INSECTS ASSOCIATED WITH *POLYGONUM* (POLYGONACEAE) IN NORTH CENTRAL FLORIDA. I. INTRODUCTION AND LEPIDOPTERA[1]

J. B. HEPPNER[2] AND D. H. HABECK[3]

Department of Entomology and Nematology,
University of Florida, Gainesville, Florida 32611

ABSTRACT

Interactions of Lepidoptera and semi-aquatic species of *Polygonum* were investigated in north central Florida. Freshwater shore species of *Polygonum* are common in Florida and form an important element in such habitats. New host records were obtained for 17 of 43 Lepidoptera species associated with *Polygonum* in Florida (21 from literature reports and 22 from our rearings). *Myriophyllum brasiliense* Cambess (Haloragaceae) is an additional new host record for 2 tortricids, *Choristoneura parallela* (Robinson) and *Argyrotaenia ivana* (Fernald). An undescribed species of *Coleophora* and a gelechiid, "*Aristotelia*" *absconditella* (Walker), are newly recorded for the Florida fauna. Lepidoptera families involved in this ecological survey include Tortricidae, Coleophoridae, Gelechiidae, Pyralidae, Papilionidae, Lycaenidae, Geometridae, Sphingidae, Arctiidae, and Noctuidae.

To better understand insect-host interactions in the freshwater shore ecosystems of Florida, an ecological survey of insects associated with semi-aquatic smartweeds, mainly *Polygonum punctatum* Elliot and *Polygonum densiflorum* Meissner (Polygonaceae), was initiated. This first report covers our results for Lepidoptera. A second report will cover the non-lepidopterous insects, including the parasitic Hymenoptera reared from the Lepidoptera reported herein. A few records for associations with *Polygonum setaceum* Baldwin ex Elliott and *Polygonum hydropiperoides* Michaux are also noted. Florida Lepidoptera not reared by us but having recorded *Polygonum* hosts are included in a summary list at the end. Plant samples were taken from several localities in Florida, but the major portion of the study was conducted in or near Gainesville, Alachua County, Florida, from mid-1972 to late 1974.

I. POLYGONUM AND ITS ENVIRONMENT

The species of *Polygonum* are commonly called "smartweeds" and "knotweeds." More specific common names for individual species add certain adjectives to these general names (Muenscher 1944), e.g., dotted smartweed for *Polygonum punctatum*. The genus *Polygonum* encompasses over 200 species worldwide, while in the United States about 2 dozen species are generally distributed. Of the 2 main species in this study, *P. densiflorum* is more or less restricted to the southeastern United States, while *P. punctatum* is found throughout the United States. Knotweeds tend to be prostrate and grow in more xeric habitats than do smartweeds, which include

---

[1]Florida Agricultural Experiment Station Journal Series No. 8028

[2]Research Associate, Florida State Collection of Arthropods.

[3]Professor; Research Associate, Florida State Collection of Arthropods, Gainesville.

erect plants occupying more mesic habitats. Typically, smartweeds will be found in moist soils, ditches, and semi-aquatic freshwater habitats. In Florida they are common and have a significant role in freshwater habitats. The 2 smartweeds emphasized here grow only in partially flooded ground or in very moist soil at pond or stream edges. Some species of *Polygonum* are of economic importance due to invasions of pastures and cultivated fields.

Polygonum species are mostly annuals, although some are perennials like *P. punctatum* and *P. densiflorum*. From our observations in north Florida, *P. punctatum* and *P. densiflorum* have a yearly life cycle with four distinct seasonal aspects: 1) initial winter growth; 2) successive flowering and continued growth from late winter to mid-autumn; 3) autumn growth of post-reproductive plants; and 4) late autumn and winter remains of frost damaged plants, followed by regrowth as temperatures moderate. *Polygonum densiflorum* is the thicker stemmed of the 2 species, but both have stems naturally swollen at the nodes. Successive generations can be found in the same areas year after year unless disturbed or displaced by competition from other plant species.

Most parts of an individual plant are exploited by different species of Lepidoptera, competition usually occurring only with the non-lepidopterous insects that utilize the same niches on the plants. Even heavy infestation by insects produces few visible effects (except for some damage from leaf feeders), the plants remaining vigorous until the first frost. This latter point demonstrates the comparatively benign coexistence of *Polygonum* plants and their insect load.

