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BIOLOGY AND IMMATURE STAGES OF THE BROMELIAD POD BORER, *EPIMORIUS TESTACEELLUS*, IN FLORIDA (LEPIDOPTERA: PYRALIDAE: GALLERIINAE)

J. B. HEPPNER[1]

Florida State Collection of Arthropods
Bureau of Entomology, DPI, FDACS, P. O. Box 147100, Gainesville, FL 32614-7100, USA

ABSTRACT.– The biology and immature stages of *Epimorius testaceellus* Ragonot are described, as reared in Florida from flower pods of the epiphytic bromeliad, *Tillandsia fasciculata* Sw. (Bromeliaceae).

KEY WORDS: *Bleptina*, Bromeliaceae, Cosmopterigidae, Eurytomidae, hostplant, Hymenoptera, Jamaica, larva, life history, Noctuidae, *Opogona*, pupa, *Pyralis*, *Pyroderces*, South America, Tineidae, Tortricidae, West Indies, *Xylesthia*.

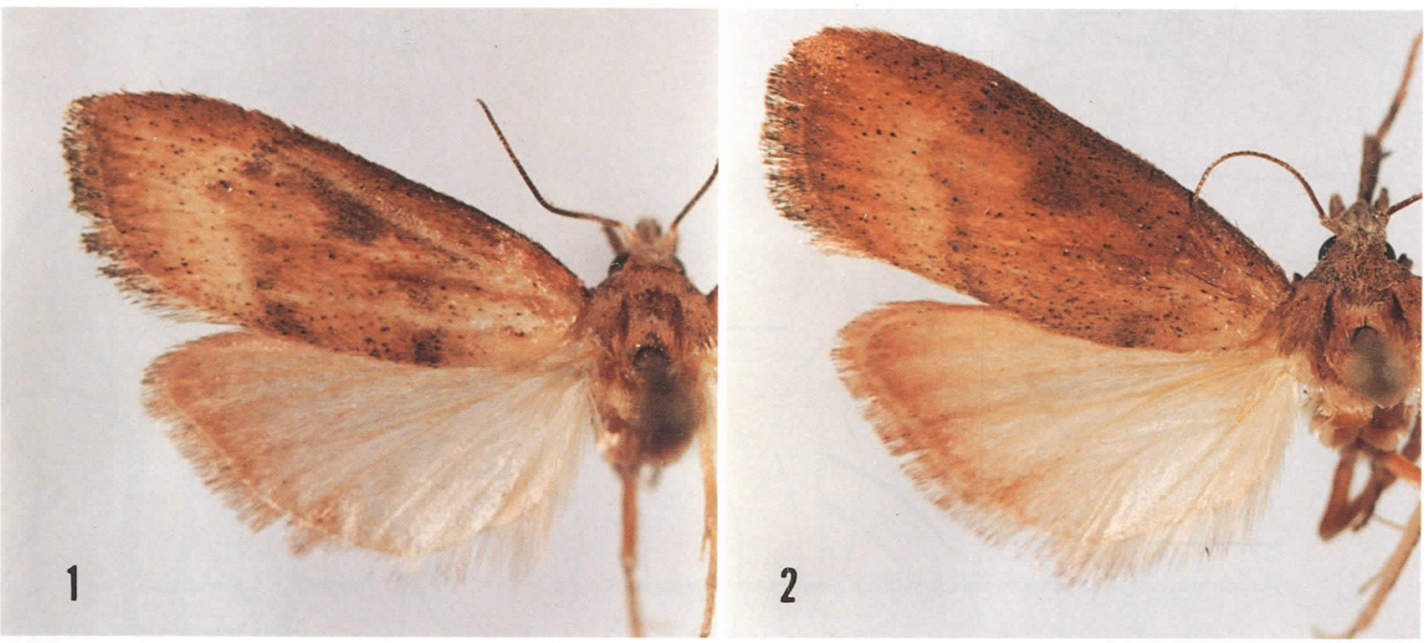

Fig. 1-2. Adults of *Epimorius testaceellus* Ragonot: 1. Male (FW = 9mm); 2. Female (FW = 11.5mm) (Palmdale, Glades Co., FL) (FSCA).

