6, fig 8; Hampson, 1896: 315-316; Maxwell-Lefroy, 1909: 517; Fletcher, 1910: 305; Fryer, 1912: 26.  
*Botys sabalis* Walker, 1859: 631.  
*Botys moeliusalis* Walker, 1859: 703-704.  
*Hedylepta vulgaris* (Guenée); Lederer, 1863: 409; Moore, 1885: 276; Joannis, 1894: 436p; Druce, 1895: 257.  
*Botys connexalis* Walker, 1865: 1394.  
*Botys reductalis* Walker, 1865: 1412-1413.  
*Botys dolosalis* Möschler, 1881: 423.  
*Nacoleia indicata* (Fabricius); Hampson, 1898: 699.  
*Nacoleia dnopheralis* Mabilie, 1900: 745.  
*Lamprosema indicata* (Fabricius); Janse, 1924: 486; Shibuya, 1928: 211, Pl. 8, fig 25; Klima, 1939a: 156; Schaus, 1940: 349-350; Vesey-Fitzgerald, 1941: 156; Ghesquiere, 1942: 141-143; Lamont and Callan, 1950: 206; Bhasin and Roonwal, 1954: 76; Patel, Patel, and Patel, 1964: 365.  
*Hedylepta indicata* (Fabricius); Paulian and Viette, 1955: 176; Amsel 1954 [1956]: 190; [1957]: Pl. 28, fig 1, Pl. 83, fig 16; Viette, 1958a: 8; Zimmerman, 1958: 64; Legrand, 1965: 103-104; Lima, 1968: 254; Vári and Kroon, 1986: 44, 169.  
*Psara lionnetalis* Legrand, 1965: 110-111, Pl. 9, No. 2, **new syn.**  
*Omiodes indicata* (Fabricius); Munroe in Hodges, *et al.*, 1983: 74; De Toledo, *et al.*, 1992 [1993]: 59-60; Gentili and Solis, 1997: 474, 478, 479, figs. 35-36, 63.

**DESCRIPTION.**— Frons orange yellow, lighter laterally but not forming distinct line along eye, middle with distinct brown sagittal line. Labial palpus upturned, not reaching vertex, third segment correct; light orange yellow with three brown spots along inner margin. Maxillary palpus brown on basal half, yellowish brown on distal. Proboscis orange yellow. Antenna scape orange yellow, vertical brown line anteriorly on outer side; male shaft ciliate, cilia about as long as segment width, female very finely ciliate, cilia about 1/3 as long as segment width. Ocellus well developed, not hidden by scales, separated from eye by less than half its width. Vertex orange yellow. Occiput brown laterally, orange yellow dorsally. Patagium with brown or orange-brown line between eye and forewing base, orange yellow elsewhere. Tegula orange brown to orange yellow, in male elongate with slender scales reaching second abdominal segment and with contrasting dark brown round spot on lateral margin just anterior to and slightly below level of wing, this spot absent in female.

Forewing radius about 10 mm; ground variable, mostly light yellowish brown; costal band light yellowish brown on basal third, orange yellow distal to antemedial band. Antemedial band from wing margin, diffuse brown, curving outward. Orbicular spot at about 2/5 distance from antemedial band to discal spot, brown. Discal spot along closing vein of cell, varying from parallel sided to reniform, brown. Discal spot along discocellular, varying from parallel sided to reniform, brown. Postmedial line diffuse, brown, from costal margin extending downward and outward to  $CuA_1$ , then curving inward sharply following between  $CuA_1$  and  $CuA_2$  to below discal spot, then hooked downward and outward to  $CuP$  fold, then angled inward and continuing straight to inner wing margin. Diffuse broad brownish patch distal to postmedial line. Terminal line well developed, dark brown, nodules between veins. Fringe brown on basal half, light brown on distal half.

Hindwing ground similar to that of forewing. Antemedial band extending downward from that of forewing, curving inward and reaching inner wing margin near angle with outer margin. Postmedial band extending downward from that of forewing, curving inward and becoming diffuse, not reaching wing margin. Terminal line dark brown, distinct, continuous rather than nodular. Base of fringe with brown line similar to terminal and narrowly separate from it; distal half of fringe white between apex and fold between  $CuP$  and  $1A+2A$ .

**TYPE MATERIAL EXAMINED.**— *indicata*, not examined.

*N. vulgaris*, lectotype male, hereby designated, labeled: "Lectotype"; "Cotype"; "Guyane française, Cayenne, ex. coll. Gn."; "Paravicini Coll. B.M.

1937-383"; "Pyralidae Brit. Mus. Slide No. 14296 (male)"; "Cotype"; "Asopia vulgaris Guenée (handwritten)"; "Asopia vulgaris Guenée Lectotype male det. E. G. Munroe, 1991".

Paralectotype female, hereby designated, labeled: "Paralectotype"; "Cotype"; "Guyane française, Cayenne, ex coll. Gn."; "Paravicini Coll. B.M. 1937-383"; "Pyralidae Brit. Mus. Slide No. 14295 (female)"; "Cotype"; "Asopia vulgaris Guenée (handwritten)".

*P. lionnetalis*, holotype male, labeled: "TYPE"[red]"; "23"; "Seychelles Mahé B. Vallon 2.II-1959 H.Legrand"; "♂"; "PSARA lionnetalis n.sp. type ♂ H.Legrand." [handwritten]; "Psara lionnetalis Legrand Mém. Mus. nat. Hist. nat. 1966 (n.s.) A. 37 (1965) p. 110"; "Museum Paris Coll. H. Legrand"; "♂ genitalia on slide 2161 J.C. Shaffer" [MNHN].

Paratype female, labeled: "♀"; "Paratype" [red]; "Seychelles Mahé B. Vallon 5.III.1956 H. Legrand"; "23"; "Museum Paris Coll. H. Legrand"; "Psara lionnetalis Legrand"; "♀ genitalia on slide 1831 J.C. Shaffer" [MNHN].

**DISTRIBUTION.**— This moth is found worldwide in the tropics and subtropics. Only 9 specimens were taken on Aldabra (2 ♂, 7 ♀), all at the settlement on Ile Picard. It may be that the species was subsisting on cultivated plants, though only very limited gardening was evident in 1968. Two females were collected on 29 March, the other 7 specimens on 31 March. No specimens were taken during nightly collecting in the same location during the period of 7-27 January.

**HOSTS.**— The species, commonly known as the bean leaf webber, is an economic pest and feeds on a variety of plants, particularly legumes [Leguminosae]. Principal hosts are: *Annona muricata* (Annonaceae), *Derris*, *Meibomia*, *Pueraria phaseoloides*, *Stizolobium*, and *Vigna*. Schaus (1940) reports the larvae on peas, beans, *Lantana camara* [Verbenaceae], *Meibomia tortuosa*, *Vigna repens*. Lima reports the larvae on leaves of *Calopogonium mucunoides*, *Dolichus* sp., *Phaseolus* spp., soja (soy), and *Vigna* sp. More recently, De Toledo, *et al.* (1992) recorded the species from corn crops in Argentina. Of these, Fosberg and Renvoise (1980) report *Vigna unguiculata* (L.) Walp. (cow pea, p. 119) and *Lantana camara* L. (pp. 223-224) on Aldabra, both from Settlement only.

**CONDYLORRHIZA** Lederer

*Condylorrhiza* Lederer, 1863: 278 (key), 393; Druce, 1895: 210; Forbes, 1923: 550; Ghesquiere, 1942: 184; Viette, 1958b: 147. Type-species *Botys illutalis* Guenée, 1854: 333. By monotypy. Type-locality: Brazil. *Botys illutalis* is a junior synonym of *Botyodes vestigialis* Guenée, 1854: 321. Type-locality: Colombia.

**DESCRIPTION.**— Frons rounded, somewhat inflated. Labial palpus (viewed denuded) with basal segment upturned; second obliquely ascending, about 1.5 times as long as basal; third segment correct, about 2/5 as long as second, slightly more than twice as long as wide, widest in middle. Maxillary palpus obliquely ascending, tip directed anteromedially. Proboscis well developed. Antenna filiform in both sexes, in male scapes wide with little separation, shaft much expanded and flattened near base, with anterior hollow, very finely ciliate throughout, cilia about 1/5 shaft diameter; in female scapes more narrow and widely separated, shaft lacking basal expansion, extremely finely ciliate. Ocellus well developed, elliptical base often at least partly hidden by scales, long axis oblique to eye margin. Vertex with small fan of scales extending anteriorly from between antennae, larger medial tuft of rather broad erect scales behind antennae more prominent in male.

Forewing with  $R_1$  from near middle of cell, closely parallel to end of cell, thereafter gradually diverging from  $R_2$  for a short distance, then angled, becoming more slender, continuing parallel to  $R_2$ .  $R_2$  from immediately above upper outer angle, angled slightly upward, then contiguous with  $R_{3+4}$  for about 1/3 its length.  $R_{3+4}$  from the angle, angled slightly downward from base, stalked portion about twice as long as free portion of  $R_3$ .  $R_5$  from just below the angle, nearly parallel to  $R_{3+4}$  for about 1/5 its length, then angled downward rather sharply, continuing straight for about half its length, then very gradually angled downward.  $M_1$  from below the angle, about 1/5 distance to lower outer angle, basal 1/3 straight, distal 2/3 very slightly convex.  $M_2$  from just above lower outer angle, basal 2/3 convex, distal 1/3 nearly straight.  $M_3$  from lower angle, basal 1/3 convex, distal 2/3 slightly



concave.  $CuA_1$  from just before the angle, slightly concave throughout.  $CuA_2$  from distal 1/3 of cell, essentially straight throughout. 1A+2A straight near base, then abruptly angled downward and concave below basal half of cell, convex below distal half, then straight to outer wing margin just above tornus. 3A contiguous with 1A+2A to just before sharp angle of 1A+2A, then diverging but following close to concave section of 1A+2A, forming loop that joins 1A+2A at 5/12 distance from base of 1A+2A; distal half of loop poorly developed, basal portion tubular.

*Hindwing* with female frenulum multiple. Costal margin distinctly convex above upper outer angle of cell. Sc+R<sub>1</sub> stalked with Rs for about 1/3 length of free portion of Sc+R<sub>1</sub>; free portion of Sc+R<sub>1</sub> convex, free portion of Rs straight. Near upper outer angle of cell M<sub>1</sub> short stalked with Rs, Rs diverging and almost immediately joining Sc+R<sub>1</sub>; M<sub>1</sub> concave. M<sub>2</sub> from immediately above lower outer angle, straight about 1/5 its length, then angled gradually downward, continuing straight to wing margin. M<sub>3</sub> from lower outer angle, straight at base, then angled downward slightly, slightly concave to wing margin.  $CuA_1$  straight at base, angled downward and slightly concave to wing margin.  $CuA_2$  from distal 1/6 of cell, straight throughout. Male with velvet androconial scale patch between 1A+2A and 3A and extending from wing base to about 3/4 distance to margin.

*Male genitalia* with uncus narrowing distally forming arching stalk with a few setae on each side of distal half; apex expanded, its lateral and dorsal surfaces at least partly covered with moderately narrow scales, each bifurcate about half its length. Gnathos absent. Juxta very slender, spine-like; base broadened, triangular. Valve very broadly rounded, about 5/8 as wide as long; dorsal half membranous and much inflated. Middle of valve with narrow sinuous longitudinal ridge bearing about 18 slender stiff setae, mostly in a row; smooth concave plate running ventral to ridge; sacculus strongly sclerotized, tubular, sinuous. Tegumen trapezoidal in lateral view, particularly heavily sclerotized along ventral and anterior margins and at their juncture, middorsally bearing prominent tubercle. Aedoeagus slender, cylindrical, about 12 times as long as central width, dorsal surface heavily sclerotized, rounded and spoon-like at posterior end, membranous elsewhere; vesica lacking cornuti, but finely denticulate.

*Female genitalia* with ovipositor lobes narrow, finely setose. Apophyses slender. Eighth segment rather heavily setose laterally and dorsally on posterior 1/3; devoid of setae ventrally. Ostium simple, membranous. Ductus bursae short, posterior half membranous, anterior half a sclerotized tube with longitudinal infold; again membranous at junction with corpus bursae. Corpus bursae elongate, slender, expanded anteriorly, surface set with numerous minute (10-20 micrometers wide) scobinations, these largest near posterior end, smallest near middle; anterior half of corpus bursae with large round area of concentric wrinkles; signum absent. Ductus seminalis slender, from posterior end of corpus bursae.

The genitalia in both sexes vary little within the genus and offer few specific characters.

***Condylorrhiza zypalis* (Viette), new comb.**

(Fig. 33, 84, 196-198, 305, 340-341)

*Pyrausta zypalis* Viette, 1958b: 146-147.

**DIAGNOSIS.**— This species differs from *vestigialis* in the following features: having a larger discal (reniform) spot with the discocellular vein marked by white rather than yellow scales; the hindwing having a single subterminal line rather than two; and the male hindwing with a less prominent androconial scale patch, not readily visible on the upper wing surface.

**DESCRIPTION.**— Frons yellowish pink; laterally with prominent white line, anteriorly angled medially, but not approaching midline, posteriorly extending between antenna and eye and hooking behind antenna. Labial palpus with outer side white on ventral 1/3, brown on dorsal 2/3, demarcation line horizontal and sharp, a few white scales dorsally near third segment; third white laterally, brown dorsally except white at base. Maxillary palpus white basally and on distal incurved portion, brown in middle. Proboscis scales light brown to reddish brown. Antenna scape anteriorly with white vertical band extending onto inner side of shaft at base, white band of scape bordered on inner side with yellowish pink band, then orange yellow to posterior surface, outer side reddish yellow in center,

bordered with yellowish white; shaft white on inner side near base, posterior side yellowish pink near base, gradually becoming brown distally. Vertex with small fan of yellowish pink scales extending anterior from between antennae, larger tuft of same color behind antennae. Occiput yellow dorsally; brown laterally, this joining horizontal brown band posterior to eye. Patagium and tegula rather uniformly yellow.

*Forewing* radius about 15 mm; ground brilliant yellow, marked with narrow grayish-purple lines. Subbasal line short, extending between cell and 1A+2A. Antemedial line extending obliquely outward from subcosta to inner wing margin, very slight outward bulge just above 1A+2A. Small grayish-purple medial spot in cell nearly half way from antemedial line to reniform spot. Reniform spot grayish purple on upper half, reddish brown on lower half, center of bluish white over closing vein of cell. Postmedial line extending from R<sub>3+4</sub> to 1A+2A; bulging outward between M<sub>2</sub> and  $CuA_1$ , then angled sharply inward between  $CuA_1$  and  $CuA_2$  to below reniform spot, there angled sharply downward and extending to inner wing margin, curving inward slightly. Subterminal line poorly developed, diffuse, beginning at R<sub>4</sub>, extending outward, convex, near to outer wing margin between  $CuA_1$  and  $CuA_2$ , there angled sharply inward, shortly intersecting  $CuA_2$  and there angled sharply downward to inner wing margin. Fringe with grayish purple terminal line on basal 1/3, lighter on outer 2/3. Underside with three prominent spots; diffuse subbasal spot in cell just distal to frenulum hook; small, round, sharply defined dark purple medial spot; reniform spot dark purple, with white central line over closing vein of cell.

*Hindwing* ground and line colors as in forewing. Dark grayish-purple spot over angle in center of closing vein of cell. Postmedial band beginning at Sc-Rs fork, extending posteriorly to M<sub>1</sub>-M<sub>2</sub> fold, then bulging outward between M<sub>2</sub> and  $CuA_1$ , between  $CuA_1$  and  $CuA_2$  angled sharply inward, intersecting  $CuA_2$  and there angled sharply toward inner wing margin, terminating at 1A+2A. Subterminal line irregular, but more or less uniform distance from outer wing margin. Fringe as in forewing. Androconial scale patch of male not apparent on upper wing surface, readily visible on underside as tan patch in deep fold between 1A+2A and 3A. Underside with prominent dark-purple spot with small white center at angle of closing vein of cell.

*Male genitalia* with uncus stalk relatively short and rather strongly curved as compared with *vestigialis*; lateral setae borne on concave plate (absent in *vestigialis*) on ventral side of apex extending onto distal 1/3 of stalk. Tegumen with middorsal tubercle about 2/3 as high as long in lateral view (less than 1/2 as high as long in *vestigialis*). Base of genitalia bearing pair of corema (Figs 340-341), each formed of brush of slender thread-like deciduous scales (similar in *vestigialis*), and a tight fan-shaped cluster (absent in *vestigialis*) of slender ligulate scales.

*Female genitalia* with anterior half of corpus bursae with patch of concentric wrinkles in lateral position. In *C. vestigialis* this patch is centered on the anterior end.

**TYPE MATERIAL EXAMINED.**— None (see discussion below).

**DISTRIBUTION.**— The species is known only from Madagascar and a single male from Aldabra, collected by D. Adamski at Settlement, 12-22 Mar. 1986.

**HOSTS.**— Unknown.

**REMARKS.**— We have examined a male and female pair from Madagascar kindly provided by Dr. Viette for deposition in the USNM and collected by him at the same locality and in the same time period (mid January 1955) as the type series and find no significant difference as compared with the Aldabra specimen. Our description of female characters is based on the female member of that pair.

Viette lists the type series as consisting of a male holotype, allotype, and 10 paratypes from "Madagascar Est, env. de Périnet, forêt d'Analamazoatra, alt. 910 m", the holotype on 16-I-1955, allotype and other paratypes on 17-I-1955.

**STEMORRHAGES Lederer**

*Stemorrhages* Lederer, 1863: 397. Type-species *Phalaena sericea* Drury, 1770 [1773]: 9. By monotypy.



**DESCRIPTION.**— External characters. Frons flat and oblique, smoothly scaled. Vertex shorter than frons, with erect, rather fine scaling. Labial palpus upturned; scaling of first two segments compressed, forming a correct angle near distal end of second; third segment short, with short, correct scale tuft extending part way anteriorly along dorsal edge of scaling of second segment. Maxillary palpus well developed, but not reaching as far dorsad as labial palpus; distal scaling expanded into a flattened tuft appressed to frons and anterior part of clypeus. Proboscis long, coiled, scaled at base. Eye large, globular. Ocellus small, immediately adjacent to eye a little behind antennal socket. Antenna slender, smoothly scaled dorsally, finely short-pilose ventrally, in the type-species, found in Aldabra, the basal part in the male somewhat thickened from base to a flattened, deflected section ending in a thorn-like dorsal angulation near middle; this specialization lacking in Asian and Polynesian species. Body slender, with abdomen tapering gracefully to a protrusible terminal tuft of fine black scales in male and a plain tip in female. Legs long and slender; foretibia with epiphysis; mid tibia with one, hind tibia with two, pairs of spurs, outer spurs shorter than inner; mid and hind femora each with a ventral groove containing hair-like scales in its basal part. Praecinctorium strongly bilobed, a large and somewhat folded lobe protruding on each side.

**Forewing** subtriangular, width about 0.4 times length; costa straight to 4/5 from base, then arched to narrowly rounded, subrectangular apex; termen oblique basad, nearly straight to  $M_3$ , there weakly bent and again almost straight to the obtusely rounded tornus; posterior margin weakly bilobed in basal half. Male with narrow costal fold enclosing androconia on ventral surface, these structures wider in some species than in others. Male without frenulum hook, but with retinaculum of stiff scales from postcubital fold. Sc reaching costa at about 3/4 from base.  $R_1$  from discal cell near middle, thick opposite cell.  $R_2$  from cell a little basad of anterior angle, apposed to basal part of  $R_{3+4}$ . The latter from anterior angle of cell, slender,  $R_3$  and  $R_4$  separating a little more than halfway to apex, very weakly divergent, apex just anterior to  $R_4$ .  $R_5$  from just behind anterior angle of cell, its basal part thickened, strongly curved and approximated to  $R_{3+4}$ . Discal cell less than half as long as wing. Discocellular straight to  $M_1$ , then concave, incurved then oblique distad.  $M_1$  from a little behind  $R_5$ , straight and not approximated to it basally.  $M_2$ ,  $M_3$ , and  $CuA_1$  arising close together around the acute posterior angle of the cell, their basal parts curved and approximated.  $CuA_2$  from cell about 2/5 from base.  $CuP$  reduced to a fold.  $1A+2A$  inflated at base, then deflected anteriorly and running straight and gradually tapering to termen at ternal angle.  $3A$  apposed to inflated part of  $1A+2A$ , then bowed posteriorly and anteriorly to form a loop joining  $1A+2A$  about 2/5 from base; a short spur distad from posterodistal extremity of loop representing continuation of  $2A$ .

**Hindwing** subtriangular, about as long as posterior margin of forewing, width about 2/3 of length. Costa weakly arched, more strongly so opposite end of discal cell; apex rounded, extending farthest distad just behind  $R_5$ ; termen convex, shallowly retracted at each vein end from  $M_1$  to  $CuA_2$ , most strongly curved at  $CuP$ ; anal angle rounded; posterior margin thickened and with a strong convexity near its middle. Discal cell about 2/5 as long as wing.  $Sc+R_1$  anastomosed with  $R_5$  for a short distance beyond end of cell.  $R_5$  and  $M_1$  stalked for a short distance beyond discocellular. Discocellular straight and erect to mid-axis of cell, then obtusely angled and straight and oblique distad to posterior angle of cell.  $M_2$ ,  $M_3$ , and  $CuA_1$  closely grouped at posterior angle, their basal parts curved and approximated.  $CuP$  from cell at about 7/8 from base.  $CuP$ ,  $1A+2A$ , and  $3A$  present, about equally developed. Frenulum single in male, multiple in female.

**Male genitalia** with uncus with slender, tubular, strongly arched shaft and equally long but thicker, downturned distal portion; the latter with a spined to setose dorsal carina on each side, the carinae and spines better developed proximally and distally, weaker in between; carinae joining distally and fusing with a band-like setose sclerite along ventral surface to junction with shaft. Tegumen about as long as shaft of uncus, forming a high compressed arch over dorsum; dorsal surface with a subtriangular to semicircular median carina on posterior half, divided by a strong notch from arched base of uncus shaft; anterior part of dorsum with a pair of carinae laterally and a shorter median carina between them anteriorly; sides of tegumen arch triangular to semicircular, with a thickened heavily sclerotized rim anteriorly and posteriorly, and joined by a narrower, flat, posteriorly rounded section to dorsal margin of vinculum on each side. Subscaphium long, strong, strap-

like, fused to ventral margin of anal tube. Transtilla incomplete medially. Juxta high and narrow. Vinculum with high, irregularly shaped lateral elements, with strong, bifurcate, thickened sclerotization along posterior margin, and bearing a large ovoidal corema on each side; these elements joining a short ventral element, produced anteriorly into a short slipper-shaped saccus. Valve with costa sigmoidally curved, supported by a strong but narrow subcostal tubular sclerite, basally continued as a ligament to vinculum that gives off the lateral remnant of the transtilla; apex broadly rounded; distal margin oblique basad, curving gently to meet ventral margin; clasper short, ventrally directed, thorn-like, not attaining ventral margin, arising from a broad discal sclerite continued basad as a weakly setose spine-like process; sacculus narrow, with curved dorsal margin and bearing a few short setae, and ending in an acute, obliquely upturned flange near middle of ventral margin. Aedoeagus about as long as valve, weakly sclerotized except for a strap-like strengthening of one wall; vesica with a long, distally hooked cornutus and a number of small, hair-like, probably deciduous ones. Eighth segment with horseshoe-shaped sclerite in sternal region and a Y-shaped sclerite flanked by a pair of thorn-like ones on the tergum.

**Female genitalia** with papillae anales high and narrow, relatively small, densely and evenly setose. Apophyses posteriores with shaft no longer than vertical bar; apophyses anteriores about twice as long. Eighth tergite setose on anterior half. Ostial chamber short, funnel-shaped, evenly sclerotized or membranous except for a short sclerotized zone at junction with ductus bursae and ductus seminalis. Ductus bursae densely but finely scobinate, enlarging rather gradually into the scobinate corpus bursae; the latter armed with a pair of thorn-like cornuti.

**REMARKS.**— This genus is a segregate of the old *Glyphodes* Guenée or *Margaronia* Hübner in the sense of Hampson or *Diaphania* Hübner in the sense of Klima and of American authors. Its genitalia have a general similarity not only to those of *Diaphania* and *Glyphodes* in the strict sense as well as of many other segregates of the old collective genus, but also to those of *Synclera*, *Maruca*, *Omiodes*, *Chabula*, and *Condylorrhiza*, as well as numerous extralimital genera not previously associated with this complex. Among the distinctive features of *Stemorrhages* are the carinate tegumen and the characteristically shaped sclerotized flange and clasper of the valve in the male, and the paired thorn-like cornuti in the female. The last are shared with the genus *Palpita* Hübner [= *Margaronia* Hübner], but that genus has the ostium moved forward into an emarginated sclerite of the seventh sternum in the female, and has the uncus simpler or even greatly reduced and the inner surface of the valve conspicuously armed in the male. The moths are pale green or blue-green in color, with a characteristic appearance. Some Neotropical species of similar facies are probably generically distinct, as are the thicker-bodied, intensely leaf-green species of *Parotis* Hübner.

**HOSTS.**— The larvae of several species are known. They are leaf-rollers, mainly on Apocynaceae, but *S. sericea* has been reported from Rubiaceae as well.

#### *Stemorrhages sericea* (Drury)

(Fig. 34, 85, 199-202, 306-307)

*Phalaena sericea* Drury, 1773 : 9, Pl. 6, fig 1.

*Stemorrhages sericea* (Drury); Lederer, 1863: 397; Paulian and Viette, 1955: 181; Viette, 1957b: 181; Legrand, 1965: 107; Vári and Kroon, 1986: 80, 170.

*Glyphodes sericea* (Drury); Hampson, 1898: 734; Pagenstecher, 1907: 135; Pinhey, 1975: 72, Pl. 1.

*Margaronia sericea* (Drury); Janse, 1924: 487.

*Palpita sericea* (Drury); Vinson, 1938: 45.

*Diaphania sericea* (Drury); Klima, 1939b: 264; Ghesquiere, 1942: 161; Marion, 1954: 46.

**DESCRIPTION.**— Frons deep orange yellow anteriorly and anteriolaterally. Labial palpus yellowish brown dorsally on outer side of second segment, abruptly greenish white on ventral half and on basal segment; third segment light orange yellow. Maxillary palpus yellowish brown, pale green at base. Proboscis scales light orange yellow. Male antenna with scape pale green; shaft finely ciliate ventrally, cilia about 1/10 as long as segment width near



base of shaft; dorsally a single cilium per segment, about 2/3 as long as segment width; scales on dorsal surface yellowish white. Eye diameter 1.4 mm. Ocellus conical, black with round clear lens. Vertex greenish white. Occiput pale green dorsally, yellowish brown laterally. Patagia pale green. Tegula pale green, line of deep orange yellow extending from eye to forewing costa. Thorax elsewhere pale green. Abdomen pale green, terminal scale tufts dark brown with scattered yellowish-white scales.

*Forewing* radius 28 mm. Ground uniform pale green; band of yellowish brown on costa and subcosta. Small dark brown spots between veins on outer margin.

*Hindwing* uniformly pale green with small dark brown spots between veins on outer margin.

*Male genitalia* with distal portion of uncus with distal half of each lateral carina bearing row of erect lanceolate scales, each set in prominent deep socket and most being distally bifurcate, these scales more numerous and crowded at apex of uncus; apex with prominent strap of slender scales, short and extremely densely set on distal portion of strap, on proximal portion scales much longer, parallel, distally ventrally angled and bifurcate, the bifurcations spreading, not parallel; basal half of distal process with mat of short recumbent distally bifurcate scales and patch of long fine hairs near junction with shaft. Aedoeagus with long cornutus equal or nearly equal to aedoeagus in length, distally with hemispherical cap bearing four strong basally directed hooks; one-third from distal end cornutus is sinuate and surrounded by numerous minute strong spines ranging from 20-250 micrometers long.

*Female genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— None.

**DISTRIBUTION.**— The species occurs nearly throughout Africa south of the Sahara, and on the islands of Madagascar, Comoros, Mauritius, Reunion, and the granitic Seychelles and Aldabra. A single male was taken at Settlement on Aldabra, Jan. 18, 1968, and one must consider the possibility that it arrived on the same boat as the senior author 10 days earlier.

**HOSTS.**— Paulian and Viette (1955) report the species has been reared (the larvae are leaf rollers) from: *Conopharyngia* (syn. of *Tabernaemontana* L.), *Nerium oleander* L., *Tabernaemontana iboga* [all Apocynaceae], and cultivated gardenia, *Gardenia jasminoides* Ellis [Rubiaceae].

### CIRRHOCRISTA Lederer

*Cirrhochrista* Lederer, 1863: 440-441. Type-species *Cirrhochrista aetherialis* Lederer, 1863: 441. By subsequent designation by Ragonot, [1891]: 542 (cited as *M. brizoalis*; see Fletcher & Nye: 34). Type-locality: Amboina [Indonesia]. Viette, 1990: 23.

*Cirrhochrista* Warren, 1892: 430. misspelling.

*Eucallaenia* Snellen, 1892: 173. Type-species *Cirrhochrista fumipalpis* Felder & Rogenhofer, 1875, Pl. 135, fig 31. By monotypy.

*Pachybotys* Warren, 1895: 475-476. Type-species *Botys spissalis* Guenée, 1854: 326. By original designation.

*Margaronia* Marumo, 1917: 35, nec Hübner, 1825. Type-species *Margaronia brizoalis* Walker, 1859: 976. By original designation.

*Ancalidia* Joannis, 1932: 446. Type-species *Ancalidia nivea* Joannis, 1932: 448. By original designation.

**DESCRIPTION.**— External Characters. Frons flat and oblique or at least somewhat flattened, smoothly scaled. Vertex with rough, erect scaling. Labial palpus porrect, exceeding frons by more than length of head; first segment curved; second segment long, cylindrically scaled, obliquely porrect; third segment porrect, acuminate, shorter than second, exposed, or with base partly hidden in scaling of second. Maxillary palpus prominent, with strongly expanded distal scale tuft, its dorsal plane joining plane of frons with dorsal plane of labial palpus. Proboscis weak, but coiled and scaled at base, generally hidden between bases of labial palpi. Eye large. Ocellus absent. Antenna prismatic, laminate or filiform in male, filiform in female. Body robust. Abdomen considerably exceeding anal angle of hindwing, especially in male. Male with strong anal scale tuft. Legs robust, often with specialized scaling in male; outer tibial spurs shorter than inner, especially in male. Praecinctorium strongly bilobed.

*Forewing* of varying width; costa straight to near apex, then curved; apex subacute to rather broadly rounded; termen oblique, evenly rounded to almost straight; tornus obtuse; posterior margin nearly straight. Discal cell

about half as long as wing.  $R_1$  from somewhat basad of anterior angle of cell.  $R_2$  from near anterior angle, apposed for some distance to  $R_{3+4}$ .  $R_3$  and  $R_4$  stalked more than half way from anterior angle of cell to apex of wing.  $R_5$  from anterior angle, its basal part strongly curved and closely apposed to that of  $R_{3+4}$ .  $M_1$  from a little behind  $R_5$ , its base not curved or approximated to that of  $R_5$ . Discocellular variably oblique and concave distad.  $M_2$ ,  $M_3$  and  $CuA_1$  arising close together around posterior angle of cell, their bases curved and approximated, those of  $M_2$  and  $M_3$  more closely so than those of  $M_3$  and  $CuA_1$ .  $CuA_2$  from somewhat basad of posterior angle of cell.  $CuP$  obsolete.  $1A+2A$  strong, more or less straight.  $3A$  forming a large closed loop with  $1A+2A$ .

*Hindwing* relatively short; costa convex; apex rounded or subacute; termen straight and oblique or somewhat convex; anal angle broadly rounded; anal margin convex.  $Sc+R_1$  anastomosed with  $R_s$  beyond cell for a considerable distance.  $R_s$  and  $M_1$  stalked for a short distance. Discal cell usually a little less than half as long as wing. Discocellular vein with basally directed angle at middle, posterior part more strongly oblique than anterior.  $M_2$  and  $M_3$  from posterior angle of cell, stalked or approximated.  $CuA_1$  from posterior angle of cell or near it, basally more or less curved and approximated to  $M_3$ .  $CuA_2$  from somewhat basad of posterior angle.  $CuP$  and both anals present.

*Male genitalia* with uncus of moderate length, rod-like, with tip slightly to rather strongly expanded, dorsally finely and sparsely setose, in some species with scales or spines as well, and tending to be differentiated into one medial and a pair of lateral lobes. Tegumen of variable dimensions, sometimes somewhat domed, but not inflated or separated by a depressed sulcus from an ascending uncus base as in many genera of the *Diaphania* group. Subscaphium weak or absent. Transtilla incomplete or medially very narrow, but with large, often triangular, lateral elements. Juxta small, irregularly subovate or U-shaped or V-shaped, often finely spinulose. Vinculum short, anteroventrally flattened. Valve short, broadly and asymmetrically rounded; costa strongly arched, sometimes inflated; sacculus weakly to strongly inflated, extending most of length of ventral margin, unarmed or with various spines or flanges; clasper small, claw-like, extending distad or weakly ventrodistad from near middle of valve. Large coremata arising from vinculum, and also modified sclerites on eighth sternum. Aedoeagus cylindrical, weakly sclerotized; vesica with varying armature, but often with a pair of long, single rows of short strong spines in echelon.

*Female genitalia* with ovipositor with high, narrow, short, rather weakly differentiated, but densely and finely setose, lobes. Apophyses posteriores with shaft a little shorter than vertical bar. Apophyses anteriores a little longer and thicker. Eighth tergite rather weakly sclerotized, narrowing ventrad, with a considerable number of fine setae; sternum unsclerotized. Ostium narrow. Ductus bursae moderately long, usually fairly wide; proximal part often spinulose, sclerotized, and/or variously modified in shape. Corpus bursae fairly large, round, oval or pyriform, unarmed or with one or two variously developed spinulose signa.

**EARLY STAGES.**— Unknown.

**REMARKS.**— This genus contains a considerable number of species, many undescribed, which collectively range from tropical and subtropical Africa, through tropical Asia to China, Japan, the East Indies, Melanesia, Micronesia and Australia. There is considerable variation in wing shape, maculation and genital structure, and it is possible that with better knowledge of the species the genus will have to be subdivided. However, the long labial palpi, large, distally expanded maxillary palpi, reduced proboscis, and general pattern of wing markings and wing venation suggest that the group is a natural one. Together with its close relatives *Pachybotys* Warren, 1895 and *Obtusipalpis* Hampson, 1896, it appears to constitute a compact subgroup in the Spilomelinae.

One species has been taken in Aldabra. Its affinities appear to be with African, rather than Asiatic, species of the genus.

### *Cirrhochrista oxylalis* Viette

(Fig. 35, 86, 203-204, 308)

*Cirrhochrista oxylalis* Viette, 1961: 191-192, figs. 3, 6, Map 1.



**DESCRIPTION.**— *Forewing* radius about 9.5 mm. Ground white; costal band deep orange yellow, this color extending posteriorly at wing base and in middle of antemedial, medial, and postmedial lines; costal band posteriorly, other bands, and outer wing margin bordered with dark yellowish brown.

*Hindwing* white with dark yellowish brown spot on wing margin between  $M_3$  and CuP, best developed between CuA<sub>1</sub> and CuA<sub>2</sub>.

*Male genitalia* with uncus with tip moderately expanded, finely setose. Juxta subovate. Valve with sacculus inflated and strongly sclerotized at base, distally with stout spine extending anteroventrally from near distal end of clasper. Aedoeagus with a pair of strong subequal spines, the longer about half length of aedoeagus, the shorter one fourth length of aedoeagus.

*Female genitalia* with ductus bursae moderately broad, moderately well sclerotized; surface appearing granular due to numerous minute scobinations. Corpus bursae somewhat elongate, unarmed, entire surface covered with minute hexagonal or stellate scale-like structures. Ductus seminalis from midregion of ductus bursae.

**TYPE MATERIAL EXAMINED.**— Holotype male, labeled: "Madagascar Est, env. de Perinet alt. 910 m, foret d'Analamazoatra, P. Viette le 21-XI-1954"; "P.E.L. Viette det. 1961, Cirrhochrista oxylalis n. sp. ♂ Holotype P. Viette"; "TYPE"; "♂ genitalia on slide 1776 J.C. Shaffer" [MNHN].