II. Lepidoptera

This section includes Lepidoptera associated with one or more *Polygonum* species as larval feeders. Most such Lepidoptera are moths, and only a few species of butterflies are recorded on *Polygonum* (Tietz 1972). During our investigations only one butterfly adult, the hesperiid *Ancyloxypha numitor* (Fabricius), was seen on *P. punctatum* flowers: no butterfly larvae were found on *Polygonum*.

Materials and Methods

Plant samples were field collected and taken into the laboratory for rearing of larvae and capture of emerging adults. Plant samples were searched for both leaf-feeding and stem-boring larvae, with individual larvae placed in petri dishes or 1 oz and larger plastic cups. Some plant samples were divided into plastic bags or gallon ice cream containers for mass, non-searched rearings. Laboratory temperatures were moderated to about 25°C (day), with nightly reductions to no less than 10°C in winter. Moisture was maintained close to natural conditions to prevent plant wilting.

No Lepidoptera were found feeding on *Polygonum* roots or submerged stems, but some nocturnally feeding larvae were found hiding in root masses during the day. Larvae boring in stems drowned if stems accidentally became submerged under water, since water entered the frass hole. Voucher specimens from reared material were deposited in the Florida State Collection of Arthropods, Gainesville. The durations of immature development were measured from early larval instars to adult emergence;

these periods are approximate due to imprecise knowledge of the ages of field collected larvae. The number following the "rearings" heading indicates the number of rearings completed. All determinations are our own except as indicated in the acknowledgments section.

TORTRICIDAE

Argyrotaenia ivana (Fernald)

Hosts: New records: *Polygonum punctatum* and *P. densiflorum; Myriophyllum brasiliense* Cambess (Haloragaceae). Literature records: *Iva imbricata* Walter and *Gnaphalium obtusifolium* Linnaeus (Compositae); *Apium graveolens* Linnaeus var. *dulce* Persoon (=celery) (Umbelliferae) (Kimball 1965).

Distribution: Southeastern United States.

Dates: Most months in Florida; summer further north.

Rearings: 10; immature period 13-24 days; pupal stadium 4-13 days.

Remarks: *Argyrotaenia ivana* is a leaf-roller, larvae feeding on the leaves. It has been rarely collected. Male genitalia of reared specimens have a very broad uncus for *Argyrotaenia*, but this character appears to be constant in *A. ivana* (J. A. Powell, personal communication).

Choristoneura parallela (Robinson)

Hosts: New records: *Polygonum punctatum* and *Myriophyllum brasiliense*. Literature records: *Acer rubrum* Linnaeus (Aceraceae) (Kimball 1965).

Distribution: Northeastern United States, south to Florida.

Dates: March, April, and July (Florida); summer (Northeast).

Rearings: 3; pupal stadium 10-19 days (only last instar larvae and pupae were collected).

Remarks: Genitalic examination showed the reared moths to be *C. parallela*, not the more common and polyphagous *Choristoneura rosaceana* (Harris). The larvae of *Choristoneura* feed on host leaves.

Platynota rostrana (Walker)

Hosts: Polyphagous (see Kimball 1965). New record: *Polygonum punctatum.*

Distribution: Eastern United States, west to Texas.

Dates: Almost every month in Florida; spring to autumn (Northeast).

Rearings: 6; immature period 21-29 days.

Remarks: Adults reared from *Polygonum punctatum* were taken from mass samples as they emerged. Larvae are leaf-tiers and feed on the leaves.

Sparganothis sulfureana (Clemens)

Hosts: New record: *Polygonum punctatum.* Literature record: *Helenium* (Compositae) (Kimball 1965).

Distribution: Eastern United States, west to Texas.

Dates: Adults most of the year in Florida; June to September (Northeast).

Rearings: 2; immature period 25-28 days.

Remarks: Sparganothids are leaf feeders, usually forming a slightly rolled leaf with silk webbing as a shelter.

COLEOPHORIDAE

Coleophora sp. (undescribed)

Hosts: New record: *Polygonum punctatum.*

Distribution: Gainesville (the distribution should be more extensive in Florida, wherever the host grows).