The bromeliad pod borer, *Epimorius testaceellus* Ragonot, has been known in Florida since possibly as early as 1960 (Heppner, 1992), and recent reports have been published by Ferguson (1991) and the author (Heppner, 1992). The present paper elaborates on my previous paper and gives further notes on the larvae and pupae, including the first descriptions of their morphology. First described from Jamaica (Ragonot, 1887), moths were reared from the bromeliad, *Tillandsia fasciculata* Sw. (Bromeliaceae), in Florida by the author in 1974, and subsequently identified and reported on by Ferguson (1991) after checking the holotype illustrated by Ragonot (1901). The species occurs over much the same distribution as the host: subtropical Florida and south into the West Indies and South America (Ferguson, 1991; Whalley, 1964). As far as is known, this is the only species of *Epimorius* occurring in Florida. The larvae of this pyralid moth do considerable damage to the flower pods of infested bromeliads, although populations appear to be localized and not very common in Florida. No economic damage has been reported thus far, but a localized outbreak could cause extensive damage if moth populations built up to high enough numbers. The moth does not appear to be responsive to light traps, since few if any adult specimens have been collected in Florida other than through rearing from larvae.

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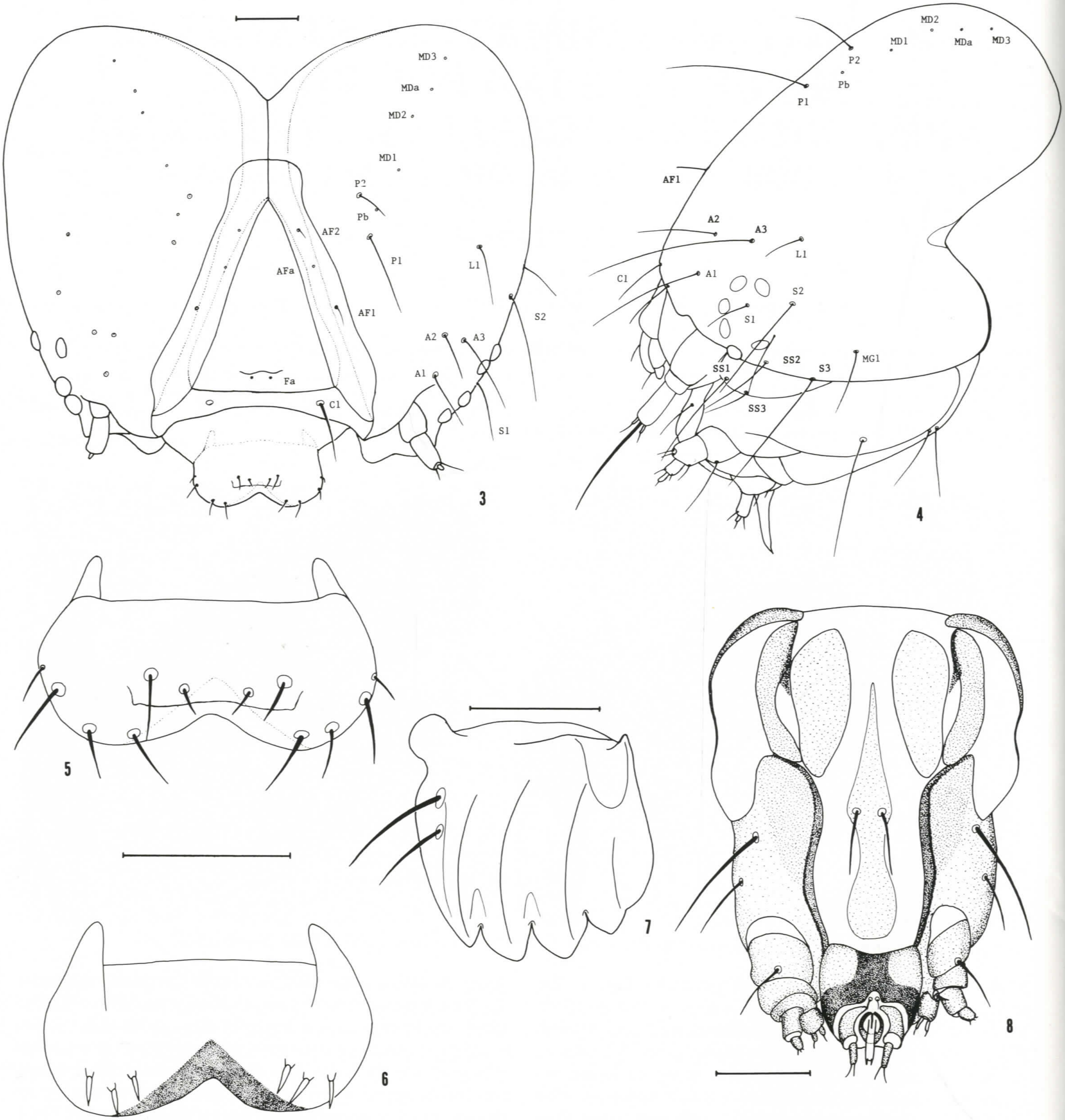
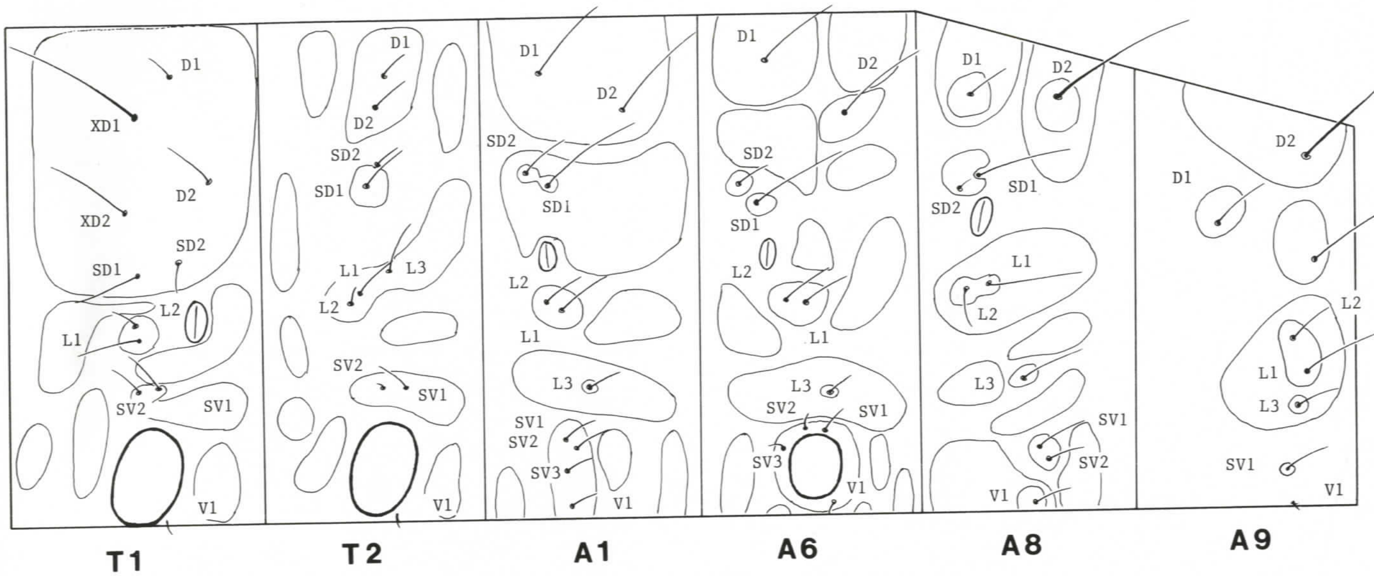


Fig. 3-8. Larval morphology: 3. Head front view and chaetotaxy; 4. Same, lateral view; 5. Labrum front view; 6. Same, venter; 7. Left mandible, venter; 8. Hypopharynx complex, with labium and maxillae morphology. (scale lines =, 0.2mm)