**DISTRIBUTION.**— Known only from Madagascar, Comores (Moheli), and Aldabra. Aldabra material: Settlement (18-27 Jan.) 6 ♀; Takamaka (31 Jan.–18 Feb.) 14 ♀. A male was collected by B. Cogan and A. Hutson at Takamaka Pool, 1-17 Feb. 1968 (Pyralidae Brit. Mus. Slide No. 14309). D. Adamski collected two males and a female at Settlement, 12-22 Mar. 1986.

**HOSTS.**— Unknown.

#### *ALYTANA* Shaffer & Munroe, new genus

Type-species *Analyta aldabralis* Viette, 1958b: 142. By present designation.  
Type-locality: Seychelles: Aldabra Atoll.

**DIAGNOSIS.**— This genus is distinguished from *Analyta* and other related genera by the unipectinate male antenna (simple in *Analyta*, *Hyperanalyta*, *Leucinolyta* and *Syngamilyta*) and by the subcostal flanges and expanded and flanged clasper of the valve of the male genitalia.

**DESCRIPTION.**— Frons somewhat flattened and prominent, with fairly smooth scaling. Vertex short, with erect scaling. Labial palpus large, broadly scaled; upturned to near dorsal level of cranium, then porrect, exceeding frons by about half length of head; scaling of segments well marked off; first segment short and somewhat curved; second segment long, obliquely ascending, broadly scaled; third segment short, porrect, lying along dorsal margin of scaling of second. Maxillary palpus short and inconspicuous. Proboscis well developed, with strong basal scaling. Eye large. Ocellus moderately developed, adjacent to dorsal margin of eye. Antenna of male more or less strongly unipectinate; that of female smooth and somewhat compressed. Body moderately robust, abdomen evenly tapering, with an expanded anal tuft in male, exceeding anal angle of hindwing by a considerable distance. Legs moderately robust. Outer tibial spurs somewhat shorter than inner. Praecinctorium strongly bilobed.

*Forewing* of moderate width; costa straight or weakly arched to near apex, then relatively strongly arched. Apex narrowly rounded. Termen with anterior part somewhat oblique basad, behind  $M_3$  curving increasingly basad to the rounded tornus; posterior margin weakly convex. Discal cell fairly narrow, about half as long as wing.  $R_1$  from cell well basad of anterior angle.  $R_2$  from just basad of anterior angle, apposed for some distance to  $R_{3+4}$ .  $R_3$  and  $R_4$  stalked more than half-way from anterior angle of cell to apex of wing.  $R_5$  from immediately behind anterior angle, its basal part curved and approximated to  $R_{3+4}$ .  $M_1$  from just behind  $R_5$ , but its basal part not curved and approximated to that of  $R_5$ . Discocellular weakly oblique distad, obtusely angled at middle, the posterior part a little more strongly oblique.  $M_2$ ,  $M_3$ , and CuA<sub>1</sub> from posterior angle of cell, their basal parts curved and approximated, those of  $M_2$  and  $M_3$  more strongly than those of  $M_3$  and CuA<sub>1</sub>. CuA<sub>2</sub> from cell at about 3/4. CuP represented by a fold only. 1A+2A strong, nearly straight. 3A forming a large closed elongated loop with 1A+2A.

*Hindwing* relatively small; costa nearly straight; apex rounded, reaching farthest distad at Rs; termen fairly evenly rounded; anal angle rounded; anal

margin somewhat convex, lightly hairy. Discal cell less than half as long as wing. Sc+ $R_1$  anastomosed with Rs beyond cell for some distance. Rs and  $M_1$  with very short stalk. Discocellular anteriorly erect, obtusely angled at middle, posteriorly weakly oblique distad.  $M_2$  and  $M_3$  from posterior angle of cell, their basal parts curved and approximated. CuA<sub>1</sub> from just basad of posterior angle, its basal part somewhat less strongly curved and approximated to that of  $M_3$ . CuA<sub>2</sub> from cell at 2/3 from base. CuP, 1A+2A, and 3A present.

*Male genitalia* with uncus fairly slender, not very long, distally decurved and with narrowly ovate, dorsally spinose, terminal expansion. Subscaphium narrow and strop-like. Tegumen long, domed. Transtilla consisting of a pair of triangular lateral elements, not meeting in mid-line. Juxta fairly strong, shaped like an inverted V or Y. Vinculum broad, somewhat irregular, with median carina. Valve broadly rounded; costa inflated and followed by a narrow ridge, bearing variably developed, sometimes prominent, flanges; sacculus inflated and ending in a finger-like, upturned process; clasper expanded into a broad, flat plate, variously dissected and spined distally. Aedoeagus short, distally expanded, without cornuti.

*Female genitalia* with ovipositor with small, weak, sparsely setose lobes. Apophyses posteriores with long slender shaft and short weak vertical bar. Eighth tergum strongly sclerotized, saddle-shaped, oblique. Apophyses anteriores a little longer and appreciably thicker than apophyses posteriores. Ostium wide, with sclerotized, rugose dorsal and ventral walls, leading to a narrow sclerotized tube at commencement of ductus bursae proper. Rest of ductus bursae narrow and membranous, leading to the narrow membranous, unarmed corpus bursae.

**EARLY STAGES.**— Ghesquiere (1942) reports the larvae boring in wild figs.

**REMARKS.**— This genus consists of a small group of African and Malagasy species, which have generally been placed in *Analyta*, though Meyrick transferred the type-species to *Leucinodes* Guenée, 1854.

#### *Alytana aldabralis* (Viette), new comb., rev. status

(Fig. 36, 87, 205-207, 309-310)

*Analyta calligrammalis aldabralis* Viette, 1958b: 142; Legrand, 1965: 107.

**DESCRIPTION.**— *Forewing* radius 11-13 mm. Ground dark yellowish brown on basal third, two or three darker spots on inner wing margin, narrow white band from 1A+2A to inner margin near distal end of this region defining dark yellowish brown antemedial line. Broad white costal band from antemedial line to near wing apex, interrupted by medial and postmedial lines; white ground posterior to CuP fold between antemedial and medial lines; ground translucent and bluish iridescent in cell and between cell and CuP fold, cubitus in cell white traced. Medial line incomplete, dark yellowish brown; postmedial line broad near costa, narrow elsewhere, dark yellowish brown. Ground between these two lines mostly dark yellowish brown, but separated from lines by narrow translucent bluish iridescent bands. Ground distal to postmedial line translucent bluish iridescent, then dark yellowish brown with whitish crescents between  $R_4$  and  $R_5$ ,  $R_5$  and  $M_1$ ,  $M_1$  and  $M_2$ . Fringe marked with four bands, inner one a thin brown line, then white band, then brown, finally white.

*Hindwing* ground translucent bluish iridescent with antemedial, medial, and postmedial bands continued from forewing. Fringe as on forewing. Museum specimens tend to become greasy thereby partially obscuring coloration.

*Male genitalia* with juxta cordate. Valve with distal half of sacculus expanded, hirsute; large bilobed depression of valve bounded dorso-distally by sharp well sclerotized ridge, distally bearing slender tooth, ventro-distally with larger flattened and dorsally directed triangular tooth. Aedoeagus broadened distally, membranous ventrally; cornutus absent; vesica with large patch of numerous minute sharp triangular teeth, separate patch of closely set minute scobinations.

*Female genitalia* with apophyses posteriores nearly straight, rather slender; apophyses anteriores lanceolate basally, about 1.5 times as long as apophyses posteriores, curved anteriorly. Ostial chamber subcylindrical, somewhat narrowed in middle, about 1.5 times as long as wide, surface smooth; chamber fused with large well sclerotized anteriorly emarginate



collar; ostium covered with large bilobed transversely angled operculum, ventral to and articulating with collar, margin of operculum lobes irregularly serrate to denticulate (Fig. 310).

**TYPE MATERIAL EXAMINED.**— Paratype male, labeled: "Paratype"; "Oc. Indiano Aldabra XI 1953"; "A. calligrammalis aldabralis n. subsp. Paratype P. Viette"; "Museum Paris Collection P. Viette"; "♂ genitalia on slide 1765 J. C. Shaffer" [MNHN].

**DISTRIBUTION.**— Known only from Aldabra. Aldabra material: Settlement (17-25 Jan.) 13 ♂, 4 ♀; Takamaka (1-18 Feb.) 24 ♂, 10 ♀; Cinq Cases (24 Feb.–9 Mar.) 4 ♂, 7 ♀ [reared specimens emerged: (11 Mar.) ♂, (22 Mar.) 3 ♂, (24, 25 Mar.) 2 ♀]; Middle Island (19 Mar.) 1 ♂.

**HOST.**— *Ficus nautarum* Bak. [Moraceae].

**REMARKS.**— We raise *A. aldabralis* to the rank of full species based on maculation differences as compared with the holotype [BMNH] of *A. calligrammalis* Mabille, 1879 (type-locality: Madagascar). The abdomen of the *A. calligrammalis* holotype has been lost. There are a number of species referable to *Alytana* found on Madagascar and on mainland Africa and we have examined specimens from both localities which are similar to the Aldabra species. A careful review of the genus will be necessary in order to sort out these various species, determine their distributions, and elucidate the zoogeographical relationships of the Aldabra species.

On March 2, 1968 six specimens were recovered at Cinq Cases as borers in twigs of *Ficus nautarum* Bak., a tree widespread on Aldabra and occurring also (Fosberg and Renvoise, 1980: 274) on Assumption and the granitic Seychelles. The 6 consisted of one pupa (adult ♂ emerged 11 Mar.), and five larvae which subsequently pupated in the cut off twig sections (3 ♂, 2 ♀ adults emerging 22-25 Mar.). Pupation dates were not observed. The biology of this species was previously unknown.

Paulian and Viette (1955: 182) report *A. calligrammalis* Mabille larvae on *Ficus melleri* in clusters of dried fruits joined together by silk and excrement. While this host and habit difference tends to support separation of *A. aldabralis* as a separate species, one must consider that there are a number of very similar species in Africa and Madagascar and that the *Ficus melleri* feeder may have been misidentified.

### PALPITA Hübner

- Palpita* Hübner, [1808] 1806: Vol. 1, Pl. [209]; Munroe, 1950: 218, 220; Rose, 1983: 54; Kirti & Rose, 1992: 62-63; Inoue, 1996: 13-17; Leraut, 2003: 78. Type-species *Pyrallis unionalis* Hübner, 1796: 21. By monotypy. Type-locality: Europe.
- Hapalia* Hübner, 1818: Vol. 1, Pl. 19. Type-species *Hapalia illibalis* Hübner, 1818: 19. By monotypy.
- Conchia* Hübner, 1821: 7. Type-species *Pyrallis unionalis* Hübner, 1796: 21. By monotypy.
- Margaronia* Hübner, [1825] 1816: 358. Type-species *Pyrallis unionalis* Hübner, 1796: 21. By subsequent designation, Moore, [1886] 1884-7, 3: 325.
- Paradosis* Zeller, 1852: 58. Type-species *Paradosis villosalis* Zeller, 1852: 58. By monotypy.
- Margarodes* Guenée, 1854: 8: 301. Type-species *Pyrallis unionalis* Hübner, 1796: 21. By subsequent designation, Desmarest, in Chenu, 1837: 203. Junior homonym of *Margarodes* Guiling, 1829 (in Hemiptera).
- Sarothronota* Lederer, 1863: 278, 394. Type-species *Phalaena flegia* Cramer, 1777: 66. By monotypy.
- Sebuntia* Walker, 1863: 77. Type-species *Sebuntia guttulosa* Walker, 1863: 78. By monotypy.
- Ledereria* Marschall, 1873: 299. Type-species *Pyrallis unionalis* Hübner, 1796: 21, type-species of *Margarodes* Guenée, 1854, for which *Ledereria* was proposed as a replacement name.
- Sylora* Swinhoe, 1900: 472. Type-species *Sisyrphora cirralis* Swinhoe, 1897: 170. By monotypy.
- Hvidiodes* Swinhoe, 1900: 1900:499. Type-species *Pyrallis unionalis* Hübner, 1796: 21, type-species of *Margarodes* Guenée, 1854, for which *Hvidiodes* was proposed as a replacement name.
- Apyrausta* Amsel, 1951: 552. Type-species *Apyrausta persicalis* Amsel, 1951: 552. By monotypy.

**DIAGNOSIS.**— External characters much as in *Glyphodes* and related genera, but with second labial palpus segment oblique, third segment porrect and lying along or more or less hidden in dorsal margin of anterior scaling of second. Tropical species with body and wings thinly scaled, usually white, rarely yellowish buff, pale green, or fuscous dusted; costa of forewing usually fulvous or fuscous; forewing often with one or two fuscous dots in cell and another dot at anterior angle and one at posterior angle of cell; sometimes traces of a fuscous postmedial line; in the *unionalis* group otherwise immaculate, but in the *annulata* group with reniform, orbicular and claviform spots and transverse bands outlined in fulvous or fuscous. The temperate *illibalis* and *persicalis* groups with wings opaque, gray, dusted with fuscous, with fuscous reniform and orbicular spots; in some of the species seasonally dichromatic, the summer or dry season form with white ground color and fulvous maculation.

*Male genitalia* with uncus rod-like, in some species with tip expanded and dorsally clothed with bifid scale-like setae, in others with distal vestiture obsolescent. Juxta characteristically shaped like an inverted shield, with acute dorsal angle, median carina, and curved transverse ventral carina, ending on each side in an acute process. Valve with narrowly inflated sacculus, bearing dorsal armature characteristic of the species, sometimes symmetrical, sometimes different on right and left sides. Aedoeagus usually with one or more fixed cornuti and often with a bundle of deciduous ones. Eighth sternite generally with U-shaped sclerotization, the lateral arms spinulose posteriorly.

*Female genitalia* with seventh sternite posteriorly asymmetrically excavated, the ostium opening into the excavation and bordered anteriorly and laterally by a heavily sclerotized area with posteriorly convergent, distally rounded lobes. Ductus bursae short with asymmetrical sclerotization. Corpus bursae armed with a pair of prominent thorn-like signa.

**DESCRIPTION.**— External characters. Frons rounded or oblique, not prominent, smoothly scaled. Vertex with tufts of erect scaling. Labial palpus obliquely ascending; third segment porrect, lying along or partly concealed in dorsal margin of anterior scaling of second segment. Maxillary palpus prominent, ending in a flat tuft of scales in upper plane of frons. Eye fully developed, globular. Ocellus present, near dorsal margin of eye. Antenna filiform, sometimes with sexual modifications in male. Body of moderate proportions; abdomen somewhat exceeding anal angle of hindwing, in male with prominent anal tuft composed of mixed black and white, gray or fulvous scales, these scales elongate but not spatulate; in females without anal tuft. Praecinctorium strongly bilobed, projecting beyond sides of abdominal base.

*Forewing* subtriangular; costa straight for most of its length, arched in apical fourth or fifth; apex subacute; termen oblique basad, evenly convex; tornus obtuse; posterior margin weakly convex in basal half. Male without frenulum hook, sometimes with costal fold on underside containing modified scales. Subcosta free, ending on costa at 2/3 from base. Discal cell about half length of wing.  $R_1$  from cell near middle, reaching costa at about 4/5 from base.  $R_2$  from anterior angle of cell, closely apposed for some distance to  $R_{3+4}$ , ending on costa a little distad of separation of those veins.  $R_{3+4}$  from anterior angle of cell;  $R_3$  separating at about 3/4 length of  $R_4$  from cell, ending on costa before apex;  $R_4$  ending at apex.  $R_5$  from anterior angle of cell, basally curved and approximated to  $R_{3+4}$ , more strongly so in larger species.  $M_1$  from behind anterior angle of cell, straight and basally divergent from  $R_5$ . Discocellular oblique distad, straight from  $R_5$  to  $M_1$ , concave distad from  $M_1$  to  $M_2$ .  $M_2$ ,  $M_3$  and  $CuA_1$  closely grouped around the somewhat acute posterior angle of cell, basally curved and approximated.  $CuA_2$  from cell at about 3/4 from base.  $CuP$  represented by a fold.  $1A+2A$  strong, basally a little thickened and deflected, then weakly arched to end at tornal angle.  $3A$  weaker, separating from basal thickening of  $1A+2A$  to form a closed loop ending on  $1A+2A$  a little basad of middle.

*Hindwing* subtriangular, about 1.5 times as long as wide; costa weakly sinuate; apex subacute, narrowly rounded; termen entire, straight on anterior half, convex on posterior half; anal angle rounded; anal margin weakly bent near middle. Frenulum single in male, multiple in female. Discal cell less than half length of wing posteriorly, shorter anteriorly.  $Sc+R_1$  anastomosed with  $Rs$  for about 1/3 distance beyond cell.  $M_1$  stalked with  $Rs$  for a short distance beyond end of cell. Discocellular erect anteriorly, obtusely angled at middle, and oblique distad posteriorly.  $M_2$ ,  $M_3$  and  $CuA_1$  from posterior angle of cell, weakly curved and approximated basally.  $CuA_2$  from cell at



about 3/4 from base. CuP, 1A+2A, and 3A strong and separate.

*Male genitalia* with uncus slender, rod-like, arched dorsad, distally somewhat expanded and dorsally armed with bifid, dark-pigmented spines. Gnathos absent. Subscaphium slender, strap-like. Tegumen deeply and irregularly domed, strengthened by anteroventral and dorsolateral sclerotized rods. Transtilla narrow, complete. Vinculum shaped like an inverted shield, dorsally pointed, ventrally convex and thickened, and with longitudinal median carina. Vinculum with complex lateral elements, rounded ventral part, and without saccus. Valve about twice as long as wide, with inflated, steeply arched costa, narrowly rounded, mesally setose apex, and ventral margin straight to 3/4, then arched to apex; sacculus inflated and sclerotized, with more or less prominent dorsal processes or flanges, their shape differing strikingly in different species, and in some species differing on the two sides. Aedeagus cylindrical or somewhat expanded distally, sclerotized strongly on one side, weakly elsewhere; vesica with strong fixed cornuti and/or slender, dark-pigmented, deciduous ones.

*Female genitalia* with anal papillae high and narrow, membranous, dorsally joined, posterior surfaces strongly short-setose. Apophyses posteriores T-shaped, shaft about twice as long as vertical bar, with weak, angular, subbasal extension. Eighth tergite pentagonal, produced anteriorly in midline, with numerous fine setae scattered over its surface. Apophyses anteriores longer and thicker than apophyses posteriores, weakly thickened and flanged subbasally. Ostium wide, invaginated in a deep posterior emargination of seventh sternite, bordered anteriorly and laterally by a thickening of sternite that forms posteriorly convergent lobes almost meeting behind ostium. Ductus bursae short. Corpus bursae oval or pyriform, containing a conspicuous pair of thorn-like signa.

**EARLY STAGES.**— Egg flat and oval, laid singly or in overlapping groups on leaf surfaces. Larva green, sometimes with dark head and pinacula, webbing or folding and tying leaves. Pupa in a slight cocoon in a folded leaf or among debris on substrate. Hosts mainly Oleaceae, though other plants have been recorded, and the Neotropical *P. flegia* feeds regularly on Apocynaceae.

**REMARKS.**— A genus of some 50 described species, but also with many undescribed ones, especially in the New World and Indo-Australian tropics. Different species often look very much alike externally, while having strikingly different genitalia. The genus is relatively poorly represented in Africa. The Aldabran species is abundant through most of Africa, but ranges into south and central Europe, where it is a well known migrant, and also into tropical Asia, where its range is uncertain because of confusion with other species. See Inoue (1996, 1997, 1999) for a recent revision of *Palpita*.

*Palpita unionalis* (Hübner)

(Fig. 37, 88, 208-210, 311-313)

*Pyrallis unionalis* Hübner, 1796: 21, Pl. 20, fig 132.

*Palpita unionalis* (Hübner); Hübner, [1808] 1806: Vol. 1, Pl. 209; Vinson, 1938: 45; Munroe, 1950: 218, 220; Bretherton, 1955: 76-81; Sevastopulo, 1955: 165-166; Marion, 1957: 86; Kuchlein, 1958: 52-57, figs. 3-5; Viette, 1958a: 9; Hasenfuss, 1960: 218; Nazmi, 1963 [1964]: 232, fig 16; Legrand, 1965: 105; Holloway, 1982: 364; Rose, 1983: 54, figs. 7-9; Vári & Kroon, 1986: 90, 133, 169; Palm, 1986: 276-277, pl. 8, figs. 28, 39, Map 218; Goater, 1986: 16, 92, pl. 6, fig. 4; Kirti & Rose, 1992: 73-74, figs. 24-27; Inoue, 1997: 142, figs 186, 235, 332; Leraut, 2003, figs. 12, 19. (The species has an extensive biological and economic literature.)

*Conchia unionalis* (Hübner); Hübner, 1821: 1821: 7.

*Margarona unionalis* (Hübner); Hübner, [1825] 1816: 358; Walker, 1859: 519; Swinhoe, 1900: 505; Hampson, 1918: 272; Janse, 1924: 487; Pierce & Metcalfe, 1938: 23, pl.14; Howarth, 1950: 85-88, 2 figs.; Agenjo, 1952: 141-142; Viette, 1957b: 180; David, 1958: 147-148; Norgaard, 1959: 40; Triggiani, 1971: 29.

*Botys unionalis* (Hübner); Treitschke, 1829: 116.

*Margarodes unionalis* (Hübner); Guenée, 1854: 301; Lederer, 1863: 398.

*Glyphodes unionalis* (Hübner); Hampson, 1896: 351-352; 1898: 739; Maxwell-Lefroy, 1909: 518; Martelli, 1916: 96-101; Sevastopulo, 1944: 425; Famhy, 1953: 487; Hruby, 1954: 183-186; fig 1; Pinhey, 1975: 72, Pl. 6.

*Diaphania unionalis* (Hübner); Klima, 1939b: 241-242; Ghesquière, 1942: 163-164; Mathur and Singh, 1963: 142, 144-146, figs. 64-69.

**DIAGNOSIS.**— Among the various rather similar white-winged African species of *Palpita* this one is easily distinguished from most by the light yellow vertex of the head as well as the light yellow line following along the posterior margin of the costal band of the forewing. However, there are undescribed species with similar yellow markings and positive identification must rely on comparison of genitalia as illustrated herein (Fig. 208-210 ♂, 311-313 ♀).

**DESCRIPTION.**— External characters. Frons whitish buff, with longitudinal buff to fulvous stripe on each side of midline. Vertex with erect pale-yellow scaling underlain by shorter and wider white scales; a narrow, smoothly scaled white zone between antenna and eye. Dorsum of labial and maxillary palpi whitish buff; lateral aspect of labial palpus dorsally and distally fulvous to brown, base contrastingly white; lateral aspect of maxillary palpus fulvous to brown. Basal scaling of proboscis whitish buff. Gena fulvous. Eye and ocellus fuscous. Antenna filiform in both sexes; dorsal scaling white; ventral surface light tan, finely ciliate. Body white; a contrasting fulvous stripe from eye to wing base. Anal tuft of male with mixed white, gray and black hair-like scales. Legs white; front femur and tibia with fulvous stripe on anterior surface, on tibia interrupted in middle.

*Forewing* radius about 15 mm. Ground translucent white. On upper surface a tapering fuscous costal stripe, shading posteriorly to fulvous, then opaque white as far as anterior margin of discal cell. Three black dots spaced on radial stem in basal half of cell; another at anterior angle and one at posterior angle of cell; often a weaker one on CuA basad of separation of CuA<sub>2</sub>.

*Hindwing* with upper surface translucent white. A weak fuscous dot at posterior angle of cell.

Wings beneath as above, but with costal stripe of forewing weaker, grayish buff; black dots absent from anterior margin and anterior angle of cell in forewing and from hindwing. Black dot at posterior angle of cell of forewing weak, that on stem of CuA stronger.

*Male genitalia* with uncus (Fig. 209) long and slender, with weak, dorsally spined distal dilation. Juxta narrow, about 8 times as high as wide. Valves (Fig. 208) symmetrical on the two sides; sacculus with a low rounded dorsal flange at 3/4 from base; immediately distad of this, just basad of distal end of sacculus, a long, slender, weakly sinuate, distally pointed process extending dorsad as far as costa; distad of this a basally wider, distally acuminate process, about 1/4 length of the subbasal one, curving dorsad from distal end of sacculus. Aedeagus with vesica nearly throughout set with numerous exceedingly minute cusps; two strong subequal cornuti, the larger slightly more than half as long as aedeagus length, the smaller slightly shorter than aedeagus length; vesica with tuft of long slender scales near base of each cornutus, scales slightly shorter than smaller cornutus.

*Female genitalia* with ductus bursae containing heavy asymmetrical sclerotization extending from ostium to corpus bursae.

**EARLY STAGES.** [based on European material].— Egg flat, oval, creamy white, becoming yellow as the embryo develops; laid singly on underside of leaf or nearby surfaces. Young larva yellow, with pale head and darker mandible; setae colorless; living in a web spun from midrib to leaf surface or within curve of petiole, and feeding on underside of leaf. Older larvae perforating the leaf; green with a darker dorsal line; head yellowish with dark stemmata and mandible; on each side a black spot anterior to supraspiracular sclerite of mesothorax and one similarly placed on metathorax; a third black spot behind supraspiracular pinaculum of eighth abdominal segment. Pupa formed in a tough white silk cocoon spun between leaves or other loose material on the substrate; greenish, darkening to mahogany brown, with a dorsal carina. In Italy the insect winters in any stage, but most commonly as a partly grown larva. Triggiani (1971) gives a description of the larval stages with detailed figures as well as a discussion of its biology, including parasites.

**TYPE MATERIAL EXAMINED.**— None. The Aldabra specimen was compared with material collected in France.

**DISTRIBUTION.**— (See also Inoue, 1997: 142). Common, sometimes abundant, in Africa and the Mediterranean region, ranging north to Denmark and southern England as a migrant or perhaps as a marginal resident; recorded also from Madagascar, the Comoros, Mauritius, Réunion, the granitic Seychelles; also from many parts of the Indo-Australian region. African, Malagasy and Indo-Australian records must all be considered



suspect unless verified by recent examination. The African and Malagasy nominal species *Botys quinquepunctalis* Boisduval, *Margarodes transvisalis* Guenée, 1854, *Margaronia claralis* Walker, [1866] 1865, *Botys intactalis* Walker, [1866] 1865, and *Margarodes septempunctalis* Mabille, 1880, placed by Hampson and most subsequent authors in the synonymy of *unionalis* are in our opinion not conspecific with that species. There are a number of additional species in Asia that have been confused in collections with *P. unionalis*. Most of these are unnamed.

Our Aldabra material consists of a single female taken at Middle Island, 18 Mar. 1968. The specimen could be a stray or migrant, as *unionalis* is one of the most abundant pyraustines in the Old World tropics and is well known for its dispersal capabilities and migratory habits.

**HOSTS.**— Various Oleaceae, such as *Forsythia*, *Ligustrum*, all species of *Jasminum*, especially *J. auriculatum* and *J. sambac* (David, 1958), and on olive, *Olea europaea*, on which it is sometimes a pest. In Europe it is recorded also from *Arbutus* [Ericaceae] and *Pelargonium* [Geraniaceae], and in India and Java from various Lythraceae, Rubiaceae, Moraceae, Apocynaceae, and Asclepiadaceae. Due to the possibility of confusion with other species of *Palpita*, and perhaps also *Cydalima* and *Stemorrhages* spp., the Asian records must be considered doubtful.

*Jasminum elegans* Knobl. is the only member of the Oleaceae reported from Aldabra, Fosberg and Renvoise (1980: 179-180) reporting it as occurring "... frequently throughout Aldabra ..." including Middle Island.

### HODEBERTIA Leraut

*Hodebertia* Leraut, 2003: 78. Type-species *Botys testalis* Fabricius, 1794: 227. By original designation. Type-locality: India.

**DESCRIPTION.**— Frons oblique, somewhat rounded. Labial palpus porrect, about 2.3 times as long as eye diameter; second segment broadly scaled; third short, hidden in scales of second. Maxillary palpus moderately well developed, basal half anterolaterodorsally directed, distal half angled inward. Antenna filiform in both sexes, dorsal surface of each segment with single erect cilium, finely ciliate ventrally; ventral cilia about 1/5 segment diameter; basal segments of shaft about 1.5 times as wide in male as in female. Ocellus well developed, separated from eye by about half its own width.

**Forewing** with costal margin essentially straight until just basad of distal end of Sc, then convex to rather sharply defined apex. Outer margin nearly straight near apex, then curving ever more strongly toward tornus, not sinuous. Inner margin essentially straight, except near base. Sc essentially straight. Radius angled upward slightly from basal 1/5, and again at nearly midway between R<sub>1</sub> and upper outer angle. R<sub>1</sub> from distal 5/7 of cell, sinuous. R<sub>2</sub> from very near upper outer angle, slightly sinuous. R<sub>3,4</sub> from upper outer angle, stalked for about 3/5 total length of R<sub>3</sub>, stalked portion contiguous with R<sub>2</sub> for at least half length of former, then gradually diverging, R<sub>4</sub> terminating at apex. R<sub>5</sub> from just below upper outer angle, parallel with R<sub>3,4</sub> stalk for about 1/8 length of former, then angled downward rather sharply, convex to outer margin. M<sub>1</sub> from upper 1/4 of cell, basal 1/3 straight, distal 2/3 convex. M<sub>2</sub> from lower 1/4 of cell, basal 1/3 concave, distal 2/3 convex. M<sub>3</sub> from half way between M<sub>2</sub> and CuA<sub>1</sub>, basal 1/6 straight, then gently angled downward, continuing straight to outer margin. CuA<sub>1</sub> from lower outer angle, straight at base, then angled downward, concave, distal half straight. CuA<sub>2</sub> from angle on distal 5/7 of cell, straight. 1A+2A straight. 3A loop joining 1A+2A at 2/5 from base of 1A+2A.

**Hindwing** with female frenulum multiple; costal margin convex above stalk of Sc+R<sub>1</sub> and Rs, slightly concave on either side; outer and inner margins smooth, lacking sinuations. Sc+R<sub>1</sub> stalked with Rs for about 1/3 free length of Sc+R<sub>1</sub>. Rs stalked with M<sub>1</sub> for short distance beyond closing vein, Rs free for shorter distance before joining Sc+R<sub>1</sub>. Free length of M<sub>1</sub> curved upward somewhat near base, then straight to outer margin. Discocellular vestigial, lower 2/3 angled sharply distally. M<sub>2</sub> from just above lower outer angle of cell, basal 2/3 convex, somewhat irregular, distal 1/3 straight. M<sub>3</sub> from lower angle, basal 1/10 parallel to M<sub>2</sub>, then angled downward, straight to outer margin. CuA<sub>1</sub> from just below the angle, angled rather sharply downward very near base, slightly concave, then straight for most of its length. CuA<sub>2</sub> from angle at distal 3/4 of cell, essentially straight. CuP

slender, basal 1/4 extremely so; basal 1/3 convex, distal 2/3 straight. 1A+2A strong, somewhat inflated at base, convex along length. 3A well developed, convex along entire length.

**Male genitalia** with uncus complex; basal 1/4 rather broadly bilobed, heavily sclerotized, each lobe subrectangular, set at about 45° to body axis; midregion heavily sclerotized, narrow, laterally concave and hourglass shaped, strongly flared distally, distal region weakly sclerotized, hourglass-shaped, dorsal surface densely set with rather stout scales, each roughly 5 times as long as wide, bifurcate half way to base; this region also with long narrow setae laterally; apex (seen at high magnification) with small triangular flap, quadrate at apex, recurved, smooth, devoid of setae. Transtilla consisting of a pair of large inflated lobes weakly joined medially. Juxta ligulate, weakly sclerotized. Vinculum with inner surface a strongly-sclerotized band, anteriorly with small sharp keel. Valve with costa somewhat irregular, not basally inflated; cucullus broadly triangular, hooked dorsally, distally set with dense patch of slender setae; costa greatly inflated, basal half bare, distal half set with several dozen slender setae; midregion of valve with 3 strong projections, the first from costa, hooked, extending ventrally, then distally, finally curving dorsad, basal half set with several long and (more distally) several short setae, distal half bare, gradually tapering; central process a stout triangular tooth, heavily sclerotized on distal margin, membranous on proximal margin; third process a large heavily-sclerotized hook, basal portion ventrally directed, then sharply bent dorsally, hooking around second process and terminating near apex of first. Aedoeagus small, subcylindrical, tapering irregularly toward broadened base, about 10 times as long as width at middle; cornutus absent, vesica with numerous minute heavily sclerotized subtriangular teeth.

**Female genitalia** with ovipositor lobes narrow, set with numerous fine setae. Apophyses anteriores about 1.5 times as long as apophyses posteriores; basal third with strong dorsal spine extending from oblique rectangular plate on base of apophyses. Apophyses posteriores straight. Eighth segment collar with fine setae scattered over posterior half; anterior half ventrally joined to large ventral pouch, open anteriorly, its anterior end 3/4 as deep as eighth segment collar, posterior end somewhat bulbous on each side, anterior margin on each side bearing heavily sclerotized vertical roll of cuticle from ostium to base of apophyses, this forming a pair of large well sclerotized laterally open chambers. Ostium small, membranous. Posterior 1/4 of ductus bursae a slender heavily sclerotized tube, open dorsally, about 3.5 times as long as wide; anterior 3/4 membranous, smooth, gradually broadening into posterior of corpus bursae, no distinct junction. Corpus bursae pear shaped, membranous, smooth, lacking signum or other ornamentation. Ductus seminalis from posterior end of membranous portion of ductus bursae, membranous.

**REMARKS.**— Based largely on the genitalia Leraut (2003, p. 79) places *Hodebertia* half way between *Palpita* and *Pleuroptya*. For a comparison of the genitalia of the three genera see Leraut, Fig. 10-12 (males) and Fig. 19-21 (females).

### *Hodebertia testalis* (Fabricius)

(Fig. 38, 89, 211, 314-315)

*Phalaena testalis* Fabricius, 1794: 227.

*Botys incoloralis* Guenée, 1854: 332-333.

*Botys ruficostalis* Lederer, 1855: 217, pl. 3, fig. 4.

*Botys melonalis* Walker, 1859: 702.

*Spilodes nitetisalis* Walker, 1859: 773.

*Botys albidalis* Walker, 1866: 1411.

*Pyrausta incoloralis* (Guenée); Hampson, 1896: 438-439; 1899: 257; Pagenstecher, 1907: 138; Fryer, 1912: 28; Shibuya, 1928: 284-285; Ghesquiere, 1942: 190; Gerasimov, 1949: 367; Nazmi, 1963: 240, fig 21; Pinhey, 1975: 76, Pl. 8; Vári and Kroon, 1986: 44, 169.

*Margaronia putrescens* Meyrick, 1934: 543.

*Diaphana* [sic] *incoloralis* (Guenée); Legrand, 1965: 106.

*Pyrausta testalis* (Fabricius); Viette, 1990: 100; Shaffer, et al, 1996: 189.

*Hodebertia testalis* Leraut, 2003: 78, figs. 10, 20.

**DESCRIPTION.**— **Forewing** radius about 13 mm. Ground pale yellow to pale orange yellow; costal band of light yellowish brown sharply set off from ground at wing base, gradually attaining ground color distally. Antemedial and postmedial bands and the two spots in cell light brown,



ground diffusely light brown along outer wing margin. Distinct small circular spot tangent to radius in cell, midway between antemedial band and discal spot; discal spot elongate along closing vein of cell. Diffuse patch of light brown just distal to lower outer angle of cell. Veins marked with light yellow.

*Hindwing* similar regarding ground, vein color, diffuse light brown band along outer wing margin. Light-brown band along discocellular; diffuse light-brown patch just distal to lower outer angle of cell; postmedial band light brown, well developed.

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— *P. testalis*, in the Zoological Museum, University of Copenhagen, examined by E.G.M. & M. Shaffer and determined conspecific with *incoloralis*. Type-locality: India.

*B. incoloralis*, Lectotype male, hereby designated, labeled: "Co type" [round yellow label]; "Ex Musaeo Ach Guenée"; "Paravicini Coll. B.M. 1937-383"; "Pyralidae Brit. Mus. Slide No.  $\delta$  14297"; "Botys incoloralis Guenée Cotype G.A. Bisset 11/3/41" [BMNH]. Type-locality: India.

Paralectotype, abdomen lost, labeled: "Co type" [round yellow label]; "Ex Musaeo Ach. Guenée"; "Paravicini Coll. B.M. 1937-383"; "Assam Silhet ex coll. Gn."; "Holotype"; "Abdomen missing"; "Incoloralis Gn. Silhet" [BMNH]. Type-locality: India, "Silhet", perhaps Silghat in central Assam.