Dates: Known only from August and September thus far.

Rearings: 2; insufficient data on immature period.

Remarks: Forbes (1923) reported a related coleophorid, *Coleophora shaleriella* Chambers, to be a seed feeder on *Polygonum*. Larvae of our species have elongate and straight cases, and larvae chew small holes in the leaf epidermis. Barry Wright (personal communication) of the Nova Scotia Museum, Halifax, has indicated that the coleophorids reared by A. F. Braun (reported in Forbes 1923) are a new species which he will describe in his forthcoming revision of the Nearctic Coleophoridae, while the species Forbes called *Coleophora shaleriella*, refers to a species different from the one reared by Braun. The species reared by us represents a third related species. Currently, only one adult is available for study.

GELECHIIDAE

"Aristotelia" absconditella (Walker) "Smartweed Node Borer"

Hosts: New records: *Polygonum punctatum* and *P. densiflorum*. Literature records: *Ampelopsis* (Vitaceae) and *Polygonum* sp. (Forbes 1923).

Distribution: Eastern United States, from Maryland to Florida.

Dates: Year round in Florida; May to June (Maryland).

Rearings: 42; immature period 16-64 days; pupal stadium 6-31 days.

Remarks: R. W. Hodges (personal communication) (Systematic Entomology Laboratory, USDA) has informed us that *A. absconditella* belongs in another genus and will be transferred to an appropriate genus in a future revision. *"Aristotelia" absconditella* is the predominant stem borer of *Polygonum punctatum*, less so in *P. densiflorum* where weevil larvae (*Rhinoncus longulus* LeConte and *Lixus* spp.) are more common borers. The host record of *Ampelopsis* needs to be verified. Forbes (1923) noted that this gelechiid is a stem borer, with larvae overwintering in the excavated nodes. His note that the larva forms a gall is erroneous: the "gall" is one of the naturally swollen stem nodes of the host plant. Often 8 or more larvae will be found per *Polygonum* stem, each occupying only 1 node plus 1-3 cm. of stem in either or both directions from the node. Such infestations produce no noticeable effect on the plant. The moth is a new record for Florida (Alachua and Columbia Counties), even though adults should be common near the host plants. The common name, "smartweed node borer," is proposed for this moth. There are at least 7 generations per year in Gainesville, Florida.

Chionodes discoocellella (Chambers)

Hosts: New records: *Polygonum punctatum* and *P. densiflorum*. Literature records: *Rumex* and *Polygonum* sp. (Forbes 1923).

Distribution: New Jersey to Florida, west to Kansas and Texas.

Dates: Nearly year round in Florida; June, July and September in the Northeast.

Rearings: 22; immature period 15-56 days; pupal stadium 5-15 days.

Remarks: *Chionodes discoocellella* is a leaf skeletonizer. A silken web is formed on the ventral leaf surface of its host in preparation for pupation. There are no records of a spring generation in Florida, but one should occur. More detailed biological notes and descriptions of immature stages of *C. discoocellella* and *A. absconditella* will be published at a later date.

PYRALIDAE

Ostrinia penitalis (Grote)

Hosts: New records: *Polygonum* sp. and *P. densiflorum*. Literature records: *Nelumbo* and *Nuphar* (Nymphaeaceae) (Mutuura and Munroe 1970).

Distribution: Eastern North America to the central plains, northwest to British Columbia; subspecies in the neotropics as far south as the Amazon region of Brazil.

Dates: January to November (Florida); May to August (Northeast).

Rearings: 5; immature period 19-73 days.

Remarks: Nymphaeaceae have been the only known hosts of *O. penitalis*. Larvae are common on *Nelumbo* in Florida, but rare on *Polygonum*. Larvae were found feeding on leaves of *Polygonum* and successfully completed their life cyces on this host. The known *Polygonum* feeder, *Ostrinia obumbratalis* (Lederer) (=*ainsliei* Heinrich), was not found during our field work: it may eventually be found in Florida as it has been collected in Louisiana and Mississippi (Mutuura and Munroe 1970).

Parapoynx obscuralis (Grote)

Hosts: *Vallisneria* (Hydrocharitaceae), *Nuphar* (Nymphaeaceae), *Sagittaria* (Alismaceae), *Potamogeton* (Potamogetonaceae), *Polygonum punctatum* (Habeck 1974).