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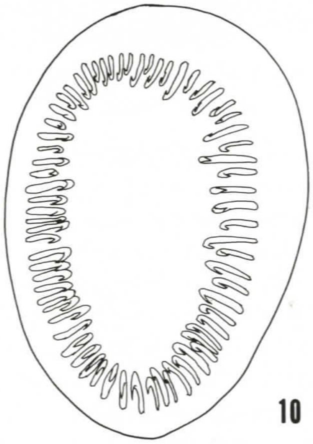

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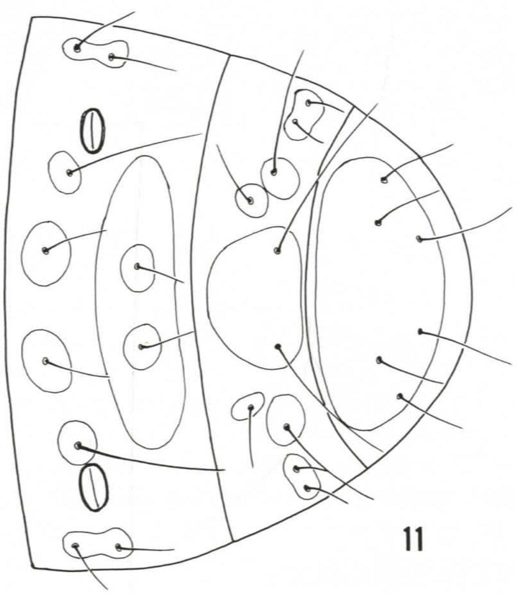

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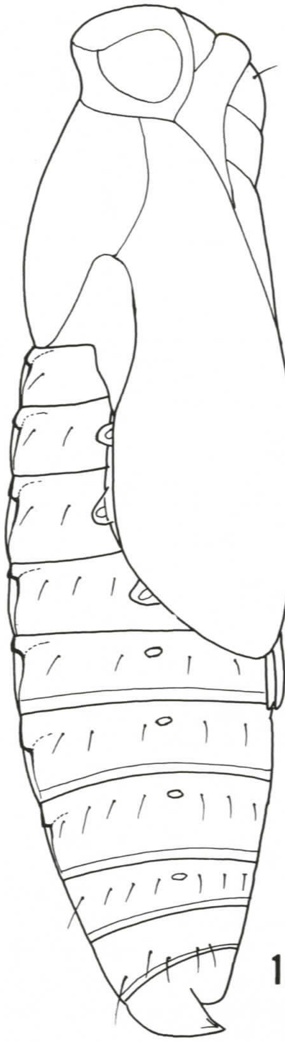
Fig. 9-11. Larval chaetotaxy: 9. Chaetotaxy map; 10. Detail of crochets on proleg (ventral view); 11. Dorsal view of posterior segments of abdomen.

LARVAL MORPHOLOGY

Fig. 3-11 illustrate details of the larval morphology of *E. testaceellus*. Last instar larvae average 14.8mm in length (n = 3). **Description**.– HEAD: rounded head capsule dark amber in color (Fig. 3-4); frons triangular, ca. 2x length of short epicranial suture; adfrontal setae present, as much separated as AF1 is from adfrontal suture base; frons setae absent and only pores Fa present; C1 prominent; stemmata in circle of 6, about evenly spaced; P1 close to P2; MD1 closer to MD2 than MD3 is to MD2; MDa midway betwen MD2 and MD3; A1-3 in fairly tight triangle near stemmata; L1 high in relation to P1 and nearly as close to P1 as to A3; L1 prominent; S1 near center of stemmata circle; S2 closer to stemma 1 than to stemma 6; SS2 near stemma 6; SS1 and SS3 close together; MG1 distant from SS2. *Labrum* (Fig. 5-6) with 4 setae near center and 4 along margin of each corner; ridge below central setae; venter with 3 setae each side of strongly sclerotized median ridge. *Mandibles* (Fig. 7) with 4 major teeth evident; lateral margin with 2 large setae. *Hypopharynx* (Fig. 8) with strong sclerotization on labium.