**DISTRIBUTION.**— Recorded from southern Africa north through Congo, and from north Africa through the Middle East, India, Indonesia, Taiwan, and Australia; also from the Comores, Assumption, and the granitic Seychelles. Aldabra material: Settlement (10-27 Jan.) 3  $\delta$ , 7  $\eta$ ; (29, 31 Mar.) 1  $\delta$ , 2  $\eta$ ; Middle Island (17-20 Mar.) 3  $\delta$ , 5  $\eta$ .

**HOSTS.**— *Pergularia tomentosa* L. [Asclepiadaceae] is given by Ghesquiere, but is not recorded for any of the Aldabra Group islands by Fosberg and Renvoise (1980). They do list 3 milkweed species from both West Island and Middle Island: *Pleurostelma cernuum* (Decne.) Bullock (pp. 189-190), *Sarcostemma viminale* (L.) R.Br., and *Secamone fryeri* Hemsley, all rather widespread on Aldabra and occurring in other islands of the Aldabra Group as well (see pp. 188-192). Meyrick records his *putrescens* as reared from a species of *Stapelia* (Asclepiadaceae).

**REMARKS.**— In his original description Guenée cites a type series of two males from "Silhet. Inde centrale." From these two syntypes we have chosen the specimen with its abdomen preserved to be the lectotype. The 'holotype' label on the paralectotype is not valid.

### HERPETOGRAMMA Lederer

*Herpetogramma* Lederer, 1863: 430. Type-species *Herpetogramma servalis* Lederer, 1863: 430. By monotypy. Type-locality: Brazil.

*Pachyzancla* Meyrick, 1884: 315. Type-species *Botys mutualis* Zeller, 1852: 40. By monotypy.

*Acharana* Moore, [1885] 1884-7: 285. Type-species *Botys otreusalis* Walker, 1859: 637. By original designation.

*Stenomelas* Warren, 1892: 437. Type-species *Botys agavealis* Walker, 1859: 574. By original designation.

*Piloptila* Swinhoe, 1894: 142. Type-species *Piloptila nigricornalis* Swinhoe, 1894: 142. By original designation.

*Pantoeocome* Warren, 1896: 173. Type-species *Pantoeocome deformis* Warren, 1896: 173. By original designation.

*Ptiloptila* Hampson, 1899: 201. Misspelling.

*Stenomelas* Hampson, 1912. Misspelling.

*Macrobotys* Munroe, 1950: 228. Type-species *Botys aeglealis* Walker, 1859: 565. By original designation.

*Coremataria* Amsel, 1956: 207. Type-species *Botys infuscalis* Guenée, 1854: 350. By original designation.

**DESCRIPTION** (based on Aldabra species).— Frons oblique, smooth scaled. Maxillary palpus short, cylindrical. Labial palpus with second segment obliquely ascending, third correct; smooth scaled; about 1.5-1.7 times as long as eye diameter. Antenna filiform and ventrally ciliate in both sexes, more finely ciliate in female; each segment with single dorsal cilium in both sexes. Ocellus well developed, conical, somewhat laterally directed, separated from eye by about half its own width.

*Forewing* with Sc reaching costa at about 2/3 distance from wing base.  $R_1$  from 3/4 distance from base of cell to upper angle,  $R_2$  from very near upper outer angle of cell, closely approximate to the stalk of  $R_{3+4}$  for about

1/2 its own length;  $R_{3+4}$  from the angle, stalked for about 4 times the free length of  $R_3$ , free portion of  $R_4$  curving downward to wing apex;  $R_5$  from just below the angle, parallel to  $R_{3+4}$  for about 1/6 its length, then angled downward slightly and gently curving toward outer wing margin.  $M_1$  from below angle, near to  $R_5$ ;  $M_2$  from just above lower outer angle;  $M_3$  from the angle.  $CuA_1$  from just before the angle;  $CuA_2$  from 3/4 distance from base of cell to lower angle. Discocellular poorly developed.  $1A+2A$  rather sharply angled downward at base, then parallel to posterior wing margin for nearly 1/2 its own length, curving downward slightly, then upward to meet tornus;  $3A$  not tubular, developed as loop meeting  $1A+2A$  at about 2/5 distance from base of latter, giving off short distal spur before meeting  $1A+2A$ . Veins nearly evenly spaced at outer margin, a slightly greater distance separating  $R_4$  from  $R_5$ .

*Hindwing* cell just under 1/3 as long as wing.  $Sc+R_1$  and  $Rs$  stalked for about 1/2 length of free portion of  $Sc+R_1$ ;  $Rs$  meeting wing apex. Discocellular extending posteriorly and perpendicular to  $M_1$  for almost 1/2 its length, then sharply angled toward lower outer angle of cell.  $M_2$  from above and very near to the angle;  $M_3$  from the angle, parallel to  $M_2$  for about 1/10 its length, then diverging.  $CuA_1$  from just below and very near to the angle;  $CuA_2$  from 2/3 distance from base of cell to lower outer angle.  $CuP$  very slender on basal 1/2 to 2/3 of its length;  $1A+2A$  and  $3A$  normal.

*Male genitalia* with uncus triangular, slender, tapering; distal half rather densely covered with stiff simple setae on all surfaces, setae extending laterally onto basal half, not reaching base. Juxta weakly sclerotized, elongate ovoid, ventrally rounded, dorsally bifurcate. Vinculum with anterior margin deeply incised along midline, saccus narrow. Valve apex rounded; costa tubular; sacculus inflated, often with small setose tubercle on distal half; small narrow oblique plate extending from near base of costa to near distal end of sacculus, sometimes bearing small setose tubercle. Aedoeagus subcylindrical, roughly 10 times as long as wide; vesica with numerous minute spines and teeth.

*Female genitalia* with ovipositor lobes somewhat narrow, unspecialized. Ostium membranous. Corpus bursae minutely scobinate; signum (when present) small, narrow, transverse. Ductus seminalis from ductus bursae, or from corpus bursae near to ductus bursae.

### KEY TO ALDABRA SPECIES OF HERPETOGRAMMA

1. Straw-yellow moths with sharply-defined, narrow, contrasting antemedial and postmedial lines; prominent discal spot; no costal modification (Fig. 90-91) ..... 2
- Darker moths, yellowish-brown to dark yellowish-brown with diffuse, wavy, less contrasting antemedial and postmedial lines; less prominent discal spot (Fig. 92-93); basal half of male forewing costa with heavy fringe of dark scales (Fig. 92) ..... *licarsisalis*
2. Fore- and hindwings with continuous terminal lines; male tegular scales slender, but only a few hair-like, not extending to posterior of thorax (Fig. 91) ..... *continualis*
- Fore- and hindwings with terminal lines of brown spots, never solid lines, often poorly marked or absent in females; male tegular scales mostly hair-like, reaching spots on 2nd abdominal tergum (Fig. 90) ..... *juba*

### *Herpetogramma licarsisalis* (Walker)

(Fig. 92-93, 220-223, 324-326)

*Botys licarsisalis* Walker, 1859: 686.

*Botys pharaxalis* Walker, 1859: 725.

*Botys immundalis* Walker, 1865: 1448.

*Entephria? fumidalis* Walker, 1865: 1486.

*Botys serotinalis* Joannis, 1888: 272, pl. 6, fig. 2.

*Pachyzancla licarsisalis* (Walker); Hampson, 1896: 402, fig 218; 1899: 202, fig 111; Hering, 1901: 102; Maxwell-Lefroy, 1909: 519; Rebel, 1910: 431; 1915: 146.

*Psara licarsisalis* (Walker); Shibuya, 1928: 263-264, Pl. 9, fig 6; 1929: 204; Tams, 1935: 286; Klima 1939b: 383-384; Ghesquiere, 1942: 179-180, Pl 7, fig 2; Viette, 1949c: 324; Paulian and Viette, 1955: 184; Viette, 1958a: 10; Braithwaite, 1959: 588.



*Herpetogramma licarsisalis* (Walker); Yamanaka, 1960: 324; Inoue, 1963: 93; Nazmi, 1963 [1964]: 204, 215-216, fig 6; Clarke, 1971: 75-77, fig 71; Udayagiri & Mohan, 1986: 279-81.  
*Psara phaeopteralis* Legrand, 1965: 113 (not Guenée). Misidentification.

**DESCRIPTION.**— Frons dark yellowish brown; bordered laterally (along eye) with line of yellowish white, line best developed at antenna base, tending to obscurity toward anterior of frons. Labial palpus with outer side dark yellowish brown on dorsal 2/3, abruptly white to yellowish white on ventral 1/3; third segment hidden in scales of second. Maxillary palpus cylindrical, dark yellowish brown on outer side, yellowish white to yellowish brown on inner side. Proboscis light yellowish brown. Antenna with scape, pedicel, and shaft dark yellowish brown on inner side, light yellowish brown on outer side; male shaft with cilia erect, about as long as segment width; female shaft with cilia recurved, extending outward about 1/4 segment width. Vertex and occiput dark yellowish brown, small tufts of yellowish white scales anterior and posterior to ocellus. Patagium and tegula dark yellowish brown.

*Forewing* radius 10-13 mm. Ground somewhat variable, usually rather uniformly moderate yellowish brown, some specimens a bit lighter, many specimens with diffuse lighter markings. Costa dark yellowish brown. Cell with dark brown spots; orbicular small, rather inconspicuous; discal moderate. Antemedial and postmedial lines dark brown, well developed but of low contrast. Antemedial extending diagonally outward to CuP, diagonally inward to about 1/3 beyond 1A+2A, finally diagonally outward to posterior wing margin. Postmedial extending downward and somewhat inward to  $M_2$ , then outward to  $M_{2,3}$  fold, then downward and somewhat inward to  $CuA_{1,2}$  fold, then inward in fold to  $CuA_2$ , then angled downward to posterior wing margin; this line on a smaller scale angled sharply outward between veins from costal margin to  $CuA_1$  giving it a diffuse appearance. Dark brown terminal line interrupted at folds between veins. Fringe with light yellowish brown line basally, dark yellowish brown distal to line. Costa of male with heavy fringe of dark scales, most prominent on underside.

*Hindwing* ground similar to forewing. Small brown spot in middle of closing vein of cell. Postmedial line, terminal line and fringe similar to condition in forewing.

*Male genitalia* with valve relatively broad, costa strongly tubular on basal half; sacculus rather broadly inflated; basal half of valve with prominent hooked process arising very near to base of costa, extending transversely and distally across valve, its distal half curved downward and terminating near center of ventral margin of valve. Aedoeagus bulbous basally, ventrally membranous on basal half; vesica with large patch of minute triangular cusps and 2 discrete well separated patches of lanceolate spines, one with numerous slender spines (fig. 222) mostly between 0.05 and 0.1 mm long, the other (Fig. 223) with fewer, broader spines, up to about 0.2 mm long.

*Female genitalia* with ductus bursae membranous but for well sclerotized collar when joining corpus bursae. Corpus bursae with posterior half longitudinally and variably rugose on right side, surface set with numerous exceedingly minute spines, toward posterior end these becoming multiple and ultimately larger, plate-like and scalloped (Fig. 326); spines extending onto anterior half of corpus bursae, triangular to mammillate near signum, absent at extreme anterior end. Signum (Fig. 325) a narrow transverse infold, about 0.25 mm long, set with several transverse rows of teeth directed distally from center. Ductus seminalis from posterior of corpus bursae, very near to junction with ductus bursae.

**TYPE MATERIAL EXAMINED.**— *licarsisalis*, holotype female (abdomen lost). [BMNH]. Type-locality: Sarawak.

**DISTRIBUTION.**— This is a wide-ranging species in the Old World tropics and subtropics recorded from Congo, Egypt, Syria, Madagascar, the granitic Seychelles, East Indies, China, Japan, Australia, Samoa, Rapa, and Hawaii. The Aldabra material consists of a single female taken at Settlement, 31 Mar., 1968. On the morning of that same date the research vessel Manihini arrived to return most of the expedition members to Mombassa and it is possible that the moth arrived with the ship. The Manihini, however, anchored offshore beyond the reef and departed well before dusk when a moth might begin flight and be attracted to the few lights at the Settlement.

**HOSTS.**— The species has been reared from a number of grasses [Poaceae] including *Cynodon dactylon* Pers., *Hyparrhenia* sp., and rice, *Oryza sativa* L., and turfgrasses; also from beets, *Beta vulgaris* [Chenopodiaceae].

Udayagiri & Mohan (1986) recorded it from patchouli, *Pogostemon patchouli* [Lamiaceae] in India. Maxwell-Lefroy (1909) reports the related *P. phaeopteralis* reared from larvae which roll the leaves of *Anisomeles ovata* [Lamiaceae].

**REMARKS.**— The species is sometimes confused with *H. phaeopteralis* Guenée which is very similar in color and maculation. Geography provides a sharp separation as the latter species is strictly Neotropical (edging into the southern Nearctic region), whereas *H. licarsisalis*, while widely distributed in the Old World tropics and subtropics, is unrecorded from the Western Hemisphere. Structurally, males of *H. licarsisalis* are readily distinguished by their heavily scaled dark fold of the forewing costa; females by the genitalia, those of *H. phaeopteralis* lacking a signum, having the sclerotized folds of the corpus bursae restricted to the posterior 1/4 (posterior 1/2 in *H. licarsisalis*) of the corpus bursae, and having the entire (posterior 1/2 in *H. licarsisalis*) corpus bursae studded with minute spicules. We find no significant differences in the male genitalia of the two species.

As only a single female was taken at Settlement around the time of the visit of the ship Manihini it may be that the specimen was a stray. None of the hosts shown above is listed for Aldabra in Fosberg and Renvoise (1980), but other hosts are possible for this rather polyphagous species.

*Herpetogramma juba* Shaffer & Munroe, new sp.

(Fig. 39, 90, 212-215, 241, 316-319)

*Psara bipunctalis*; Legrand, 1965: 113; Vári and Kroon, 1986: 16, 169 (not Fabricius, 1794). Misidentifications.

**DIAGNOSIS.**— The vesica armature, a pair of long slender somewhat indistinct plates and an extensive patch of minute denticles, is diagnostic of males.

**DESCRIPTION.**— Frons yellowish white, anterolateral corners brown. Labial palpus white on ventral half of outer side, brown on dorsal half and on dorsal surface; third segment entirely brown, in lateral view mostly hidden by scales of second segment. Maxillary palpus yellowish white toward base, brown distally; extending just beyond middle of eye. Proboscis yellowish white. Antenna nearly uniformly yellowish white on scape and shaft of both sexes; cilia of male appearing about 2/3 as long as shaft diameter (Fig. 241), of female about 1/3. Vertex covered with slender yellowish-white scales extending anteriorly between antennae bases. Occiput with a mixture of slender brown and white scales behind eye, longer slender yellowish-white scales behind ocellus, dorsally with broad yellowish-white scales. Patagium pale yellow to pale orange yellow; on male scales long and slender, curving toward middorsal line, extending posteriorly about as far as unscaled portion of tegula; on female scales broader, shorter. Tegular pale yellow; on male scales mostly hair-like, forming distinctive long mane extending posteriorly to or just beyond laterodorsal brown spot on second abdominal segment; on female scales slender, only a few hair-like, extending over first abdominal segment. Thorax anterolaterally with brown band extending anteriorly from costa to behind eye; beneath this band a white band, posteriorly forming strong brush of slender white scales extending beneath wings.

*Forewing* radius about 10 mm (range 9.0 - 11.0; n=6). Ground pale yellow to pale orange yellow; costal band marked by dense mat of fine appressed scales, in color somewhat darker than ground elsewhere, especially toward base, and particularly in males where basal half of costal band is light to moderate yellowish brown; base of costa brown in both sexes, abruptly so in female forming basal spot. Small round brown orbicular spot on posterior wing margin at 1/3 distance from base to antemedial line. Antemedial line brown, well marked and broadest between costa and cell; on radius angled distally, narrowing in cell; on CuP fold slightly expanded, angled posteriorly and narrowing to 1A+2A, then angled distally to posterior wing margin. Small round brown spot in cell at 1/3 distance from antemedial line to discal spot. Discal spot brown; elliptical, on discocellular. Postmedial line brown, well marked on costal band, extending posteriorly from costa to fold between  $M_1$  and  $M_2$ , there angled



distally and posteriorly to between  $M_3$  and  $CuA_1$ , there angled posteriorly to between  $CuA_1$  and  $CuA_2$ , there following between these veins toward lower angle of cell, then before cell sharply angled posteriorly and somewhat basally, curving distally to  $1A+2A$ , there angled basally and posteriorly to posterior wing margin. Terminal line of brown spots between veins well marked in male, poorly marked or absent in female. Some specimens have poorly developed indistinct brown band between discal spot and postmedial line, and another between postmedial line and terminal line.

*Hindwing* ground yellowish white basally to pale orange yellow distally. Small round brown spot on angle of discocellular. Postmedial line beginning at  $R_s$  just distal to its divergence from  $Sc+R_1$ ; extending posteriorly to midway between  $M_1$  and  $M_2$ , there curving distally to between  $M_2$  and  $M_3$ , then posteriorly to between  $CuA_1$  and  $CuA_2$ , there angled sharply and following between these veins toward lower angle of cell (here often poorly marked), angled posteriorly well before cell and extending straight to  $3A$ , terminating just before reaching inner wing margin near distal end of  $3A$ . A diffuse brown band extends posteriorly from  $CuA_2$ , often appearing as extension of postmedial line from lower outer angle of its loop. A second diffuse brown band extends between postmedial line and outer wing margin from  $R_s$  to near  $CuA_2$ . Ground brown at apex. Terminal line of brown spots between veins from apex to near tornus.

Forecoxa white, irregular brown marking anterolaterally near base. Forefemur white. Foretibia white on basal half, distal half with tuft of brown scales. Foretarsus nearly uniformly white to dirty white. Midthoracic leg white, in some specimens short longitudinal brown streak on posterior surface of tibia near proximal end. Hind leg white.

Thorax and abdomen light orange yellow dorsally, abdomen tending toward pale orange yellow posteriorly, abdominal segments fringed posteriorly with pale yellow; second abdominal segment with pair of prominent round brown spots on anterior margin. Ventrally abdomen white on anterior half, gradually dirty white on posterior half.

*Male genitalia* with gnathos about twice as wide as high; ventral margin rounded, dorsal margin with broad bell-shaped lobe; lateral arms very short, narrow. Valve relatively slender; costa tubular about half length of valve, a narrow fold extending beyond tube, angled slightly ventrally, at its distal end about 1/4 distance across valve; dorsal margin of sacculus medially with one or a few close together minute irregular setose tubercles (Fig. 215); oblique plate with one or a few minute setose tubercles near proximal end. Vesica of aedeagus with: pair of long very slender plates, distinct in middle of aedeagus, posterior extent difficult to discern; very numerous minute flat triangular cusps throughout posterior half of aedeagus as seen with vesica uninflated.

*Female genitalia* with apophyses posteriores very slender; apophyses anteriores about 1.6 times as long as apophyses posteriores, posterior 1/3 compressed, horizontal, anterior 1/3 more slender and angled ventrally. Ductus bursae membranous throughout; inner surface of anterior half crowded with numerous very slender anteriorly-directed spines, the longest (near corpus bursae) about 25 micrometers long. Corpus bursae elongate, about 3 times as long as maximum width; posterior 1/4 rather abruptly narrowed; signum near to narrowed posterior portion, small, transverse, denticulate crescentic ridge; posterior 1/3 of broad portion of corpus bursae set with numerous minute blunt triangular cusps, each separated from its neighbors by about its own width, about 8 micrometers; anterior portion of corpus bursae smooth; narrow posterior region of corpus bursae with numerous extremely minute sharp spines, these largest near ductus bursae. Ductus seminalis from posterior end of corpus bursae very near to origin of ductus bursae.

**TYPES.**— *Holotype* - Male, labeled: "Aldabra Atoll 9°24'S, 46°20'E Middle Is. Camp 18 March 1968 Jay C. Shaffer"; "Genitalia Slide By Jay Shaffer USNM 58146"; "Holotype *Herpetogramma juba* Shaffer & Munroe" [USNM].

*Paratypes* - 2 Males, same locality data as holotype, collected March 16 and 18; 3 females, same locality data as holotype, 2 on March 18 (one USNM slide no. 57888, the abdomen of the other lost), the third on March 31 (USNM slide no. 57889); all labeled: "Paratype *Herpetogramma juba* Shaffer & Munroe" [USNM].

**DISTRIBUTION.**— Known from the type-locality, Aldabra, and by two male specimens from South Africa, one from Umkomaas [KwaZulu-Natal] ("1. 1, '14. A.J.T. Janse"), USNM slide no. 57829 [USNM], the other

labeled "Caffra-ria", J. Shaffer slide no. 1944 [NHRM] (see Shaffer and Munroe, 1989b, p. 416).

**HOSTS.**— Unknown.

*Herpetogramma continualis* Shaffer & Munroe, new sp.

(Fig. 91, 216-219, 242, 320-323)

**DIAGNOSIS.**— The vesica armature, a small patch of stout round peg-like spines, is diagnostic of males.

**DESCRIPTION.**— Externally very similar to *H. juba*, differing mainly as follows. Male antenna shaft finely ciliate, cilia appearing only about 1/3 as long as segment width (Fig. 242). Tegula scales appressed, mostly slender, but only a few hair-like; extending posteriorly only to posterior end of thorax. Fore- and hindwing with solid terminal line, well marked in both sexes.

*Male genitalia* with medial lobe of gnathos poorly developed. Dorsal margin of sacculus of valve even, lacking tubercles. (Fig. 219). Aedeagus with vesica (viewed uninflated) much folded and wrinkled throughout at least on posterior half of aedeagus, but armament restricted to distal 1/6 of aedeagus; there patch of stout, sharp-pointed peg-like spines round in cross section (Fig. 218); patch of numerous long slender blade-like spines, the largest nearly as long as aedeagus width, but mostly much shorter.

*Female genitalia* with ductus bursae mostly membranous, but with short smooth sclerotized collar about twice as long as wide very near junction with corpus bursae; minutely scobinate, spines and teeth absent. Corpus bursae elongate, not abruptly constricted posteriorly; signum in middle of corpus bursae, a narrow transverse denticulate ridge centered on a weakly sclerotized rhomboid plate, the plate bearing minute triangular teeth directed away from signum; central half of corpus bursae set with minute rhomboid scales touching rather than separated by smooth membrane; numerous minute sharp triangular spines near ductus bursae. Ductus seminalis from posterior end of corpus bursae, well separated from ductus bursae.

**TYPES.**— *Holotype* - Male, labeled: "Aldabra Atoll 9°24'S, 46°20'E Middle Is. Camp 18 March 1968 Jay C. Shaffer"; "Genitalia Slide By Jay Shaffer USNM 58141"; "Holotype *Herpetogramma continualis* Shaffer & Munroe" [USNM].

*Paratypes* - 2 males, same locality and date as holotype (one USNM slide no. 58142, the other undissected); 4 females, same locality as holotype, 3 on March 18 (USNM slide nos. 57890, 58143, 58145), 1 on March 31 (USNM slide no 58144); all labeled: "Paratype *Herpetogramma continualis* Shaffer & Munroe" [USNM].

**DISTRIBUTION.**— Known only from Aldabra.

**HOSTS.**— Unknown.

**MARASMIA** Lederer

*Marasmia* Lederer, 1863: 277, 385; Hampson, 1896: 275; 1898: 638; Munroe, 1991. Type-species *Marasmia cicatricosa* Lederer, 1863: 386. By monotypy.

Type-locality: Indonesia, Java.

*Dolichosticha* Meyrick, 1884: 293, 304. Type-species *Asopia venialis* Walker, 1859: 373. By monotypy.

*Epimima* Meyrick, 1886: 235. Type-species *Epimima stereogona* Meyrick, 1886: 236. By monotypy.

*Lasiacme* Warren, 1896: 176. Type-species *Lasiacme pilosa* Warren, 1896: 176. By original designation.

*Bradynomorpha* Matsumura, 1920: 514. Type-species *Bradynomorpha nawae* Matsumura, 1920: 514. By monotypy.

*Susumia* Marumo, 1930: 39, 41. Type-species *Samea exigua* Butler, 1879a: 453. By original designation.

*Prodotaula* Meyrick, 1934: 541. Type-species *Prodotaula conformis* Meyrick, 1934: 541. By monotypy.

*Neomarmasia* Karla, David, & Banerji, 1967: 544. Unavil. (ICZN Art. 13).

**DIAGNOSIS.**— Small moths with pallid ground, fuscous termen, narrow transverse lines and strigose costa.  $R_1$  and  $R_2$  of forewing separate from near anterior angle of discal cell, or  $R_2$  stalked with  $R_{3+4}$ , not with  $R_1$  as in *Cnaphalocrocis* Lederer, 1863. Male in the type-species and some others with a prominent pustule in end of discal cell of forewing, covered with modified scales on dorsal and ventral surfaces. Valve of male genitalia in the typical group, to which the Aldabra species belongs, with terminal



margin deeply excavated, but this margin convex in some species groups. **DESCRIPTION.**—Frons flat or weakly rounded, oblique, smoothly scaled. Vertex with long, erect, radiating scaling. Labial palpus obliquely ascending to level of plane of frons; anteroventral surface with anteriorly directed scaling of even length; third segment short, with porrect acuminate scale-tuft extending along dorsal margin of scaling of second segment. Maxillary palpus conspicuous, reaching plane of frons; terminal scaling obliquely compressed, slightly expanded along the plane of compression. Proboscis prominent, coiled, scaled at base. Eye large, globular. Ocellus small, separated from dorsal margin of eye by at least its own diameter, situated on a raised area, looking laterad. Antenna basally filiform, distally annulate; dorsal surface scaled; ventral surface with numerous fine setae. Body slender, somewhat exceeding anal angle of hindwing. Legs slender; foretibial epiphysis present; spurs 0-2-4, outer spurs shorter than inner, especially in male. Praeincinctorium prominently bilobed.

**Forewing** subtriangular, about 2.5 times as long as wide; costa straight to 5/6 from base, then arched to the more or less rectangular apex; termen straight and slightly oblique to cell  $M_3$ , then arched to oblique tornus; posterior margin weakly convex near base. Male without frenulum hook, but with a few bristle-like setae extending posterodistad from basal part of costa; a retinaculum of stiff scales from behind cell. Male with a variably developed pustule in distal part of cell, covered dorsally by a recurved brush of scales, ventrally with thick clothing of appressed black scales; these features absent in some species groups. Discal cell about half as long as wing. Sc free, ending about opposite end of discal cell.  $R_1$  from anterior margin of cell, ending on costa at about 3/4 from base.  $R_2$  from anterior angle of cell, its basal part closely appressed to or stalked with  $R_{3+4}$ .  $R_3$  and  $R_4$  separating at about 3/5 of distance from angle of cell to apex;  $R_4$  ending on costa just basad of apex.  $R_5$  from anterior angle of cell, straight, basally not curved or approximated to  $R_{3+4}$ .  $M_1$  from just behind anterior angle of cell, straight and weakly divergent from  $R_5$ . Discocellular straight and erect or weakly concave for anterior 2/3 of cell width, then obtusely angled and oblique distad to posterior angle.  $M_2$ ,  $M_3$  and  $CuA_1$  closely grouped at posterior angle of cell, their basal parts approximated.  $CuA_2$  from cell at 3/4 from base. CuP represented by a fold.  $1A+2A$  curved at base, then almost straight to tornus.  $3A$  approximated to  $1A+2A$  basally, then diverging and recurving anteriorly to meet  $1A$  at right angles about 1/3 from base.

**Hindwing** subtriangular, about 1.75 times as long as wide; costa the same length as posterior margin of forewing, very weakly sinuous, hardly arched to the subacute, narrowly rounded apex; termen weakly convex from apex to  $M_3$ , there more strongly flexed, then almost straight to the narrowly rounded anal angle; anal margin weakly convex. Frenulum single in male, multiple in female. Discal cell about 1/3 length of wing.  $Sc+R_1$  anastomosed with  $R_s$  for 2/3 to 3/4 distance from cell to apex; distal free part of  $Sc+R_1$  very short and intersecting costa at a steep angle;  $R_s$  ending on apical curve.  $R_s$  and  $M_1$  stalked for a short distance beyond cell. Discocellular weakly concave distad, posterior limb a little more oblique than anterior.  $M_2$  and  $M_3$  from posterior angle of cell, their basal parts curved and approximated.  $CuA_1$  from just basad of posterior angle, not appreciably curved or approximated to  $M_3$ .  $CuA_2$  from cell at 2/3 from base. CuP,  $1A+2A$  straight, well developed, equally spaced and weakly divergent;  $1A+2A$  ending before,  $3A$  behind anal angle.

**Male and female genitalia.**— See under *M. poeyalis*, below, for the structures of the type-species. Some species differ considerably in the shape of the male valve and the shape and armature of the female corpus bursae. See, for example, Clarke, 1971, Fig. 64, 65.

**HOSTS.**— Larvae of this and related genera so far as known are leaf folders and rollers, mainly on grasses, some on crop plants such as maize, sorghum, sugar cane, millet and rice; Ghesquière (1942) described a species *M. liliicola*, reared from *Kniphofia bequaerti* De Wild. (Liliaceae) at Lulenga, Kivu, Central Africa. Clarke (1971) reports *M. trapezalis* feeding on *Paspalum* species, *Miscanthus floridulus*, indian corn, millet, sorghum, and sugar cane.

**REMARKS.**— The taxonomy of this genus needs further work (Munroe, 1991). I.W.B. Nye began a revision a number of years ago, but did not finish it. It appears that *Marasmia* as understood here should probably be subdivided, though the segregates, with *Cnaphalocrocis* and perhaps some additional genera, form a clearly monophyletic group. There are a number of undescribed species, as

well as confusion in published synonymy. Resolution of these problems is beyond the scope of the present study. Fortunately only the type-species of *Marasmia* is known from Aldabra. The typical species group ranges through Africa, the Malagasy subregion, tropical and subtropical Asia, the East Indies, Melanesia, Australia, Micronesia and Polynesia as far as the Society Islands and Rapa. Species referred to *Marasmia* in the broad sense occur in the Marquesas Islands and the Western Hemisphere, but their generic positions require critical review.

***Marasmia poeyalis* (Boisduval)**

(Fig. 40, 94-95, 224-228, 327-329)

*Botys poeyalis* Boisduval, 1833: 266.

*Botys marisalis* Walker, 1859: 717-718.

*Marasmia cicatricosa* Lederer, 1863: 386, Pl. 12, fig 8; Munroe, 1958: 513.

*Marasmia poeyalis* (Boisduval); Marion, 1954: 76, 78; Viette, 1957b: 178-179;

1958a: 8; Legrand, 1965: 99-100; Holloway, 1982: 358.

*Botys minutalis* Mabille, 1879b: 339.

*Marasmia rectistrigosa* Snellen, 1872: 92, Pl. 7, figs. 11, 12; Klima, 1939a: 66;

Munroe et al., 1958: 82.

*Pyrausta minutalis* (Mabille); Hampson, 1899: 272.

*Marasmia hamptoni* Rothschild, 1921: 227.

*Cnaphalocrocis poeyalis* (Boisduval); Shaffer et al., 1996: 199.

**DESCRIPTION.**— **Forewing** radius about 8 mm. Ground yellowish brown at wing base from costa to  $2A$ , extending through cell to postmedial line; broad yellowish-brown band along outer wing margin, concave on its inner margin and extending nearly to postmedial line near costa, to just beyond postmedial line at  $CuA_2$ . Costa, except near base, pale orange yellow, interrupted by antemedial line, about 8 spots, postmedial line; lines and spots dark yellowish brown. Antemedial line extending from costal to inner wing margins, concave; medial line from radius to inner wing margin, concave, best developed as discal spot over discocellular vein; postmedial line nearly straight, broadest at costa. Ground posterior to cell pale orange yellow, with a few darker scales.

**Hindwing** with antemedial, medial, postmedial and band along outer wing margin continued from forewing. Medial and postmedial lines joined on  $CuA_2$ ; ground pale orange yellow.

**Male genitalia** with uncus rounded, deeply bilobed, dorsal surface of lobes densely covered with minute scales, each bifurcate from base. Juxta subrectangular, anterior margin convex, bearing pair of short lateral processes, posterior margin weakly sclerotized. Valve narrowest at base, tapering, broadest on distal end; distally deeply emarginate with cucullus strongly projected, slender, apex with tuft of fine hairs; costa tubular; sacculus tubular, distally with dorso-distally directed spine; valvula narrowly rounded, inner surface of apex with cluster of fine spatulate setae. Aedoeagus tapering and slightly curved distally; three cornuti, the ultimate shaped like a cupped hand with one large and about five smaller teeth on distal margin, penultimate about 1.5 times as long as ultimate, subcylindrical, its surface covered with numerous small distally-directed sharp-pointed teeth, antepenultimate about same size as penultimate, clavate, smooth basally, distally broader and covered with small basally-directed teeth; bundle of about five long slender spines near latter cornutus; vesica with patch of small rounded to triangular scales.

**Female genitalia** with ovipositor lobes very narrow; apophyses very slender, apophyses posteriores somewhat sinuate, apophyses anteriores about 1.3 times as long as apophyses posteriores. Ostial chamber a flattened tube, moderately well sclerotized; posterior 2/3 appearing granular due to numerous minute sharp spines, except extreme posterior end, this devoid of spines; anterior 1/3 smooth, more heavily sclerotized. Ductus bursae broad, somewhat bulbous posteriorly, broadly joined to corpus bursae anteriorly; posterior half with close-set rows of minute scobinations, these forming sharp spines in bulbous region. Corpus bursae elliptical, its surface covered with fine reptilian-like scales, these best developed on posterior half; signum a single short roughened spine. Ductus seminalis from posterior end of ductus bursae.

**TYPE MATERIAL EXAMINED.**— *cicatricosa*, holotype male, labeled: "Java Dol."; "*Marasmia cicatricosa*"; "Rothschild Bequest B.M. 1939-1"



[BMNH].

*hampsoni*, holotype male, Jigawa, Nigeria, BMNH slide 6395 ♂ [BMNH].*marisalis*, female syntype, Sarawak, abdomen lost; Sydney syntype not seen [BMNH].*minutalis*, type not seen.*poeyalis*, type not seen, probably lost.*rectistrigosa*, lectotype male, labeled: "Africa Banana v. Woerden ♂ "; "Museum Leiden Lectotype 1958 Marasmia rectistrigosa ♂ Snellen Selected by E. G. Munroe"; "Type" [red label][RMNH].**HOSTS.**— Unknown, but see under the genus (above).**DISTRIBUTION.**— Widespread in Africa; recorded from Madagascar, Mauritius, granitic Seychelles, the East Indies, and Norfolk Island (Holloway). Apparently widespread in the Old World Tropics. Aldabra material: Settlement (29, 31 Mar.) 2 ♂, 3 ♀; Middle Island (13-20 Mar.) 5 ♂, 7 ♀.**REMARKS.**— The synonymy of this and related species needs further work. We have not been able to find the type of *M. poeyalis*, but have examined topotypic material in the Natural History Museum (London) collections (B.M. pyralid slide no. 6475) that matches Aldabra material as well as the holotype of *M. hampsoni* and *M. rectistrigosa*. On external characters the lectotype of *M. rectistrigosa* is a good match for the Aldabra material, the only difference we are able to discern being a slightly more yellowish wing color, possibly due to greater age of the specimen. The abdomens are missing from the types of *M. cicatricosa* and *M. marisalis*, but they appear to be conspecific with the above. An examination of a photograph of the type of *M. minutalis* provided no reason to doubt its synonymy.The type of *M. venialialis* Walker appears not to be conspecific with the above, though unfortunately its abdomen is missing. On the basis of genitalia preparations of the types of *M. ruralis* Walker and *M. mimica* Warren it is clear that neither is conspecific with *M. poeyalis*. It seems likely that some of the literature references to *M. venialialis* are misidentifications of *M. poeyalis*.**ORPHANOSTAGMA** Warren*Orphanostigma* Warren, 1890: 478. Type-species *Asopia abruptalis* Walker, 1859: 371. By original designation. Type-locality: Sri Lanka.**DESCRIPTION.**— Frons flat and oblique, not prominent, smoothly scaled. Vertex with erect scale tufts. Labial palpus obliquely upturned, reaching plane of frons; first and second segments with long compressed scaling from ventral surface, extending anteriorly for a distance about half width of eye; third segment small, hidden in scaling of second. Maxillary palpus prominent, reaching plane of frons, its distal scaling narrowly cylindrical, not expanded. Proboscis well developed. Eye large, globular, surrounded by scales. Ocellus present, separated from eye by a little more than its own width, situated on a conical prominence, looking dorsodistad. Antenna slender, dorsally scaled, with alternate scale-rows raised, ventrally finely ciliate or pilose, the setae longer in male than in female. Body slender; tip of abdomen exceeding anal angle in male by about half width of hindwing, in female only slightly. Legs without special peculiarities; foretibia with epiphysis; tibial spurs 0-2-4, outer spurs of all pairs about half length of inner in both sexes. Praecinctorium distally transversely compressed, a dorsal indentation dividing it into a pair of fan-shaped lobes. Abdomen distally tapering, without obvious anal tuft.Forewing about 2.4 times as long as wide; costa straight to 3/4 from base, then arched to slightly obtuse apex; termen straight to  $M_3$ , then convex to obtuse tornus; posterior margin with basal half weakly convex. Sc close to costa, ending on it a little past end of discal cell.  $R_1$  from slightly basad of anterior angle of cell.  $R_2$  from anterior angle, closely apposed to  $R_{3+4}$  more than halfway to apex.  $R_3$  and  $R_4$  separating about 3/4 of way from cell to apex, then diverging weakly,  $R_4$  ending just anterior to apex.  $R_5$  from a little behind anterior angle, basally weakly curved and approximated to  $R_{3+4}$ . Discal cell about half as long as wing. Discocellular weakly oblique distad, almost straight to near posterior angle, then weakly curving distad to angle.  $M_1$  from discocellular a little behind  $R_5$ , straight and not approximated to  $R_5$ , $M_2$ ,  $M_3$ , and  $CuA_1$  closely spaced at posterior angle, their basal parts curved and approximated.  $CuA_2$  from cell at 2/3.  $CuP$  absent, represented by a fold.  $1A+2A$  strong and weakly sinuous, a short deflection dorsad subbasally the vein terminating just anterior to tornal angle.  $3A$  forming a closed loop with  $1A+2A$ , meeting it at right angles about 1/3 from base.Hindwing about twice as long as wide, a little longer than posterior margin of hindwing; costa weakly sinuous; apex obliquely convex from  $Sc+R_1$  to  $Rs$ ; termen evenly convex to rounded anal angle; anal margin weakly convex.  $Sc+R_1$  anastomosed with  $Rs$  beyond cell for about 1/4 distance from cell to apex.  $Rs$  and  $M_1$  stalked for a short distance. Discal cell anteriorly about 1/3, posteriorly about 4/10 as long as wing. Discocellular erect to middle of cell, thence oblique and concave distad to posterior angle.  $M_2$ ,  $M_3$ , and  $CuA_1$  closely spaced at posterior angle, their bases weakly curved and approximated.  $CuA_2$  from cell at 3/5 from base.  $CuP$  with basal part attenuated, distal part of normal thickness.  $1A+2A$  and  $3A$  present, the latter ending at anal angle.