Distribution: Nova Scotia to Wisconsin, south to southern Florida.

Dates: Almost year round in Florida; summer in the north.

Rearings: 1; immature period 24 days.

Remarks: Larvae were found in portable cases constructed from two pieces of a *Polygonum* leaf. Larvae are aquatic and feed on submerged leaves.

Sylepta penumbralis (Grote)

Hosts: New records: *Polygonum* sp. and *P. densiflorum*.

Distribution: Ohio to Missouri, south to Florida.

Dates: April, July to September (Florida); May, September to October (Ohio).

Rearings: 2; immature period 14-33 days.

Remarks: Larvae feed on leaves of the host. Some question exists regarding the specific name of this species. It has been indicated that *S. penumbralis* may be a synonym of *Sylepta silicalis* (Guenée) (Forbes 1923, Kimball 1965); in this case the latter name would have priority.

Synclita obliteralis (Walker) Waterlily Leafcutter

Hosts: New records: *Polygonum* sp., *P. punctatum*, *P. densiflorum*, and *P. hydropiperoides*. Literature records: numerous aquatic plants (Kimball 1965).

Distribution: Nova Scotia to Manitoba, south to Florida and Texas; also British Columbia; introduced in Hawaii and England.

Dates: Year round in Florida; spring to autumn in the Northeast.

Rearings: 8; immature period 20-30 days.

Remarks: *Synclita obliteralis* is a polyphagous feeder of freshwater plants. Larvae feeding on submerged *Polygonum* leaves form a typical bivalve case of 2 leaf parts.

GEOMETRIDAE

Anacamptodes defectaria (Guenée)

Hosts: New record: *Polygonum punctatum.* Literature records: *Populus* and *Salix* (Salicaceae) (Kimball 1965).

Distribution: Southeastern United States, north to Virginia.

Dates: Year round in Florida; summer further north.

Rearings: 1; immature period 21 days; pupal stadium 12 days.

Remarks: Early instar larvae feed on the flowers of *Polygonum punctatum* moving onto the leaves in later instars. As mentioned by Forbes (1948) and Kimball (1965), known host records are only for Salicaceae, indicating that *Polygonum* may be only an incidental host.

[*Synchlora frondaria denticularia* (Walker)]

Hosts: Literature records: *Stillingia* (Eurphorbiaceae), *Pluchea* and *Bidens* (Compositae) (Ferguson 1969); *Chrysanthemum* and *Rubus* (Rosaceae) (Kimball 1965); *Ambrosia artemisiifolia* Linnaeus (Stegmaier 1971). ?*Polygonum punctatum.*

Distribution: North Carolina to Florida, west to Arkansas and Texas; Cuba, Bahamas, and Bermuda.

Dates: Adults every month in Florida; spring to autumn further north.

Rearings: 1; insufficient data on immature period.

Remarks: Ferguson (1969) noted that most species in the Synchlorini are flower feeders of Compositae, and this holds true for *Synchlora frondaria* and subspecies, except for the *Stillingia* and *Rubus* records. The pupa found on *Polygonum* may, consequently, represent only a pupation site and not a larval host.

ARCTIIDAE

Diacrisia virginica (Fabricius) Yellow Wollybear

Hosts: Polyphagous. New record: *Polygonum punctatum.* Literature records: numberous plants including *Polygonum* sp. and *Polygonum convolvulus* Linnaeus (Tietz 1972).

Distribution: Nova Scotia to Florida, west to British Columbia; Mexico.

Dates: Every month in Florida; May-June and August-September (Northeast).

Rearings: 1 larva collected on *P. punctatum.*

Remarks: only 1 larva was collected, indicating that *Polygonum* is not often used as a host in Florida.

Estigmene acraea (Drury) Salt Marsh Caterpillar

Hosts: Polyphagous. New record: *Polygonum punctatum.* Literature records: Tietz (1972) lists numerous plants, including *Polygonum amphibium* Linnaeus.

Distribution: Southern Canada to Central America.