BODY: (Fig. 9-11) with secondary setae absent; integument relatively smooth and a golden yellow, with pinacula slightly darker shade; pinacula rings not evident; most pinacula on elevated integumental plates. *Thorax* with T1 showing long XD1 and XD2 setae, SD1 close to SD2, L1 and L2 approximate on same pinaculum, and SV1 and SV2 approximate on single pinaculum; T2 with D1 and D2 small, SD2 on edge of SD1 pinaculum, L1-3 in straight row angled up to L3, and SV2 minute. *Abdomen* with prolegs an A3-6 and A10, with crochets (Fig. 10) in triordinal circles; A1 with D1 and D2 prominent, SD1 and SD2 on approximate pinacula, L3 separate from approximate L1-2, and SV1-3 close together; A2-6 similar to A1; A7-8 same but with SV3 absent and SD1 off pinaculum of small SD2; A9 with SD1 distant from D1, L3 close to L1-2, and SV2-3 absent; A10 (Fig. 11) with large dorsal plate for D1-2 and SD1.



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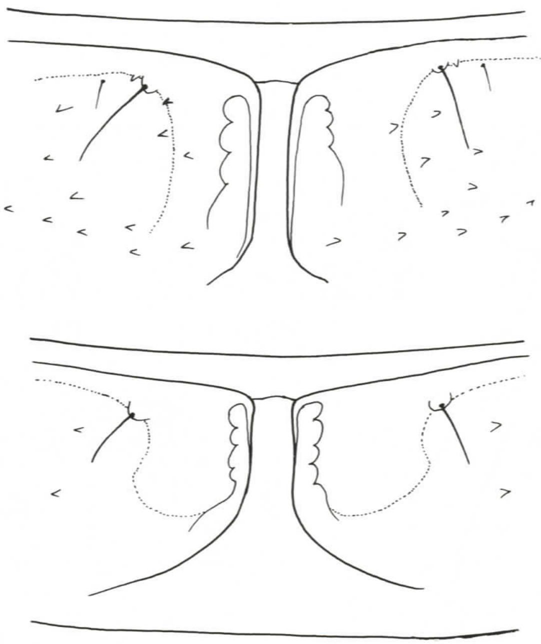

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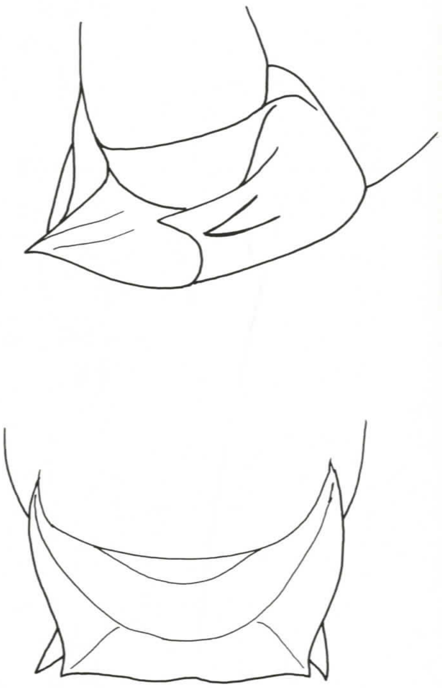

14

Fig. 12-14. Pupal morphology: 12. Pupa, lateral view; 13. Detail of dorsal segments of abdomen; 14. Details of posterior segment of abdomen, oblique and ventral views.

PUPAL MORPHOLOGY

Fig. 12-14 illustrate details of the pupa of *E. testaceellus*. Size: 9.2mm (n = 1).

Description.– Pyraloid configuration, with protruded spriacles on A2-3; dorsum of abdominal segments with strongly sclerotized ridges (Fig. 13), with a large seta on each side (sometimes a smaller one as well); terminal segment of abdomen with pronounced cup-like protrusion with sharp lateral points and side spur (Fig. 14); ultimate 2 segments with dorsal setae having small hook-tips.

HOST.– Thus far, the only confirmed host of *E. testaceellus* is the large bromeliad, *Tillandsia fasciculata*. There is an FSCA record of basal leaf damage to *Tillandsia valenzuelana* A. Richard, from Copeland, Collier Co., in Jan 1976 (V. W. Yingst, collector), but the moth species is not confirmed as being *E. testaceellus* and probably is another pyralid species.