Male genitalia with uncus short, about as long as dorsal width of tegumen, divided into a pair of rods arising from posterolateral angles of tegumen, each bearing dorsally an oval terminal pad densely set with short, dark-pigmented, scale-like setae. Tegumen shorter than wide, with deep, narrow lateral elements. Transtilla composed of a pair of slender triangular elements nearly meeting in mid-line. Juxta large and subrectangular, its ventral margin convexly rounded. Vinculum with high, short lateral elements, each with a dorsal process bearing a group of a few long, slender, posteriorly directed setae, and each also with a prominent corema bearing a ventral tuft of short woolly setae and a fan of much longer, slender, somewhat curved scales. Ventral part of vinculum narrow, produced anteriorly into a short, acute saccus. Valve subrhomboidal, anterobasal and antero- and postero-distal angles rounded; costa with an antemedial rounded prominence; a slender subcostal ridge or strut from base to near apex; a subcostal row of long dorsally directed scales at about mid-length; a patch of short basally directed scales near apex; a large flabellate seta ventrad of middle of subcostal ridge, and somewhat variable ridges and spines in saccular region. Aedeagus evenly cylindrical. Vesica bearing an acuminate cornutus and numerous minute denticles. Eighth sternite with a posteriorly excavated sclerite.

Female genitalia with ovipositor lobes each high and narrow, with numerous fine short setae of assorted lengths, rather sparse peripherally. Apophyses posteriores slender, T-shaped, vertical element wider ventrally than dorsally; longitudinal element a little longer, almost straight. Eighth tergite short and wide, rectangular, with a row of fine setae along posterior margin. Apophyses anteriores longer than apophyses posteriores, slender, slightly bent. Ostial chamber sclerotized, of irregular shape, posteriorly with ventral spine and dorsal angular processes. Ductus bursae short and slender, basally continuing sclerotization of ostial chamber, distally membranous. Corpus bursae elongate-ovate, somewhat expanded distally; proximal third longitudinally striated, densely set with short spines; middle third with much finer spines and a small oval signum; posterior third membranous.

**REMARKS.**— The Aldabra species belongs to the species complex centering on *Orphanostigma abruptalis* (Walker), 1859, the type-species of the genus, originally described in *Asopia* Treitschke, 1828. Hampson (1896, 1898), followed by Klima (1939), synonymized *Orphanostigma* with *Syngamia* Guenée, 1854, but the type-species, *Phalaena florella* Stoll, 1781, differs appreciably in male genitalia, having the branches of the uncus much longer and the armature of the valve very different, among other points of distinction, and in our opinion *Syngamia* will prove to be a monotypic American genus. Hampson synonymized four additional genera with *Syngamia*, viz: *Salbia* Guenée, 1854, type-species *S. cassidalis* Guenée, 1854; *Platamonia* Lederer, 1863, type-species *P. ampliatalis* Lederer, 1863; *Aethaloessa* Lederer, 1863, type-species *Stenia floralis* Zeller, 1852; and *Bacotoma* Moore, [1885], type-species *Botys abjungalis* Walker, 1859. Of these, *Platamonia* is generically distinct, but is a junior homonym (of *Platamonia* Busch, 1851) without an objective replacement name. We hereby propose the replacement name *Platamonina*, new name, type-species *Platamonia ampliatalis* Lederer, 1863. *Aethaloessa* was removed



and monographed by Whalley (1961). *Salbia* is an American genus with a number of grey species with an excision and scale tuft on the base of the antennal shaft in the male. Though one of us (Munroe, in Hodges *et al.*, 1983) placed in *Salbia* an American species, *Salbia haemorrhoidalis* Guenée, 1854, that is closely similar to *Orphanostigma abruptalis*, we now consider that it should be put, along with a number of Old World species, in *Orphanostigma*. It is likely that *Bacotoma* will prove to be a distinct genus and that there will be a number of species to be distributed elsewhere. It is clearly outside the scope of this paper to unravel these complexities or even to revise the species of *Orphanostigma*, and we content ourselves with discussion the identity and immediate relationships of *O. abruptalis*.

*Orphanostigma abruptalis* (Walker)

(Fig. 41, 96, 231-234, 330-331)

*Asopia? abruptalis* Walker, 1859: 371.

*Hedylepta abruptalis* (Walker); Moore, 1885: 277, pl 178, fig 14.

*Orphanostigma abruptalis* (Walker); Warren, 1890: 478; Vári and Kroon, 1986: 5, 169.

*Syngamia abruptalis* (Walker); Hampson, 1896: 279; 1898: 645; Maxwell-Lefroy, 1909: 517; Fletcher, 1910: 304; Fryer, 1912: 26; Shibuya, 1928: 194, Pl. 7, fig 32; Vinson, 1938: 44; Klima, 1939a: 75; Ghesquiere, 1942: 126; Mathur, 1954: 257-258, Pl. 4, figs. 69-74; Viette, 1958a: 8; Legrand, 1965: 100-101, Pl. 8, fig 7; Singh and Gulati, 1967: 180; Sagar & Reddy, 1985: 488-492; Mathew & Menon, 1989: 83, pl. 1, fig. 8.

*Asopia dototalis* Walker, 1865: 1305.

*Asopia suffectalis* Walker, 1865: 1307.

**DESCRIPTION.**— Frons strong orange yellow centrally, laterally marked with lines of brown, white, finally brown; brown lines short and bordering longer white line extending posteriorly between antenna and eye, hooking behind antenna; anteriorly white line curving inward, but not attaining body midline. Labial palpus white ventrally and ventrolaterally, outer side otherwise brown; third segment light brown, appressed against dorsal surface of second. Maxillary palpus dark brown on outer side; inner, posterior, and dorsal surfaces light brown to white. Proboscis light brown. Antenna with scape white with two prominent vertical brown lines, one on outer side, the second anterior and continuing onto shaft; white region of scape between brown lines narrowed and continued onto shaft contiguous to brown line. Ocellus well developed, laterally directed, central portion exposed, lateral conical portion largely hidden by scales. Vertex strong orange yellow; occiput similar, with small white bar at posterodorsal angle of eye. Patagium and tegula rather uniform strong orange yellow. Prothorax with pectus yellowish white; prominent white spot behind and beneath eye. Forecoxa pale yellow, brownish purple spot near base; forefemur pale yellow; foretibia white on basal 1/3, brown on distal 2/3; foretarsus with first 3 segments white, brown at apex, fourth segment brown, fifth segment light brown. Mid femur pale yellow; mid tibia pale yellow beneath, upper surface yellowish brown; mid tarsus golden yellow. Hind femur and hind tibia pale yellow, hind tarsus golden yellow.

**Forewing** radius about 9 mm. Ground strong orange yellow from basal to postmedial line and within basally-directed loop of postmedial line; deep orange yellow on costal band and in region distal to postmedial line (except within basally-directed loop), lighter on distal half of this region. Basal line orange, extending from cubitus to inner wing margin. Antemedial line dark brown, prominent, angled outward and somewhat convex to CuP fold; distinctly concave between CuP fold and inner wing margin, here more narrow and lighter. Prominent dark-brown line on closing vein of cell, concave; narrowly but distinctly separated from loop of postmedial line. Postmedial line dark brown, broadened, concave, and especially prominent and black near costa; convex between  $R_2$  and  $M_1$ ; rather strongly concave between  $M_1$  and  $M_2$ ; strong distally-directed loop between  $M_2$  and  $CuA_1$ , then turning basally, extending between  $CuA_1$  and  $CuA_2$  toward lower outer angle of cell, below the angle forming wide basally-directed loop, then extending posteriorly to inner wing margin, distinctly broadened at margin. Terminal line black, narrow but contrasting and prominent. Fringe grayish brown, basal half abruptly darker than distal half.

**Hindwing** light yellow basal to postmedial line; region distal to

postmedial line orange brown on its basal half, orange yellow on its distal half. Antemedial line dark brown, extending straight from lower outer angle of cell to just short of tornus. Postmedial line dark brown, extending from  $R_s$  to halfway between  $CuA_1$  and  $CuA_2$ ; concave between  $M_1$  and  $M_2$ ; straight from posterior end to half way between  $M_2$  and  $M_3$ . Terminal line and fringe on outer margin as in forewing.

**Male genitalia** with midregion of valve bearing variously developed dorsally directed, distally hooked, sharp pointed spine; midbasal region of valve membranous, setose, abruptly bounded distally by short concave transverse ridge and smooth well sclerotized excavation; ventral margin toward apex bearing straight dorsally directed spine about 1/2 as long as valve width; ventro-distal angle with row of 3-4 somewhat branched setose papilla. Aedeagus with numerous minute denticles, larger and stronger in distal elongate patch (Fig. 234).

**Female genitalia** with ostial chamber ventrally hispid, laterally with posteriorly directed needle-like spines. Ductus bursae very short, flat, strap-like. Corpus bursae with basal 2/3 somewhat cylindrical, slightly broader distally, distal 1/3 bulbous; basal 1/3 armed with irregular rows of numerous moderately large lanceolate spines, central portion armed with minute cusps and, around signum, rounded reptilian-like scales which in denser aggregation form and radiate from center of signum (fig 331).

**TYPE MATERIAL EXAMINED.**— *abruptalis*, type female, labeled: "Ceylon"; "52 62"; "Pyralidae Brit. Mus. Slide No. 14303" [BMNH].

*dototalis*, TL: "South Hindostan" [northern India].

*suffectalis*, TL "Moreton Bay" [Australia: Queensland].

**DISTRIBUTION.**— Recorded from West Africa (Spanish Sahara, Sierra Leone) to Zimbabwe and East Africa; also Mauritius, granitic Seychelles, Socotra, India, Sri Lanka, Andaman Islands, Burma, Java, Fiji, Taiwan, and Australia. The Aldabra material consists of just one specimen of each sex; a male from Settlement (31 Mar.), and a female from Middle Island (17 Mar.).

**HOSTS.**— Reported (see Ghesquiere, 1942; Maxwell-Lefroy, 1909; Mathur, 1954; Singh and Gulati, 1967; Sagar & Reddy, 1985) from various mints [Lamiaceae]: *Ocimum sanctum* L., *O. kilimandscharicum*; *Coleus suberraneus*, *Perilla ocymoides*, and *Mentha*, including Japanese mint, *M. arvensis haplocalyx* Briq. var *piperascens* Holmes, *M. viridis*, *M. citrata* L., *M. piperita* L., and *M. spicata* L.; also on Java tea, *Orthosiphon grandiflorus* Boddington. Fosberg and Renvoise (1980: 230-231) list 2 of these species for Aldabra (Ile Picard): *Ocimum sanctum* L. and *O. canum* Sims. They record no mints from Middle Island.

**REMARKS.**— The type-specimen of *A. suffectalis* lacks both head and abdomen, that of *A. dototalis* lacks the abdomen. On the basis of wing pattern and other external features they probably fall within the normal range of variation shown by *O. abruptalis*, though we would not be comfortable accepting this synonymy without a careful study of the species and its allies.

While variation within this species is deserving of further study, a detailed comparison of the 2 Aldabra specimens with males and females from South Africa and Sri Lanka provides no basis for regarding them as anything but conspecific. There is some diversity in the armature of the valves of the male genitalia, but in some cases the variation is as great between the right and left valves of the same specimen as it is among specimens.

**HYMENOPTYCHIS** Zeller

*Hymenoptychis* Zeller, 1852: 64; Lederer, 1863: 425; Hampson, 1897: 195. Type-species *H. sordida* Zeller, 1852: 65. By monotypy. Type-locality: South Africa: KwaZulu-Natal.

*Syrbatis* Walker, 1863: 119. Type-species *Syrbatis tipuliformis* Walker, 1863: 120. By monotypy.

**DESCRIPTION.**— Frons rounded, normal in female; in male somewhat bulging and very narrow, sides concave, medially no more than 1/2 as wide as high. Labial palpus upturned, somewhat short and slender, about 1.2 times as long as eye diameter. Basal segment about 4/5 length of second; third short, rounded. Maxillary palpus very short. Proboscis well developed. Antenna shaft filiform and finely ciliate in both sexes; basal segments of



male shaft nearly twice as thick as in female, cilia about 0.15 as long as shaft diameter; cilia somewhat shorter in female. Eye large. Ocellus well developed, narrowly separated from eye margin.

*Forewing* slender in both sexes. *Female* with costal margin very slightly sinuate. Cell about 2/5 wing length.  $R_1$  from distal 9/10 of cell.  $R_{2+4}$  from upper outer angle of cell;  $R_2$  separating at about 2/5 total length of  $R_4$  from cell;  $R_3$  and  $R_4$  separating at 4/5 distance from cell; common stalk of  $R_{2+4}$  straight, veins curving beyond  $R_2$  separation, free portion of  $R_4$  most strongly so.  $R_5$  from same point as  $R_{2+4}$ , convex.  $M_1$  from just below upper angle, somewhat convex.  $M_1$  from just below the angle, somewhat convex. Basally angled portion of closing vein centered on  $M_1$  origin; lower portion of closing vein angled sharply outward at nearly 90°.  $M_2$  from immediately above lower angle, parallel to  $M_1$ .  $M_3$  from lower angle, parallel to  $M_2$  for basal 1/5, then diverging downward; nearly straight.  $CuA_1$  from immediately before the angle; very shortly parallel with  $M_3$ , then diverging downward.  $CuA_2$  from distal 1/10 of cell, concave. 1A+2A straight at base; angled downward, very slightly sinuate. 3rd A undeveloped.

*Male forewing* (Fig. 42) long and slender with complex modification, principally as follows: shallow fovea at upper outer angle of cell; both upper and lower wing surfaces devoid of scales here as well as between  $R_3$  and  $M_1$  in cell. Fringe of relatively large scales on  $M_1$  on upper wing surface, and similar fringe on anterior vein of cell (radius) on under surface. Upper surface with deep narrow fold in cell between  $M_1$  and posterior vein of cell (cubitus). Lower surface with deep fold in cell between upper vein and  $R_5$ . Closing vein absent, cell open distally,  $R_5$  and  $M_1$  developed well into cell, joining in basal 1/3 of cell.  $M_1$  with anterior margin in cell bearing fine file of alternating well developed major and less well developed minor teeth (Fig. 337-338), separation of major teeth about 20-25  $\mu$ m; file extending shortly beyond cell, here all teeth well developed, their separation approximately 10  $\mu$ m. File appearing equally well developed on right and left forewings.  $M_{2+3}$  stalked with  $CuA_1$ , the  $M_{2+3}$  stalk only slightly short.

*Hindwing of female* with frenulum double. Costal margin  $Sc+R_1$  and  $R_s$  stalked about 1/2 free length of  $R_s$ ;  $R_s$  terminating at apex.  $M_1$  from upper angle of cell, straight.  $M_2$  and  $M_3$  from point at lower angle.  $CuA_1$  from just before the angle.  $CuA_2$  4/5 from base of cell.

*Hindwing of male* similar to female, but somewhat more elongate;  $M_{2+3}$  short stalked.

*Male genitalia* with uncus with distal portion slender, short, apex spatulate, its dorsal surface densely covered with minute lanceolate scales. Valve broadly rounded at apex; costa tubular, its apex pointed and inwardly directed; strong sharp-edged ridge developed along side of costa; base of costa with broad sclerotized band joining similar band from sacculus to form blunt cusp in middle of valve base, long slender distally directed spine arising from base of cusp, curving dorsally; a second shorter spine arising just distal to cusp, curved, dorsally directed. Juxta lyre shaped. Aedoeagus strongly angled and bulbous basally, slender and very finely serrate distally.

*Female genitalia* with ovipositor lobes narrow, ventrally directed. Apophyses posteriores nearly straight; apophyses anteriores stronger, nearly straight, about 1.5 times as long as apophyses posteriores, triangular thickening on basal third. Ostium moderately well sclerotized, crescent shaped from above. Ductus bursae a very slender tube of uniform thickness arising sharply from ostium. Corpus bursae ovate, unarmed, surface smooth, narrow end joining ductus bursae. Ductus seminalis from posterior end of corpus bursae very near to junction with ductus bursae.

*Hymenoptychis sordida* Zeller  
(Fig. 42, 97, 99, 235-237, 332, 337-339)

*Hymenoptychis sordida* Zeller, 1852: 65; Lederer, 1863: 426, Taf. 16, fig 2; Hampson, 1897: 195; Pagenstecher, 1907: 132; Fryer, 1912: 25; Legrand, 1965: 94; Rose & Pajni, 1986: 6.

*Syrbatis tipuliformis* Walker, 1863: 120.

*Botys pterophoralis* Walker, 1865: 1413.

**DESCRIPTION.**— Frons brown. Labial palpus with basal and second segments brown on dorsal half, white on ventral half; third segment brown. Proboscis scales light brown. Vertex brown, moderate yellowish brown behind antennae. Patagium and tegula moderate yellowish brown. Legs long, slender. Abdomen elongate and slender in male, extending well beyond forewing tips (wings in folded position).

*Forewing* radius 11-13 mm in males, 9-13 mm in females. Ground moderate yellowish brown; small orange-yellow spot bordered with dark brown at inner angle of cell, a similar somewhat larger marking near middle of cell; large dark brown elliptical ring centered on 1A+2A and extending from cell to inner wing margin, narrow dark brown band extending distally from ring where tangent to  $CuA_2$ , then curving anteriorly and extending as postmedial band to costal margin. Area between elliptical ring and wing base dark orange yellow. Veins from cell just perceptibly darker than ground. Above described markings inconspicuous in many specimens, particularly males.

*Hindwing* ground moderate yellowish brown, just perceptibly darker in large diffuse spot in center of wing.

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**— *H. sordida*, lectotype male, hereby designated, labeled: "Zeller Coll. 1884"; "Pyralidae Brit. Mus. Slide No. 14322" [BMNH].

*S. tipuliformis*, holotype male, labeled: "Sarawak, Saunders' Coll. 94-68"; "Pyralidae Brit. Mus. Slide No. 14323" [BMNH].

*B. pterophoralis*, holotype male, labeled: "60-15 E.I.C."; "Pyralidae Brit. Mus. Slide No. 14324" [BMNH]. Type-locality: Penang [Malaysia].

**DISTRIBUTION.**— A widespread species occurring from southern Africa through southern Asia and the Pacific, including South Africa, Mozambique, Tanzania, Bangladesh, Sri Lanka, Burma, New Guinea, West Malasia, Borneo, Philippines, Sulawesi, Bismark Archipelago, Shortland Islands, Marshall Islands, Tuvalu, Queensland, and Tasmania. Legrand records the species from Aldabra and the Mahé in the granitic Seychelles. Aldabra material: Settlement (10-27 Jan.) 7  $\delta$ , 33  $\eta$ ; (29 Mar.) 1  $\delta$ , 1  $\eta$ ; Takamaka (31 Jan.-18 Feb.) 17  $\delta$ , 56  $\eta$ ; Cinq Cases (23 Feb.-9 Mar.) 2  $\delta$ , 14  $\eta$ ; Middle Island (13-25 Mar.) 5  $\delta$ , 45  $\eta$ .

**HOSTS.**— Unknown.

**REMARKS.**— The function of the forewing file should be investigated. Its restriction to the male suggests a role in courtship. If the file is part of a sound producing apparatus, as one might assume, then it is difficult to see how any structure other than a leg might engage it. The apex of the male forefemur (Fig. 339) bears a minute fingernail-like process that seems well positioned to stroke the file. Smaller fingernail-like processes occur on the apices of meso- and metathoracic femurs of both sexes, but as these two pairs of legs are mounted much farther posteriorly they appear not to be in a position to move along the length of the file, but rather intersect it transversely. The halving of the distance between fully developed file teeth distal to the cell suggests an increase in pitch from this region.

Four other species (*L. liralis*, *S. lancinalis*, *D. fovealis*, *T. furia*) covered herein have a forewing fovea, though none of these exhibit a file. In *H. sordida* the fovea may act as a resonator.

## Subfamily CYBALOMIINAE

### THYRIDIPHORA Warren

*Thyridiphora* Warren, 1888: 310. Type-species *Thyridiphora fenestrata* Warren, 1888: 311. By monotypy. Type-locality: Campbellpore, Pakistan.  
*Thyridophora* [sic] Hampson, 1895: 905; Turner, 1927: 130. Misspelling. In "Schoenobiadae."

**DESCRIPTION.**— Frons oblique, flattened. Labial palpus of male obliquely ascending, third segment decumbent; about 2.8 times as long as eye diameter. Basal segment (denuded) about 4/10 length of second, third about 3/10 length of second; female similar, more slender. Maxillary palpus well developed. Antenna shaft filiform, somewhat thickened basally, especially in male, male basal segments about 1.5 times as thick as in female. Cilia very short and of about equal length in both sexes, in male about 0.1 times segment length, in female about 0.15 times. Ocellus absent.

*Forewing in female* with costal margin rather strongly concave, apex somewhat pointed; termen straight to very slightly concave from apex to  $M_2$ , rounded to  $CuA_2$ , straight to near tornus; posterior margin nearly straight from 3A to near tornus. Cell long, 3/5 wing length.  $R_1$  from distal 7/10 of cell;  $R_2$  from distal 9/10 and well separated from other veins.  $R_{3+4}$  from



upper outer angle, stalked for about 6/10 free length of  $R_4$ ;  $R_4$  terminating basally to apex.  $R_5$  very short stalked with  $M_1$ , from just below upper angle. Closing vein poorly developed.  $M_2$ ,  $M_3$ , and  $CuA_1$  well separated.  $CuA_2$  from distal 3/5 of cell; straight. Fold of  $CuP$  well developed; the vein very slender, tubular toward wing margin.  $1A+2A$  convex over most of its length; concave and slender near tornus, terminating at tornus.  $3A$  not tubular, straight, reaching posterior wing margin nearly 1/2 way to tornus.

*Forewing of male* (Fig. 43) similar, but with narrow, almost slit-like fovea, nearly devoid of scales on both upper and lower wing surfaces; distal to upper outer angle of cell; veins  $R_5$ ,  $M_1$ , and  $M_2$  modified at fovea (see Fig. 43).

*Hindwing* similar in both sexes. Female frenulum single. Costal margin gently convex; apex well rounded; tornal region very broadly rounded. Cell long, about 0.65 wing length.  $Sc+R_1$  and  $R_s$  stalked for just over 1/2 free length of  $R_s$ , from upper angle, veins diverging rather strongly beyond fork.  $M_1$  also from the angle, slightly concave. Closing vein incomplete, tubular toward lower angle of cell.  $M_2$  and  $M_3$  from lower angle of cell, divergent.  $CuA_1$  rather well before the angle.  $CuA_2$  from distal 6/10 to 7/10 of cell.

*Male genitalia* with uncus articulating with tegumen, scoop-shaped, ventrally concave and setose, dorsally convex and finely setose. Gnathos pyramid shaped, apex posteriorly with medial and pair of lateral round flanges, anteriorly with pair of lateral rounded flanges. Vinculum with anteriorly projecting heavily sclerotized digitate medial process. Juxta a broad-based cone, emarginate to apex. Valve subrectangular; large flattened digitate process arising from base of costa; irregular heavily sclerotized mass developed in middle of valve base, from this near costa arises a short, curved, digitate process; sacculus well sclerotized, sclerotization extending narrowly along ventral margin of valve. Aedoeagus with base subtriangular and heavily sclerotized; distal portion very slender, curved ventrally.

*Female genitalia* with ovipositor lobes very short, straight, finely setose. Apophyses posteriores slender, curved anteriorly; apophyses anteriores broader, short, arising from heavily sclerotized anterior projections of eighth segment collar. Ostium chamber triangular. Ductus bursae narrow, membranous. Corpus bursae small, round, membranous, unarmed. Ductus seminalis from middle of ductus bursae.

### *Thyridiphora furia* (Swinhoe)

(Fig. A9, 43, 98, 229-230, 333)

*Micra furia* Swinhoe, 1884: 519, Pl. 47, fig 13.

*Thyridiphora fenestrata* Warren, 1888: 311.

*Thyridiphora* [sic] *furia* (Swinhoe); Hampson, 1895:905; Gerasimov, 1949:365; Hackman, 1954: 6.

*Dysodia calidella* Legrand, 1965: 88-89. [In Thyrididae], **new syn.**

*Thyridiphora* [sic] *calidella* (Legrand); Whalley, 1968: 1.

**DESCRIPTION.**—Frons ground color light grayish yellowish brown, medial white line extending length of frons and posteriorly through vertex and occiput, bisecting these regions. Scales of ground color radiating anterodorsally from medial white line, with white fringe laterally over eye, falcate anterodorsally. Maxillary palpus distally expanded, subtriangular, light yellowish brown with white distal fringe. Antenna shaft scales light yellowish brown, anteromedially with white line extending from scape onto basal segments of shaft, there tapering rather abruptly. Vertex, occiput, patagium, tegula, and thorax dorsally light grayish yellowish brown; medial white line on vertex and occiput (as above), and on mesoscutum.

*Forewing* radius about 6.0-7.5 mm. Ground light grayish yellowish brown; broad diffuse postmedial band internally mostly same color as ground, its borders a darker grayish yellowish brown, and a longitudinal band of this color connecting borders along posterior margin of cell. Costa with a few white scales along its length. Ground gradually darkening toward outer wing margin; fringe dark grayish yellowish brown on basal 2/3, distal 1/3 white. Male with costal margin more concave and lenticular clear spot (fovea) within postmedial band at upper outer angle of cell.

*Hindwing* ground very slightly lighter than that of forewing. Postmedial band variably developed, less prominent than in forewing, best marked between  $R_s$  and lower outer angle of cell, also in cell basal and posterior to origin of  $M_1$ .

*Genitalia* as described for the genus.

**TYPE MATERIAL EXAMINED.**—*M. furia*, holotype male, labeled in

part: "Kurrachee"; "Type"; BMNH Pyralid Slide No. 13118♂ [BMNH]. Type-locality: Karachi, Pakistan.

*T. fenestrata*, holotype male, BMNH Pyralid Slide No. 11607♂ [BMNH]. Type-locality: Campbellpore (Campbellpur).

*D. calidella*, paratype male, labeled: "Paratype"; "255"; "Dysodia calidella Legrand"; "♂"; "Aldabra 15. XI. 1959 M. Gerber"; "Museum Paris Coll. H. Legrand"; "♂ genitalia on slide 1771 J.C. Shaffer" [MNHN].

**DISTRIBUTION.**—Described from Karachi, Pakistan; recorded also from India, Arabia, Syria, Cyprus, Kenya, Tanzania, South Africa, and Cameroon. Aldabra material: Settlement (17, 19 Jan.) 1 ♂, 1 ♀; (21, 29 Mar.) 4 ♂, 2 ♀; Cinq Cases (29 Feb.—6 Mar.) 4 ♂, 1 ♀; Middle Island (11-30 Mar.) 54 ♂, 15 ♀.

**HOST.**—Caper, *Capparis cartilaginea* Decne. [Capparidaceae] Larvae in fruits; tunnel wall and escape aperture covered with silky parchment prior to pupation (see Fig. A9). The host is widespread on Aldabra, occurring also on Assumption and Astove and ranging from Madagascar and eastern Africa north through the Middle East to Pakistan (Fosberg and Renvoise, 1980: 41)

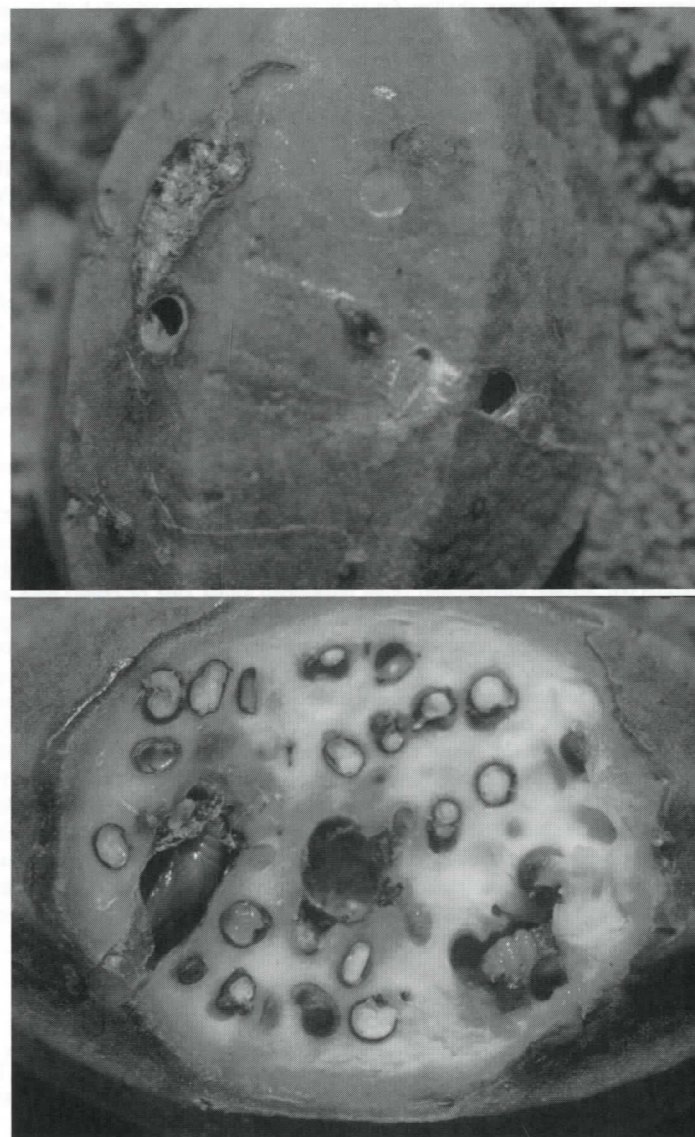


Fig. A9. Caper fruit with damage from *Thyridiphora furia*: a) sealed emergence hole for pupa; b) sectioned fruit showing larva and pupa with its sealed emergence hole.

**REMARKS.**—In the original description of *fenestrata* Warren listed a single female, but the holotype is in fact a male.



## Subfamily CRAMBINAE

*CHRYSOCATHARYLLA* Bassi

*Chrysocatharylla* Bassi, 1999: 170. Type-species *Crambus oenescentellus* Hampson 1895: 933. By original designation. Type-locality: "N'gatana, Brit. E. Africa."

*Chrysocatharylla agraphella* (Hampson)

(Fig. 44, 100, 336, 342-344)

*Crambus agraphellus* Hampson, 1919: 290.

*Pseudocatharylla agraphella* (Hampson); Bleszynski, 1962: 10; 1964: 711-712, fig. 27.

*Pseudocatharylla agraphellus* (Hampson); Bleszynski and Collins, 1962: 346.

*Chrysocatharylla agraphella* (Hampson); Bassi, 1999: 178.

**DESCRIPTION.**— Frons somewhat bulging, obliquely scaled; pale yellow to grayish yellow. Labial palpus about 2.3 times as long as eye diameter; basal segment yellowish white, 2nd and 3rd segments rather uniformly grayish yellow. Maxillary palpus yellowish white. Proboscis scaling yellowish white. Antenna finely filiform in female; scape yellowish white; shaft with yellowish white scales on first several segments, then scaling consisting of alternating irregular rows of yellowish white and light orange scales. Eye diameter about 0.67 mm. Ocellus small, circular in outline, separated from eye by about 1.5 times its own diameter. Vertex clothed in yellowish white scales, anteriorly directed, forking and extending above frons. Patagium mostly light orange yellow, lighter along body axis. Tegula mostly light orange yellow, lighter laterally.

Forewing radius about 8.0 mm. Costal margin very slightly convex. Apex narrowly rounded, tornus rather broadly rounded. Costal and outer wing margins with fringe of minute setae in perimeter between  $R_2$  and  $CuA_1$ ; most closely set in apical region, everywhere separated by at least their own length. Forewing with 4 radials present (Fig. 44).  $R_1$  from cell at 7/10 from base, leaving at rather great angle, not joining Sc.  $R_2$  from before upper angle, well separated from  $R_1$  and  $R_{3+5}$ .  $R_{3+5}$  from the angle;  $R_{3+4}$  fused; free portion of  $R_5$  slightly longer than common stalk.  $M_1$  from top 2/5 of cell,  $M_2$  from just above lower angle; both convex.  $M_3$  from lower angle, concave. Ground pale yellow to pale orange yellow with scattered moderate yellowish brown scales except anterior to cell and posterior to 2nd A on basal half of wing. Ground within cell moderate yellowish brown so as to form prominent longitudinal bar, otherwise wing maculation rather subtle. A longer, less prominent, and variably developed longitudinal band of scattered moderate yellowish brown scales extends between cubitus and 1A+2A from wing base to about 7/8 to outer wing margin. Similarly colored scales form diffuse broken postmedial and subterminal bands, the former best developed as a diffuse spot on CuP fold and similar spot basal to tornal angle. Radial, medial, and cubital veins distal to cell just perceptibly marked with white tracing.

Hindwing with costal margin nearly straight, only very slightly convex. Apex rounded. Outer margin rather deeply concave between  $M_1$  and  $M_3$ . Tornal angle very broadly rounded. Costal and outer wing margins with fringe of minute setae on perimeter between Sc+ $R_1$  and  $CuA_2$ , most closely set in apical region, here spacing slightly greater than seta length. Sc+ $R_1$  and Rs stalked for 2/3 free length of Rs. Cell open, closing vein developed only near lower angle.  $M_{2+3}$  short stalked, then widely divergent, then parallel; from lower angle.  $CuA_1$  from just before the angle.  $CuA_2$  nearly 3/4 from base of cell. Nearly uniformly yellowish white. Fringe on cubitus near base, and on basal 5/8 of 1A+2A.

Male genitalia (Fig. 342-344) with uncus and gnathos of equal length. "Valva with pars basalis not well demarcated, in form of a long and rather heavily sclerotized fold the ventral edge of which is decidedly inbent near base" (Bleszynski, 1964: 712). Aedoeagus 4/5 length of valve, somewhat irregular, with a single strong, broad-based, distally-pointed cornutus nearly 1/4 length of aedoeagus.

Female genitalia (Fig. 336) with ovipositor compressed, short, posterior margin with prominent concavity on dorsal third. Apophyses posteriores from middle of papillae anales; thickened at base, shaft slender and gently curved. Apophyses anteriores short, about half as long as apophyses posteriores, anterodorsally directed, tapering from broad

base, curved. Eighth segment collar somewhat compressed, posterior half with deep dorsal emargination; posterior margin forming well sclerotized band around ostium and extending dorsally to apophyses; bare but for patch of about 2 dozen small setae near posterior margin ventral to base of apophyses. Wall of ostium heavily sclerotized, longitudinally rugose. Ductus bursae membranous, unarmed. Corpus bursae membranous, lacking signum or other armament.

**HOLOTYPE.**— male, labeled: "Holo-type"; "Aldabra J.C.F.

Fryer Seychelle Islands. Percy Sladen Trust Expedition. 1913-170."; "Crambus agraphellus. type ♂. Hmpsm."; "108 Bleszynski 195"; "Pyralidae Brit. Mus. Slide No. 5591♂" [BMNH].

**DISTRIBUTION.**— Known only from Aldabra and Mozambique. There are 4 known specimens, the male holotype, two females taken at Cinq Cases Camp, 24 Feb. and 3 Mar. 1968, and a single male which Bassi reports from Mozambique.

**REMARKS.**— M. Shaffer has kindly provided color slides of the holotype and its labels and made the genitalia slide available on loan to us.

Bleszynski (1964: 712) in discussing *Pseudocatharylla* places this species closest to *infixella* (Walker), recorded from China, Japan, and Formosa, and to *oenescentella* (Hampson), known from subspecies in Sri Lanka and KwaZulu-Natal, South Africa. While *agrappella* appears most similar to *infixella*, if its closest relative is in fact one of these two species the distributional data would argue for the South African one. Bleszynski indicates that the Ethiopian fauna of *Pseudocatharylla* is poorly known and that undiscovered species may well occur there. He lists 15 species of this genus from the Indo-Australian and East Palearctic regions and 20 from the Afrotropical region with no species known from Madagascar.

## Subfamily SCHOENOBIINAE

*SCIRPOPHAGA* Treitschke

*Scirpophaga* Treitschke, 1832: 55; Hampson, 1895: 912; 1896: 45; Common, 1960: 311; Lewvanich, 1981: 185-298; Fletcher and Nye, 1984: 138. Type-species *Tinea phantasmata* Hübner, 1796: 23. By monotypy. Type-locality: Florence, Italy.

*Apurima* Walker, 1863: 194. Type-species *Apurima xanthogastrella* Walker, 1863: 194. By monotypy.

*Tryporyza* Common, 1960: 339. Type-species *Tipanaea innotata* Walker, 1863: 523. By original designation.

**DESCRIPTION.**— Frons narrow, rounded, smoothly scaled. Vertex short, with tufts of slender scales. Labial palpus porrect, longer in male than in female. Maxillary palpus porrect, about half as long as labial palpus, four segmented. Proboscis much reduced, not as long as labial palpus. Eye large, globular, wider than frons. Ocellus nearer occipital margin than antenna, removed by more than its width from eye, looking dorsad. Chaetosema present, located near ocellus. Antenna filiform, weakly serrated, shorter and more slender in female than in male, smoothly scaled above, finely setose below. Body slender, much exceeding anal angle of hindwing. Seventh and eighth sternites of male with median posterior combs of stiff posteriorly directed scales, the eighth sternite considerably modified in shape and sclerotization. Female abdomen with a large terminal tuft of deciduous scales, used to cover the egg mass during oviposition.

Forewing 2.5 to 3 times as long as wide, longer and with termen more oblique in female than in male.  $R_1$  from anterior margin of cell, distally free or anastomosed with Sc to costal margin.  $R_2$  from anterior angle of cell. Cell about 3/5 to 2/3 length of wing.  $R_{3+4}$  from a little behind anterior angle of cell, stalked halfway or somewhat less from cell to apex.  $R_5$  and  $M_1$  free from behind  $R_{3+4}$ . MDC forming a weakly acute angle basad.  $M_2$  to  $CuA_2$  spaced at increasing intervals from posterior angle of cell. CuP distally preserved as a tubular vein, ending at tornal angle. 1A+2A straight and tubular, ending basad of tornal angle. 3A very short, weak, free. Male with frenulum hook present; both sexes with scaled retinaculum.

Hindwing about as long as posterior margin of forewing, about 2/5 as wide as long. Sc+ $R_1$  anastomosed with Rs for a short distance beyond end



of cell.  $M_1$  connate or stalked with Rs. MDC acutely angled basad as in forewing.  $M_2$  to  $CuA_2$  spaced at increasing intervals from posterior angle of cell.  $CuP$  distally preserved as a tubular vein as on forewing;  $1A+2A$  well developed,  $3A$  weaker. Frenulum single in male, single or double in female (single in the Aldabra species).

**Male genitalia** with uncus and gnathos well developed, simple, distally acuminate, about equal in length. Tegumen with a pair of prominent subteguminal processes, varying in length with species, from ventrolateral margin. Anellus and manica membranous, with variously developed spines. Juxta simple, about twice as high as long. Vinculum with short saccus and with large scale-like structures on each side beneath base of valve. Aedoeagus tubular, ductus ejaculatorius entering near posterior end. Vesica with cornuti, various in shape and number. Valve simple, oblong, with weakly differentiated costa and sacculus.

**Female genitalia** with ovipositor lobes large, membranous, densely setose, dorsally joined. Apophyses posteriores and apophyses anteriores of about the same length. Ostial chamber membranous or variously sclerotized. Ductus bursae short, with a variously shaped sclerotized collar. Opening of ductus seminalis immediately anterior to ductus bursae. Corpus bursae round or oval, minutely spinulose, otherwise unarmed.

**EARLY STAGES.**—Eggs laid in scale-covered masses. Larvae borers in Poaceae, best known from rice and sugar cane, on which some species are major pests.

**REMARKS.**—Of the 35 species recognized by Lewvanich (1981), 8 species are Afrotropical, the rest being Indo-Australian and/or Palearctic. The Aldabra representative is widespread in mainland Africa and in Madagascar.

*Scirpophaga occidentella* (Walker)  
(Fig. 45, 101, 238-240, 334-335)

*Rupela occidentella* Walker, 1863: 524.

*Scirpophaga occidentella* (Walker); Hampson, 1895: 913; Meyrick, 1933: 376;

Lewvanich, 1981: 234, figs. 69, 70, 113, 162, 163, map 14.

*Topoutis* [sic] *occidentella* (Walker); de Joannis, 1927: 189.

**DESCRIPTION.**—The wings are uniformly white with a radius of about 13 mm. We omit further description as the white wings are distinctive and the structural characters of the genus and species are well covered in Lewvanich's revision of the Old World *Scirpophaga*.

**TYPE MATERIAL EXAMINED.**—None.

**DISTRIBUTION.**—*S. occidentella* is widespread over tropical Africa from Senegal to South Africa and north through Tanzania, as well as Madagascar. A single female was collected on Aldabra, at Settlement, 31 Mar. 1968. The reader is referred to notes under *Herpetogramma licarsialis* concerning the visit of the ship Manihini on this date. It is doubtful that suitable habitats exist on Aldabra and the specimen is likely adventive.

**HOSTS.**—Lewvanich lists *Oryza sativa* [rice] from specimen label data.

**REMARKS.**—Two sibling species (*fusciflua* and *virginia*) occur in Asia and a third (*ochroleuca*) in Australia. In a comparison of the Aldabra female with females from KwaZulu-Natal, South Africa (*occidentella*), Manila (*virginia*), Sri Lanka (*fusciflua*), and Dampier Islands (*ochroleuca*), the Aldabra specimen clearly matched only the one from KwaZulu-Natal, notable in the form of the ostium (heavily sclerotized and 'puff ball' shaped), in the shape of the venulae secundae extending posterior from the tympanum, and in the shape

of the rounded flap that projects medially from the outer wall of the tympanic bulla. There are numerous white species of *Scirpophaga* and related genera elsewhere in the tropics and identification of specimens should therefore be confirmed by examination of genitalia.

#### ACKNOWLEDGMENTS

A project of this scope inevitably owes a debt to many individuals and organizations. Field work by the senior author on Aldabra was supported by the Royal Society of London with sponsorship and additional aid provided by the Smithsonian Institution and further essential support in the form of a grant (#667) from the National Geographic Society. The senior author gratefully acknowledges travel support provided by the American Philosophical Society for a visit to the Natural History Museum (London) in 1972, and partial financial support by the George Mason University Biology Dept. for visits to Ottawa in 1979 and 1988. The George Mason University, Dept. of Environmental Science and Policy, provided critical financial support for the publication of this paper. The Hitachi S-530 scanning electron microscope used in this study was supported in part by NSF grant BSR-8511148.

Of the many persons who assisted us in innumerable ways there are two who deserve special recognition. Most type-specimens and other material relevant to this study are found in the collections of the Natural History Museum in London and the Museum National d'Histoire Naturelle in Paris. As representatives of those two institutions respectively Mr. Michael Shaffer and Dr. Pierre Viette (both retired) have over the years following the inception of this study responded faithfully and with generosity and understanding to what must have seemed like a never ending litany of requests which were necessary in spite of visits by both of us on separate occasions. As in any detective work the solution of scientific mysteries entails countless hours spent examining seemingly mundane details and for their willingness to assist us in this endeavor we are profoundly grateful. We also thank Mr. Bert Gustafsson of the Swedish Museum of Natural History, Stockholm; Dr. Joel Minet, Museum National d'Histoire Naturelle, Paris; Dr. U. Dall'Asta, Musée Royal de l'Afrique Centrale, Tervuren, and Mr. E. C. Dahms of the Queensland Museum, Australia, for loans of type and other specimens. The late Dr. F. Raymond Fosberg of the Smithsonian Institution identified hostplants for the senior author in the field and we have relied heavily on Fosberg and Renvoise (1980) for botanical information on Aldabra plants presented herein. Dr. Ted Bradley, George Mason University, has been most generous with his time in helping us correlate common and scientific plant names. Drs. Paul Whalley (retired) of the Natural History Museum (London), W. Donald Duckworth, now director of the Bishop Museum in Honolulu, and Drs. Don Davis, the late J.F. Gates Clarke of the Smithsonian Institution, and Dr. Alma Solis of the Systematic Entomology Laboratory, USDA all offered valuable advice during various stages of the project. Dr. Solis also reviewed the final manuscript as did Dr. Koen Maes of the Royal Museum for Central Africa (Tervuren), and we are indebted to them for their many constructive comments. Dr. Robert Poole of the Systematic Entomology Laboratory, USDA, identified to family a nolid moth erroneously placed in the pyraustine genus *Stenia*. We also thank Dr. Arndt Laemmerzahl for reviewing portions of the manuscript and Michael C. Shaffer for valuable assistance in producing the back cover illustration. Finally, we are most grateful to Dr. David Stoddart for permission to reproduce, with modification, the figure used in Map 1.



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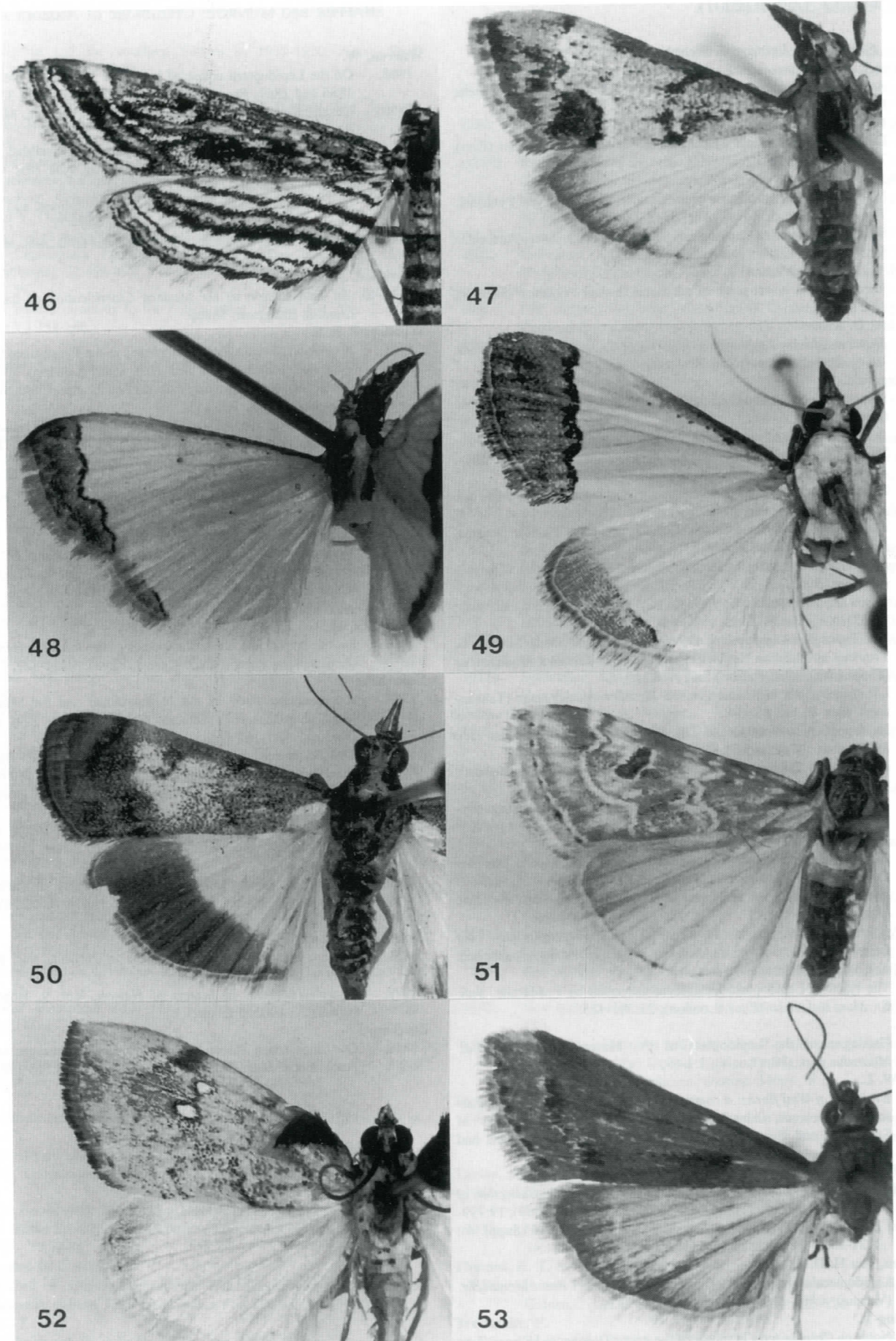


Fig. 46-53. Adult moths. 46, *Paraponyx fluctuosalis*; 47, *Autocharis barbieri*; 48, *A. linealis*, allotype, USNM slide 57878; 49, *A. discalis*, holotype; 50, *Noorda blitealis*; 51, *Hellula undalis*; 52, *Crocidolomia pavonana*; 53, *Achyra coelatalis*.



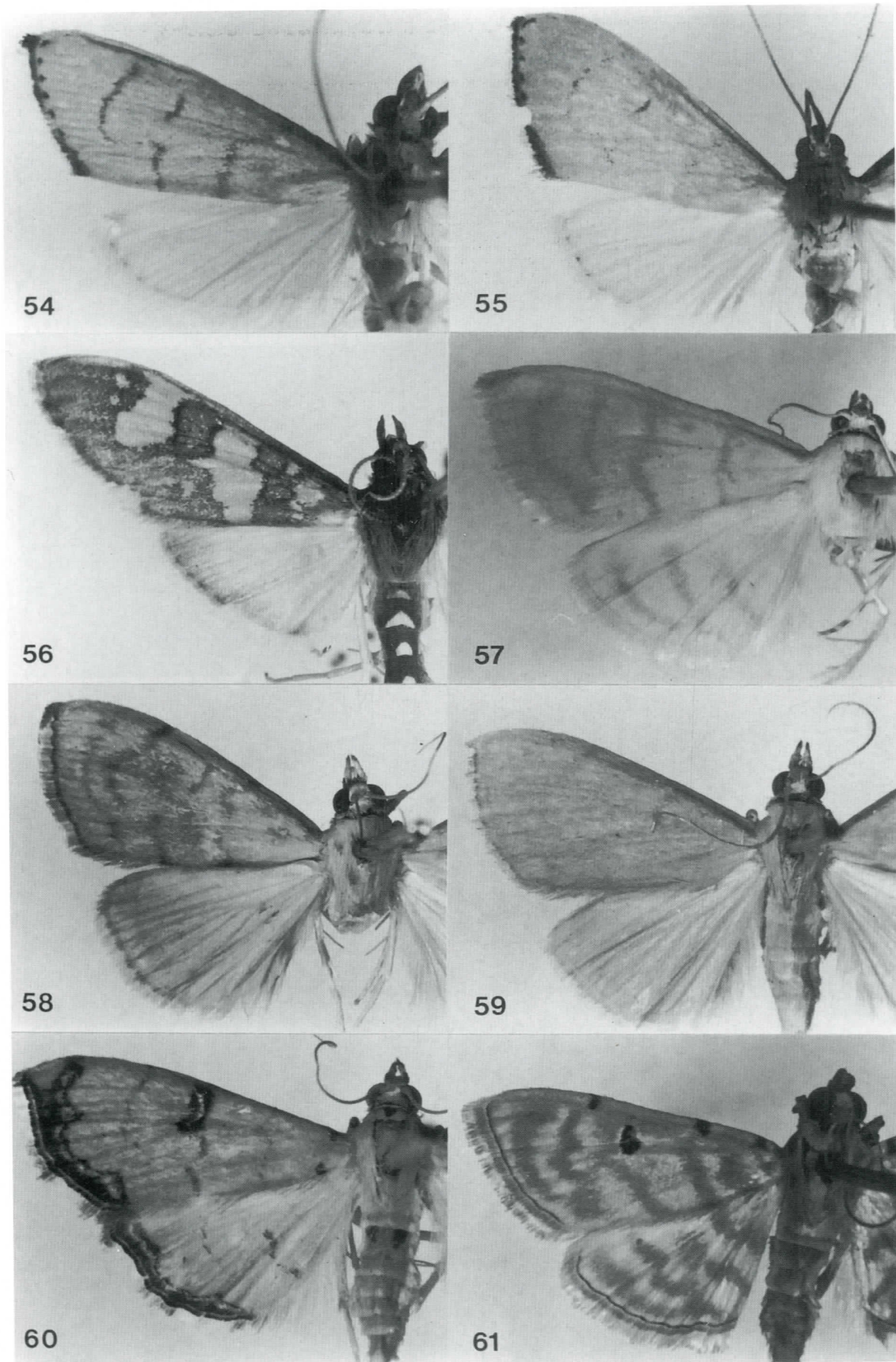


Fig. 54-61. Adult moths. 54, *Lirabotys liralis*, male; 55, *L. liralis*, female; 56, *Stenochora lancinalis*; 57, *Pagyda sounanalis*; 58, *Pioneabathra olesialis*, lined morph; 59, *P. olesialis*, unlined morph; 60, *Isocentris retinalis*; 61, *Notarcha digitalis*; male paratype, 18 Jan. 1968.



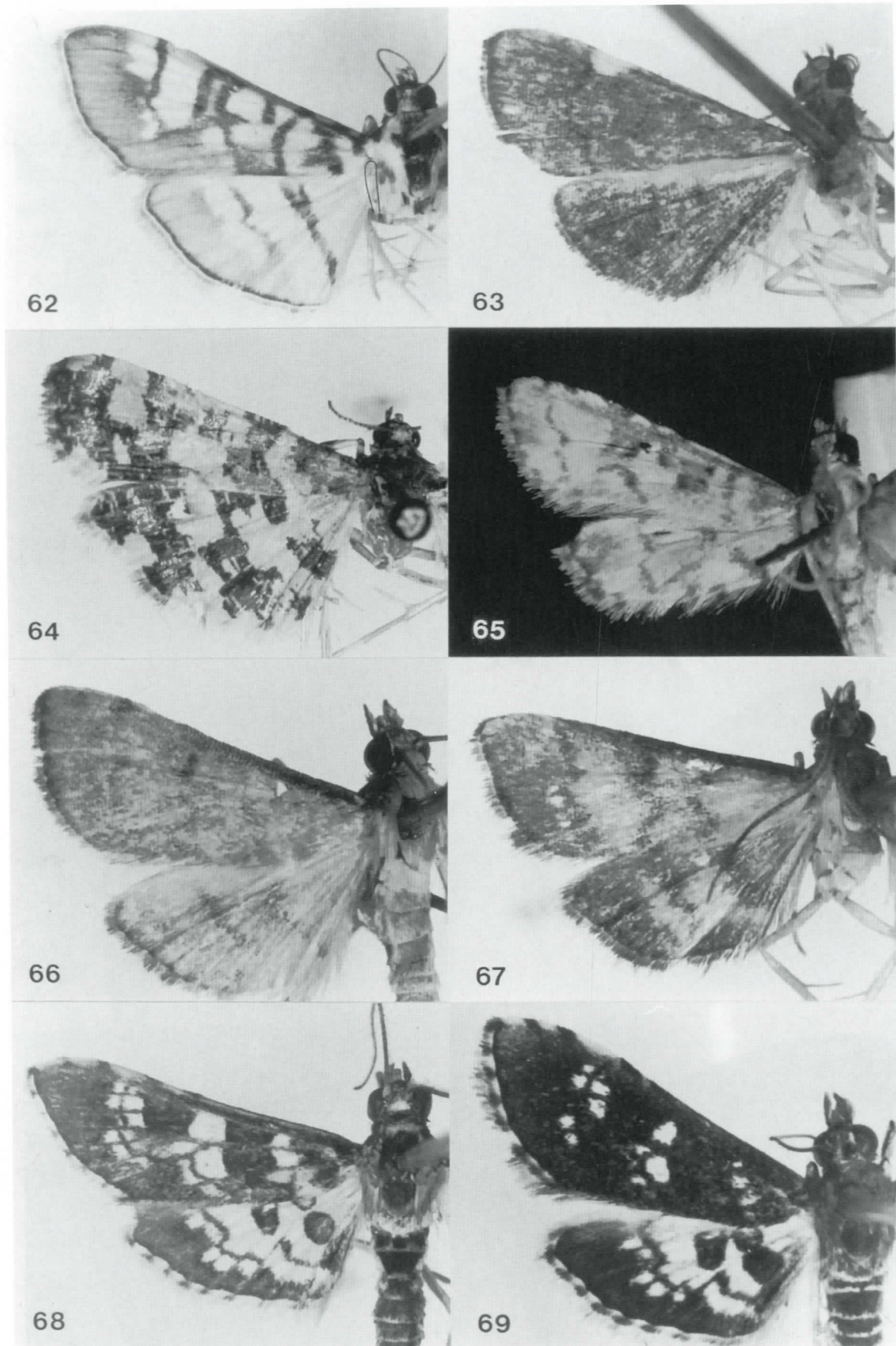


Fig. 62-69. Adult moths. 62, *Pardomima zanclophora*; 63, *Legrandellus fuscolarosalis*; 64, *Eurrhyarodes tricoloralis*; 65, *Microgeshna laportei*; 66, *Metasia perfervidalis*, male; 67, *M. perfervidalis*, female; 68, *Pessocosma prolalis*, male; 69, *P. prolalis*, female.



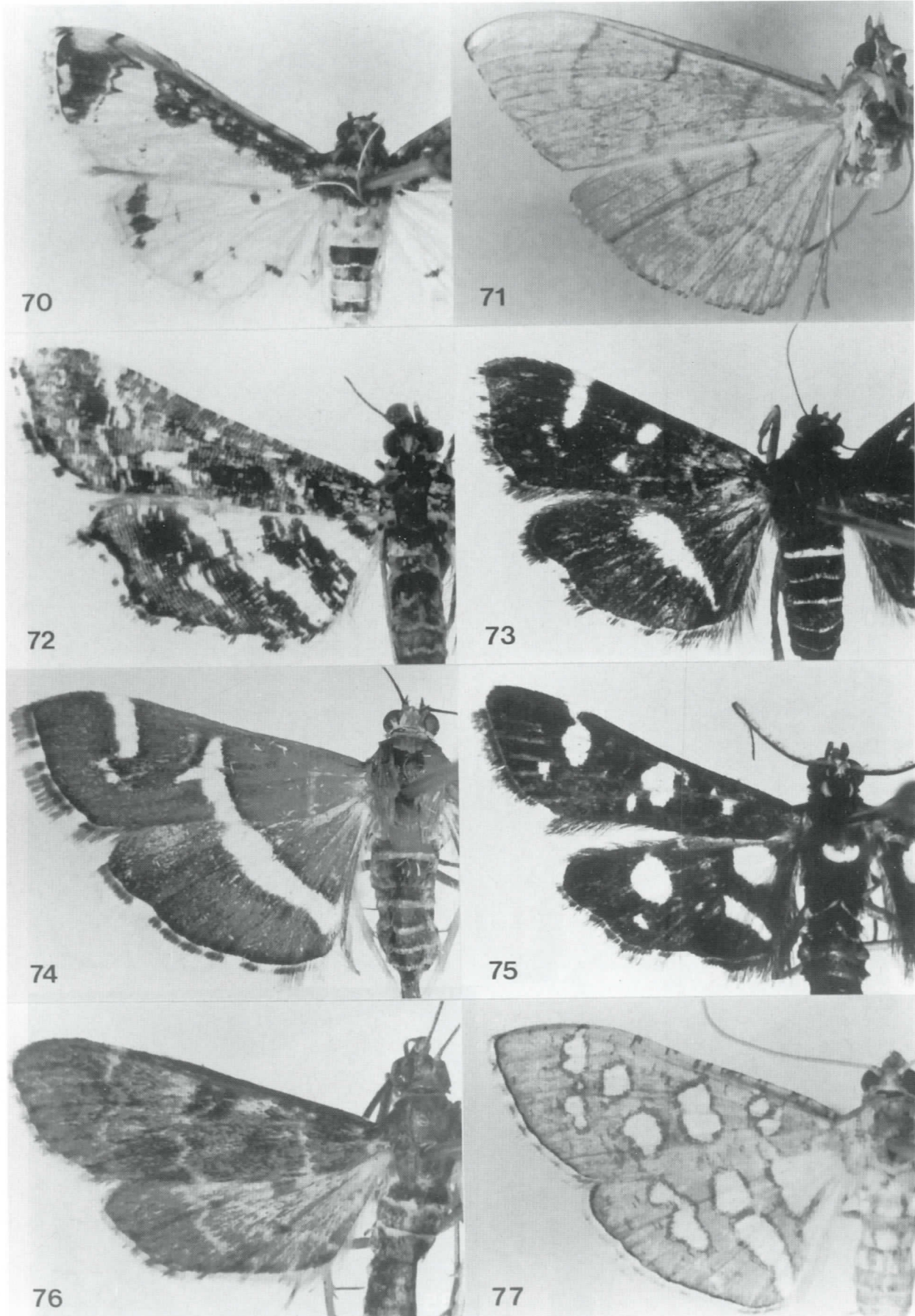


Fig. 70-77. Adult moths. 70, *Ommatobotys aldabralis*; 71, *Poliobotys ablactalis*; 72, *Diasemiopsis ramburialis*; 73, *Hymenia perspectalis*; 74, *Spoladea recurvalis*; 75, *Bocchoris inspersalis*; 76, *Duponchelia fovealis*; 77, *Nausinoella aphrospila*.



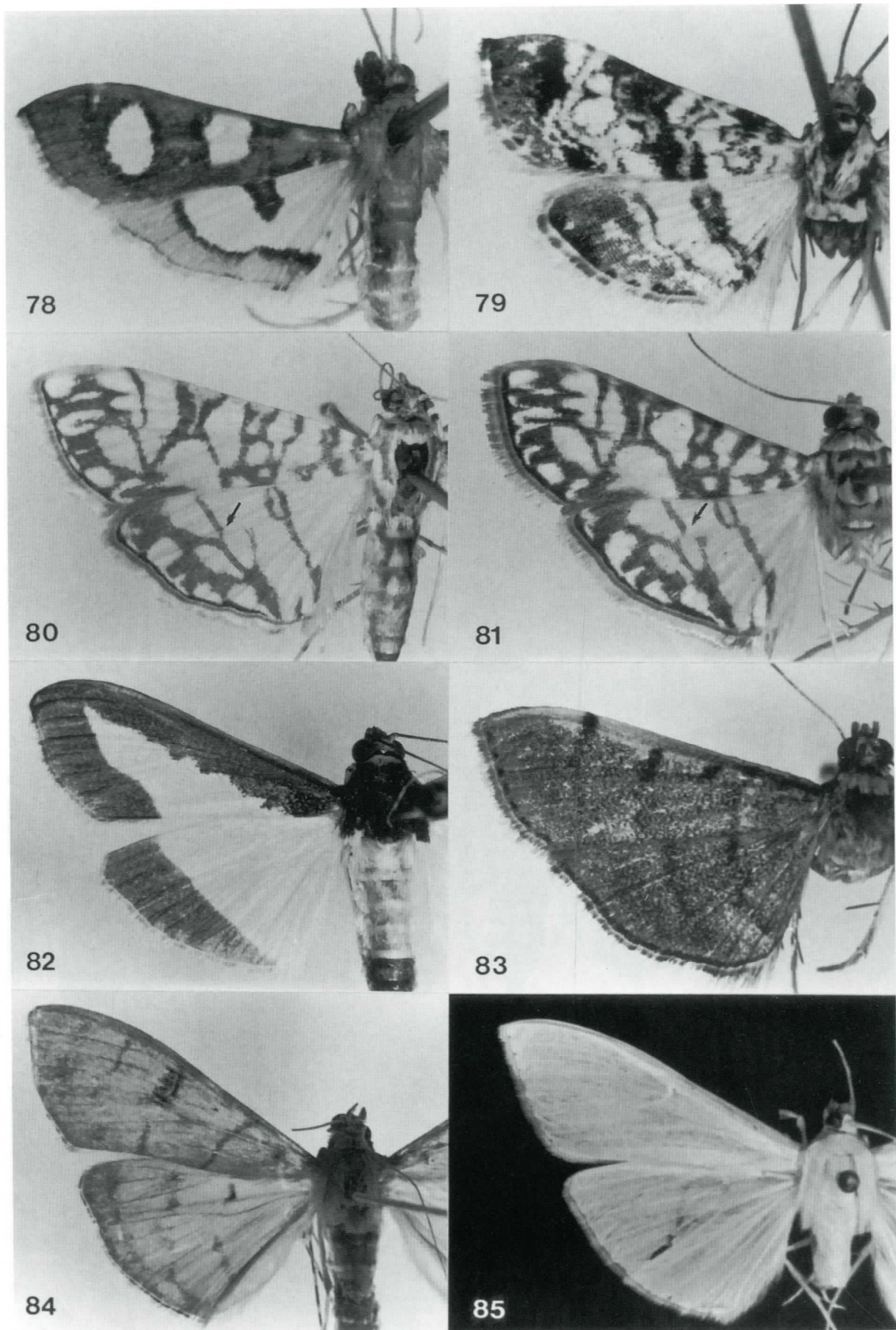


Fig. 78-85. Adult moths. 78, *Glyphodella savyalis*; 79, *Chabulina putrisalis*; 80, *Syncлера traducalis*; 81, *S. seychellensis*, paratype, USNM slide 57860; 82, *Diaphania indica*; 83, *Omiodes indicata*; 84, *Condylorrhiza zyphalis*; 85, *Stemorrhages sericea*.



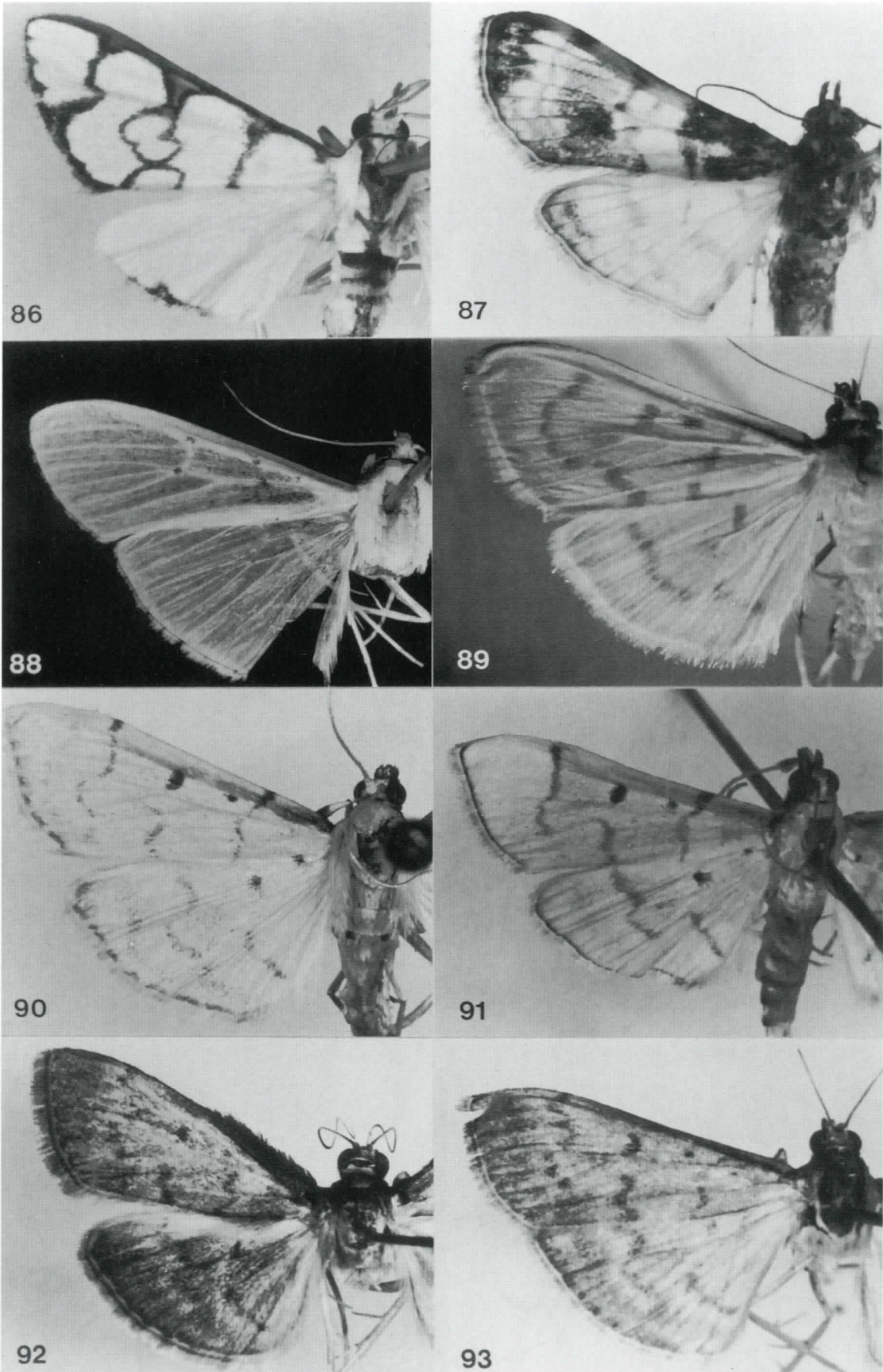


Fig. 86-93. Adult moths. 86, *Cirrhochrista oxylalis*; 87, *Alytana aldabralis*; 88, *Palpita unionalis*; 89, *Hodebertia testalis*; 90, *Herpetogramma juba*, male paratype, 16 Mar. 1968, undissected; 91, *H. continuialis*, male paratype, 18 Mar. 1968, undissected; 92, *H. licarsisalis*, male; 93, *H. licarsisalis*, female.