BIOLOGY

In addition to the rearings from the Fisheating Creek area, Palmdale, Glades Co., in May 1974 (JBH 74E5) and May 1975 (JBH 75E10), the author also reared the moth from larvae found at Matheson Hammock, Miami, Dade Co., in Jan 1974 (JBH 74A2), and near the Archbold Biological Station, 6 mi SE Lake Placid, Highlands Co., in May 1975 (JBH 75E8). A more recent record is from Miami, in Mar 1981 (E. Pena, collector). Earlier records from FSCA files include a larvae collected Mar 1960 from a bromeliad in Ft. Lauderdale, Broward Co. (J. M. Soowal, collector), and a pyralid flower pod borer, which may be this same species, collected Jul 1964, in Ft. Lauderdale (D. McKean, collector).

Larval feeding by *E. testaceellus* involves excavations from feeding inside individual flower pods (or capsules) of the large flower spikes of the hostplant, *Tillandsia fasciculata*, a strictly epiphytic bromeliad (Langdon, 1981). Larval damage is evident by frass ejected from the flower capsule and discoloration of the infested flower spikes (Fig. 16). A large bromeliad will have 10 or more flower spikes in each inflorescence (Fig. 15), and each spike may have 2-3 larvae feeding on several of the individual flower pods (Fig. 16). Several flower pods are usually consumed by each larva.

Fig. 15-16. Hostplant damage from *Epimorius testaceellus*: 15. Mature bromeliad (*Tillandsia fasciculata*); 16. Larval damage (1 larva visible in opened flower capsule) (Palmdale, FL). © J. B. Heppner.

Pupation is within the shell of an excavated flower pod, usually toward the apex of a flower inflorescence and near a spike base. A silken cocoon is spun against the capsule walls and an exit hole is partially chewed on an exterior wall near the pod base, leaving the adult to push a thin plant flap upon emergence. The head of the pupa is placed just beneath the exit hole of the flower capsule. Pupation lasts about 17 days during the winter and 6-14 days during May (n = 5). Adults emerge early evening, 7-8 PM. Adults are known thus far only for Jan-Feb and May, but since the hostplants in a given area have 3-4 flowering periods per year in south Florida, the moths also probably have 3-4 generations per year (probably Feb, May, Aug, Nov, being months of adult activity, at least in the Miami area).

Among the bromeliad moth micro-fauna that has thus far been reported from *Tillandsia fasciculata* in Florida, in addition to *E. testaceellus*, species which might be confused with it include the detritus-feeder, *Pyralis farinalis* (Linnaeus) (Pyralidae: Pyralinae); the stem and detritus-feeder, *Opogona sacchari* (Bojer) (Tineidae); the detritus-feeder, *Xylesthia pruniramiella* Clemens (Tineidae); a detritus-feeding Cosmopterigidae (probably *Pyroderces* sp.); a Tortricidae flower-feeder (sp. unknown); and a dead-leaf feeding Noctuidae (*Bleptina* sp.). However, there appear to be no moth larvae with feeding habits similar to *E. testaceellus* in these bromeliads. The only recent study of bromeliad Lepidoptera faunas, in Mexico, did not discover any Pyralidae species (Beutelspacher, 1972a, 1972b).

Bugbee (1975, 1976) reported on a new and relatively large orange Eurytomidae parasitoid, which he named *Eurytoma aerflora*, and which was reared by the author from both the Palmdale and Miami rearings of *E. testaceellus*.

ACKNOWLEDGMENTS

Reared moths from Florida were sent a number of years ago to Dr. D. C. Ferguson, USDA, SEL, c/o USNM, Washington, DC, for identification, and his efforts over several years to determine the name of the species, resulting in his recent paper on the genus (Ferguson, 1991), are greatly appreciated. Larval rearings were conducted while the author was a graduate student in 1974-75 at the University of Florida, Gainesville, with support from the Department of Entomology and Nematology, Institute of Food and Agricultural Sciences; Dr. D. H. Habeck, graduate advisor.

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