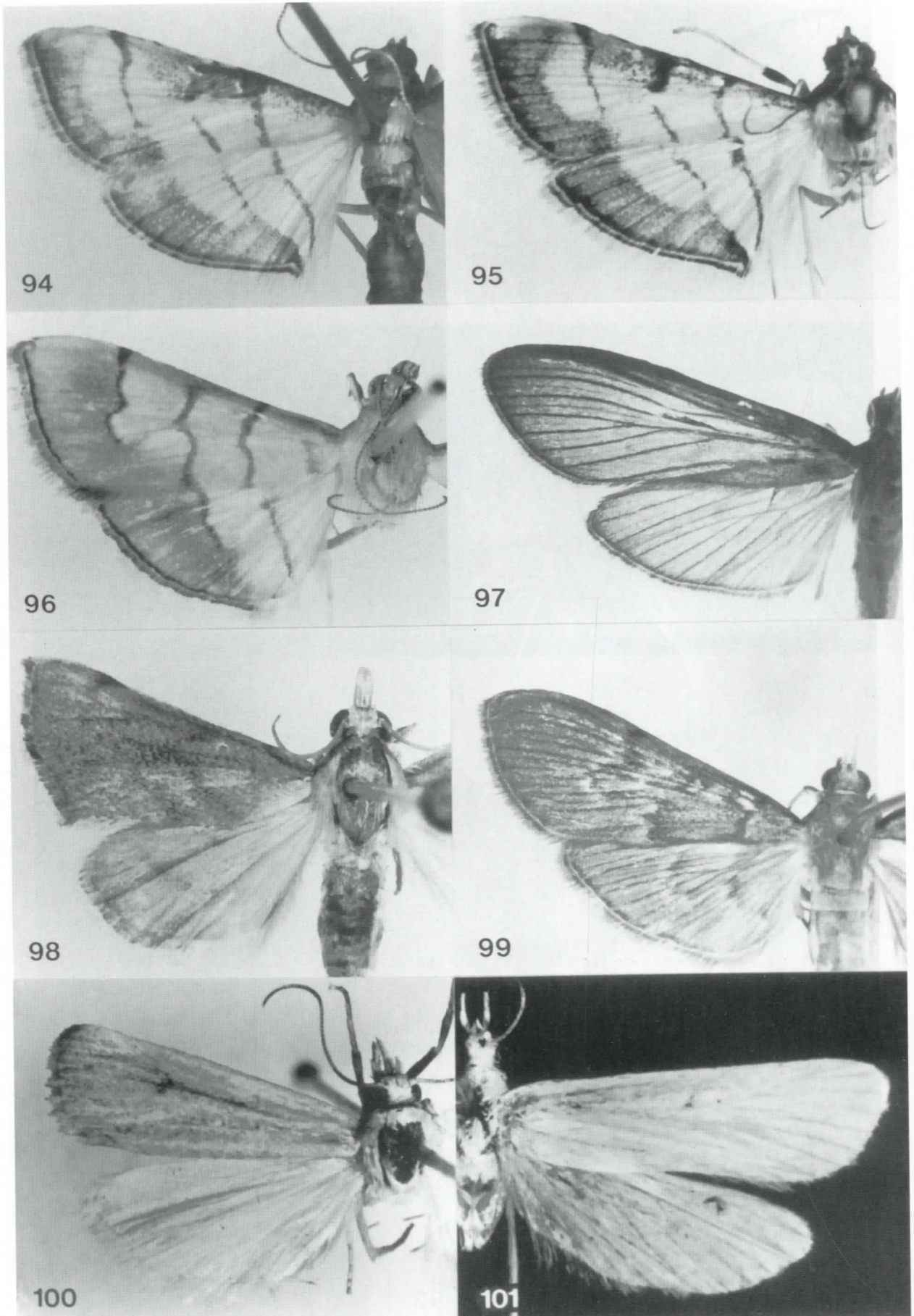


Fig. 94-101. Adult moths. 94, *Marasmia poeyalis*, male; 95, *M. poeyalis*, female; 96, *Orphanostigma abruptalis*; 97, *Hymenoptychis sordida*, male; 98, *Thyridiphora furia*; 99, *H. sordida*, female; 100, *Chrysocatharylla agraphella*; 101, *Scirpophaga occidentella*.



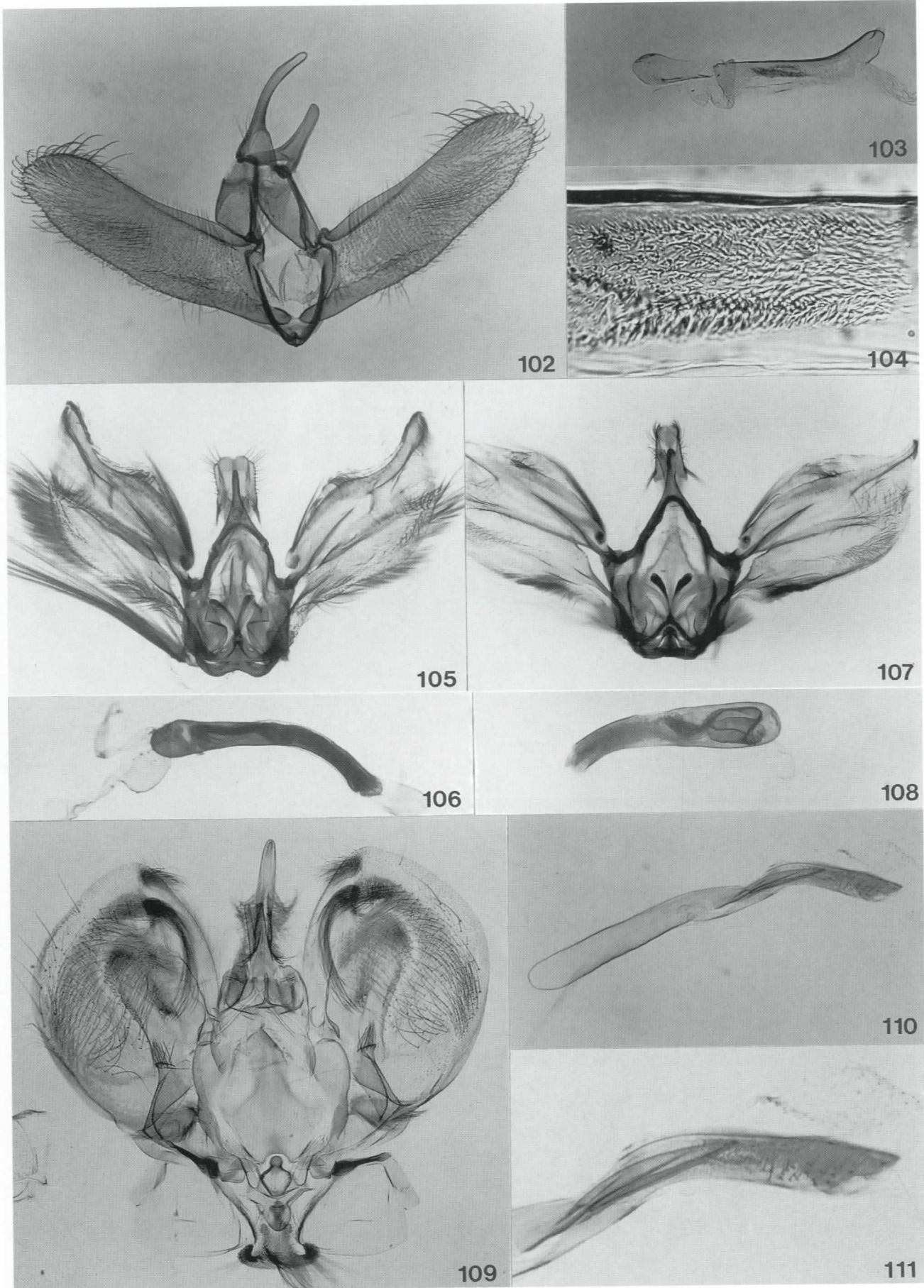


Fig. 102-111. Male genitalia. 102, *Parapoynx fluctuosalis*; 103, aedeagus and juxta; 104, vesica spines; Philippines, USNM slide 57870. 105, *Autocharis barbieri*; 106, aedeagus. 107, *Autocharis linealis*; 108, aedeagus; holotype. 109, *Noorda blitealis*; 110, aedeagus; 111, distal end of aedeagus.



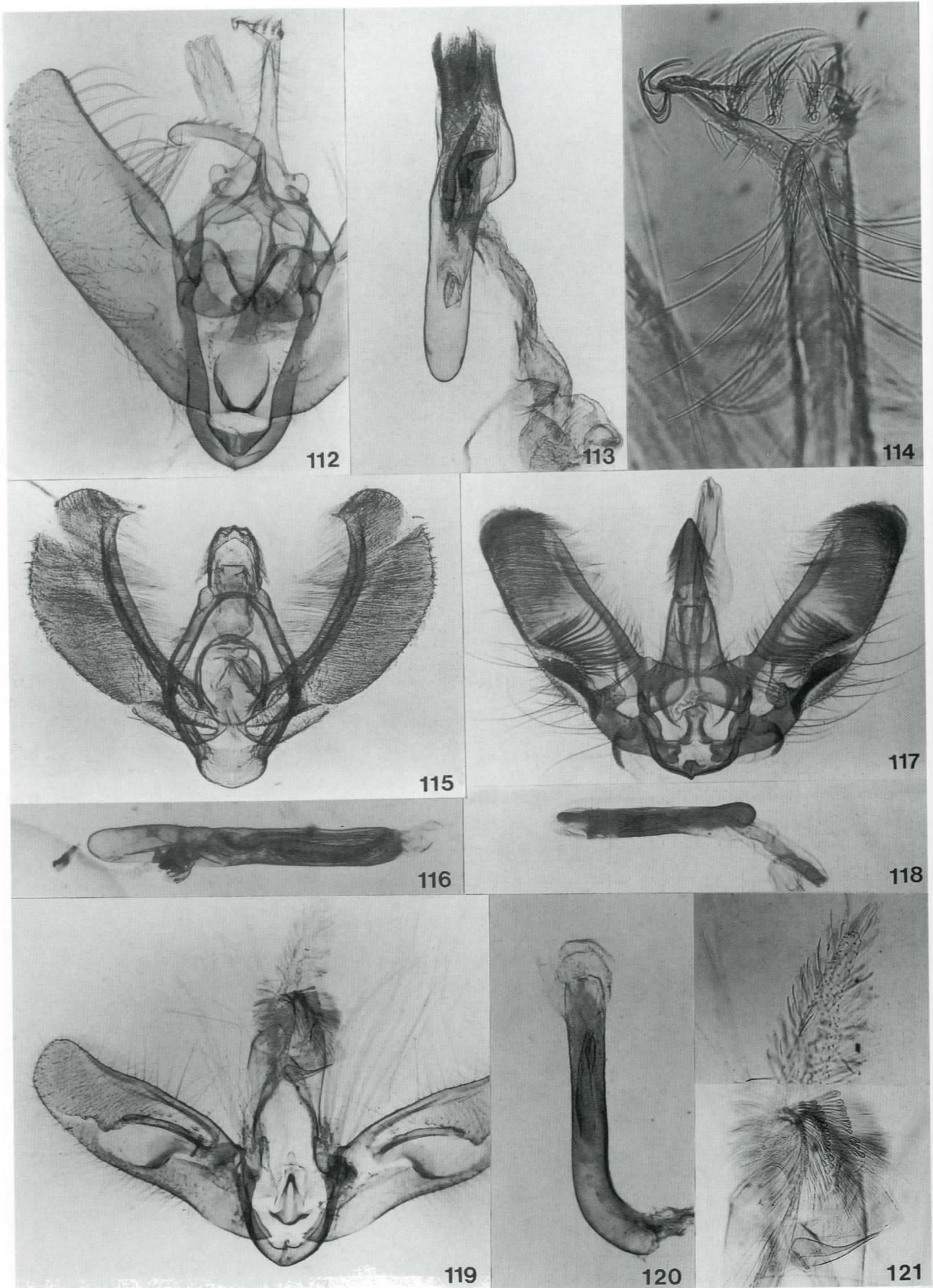


Fig. 112-121. Male genitalia. 112, *Crocidolomia pavonana*; 113, aedeagus; 114, uncus tip; lectotype of *comalis*, BMNH slide 14291. 115, *Hellula undalis*; 116, aedeagus; lectotype of *exemptalis*, BMNH slide 14334. 117, *Achyra coelatalis*; 118, aedeagus. 119, *Lirabotys liralis*; 120, aedeagus; 121, uncus tip.



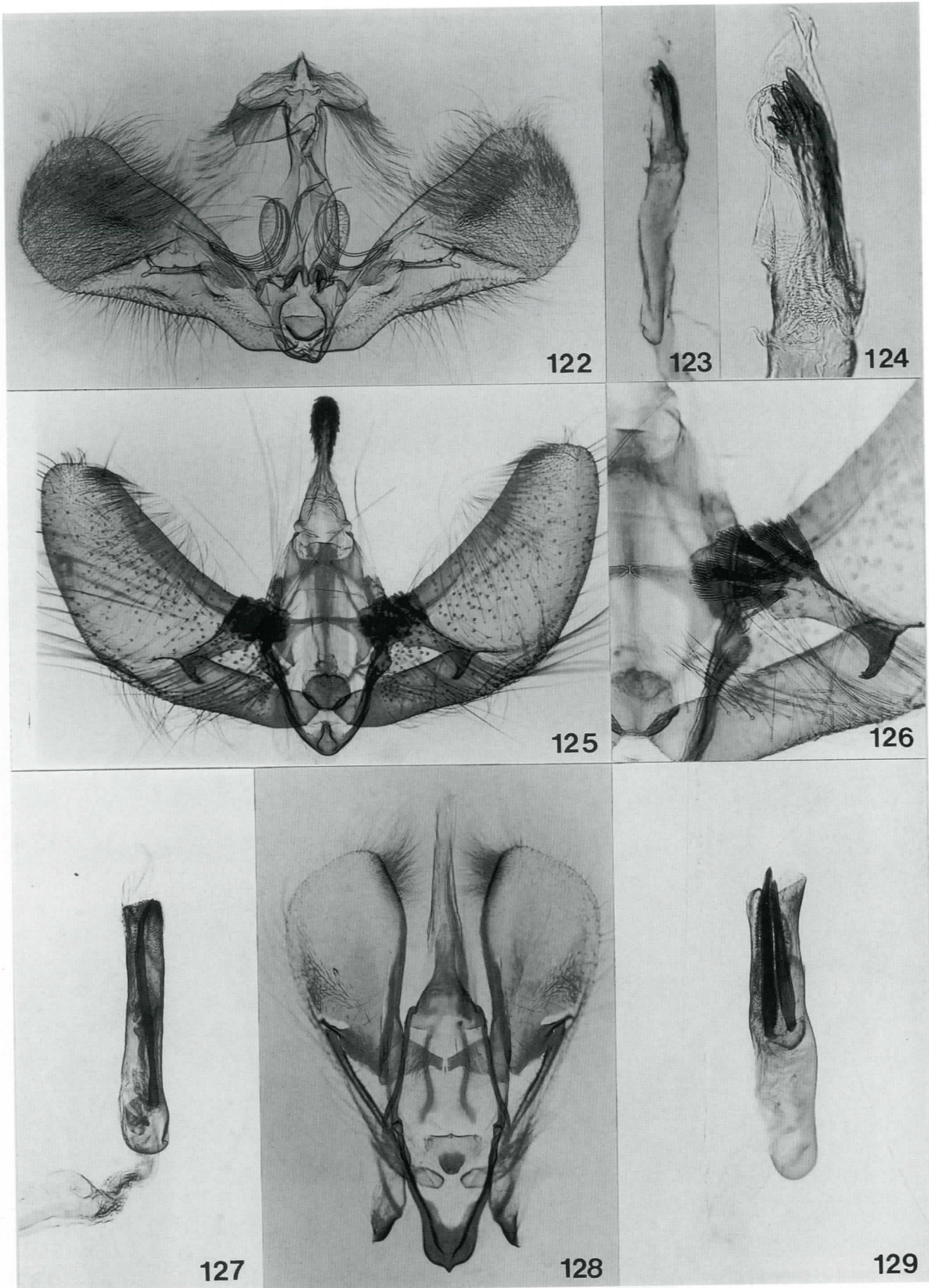


Fig. 122-129. Male genitalia. 122, *Stenochora lancinalis*; 123, aedeagus; 124, aedeagus tip. 125, *Pagyda sounanalis*; 126, clasper; 127, aedeagus. 128, *Notarcha digitalis*; 129, aedeagus; holotype.



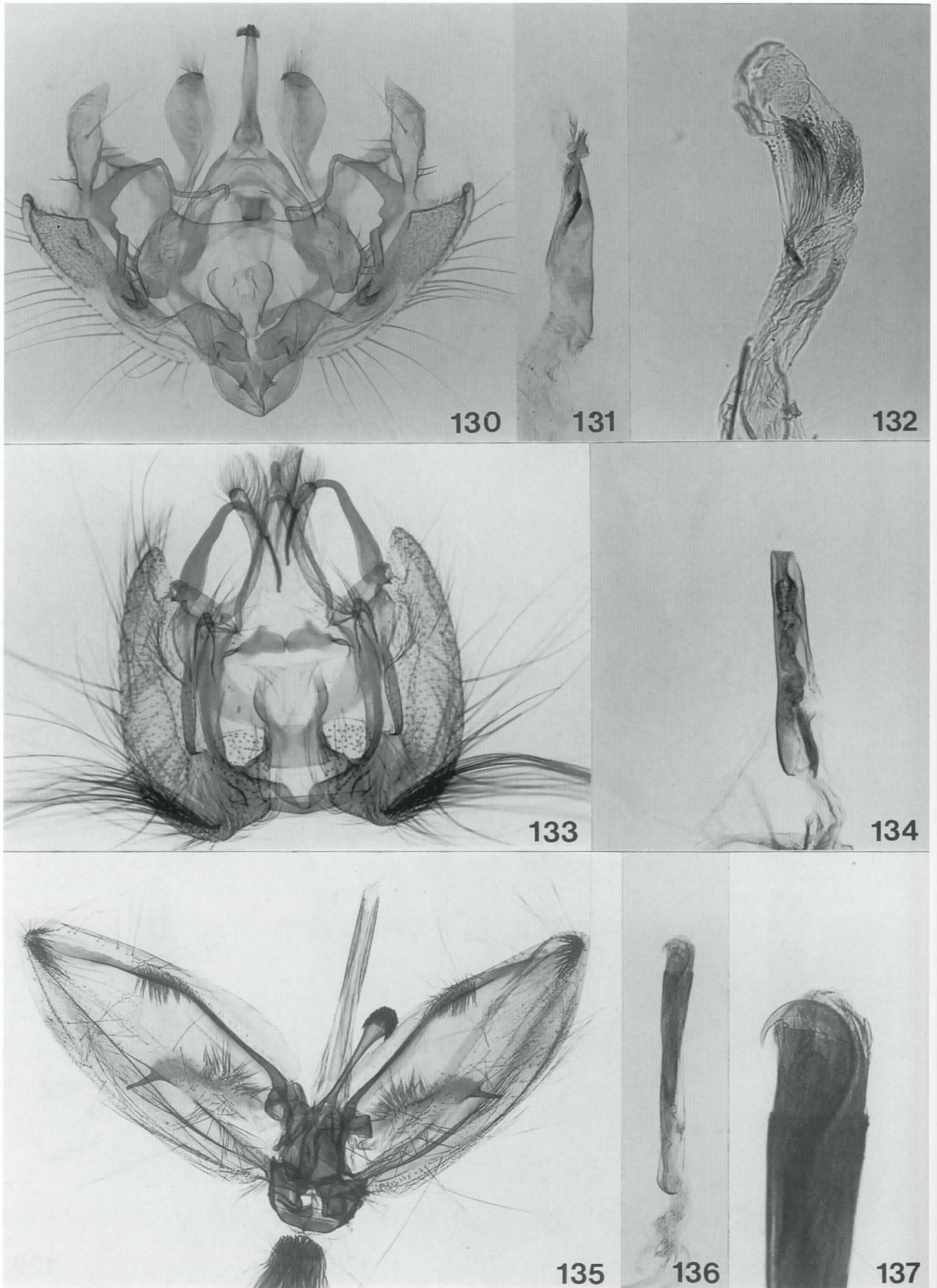


Fig. 130-137. Male genitalia. 130, *Pioneabathra olesialis*; 131, aedeagus; 132, aedeagus distal end. 133, *Isocentris retinalis*; 134, aedeagus. 135, *Pardomima zanclophora*; 136, aedeagus; 137, aedeagus distal end.



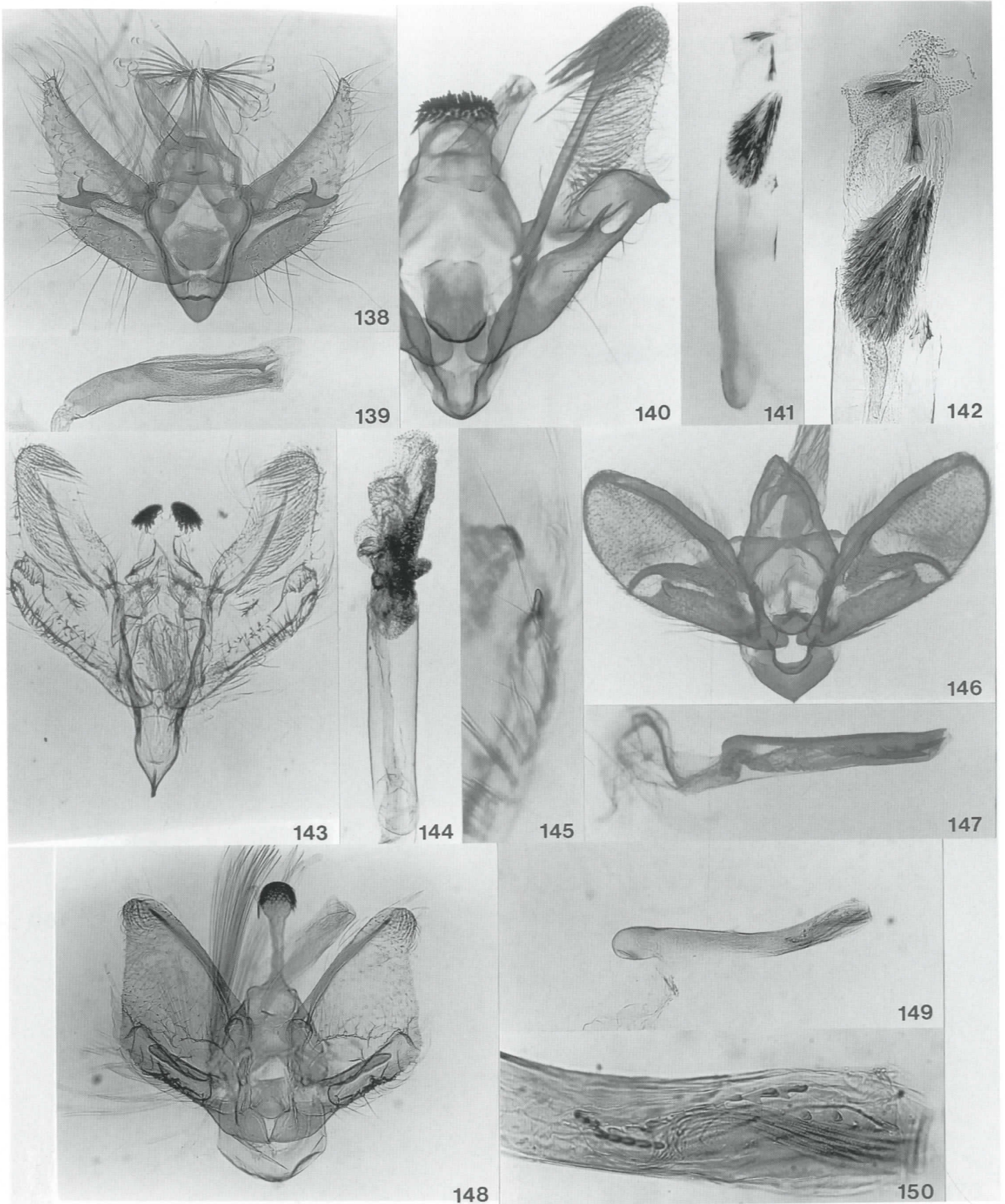


Fig. 138-150. Male genitalia. 138, *Legrandellus fuscolarosalis*; 139, aedeagus; paratype, JCS slide 1764. 140, *Eurrhyarodes tricoloralis*; 141, aedeagus; 142, cornuti. 143, *Metasia perfervidalis*; 144, aedeagus; 145, tooth on apex of valve costa; Mt. Mlanje, Malawi, BMNH slide 14319. 146, *Pessocosma prolalis*; 147, aedeagus. 148, *Microgeshna laportei*; 149, aedeagus; 150, aedeagus distal end.



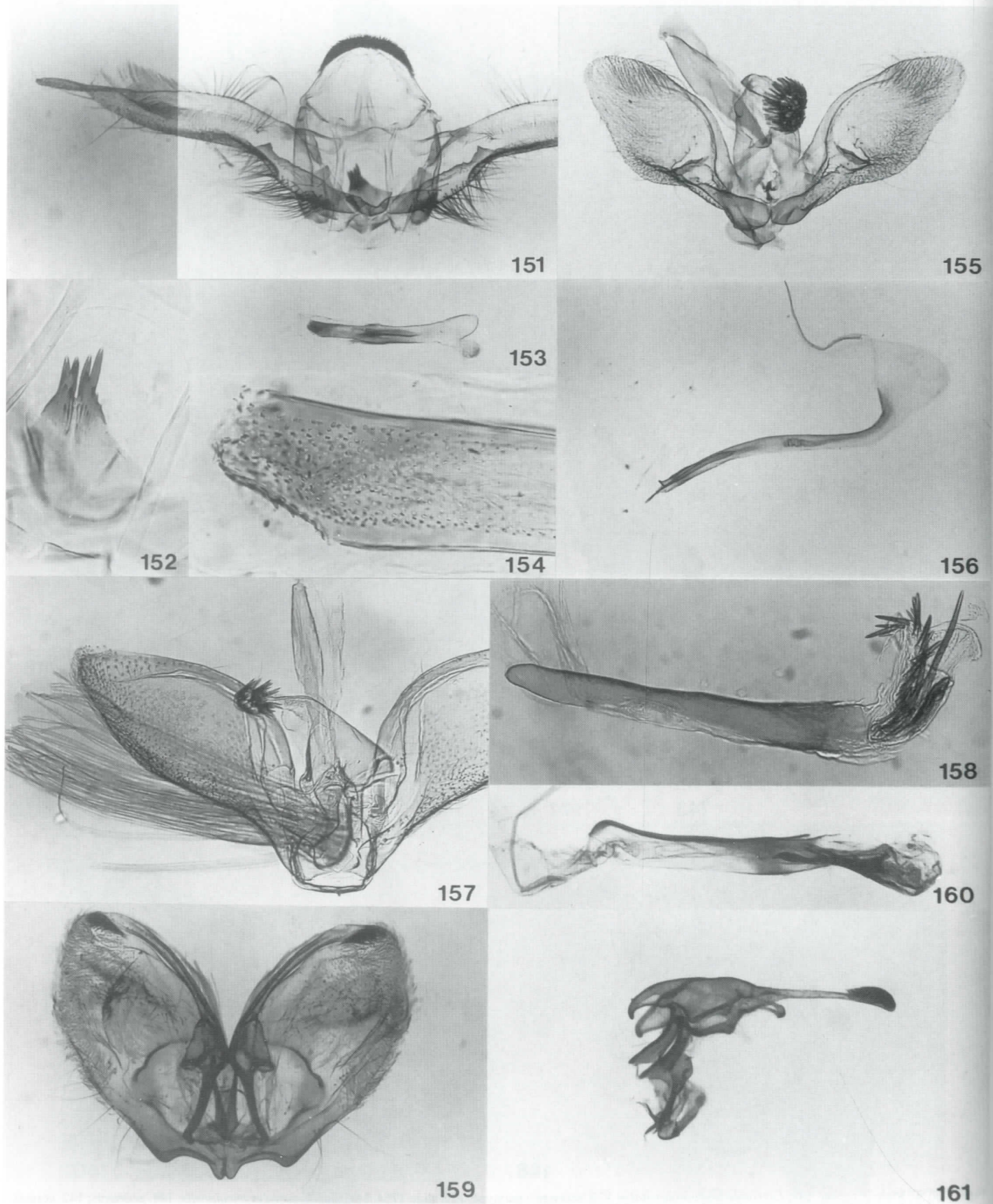


Fig. 151-161. Male genitalia. 151, *Ommatobotys aldabralis*; 152, juxta; 153, aedeagus; 154, aedeagus distal end. 155, *Poliobotys ablactalis*; 156, aedeagus. 157, *Diasemiopsis ramburialis*; 158, aedeagus. 159, *Hymenia perspectalis*, valves; 160, aedeagus; 161, vinculum, tegumen, uncus (lateral view); Florida, USA.



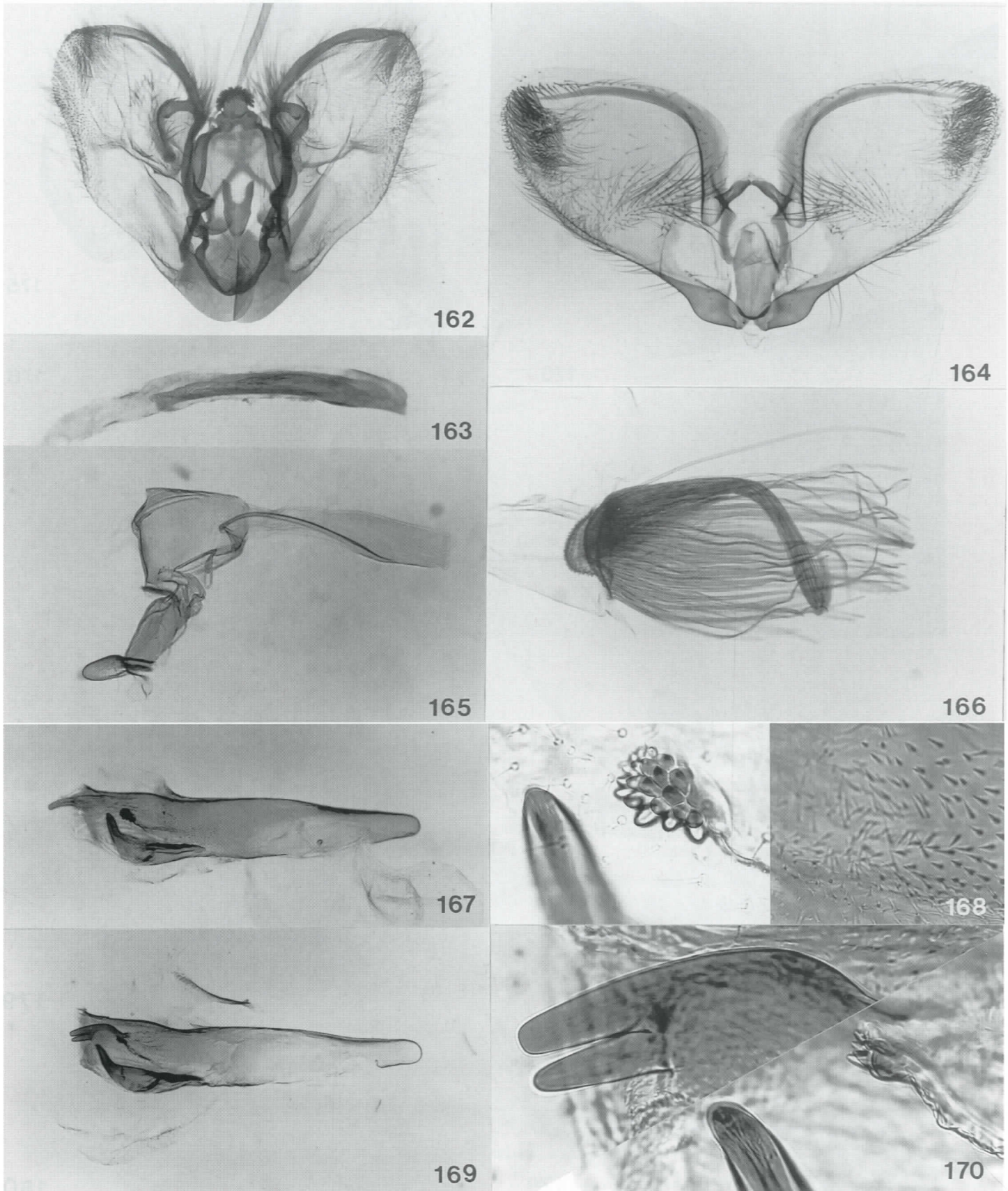


Fig. 162-170. Male genitalia. 162, *Spoladea recurvalis*; 163, aedeagus. 164, *Bocchoris inspersalis*, USNM slide 57812, Aldabra, valves; 165, vinculum, tegumen, uncus (lateral view); 166, hair pencil; 167, aedeagus; 168, cornuti (two focal levels). 169, *B. inspersalis*, USNM slide 57847, Aldabra, aedeagus; 170, cornuti (two focal levels).



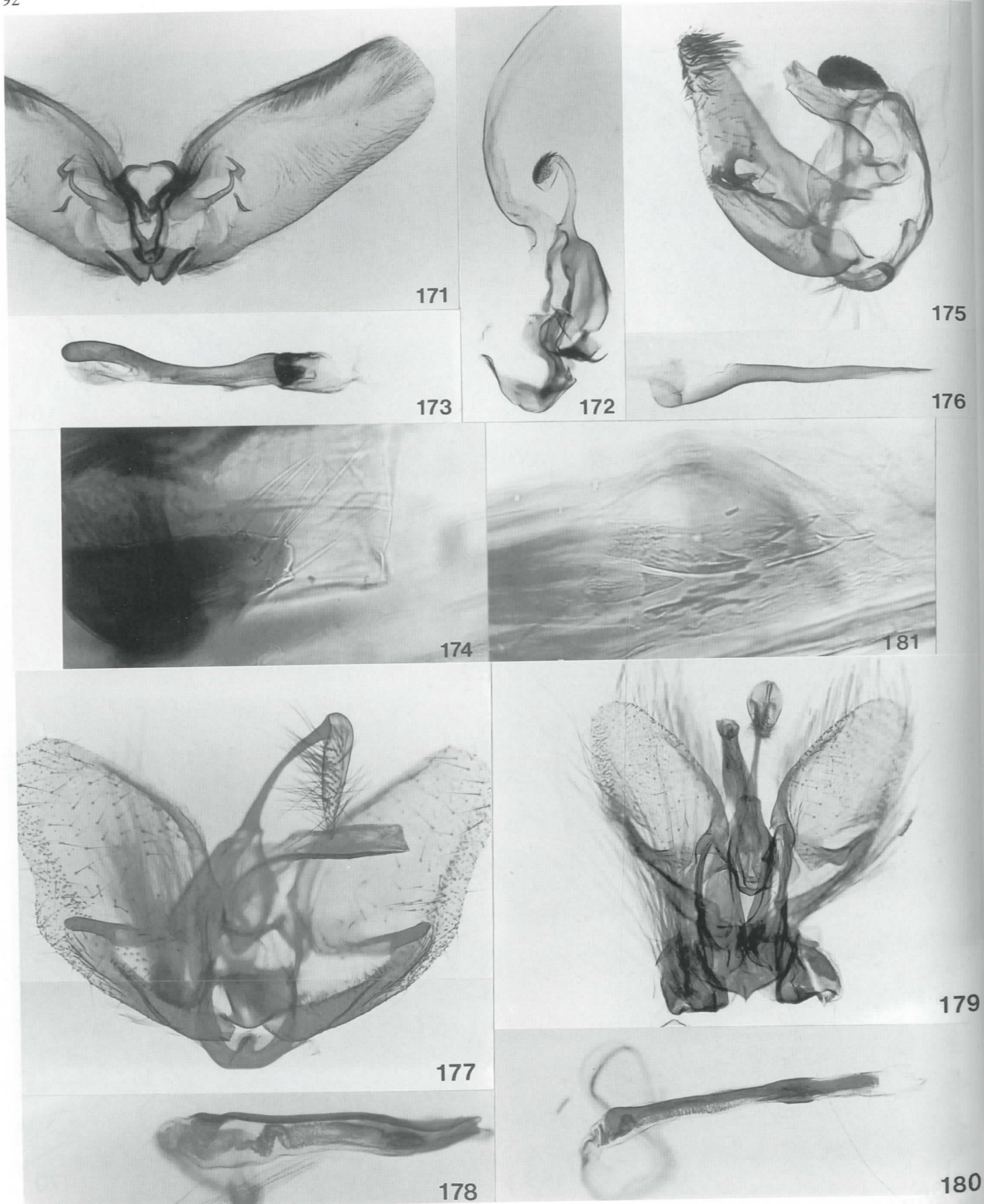


Fig. 171-181. Male genitalia. 171, *Duponchelia fovealis*, valves; 172, vinculum, tegumen, uncus (lateral view); 173, aedeagus; 174, spines on distal end of aedeagus. 175, *Nausinoella aphrospila*; 176, aedeagus. 177, *Chabulina putrisalis*; 178, aedeagus; holotype, Grande-Comore, JCS slide 1649. 179, *Glyphodella savyalis*; 180, aedeagus; 181, cornuti; paratype, Aldabra, JCS slide 1770.



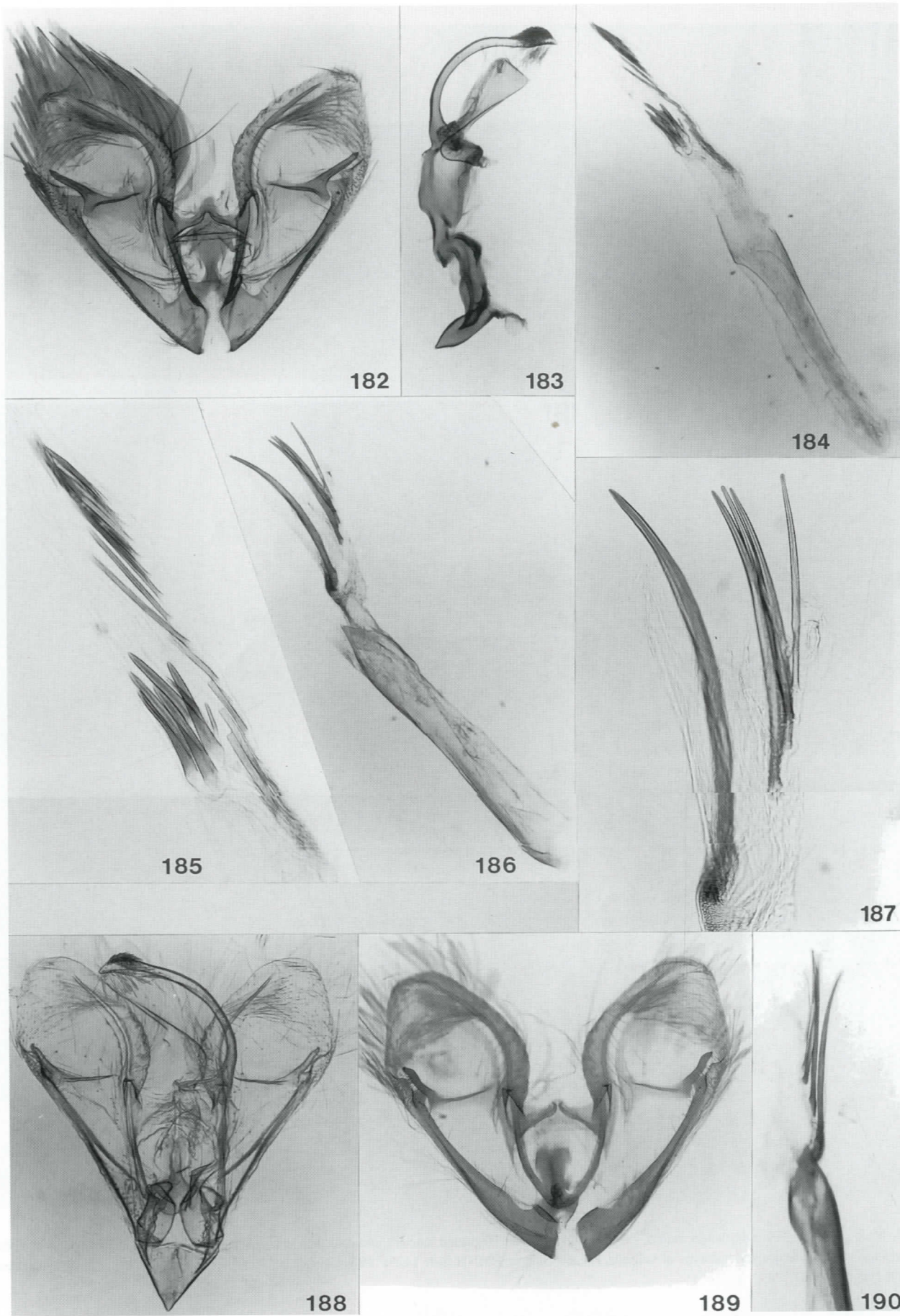


Fig. 182-190. Male genitalia. 182, *Synclera seychellensis*, valves; 183, vinculum, tegumen, uncus (lateral view); paratype, USNM slide 57857. 184, *S. seychellensis*, aedeagus; 185, *cornuti*; holotype, USNM slide 57859. 186, *S. traducalis*, aedeagus; 187, *cornuti*; 188, genitalia of same specimen. 189, *S. traducalis*, valves; 190, *cornuti*; Beirut, Lebanon, BMNH slide 12068.



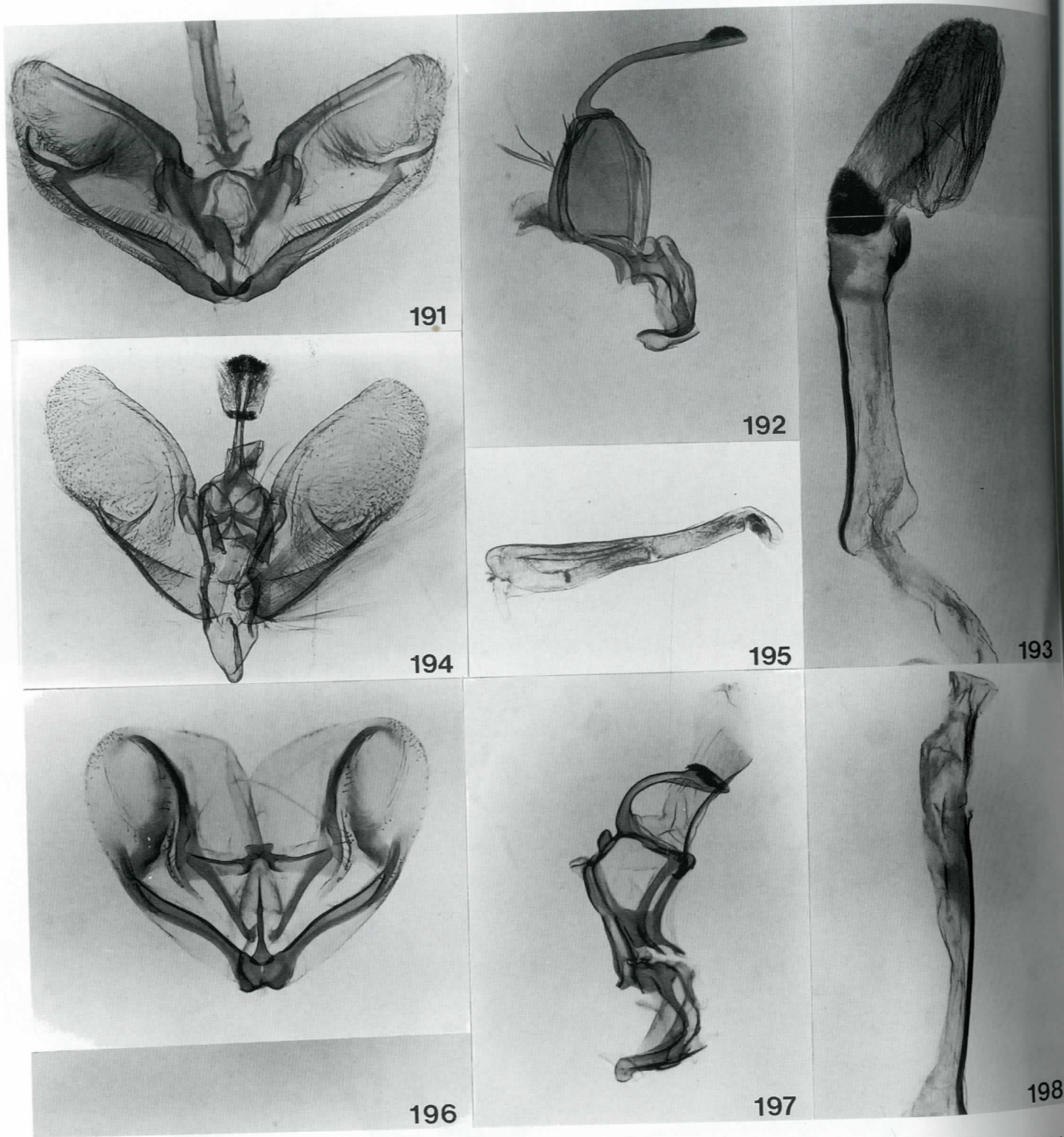
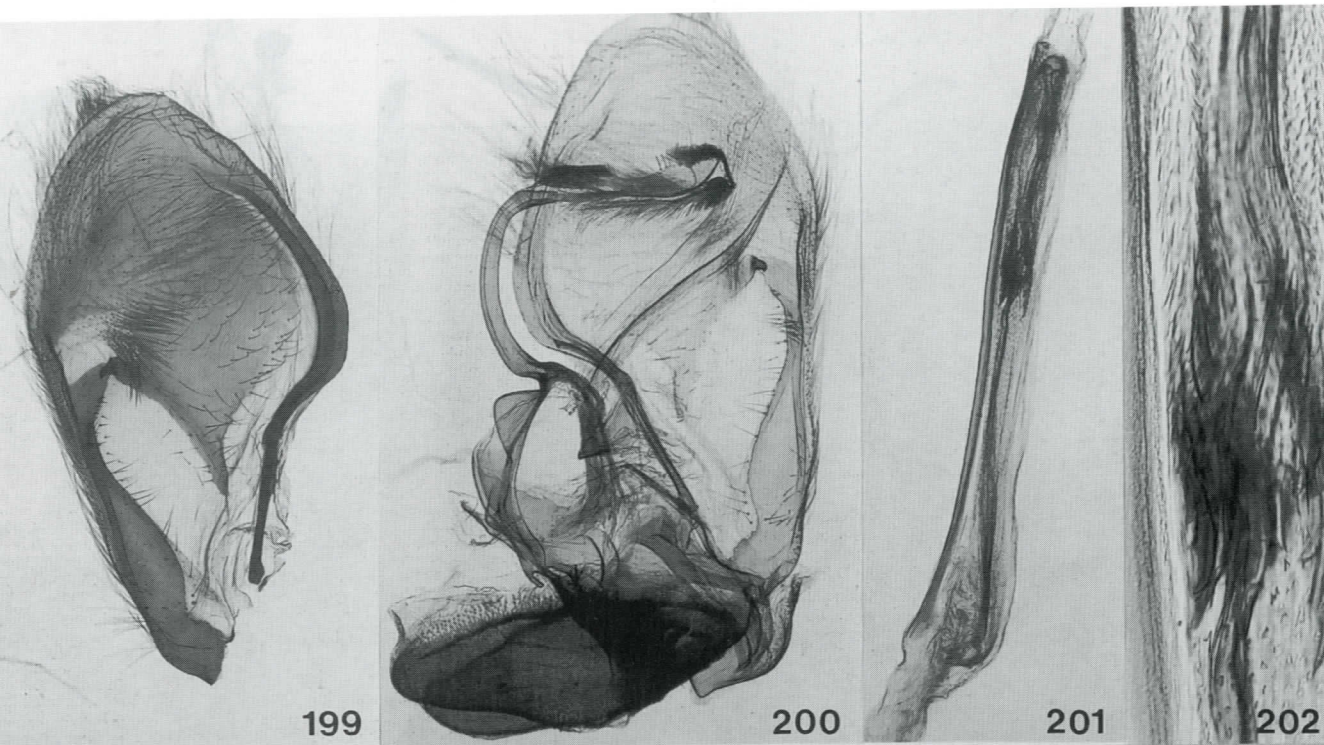


Fig. 191-198. Male genitalia. 191, *Diaphania indica*, valves; 192, vinculum, tegumen, uncus (lateral view); 193, aedeagus; Mwanza, Tanzania, USNM slide 55496. 194, *Omiodes indicata*; 195, aedeagus; holotype of *vulgalis*, French Guiana, BMNH slide 14296. 196, *Condylorrhiza zyphalis*, valves; 197, vinculum, tegumen, uncus (lateral view); 198, aedeagus.



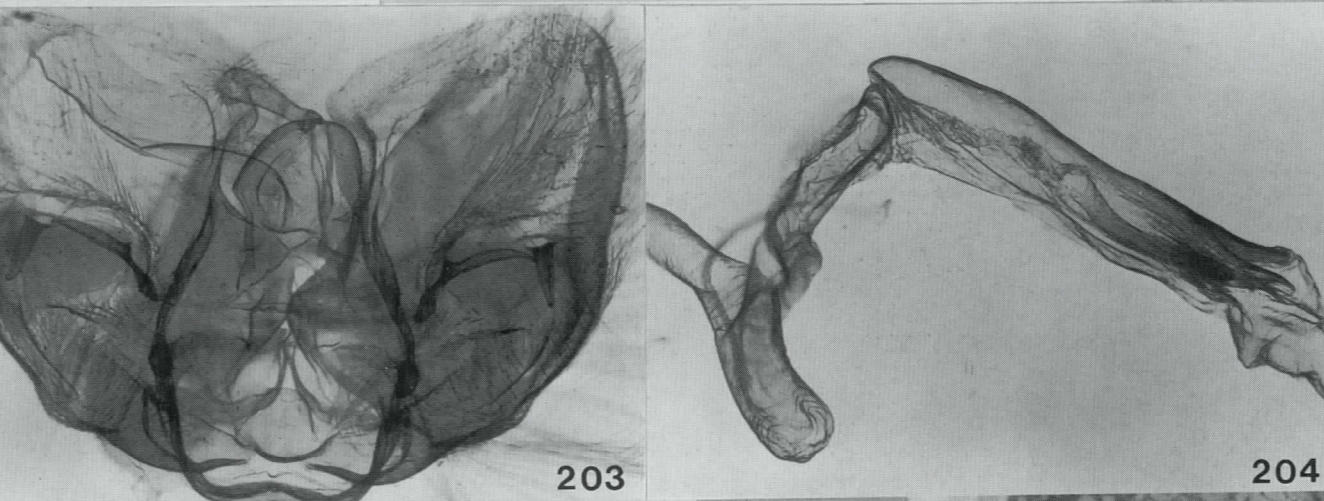


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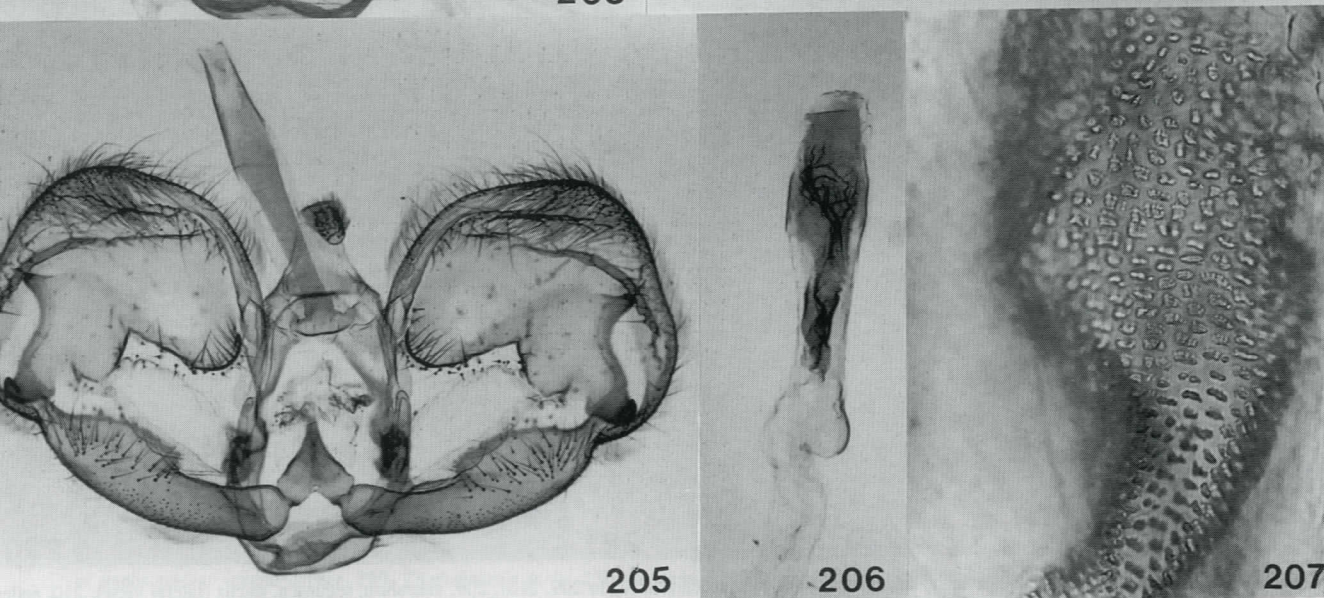
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199-207. Male genitalia. 199, *Stemorrhages sericea*, left valve; 200, genitalia (lateral view, left valve removed); 201, aedeagus; 202, cornuti; Bitye, Cameroon, IM slide 57879. 203, *Cirrhochrsta oxylalis*; 204, aedeagus. 205, *Alytana aldabralis*; 206, aedeagus; 207, vesica teeth.



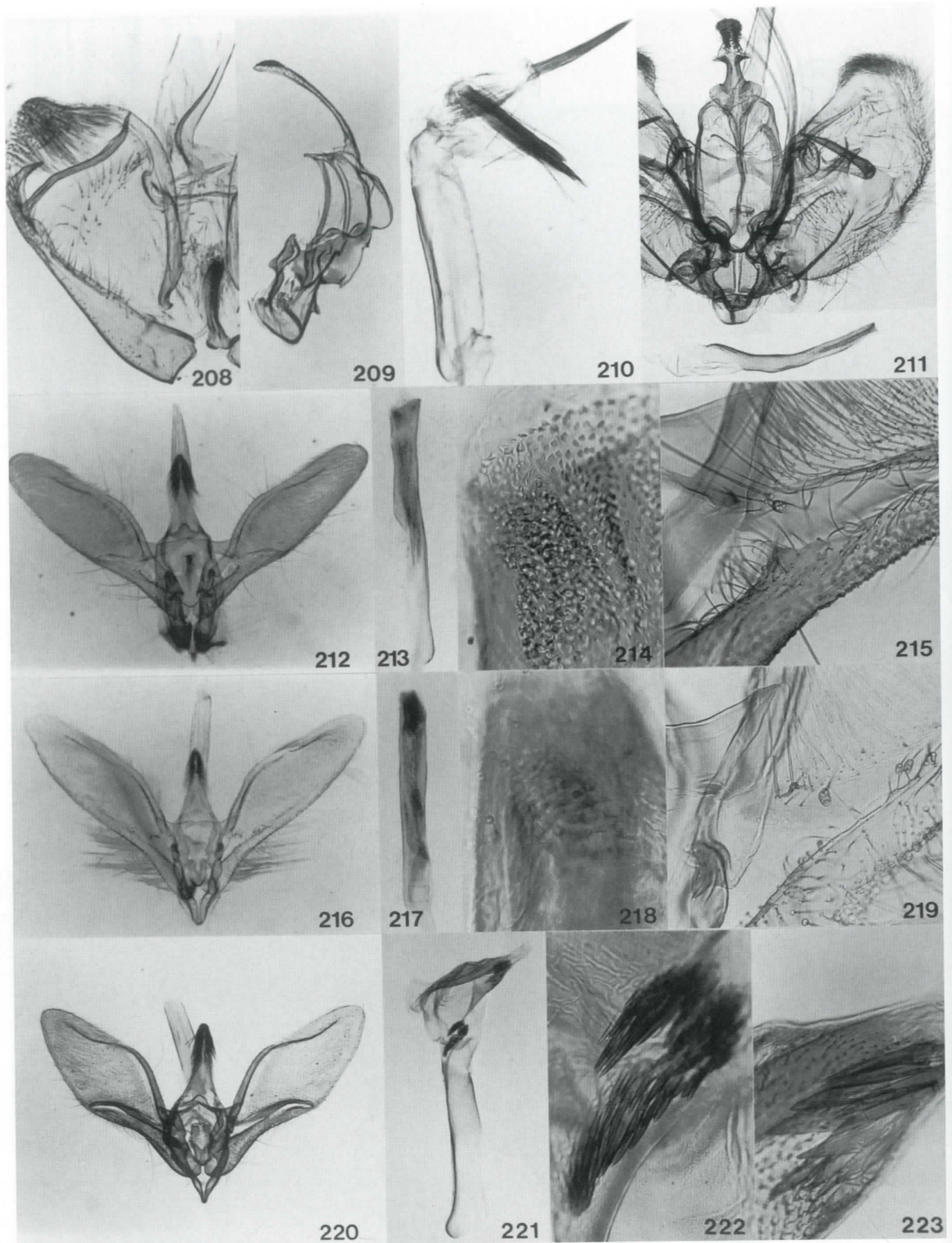


Fig. 208-223. Male genitalia. 208, *Palpita unionalis*, left valve (slightly enlarged relative to 209, 210); 209, vinculum, tegumen, uncus (lateral view); 210, aedeagus; Digne, France, BMNH slide 18047. 211, *Hodebertia testalis*. 212, *Herpetogramma juba*; 213, aedeagus; 214, distal end of aedeagus; 215, costa of valve; holotype. 216, *H. continuialis*; 217, aedeagus; 218, distal end of aedeagus; 219, costa of valve; holotype. 220, *H. licarsialis*; 221, aedeagus; 222, proximal cornuti; 223, distal cornuti; Mahe, Seychelles, USNM slide 55498.



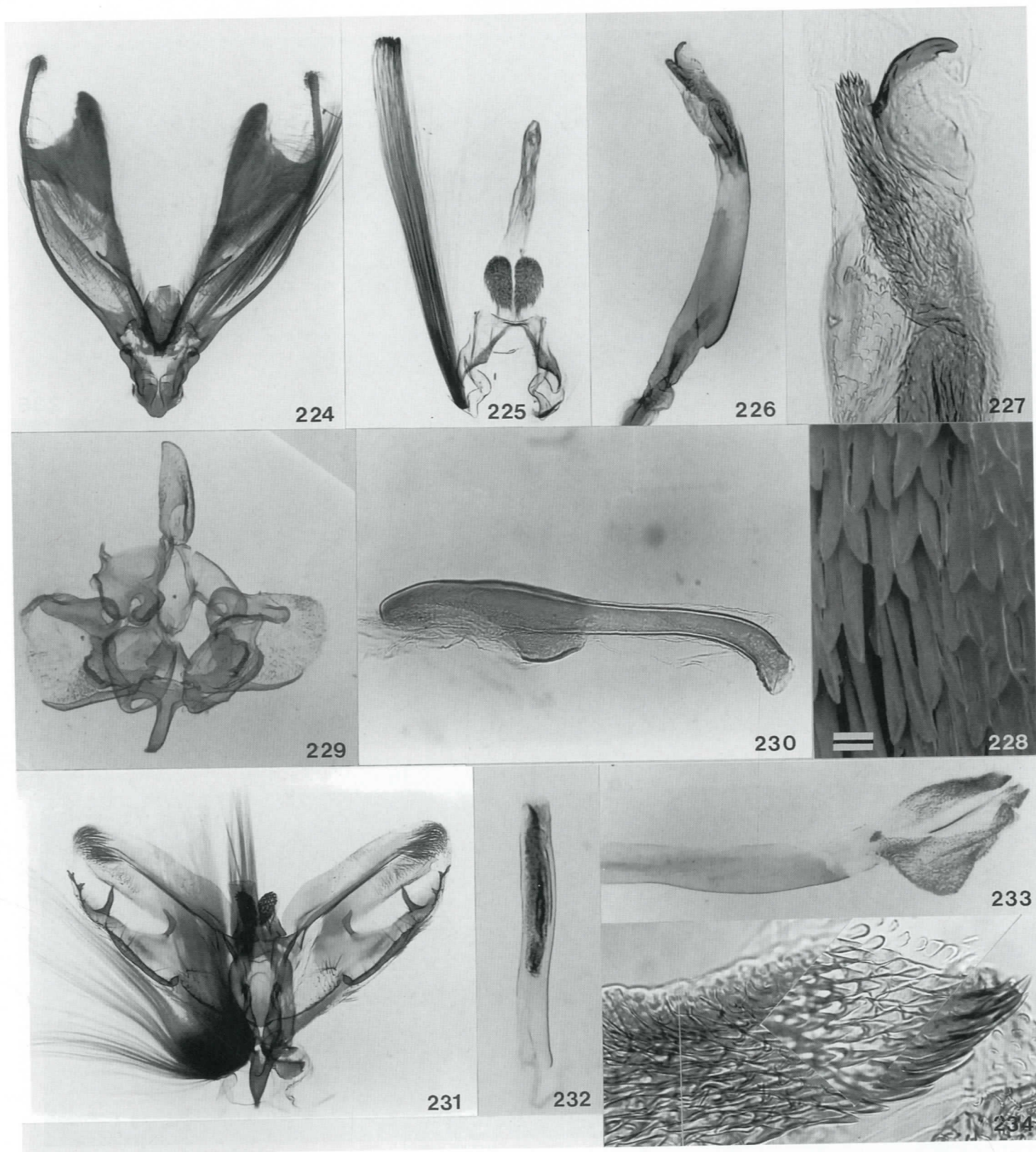


Fig. 224-234. Male genitalia. 224, *Marasmia poeyalis*, valves; 225, vinculum, tegumen, uncus, hair pencil (ventral view); 226, aedeagus; 227, cornuti; 228, SEM view of uncus scales, ventral aspect. 229, *Thyridiphora furia*; 230, aedeagus; holotype, Karachi, Pakistan, BMNH slide 13118. 231, *Orphanostigma abruptalis*; 232, aedeagus; 233, same specimen, vesica everted; 234, cornuti (part), composite of 2 focal levels. Scale bar = 10 mm.



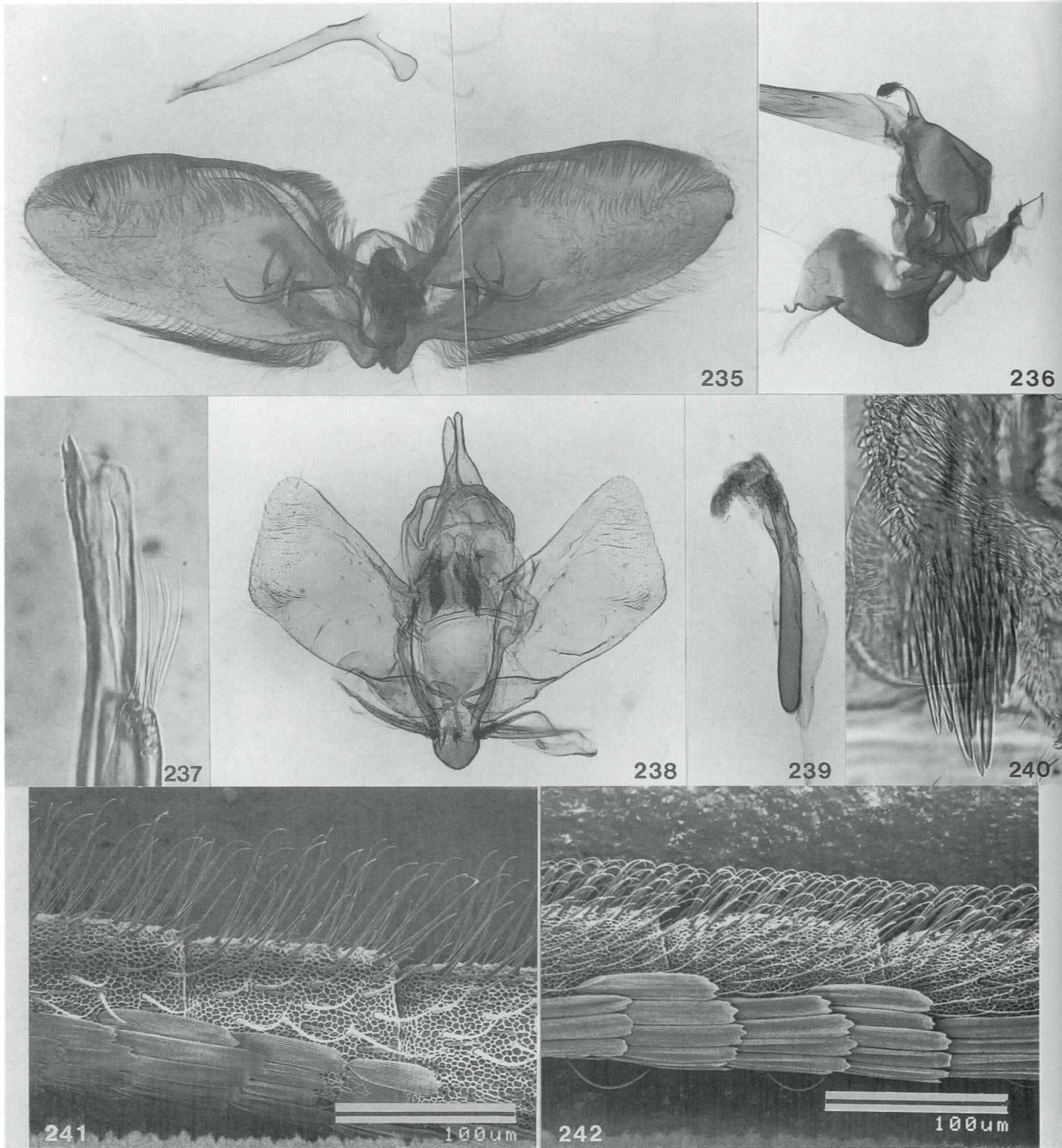


Fig. 235-240. Male genitalia. 235, *Hymenoptychis sordida*, valves, aedeagus; 236, vinculum, tegumen, uncus (lateral view); 237, distal end of aedeagus. 238, *Scirpophaga occidentella*; 239, aedeagus; 240, gnathos spines, right side; Ivory Coast, BMNH slide 11009.  
 Fig. 241-242. SEM photographs of right male antenna, centered on 7th shaft segment. 241, *Herpetogramma juba*; paratype, 16 March specimen. 242, *H. continualis*; holotype. Scale bar = 100 μm.



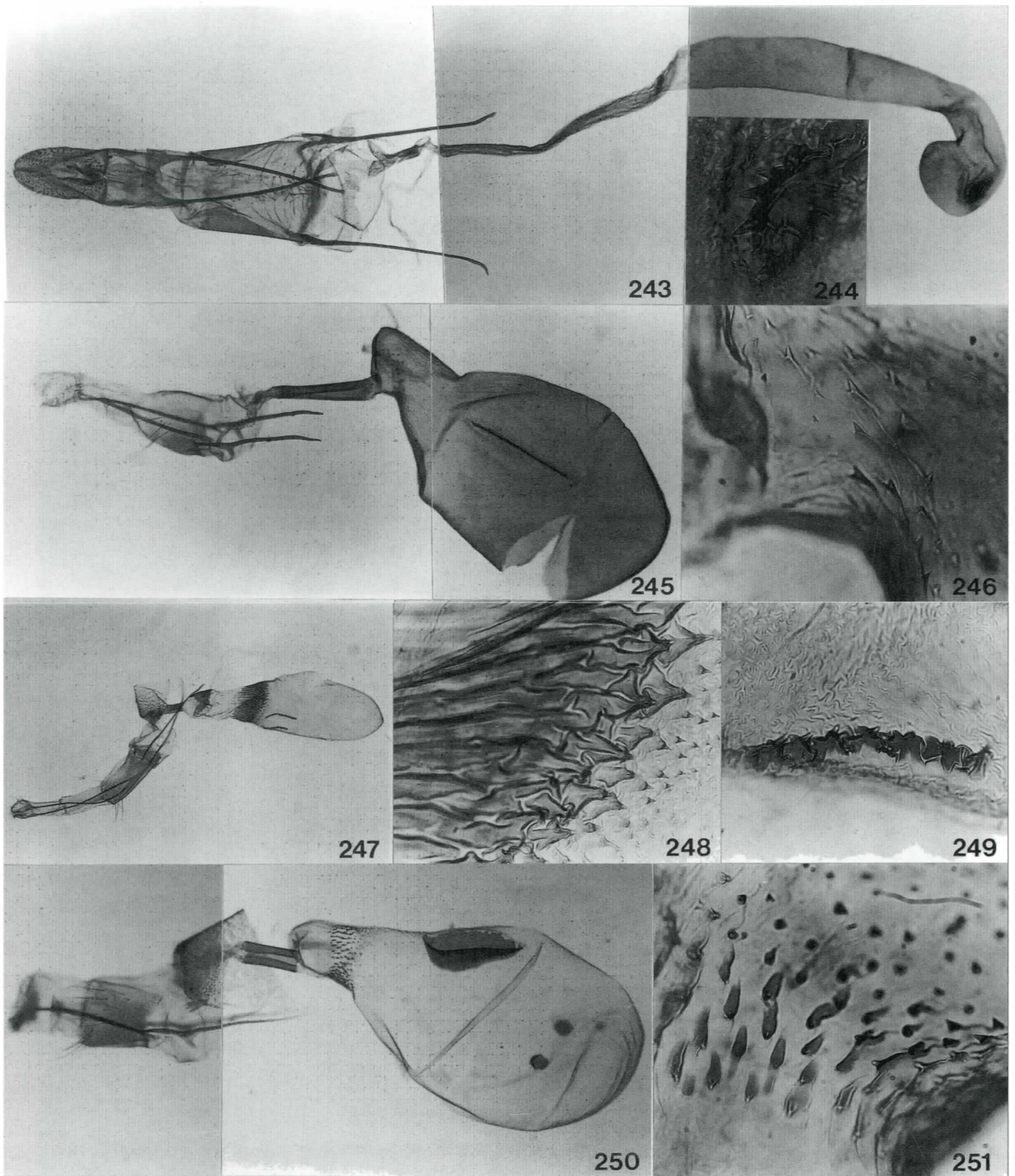


Fig. 243-251. Female genitalia. 243, *Parapoynx fluctuosalis*; 244, signum. 245, *Autocharis barbieri*; 246, detail of corpus bursae neck. 247, *A. linealis*; 248, detail of corpus bursae; 249, detail of signum; allotype, USNM slide 57878. 250, *A. discalis*; 251, detail of corpus bursae neck; holotype.



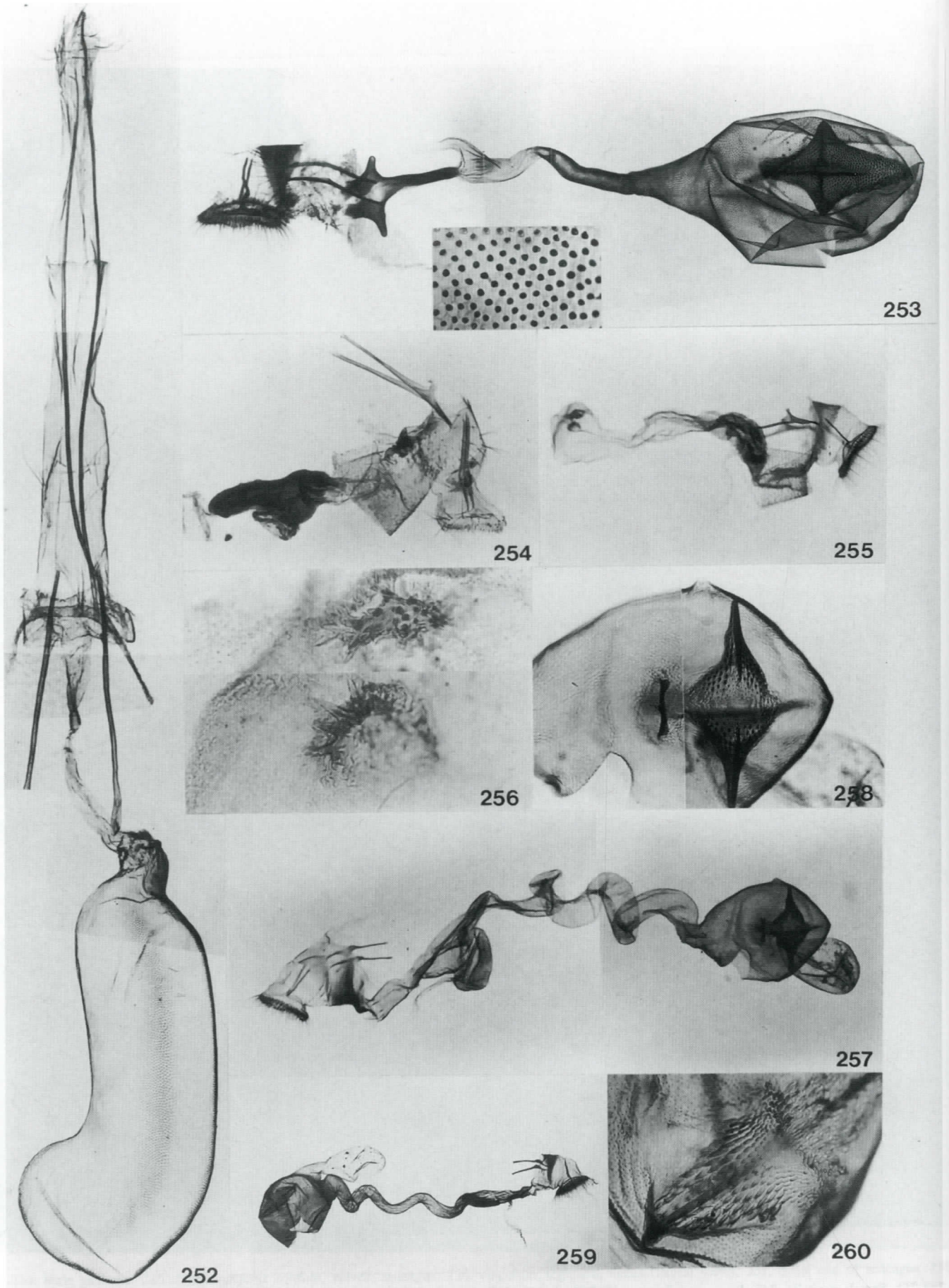


Fig. 252-260. Female genitalia. 252, *Noorda blitealis*, holotype, Sri Lanka, BMNH slide 14305. 253, *Lirabotys liralis*, insert shows detail of corpus bursae surface posterior to signum; paratype, JCS slide 1947. 254, *Hellula undalis*, holotype of *alconalis*, Sri Lanka, BMNH slide 14335. 255, *Crocidolomia pavonana*; 256, signa (two focal levels). 257, *Achyra coelatalis*; 258, signa. 259, *Stenochora lancinalis*; 260, signum.



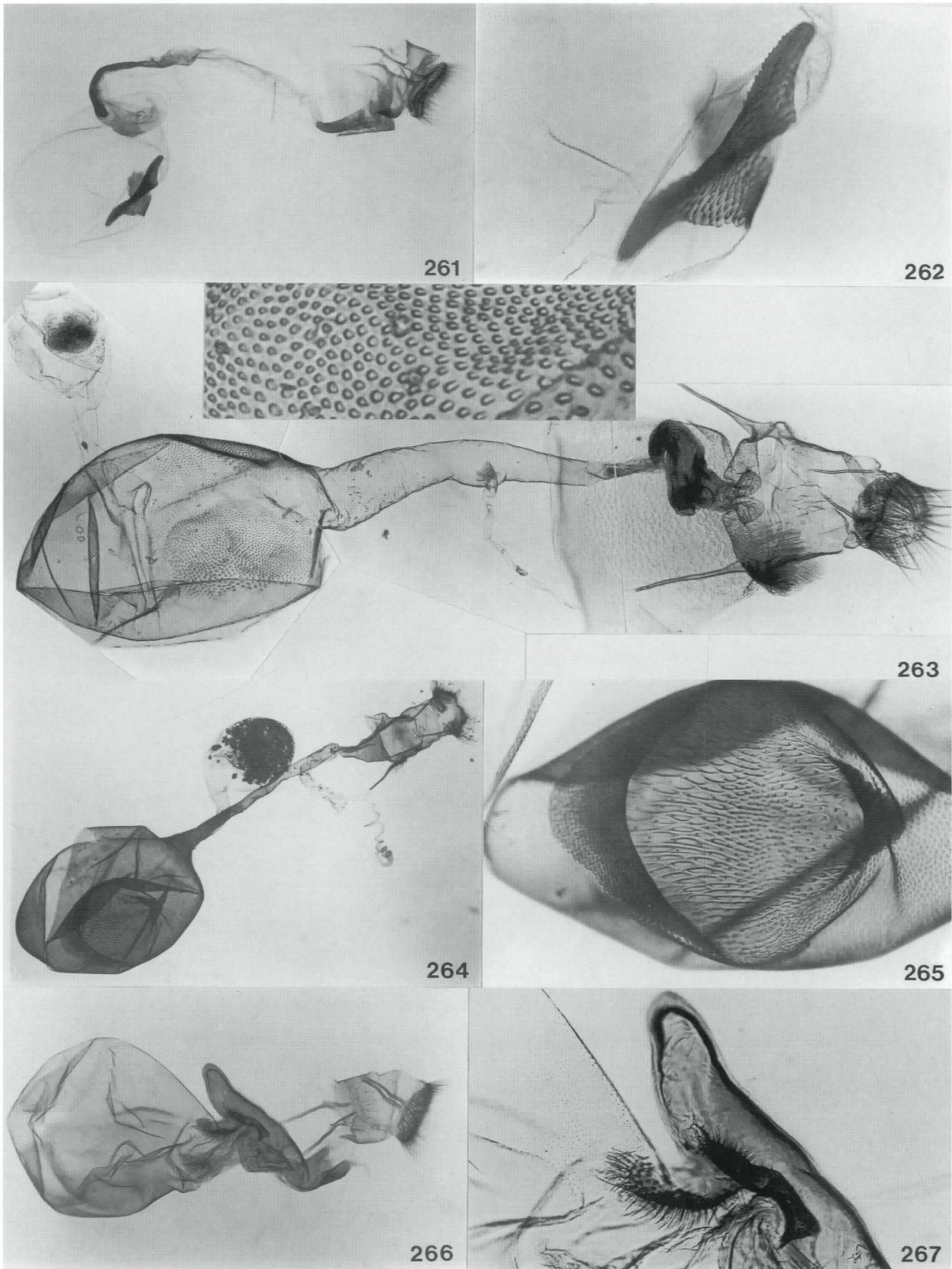


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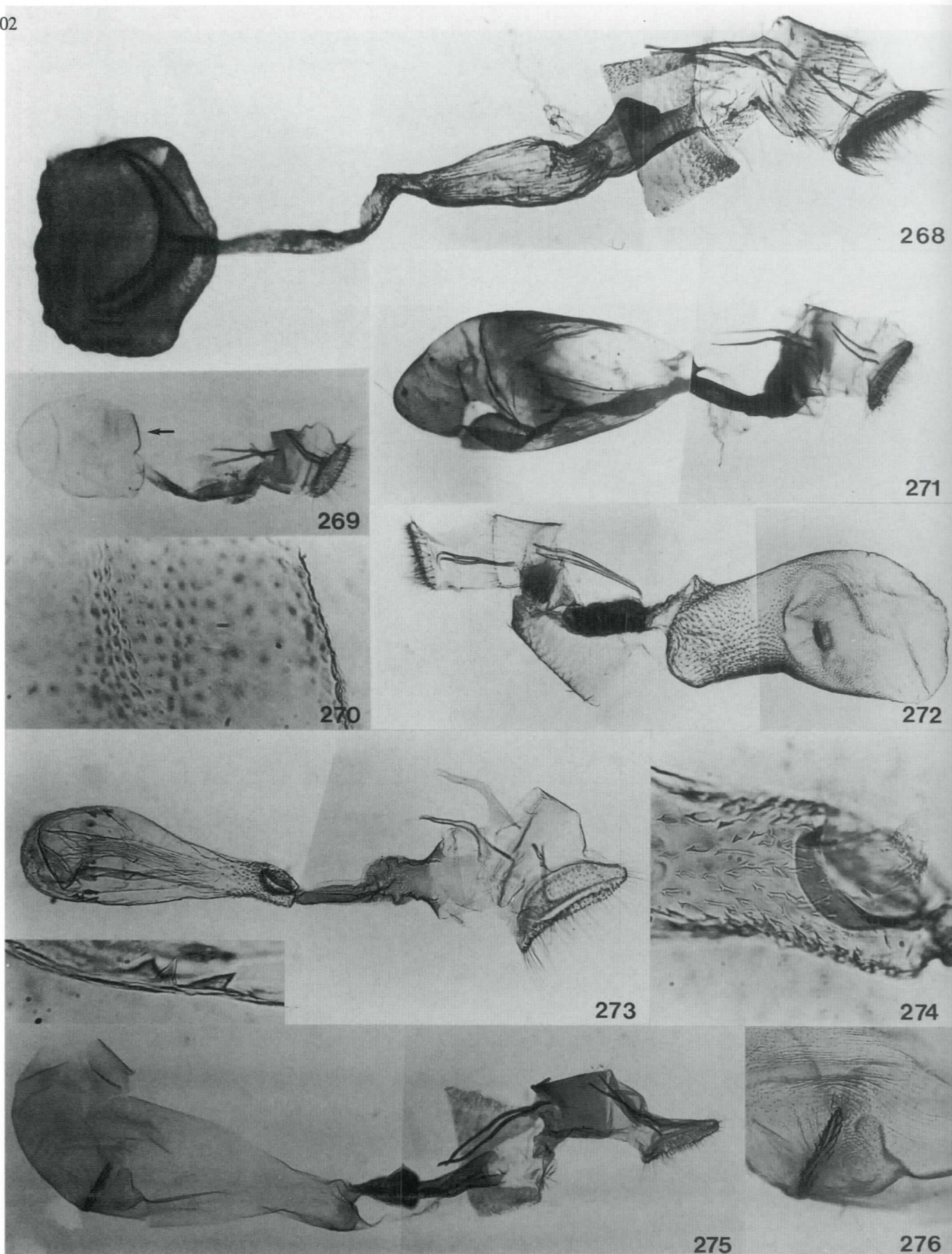


Fig. 268-276. Female genitalia. 268, *Pardomima zanclophora*, allotype, Suna, Tanzania, BMNH slide 14338. 269, *Legrandellus fuscolarosalis*, arrow indicates signum; 270, detail of posterior of corpus bursae showing signum. 271, *Eurrhyarodes tricoloralis*, holotype, South Africa (NHRM), JCS slide 1796. 272, *Metasia perfervidalis*, holotype, Nairobi Plains, Kenya, BMNH slide 14302. 273, *Microgeshna laportei*, insert shows teeth, anterior of corpus bursae; 274, corpus bursae neck. 275, *Pessocosma prolalis*; 276, signum; paratype, Aldabra, JCS slide 1762.



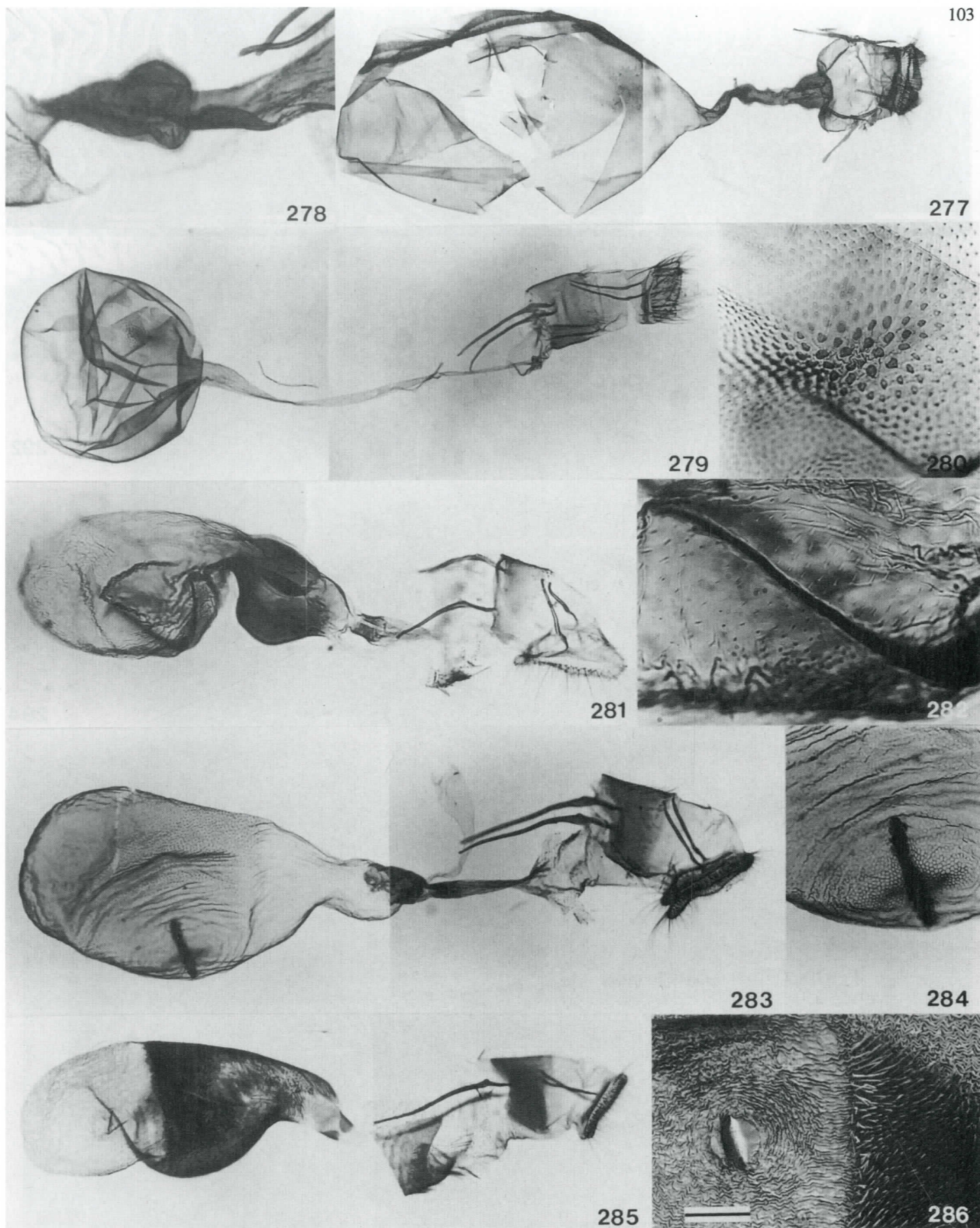


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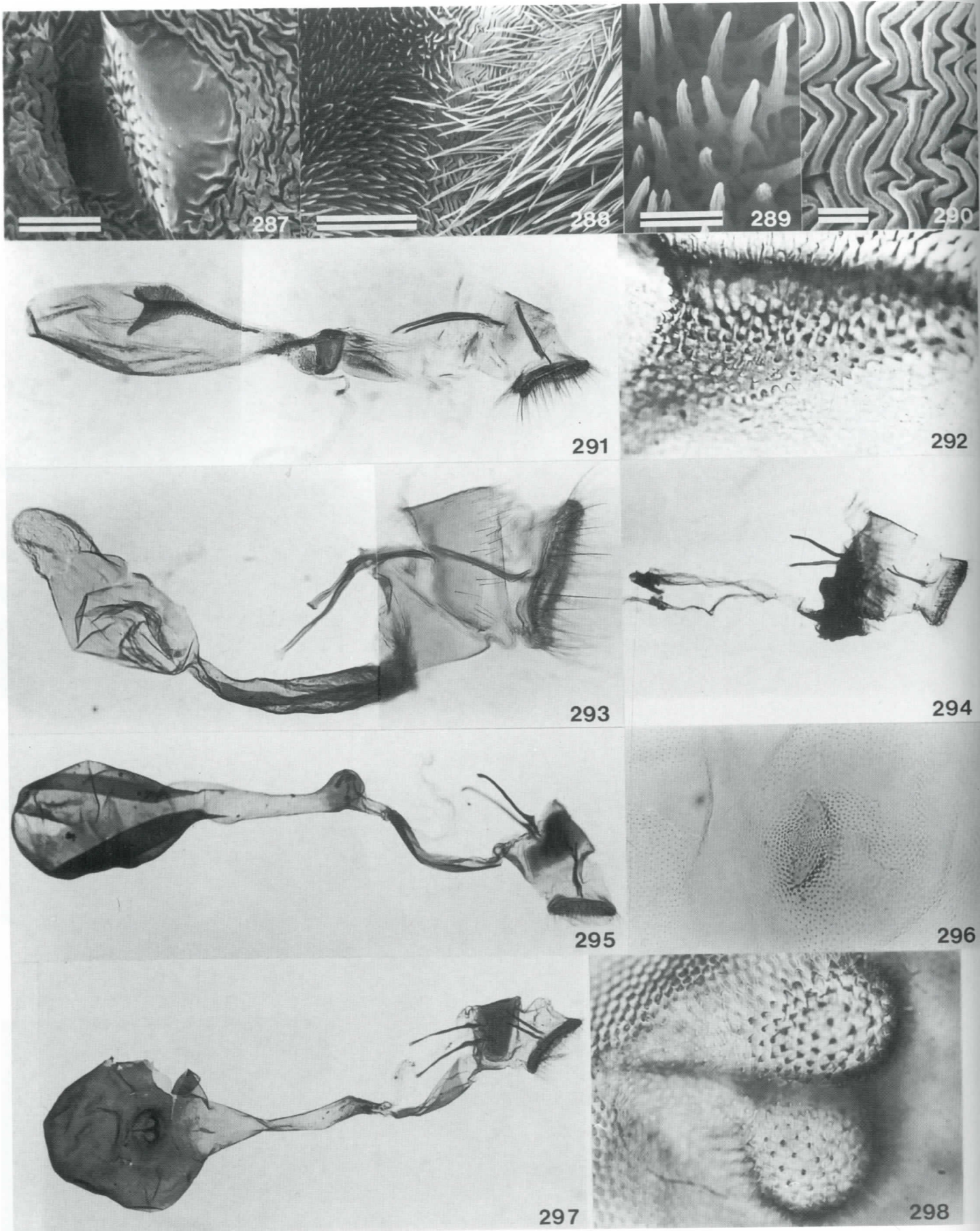


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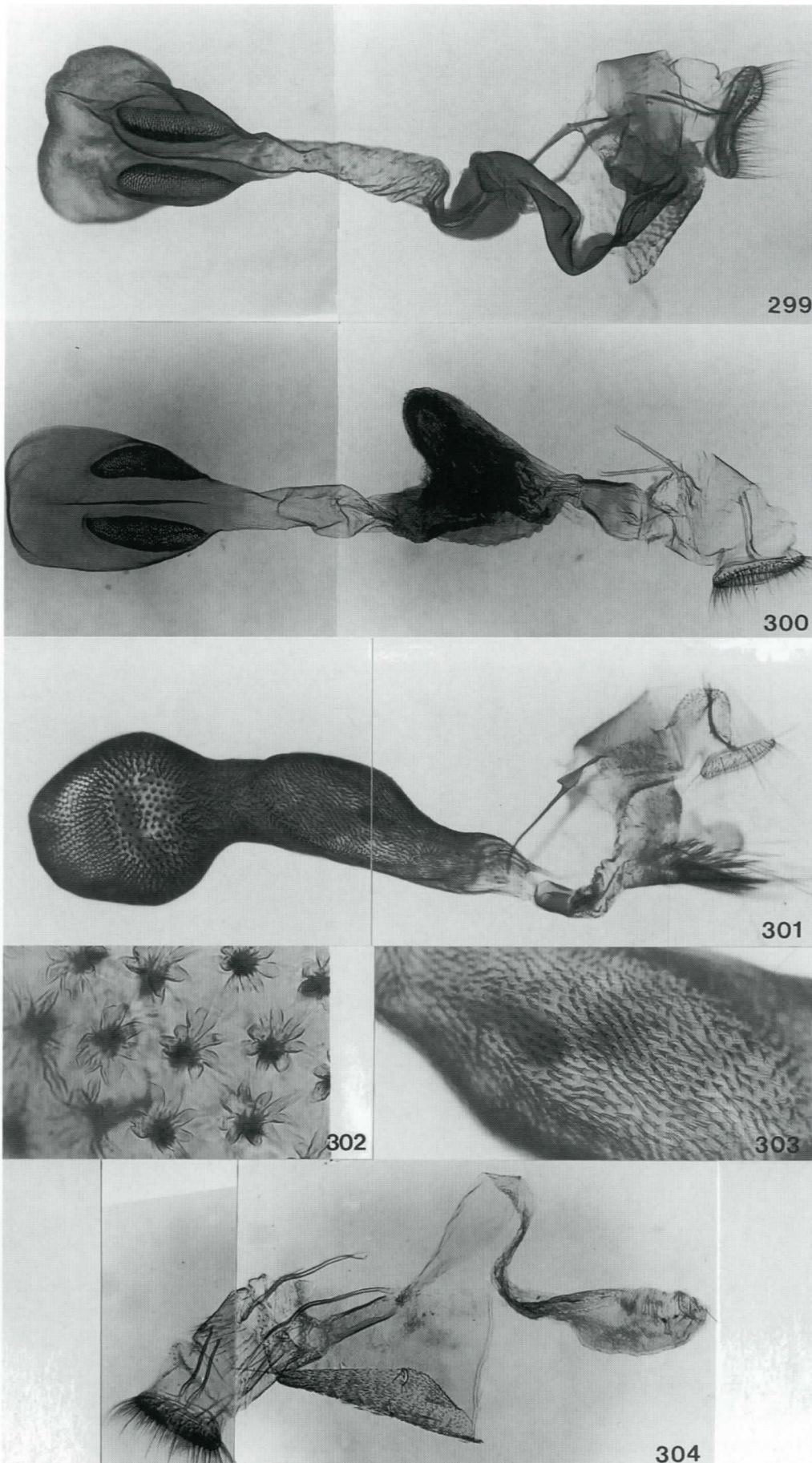


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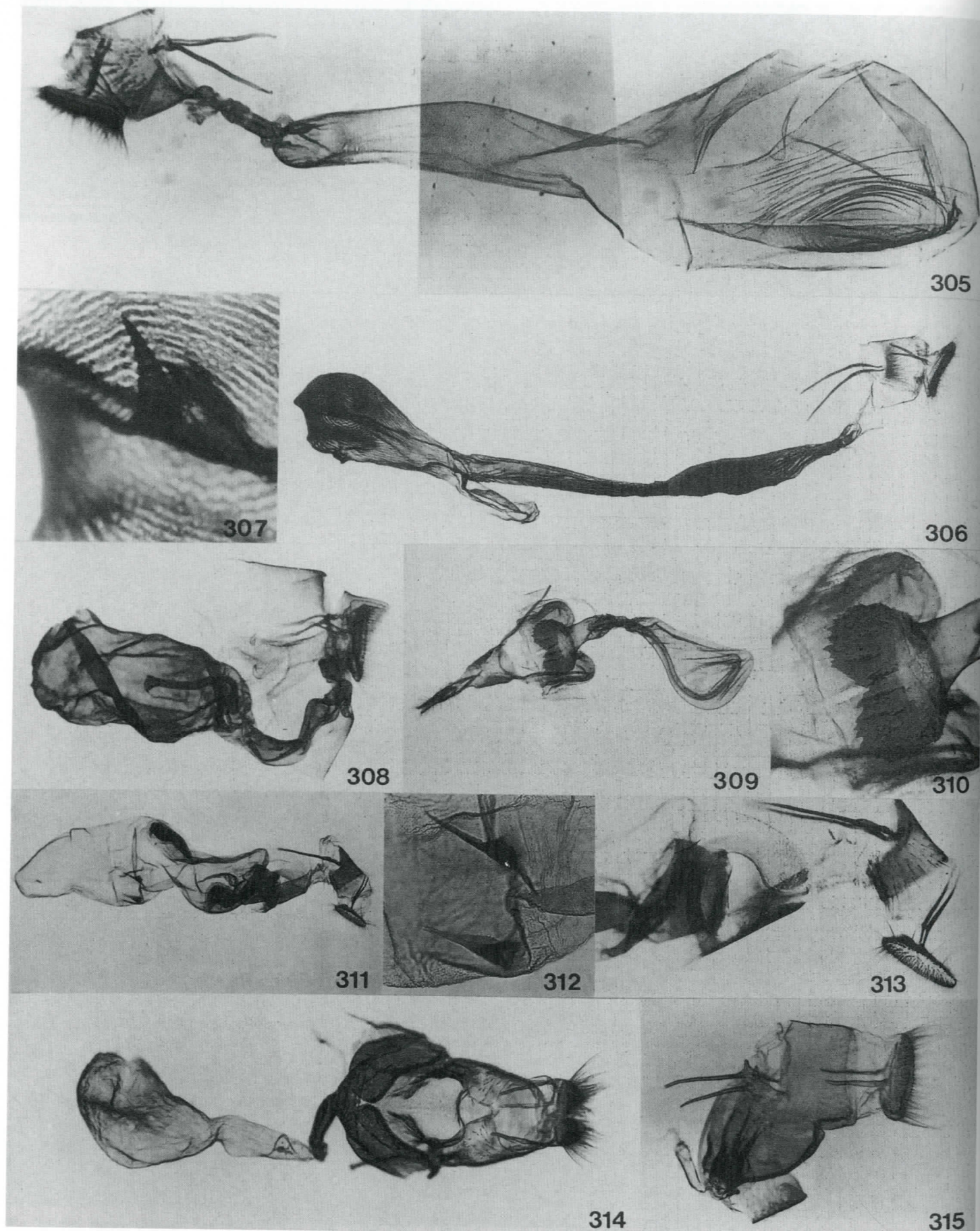


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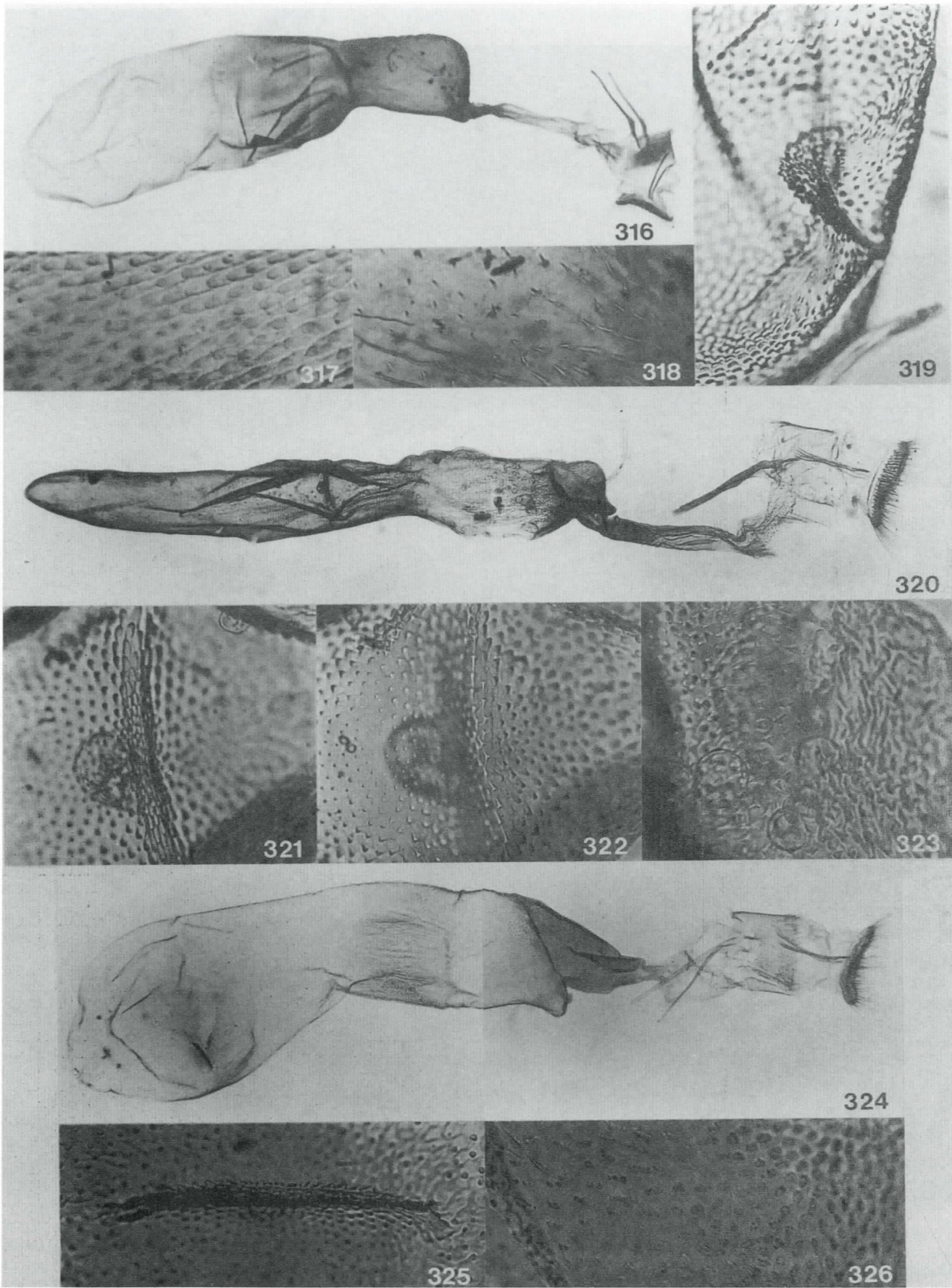


Fig. 316-326. Female genitalia. 316, *Herpetogramma juba*; 317, detail of posterior-central region of corpus bursae; 318, detail of posterior lobe of corpus bursae; paratype, USNM slide 57888; 319, signum, paratype, USNM slide 57889. 320, *H. continualis*; 321, 322, signum at two focal levels; 323, detail, posterior end of corpus bursae; paratype, USNM slide 57890. 324, *H. licarsialis*; 325, signum; 326, detail, corpus bursae posterior to origin of ductus seminalis; Mahe, Seychelles, USNM slide 55499.



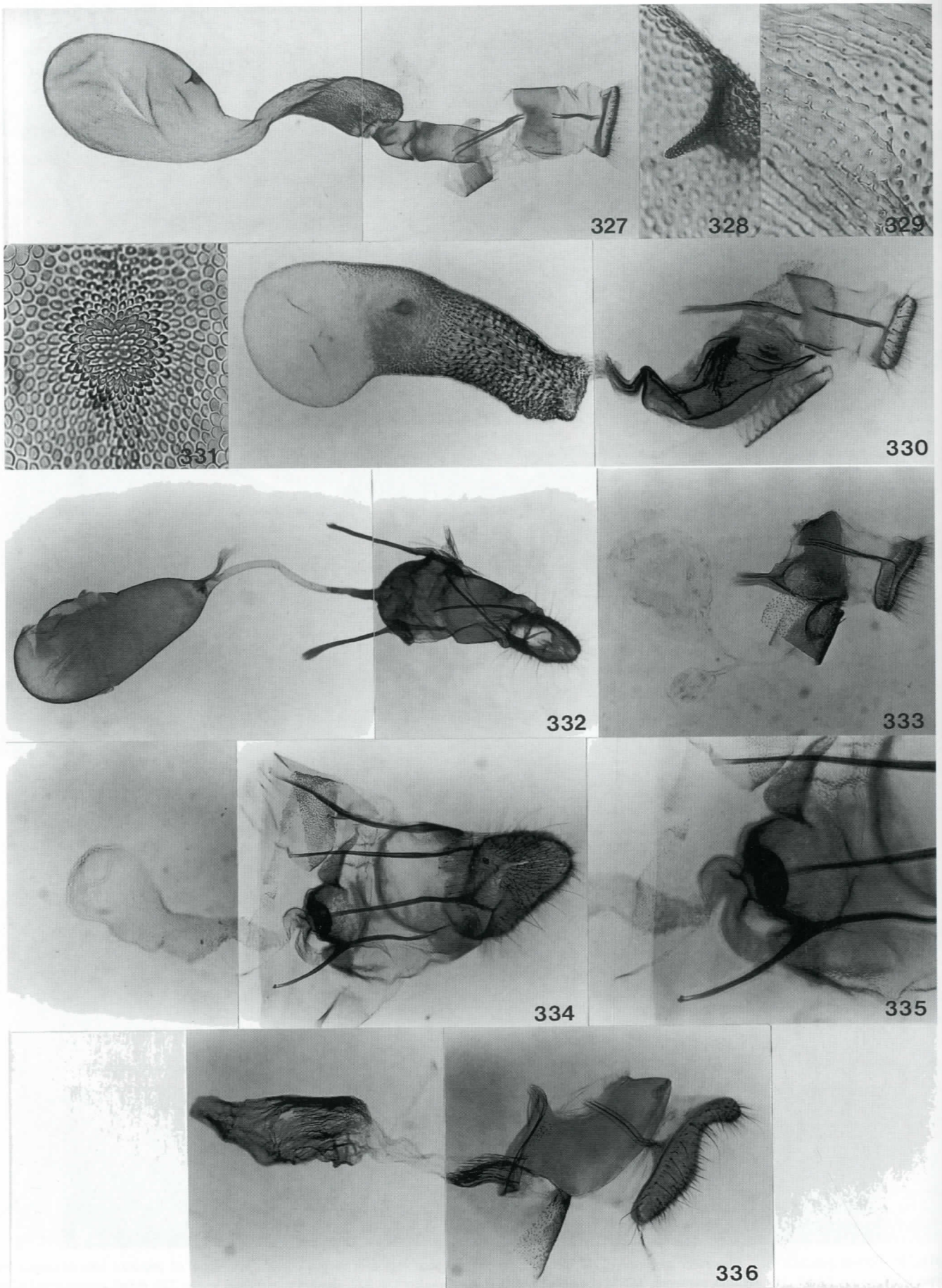


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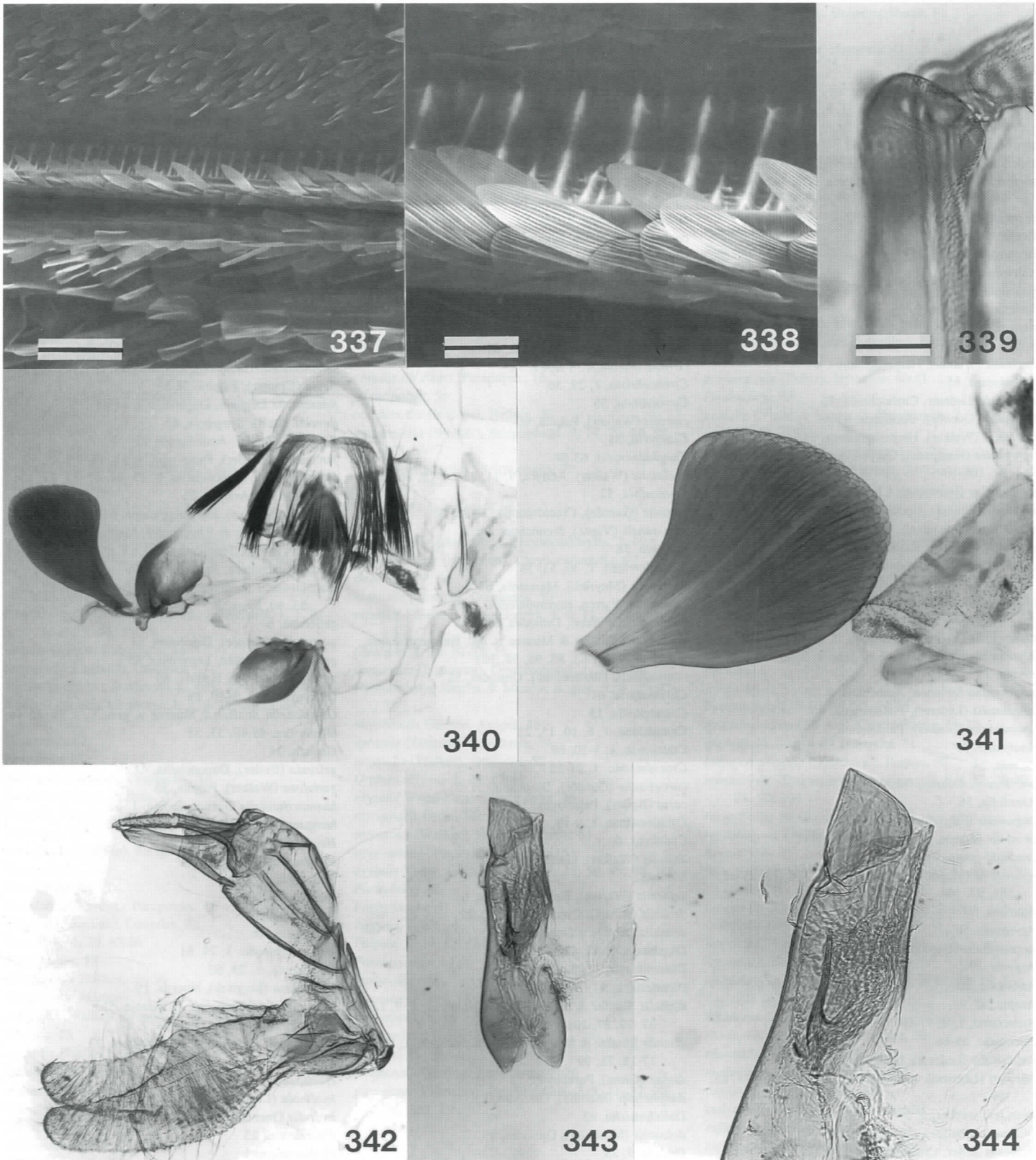


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