Dates: Most months in Florida; June and August (Northeast).
Rearings: 1 larva on *P. punctatum.*

NOCTUIDAE

Acronicta oblinita (Abbot & Smith) Smeared Dagger

Hosts: Polyphagous. Tietz (1972) lists numerous plants, including *Polygonum hydropiper* Linnaeus and *P. punctatum.*

Distribution: Nova Scotia to Manitoba, south to Florida and Texas; British Columbia.

Dates: Almost year-round in Florida; April-September (Northeast).

Rearings: 1 larva on *P. punctatum.*

[*Anticarsia gemmatilis* (Hübner)] Velvetbean Caterpillar

Hosts: Numerous Leguminosae. ?*Polygonum punctatum.*

Distribution: American tropics north to the northeast U. S.

Dates: Year round in Florida; summer and autumn as adults fly north from breeding areas.

Rearings: 1; immature period 14 days (late instar to adult).

Remarks: *Anticarsia gemmatilis* is a crop pest in Florida and nearby states. The only certain recorded hosts are leguminous plants, indicating that the larva found on *Polygonum punctatum* was using the plant only as a pupation site.

Argyrogramma verruca (Fabricius)

Hosts: New records: *Polygonum punctatum* and *P. setaceum.* Literature records: *Sagittaria* (Alismataceae) and *Calendula* (Compsitae) (Kimball 1965).

Distribution: Ontario to Florida, west to Arkansas; also Colorado; south to the neotropics.

Dates: Adults every month in Florida; late summer in the Northeast.

Rearings: 6; immature period 24-35 days; pupal stadium 6-26 days.

Remarks: Larvae feed diurnally on leaves.

Neoerastria apicosa (Haworth)

Hosts: New record: *Polygonum punctatum.* Literature record: *Polygonum* spp. (Tietz 1972).

Distribution: Nova Scotia and Quebec, west to Iowa; south to Florida and Texas.

Dates: Every month in Florida; May to September in the northeast.

Rearings: 4; immature period 33-43 days; pupal stadium 9-17 days.

Remarks: Larvae are leaf feeders.

Palthis asopialis (Guenée)

Hosts: New record: *Polygonum punctatum.* Literature records: *Bidens* and *Erechtites hieracifolia* (Linnaeus) (Compositae); *Phaseolus* spp. (Leguminosae); *Zea* (Gramineae) (Tietz 1972).

Distribution: New York to Illinois, south to the neotropics.

Dates: Nearly every month in Florida; June to September (Northeast).

Rearings: 1; immature period 14 days (late instar larva).

Remarks: Larvae are leaf feeders, forming a shelter of leaves for protection during inactive periods of the day. Forbes (1954) noted the same "cocoon" in larvae reared from heads of *Bidens.*

Spodoptera dolichos (Fabricius)

Hosts: New record: *Polygonum punctatum*. Literature records: numerous weeds and cultivated plants (Kimball 1965).

Distribution: Maine to Illinois and Wisconsin, south to the Antilles.

Dates: Adults almost every month in Florida; June and August to September in the Northeast.

Rearings: 3; immature period 15-21 days; pupal stadium 13 days.

Remarks: Larvae are polyphagous, feeding nocturnally on leaves and hiding among detritus of plant stems at soil level during the day.

Spodoptera eridania (Cramer) Southern Armyworm

Hosts: Polyphagous. New record: *Polygonum punctatum*.

Distribution: Southeastern United States, north to Maryland.

Dates: Year round in Florida; spring and autumn further north.

Rearings: 2; immature period 27 days; pupal stadium 13-14 days.

Remarks: *Spodoptera eridania* is an important economic pest in the Southeast on many crops. It is not especially common on *Polygonum*.

The following list includes all Lepidoptera associated with *Polygonum* species in Florida. Species preceded by an asterisk have *Polygonum* host records (literature records of Tietz 1972), but were not found during the course of our investigations. The two species in brackets indicate possible non-*Polygonum* feeders reared from *Polygonum* samples, apparently using the plants only as pupation sites. The arrangement of families follows phylogenetic relationships; genera are listed alphabetically.

LIST OF *Polygonum*—ASSOCIATED LEPIDOPTERA IN FLORIDA

Tortricidae

Argyrotaenia ivana (Fernald)
Choristoneura parallela (Robinson)
**Epiblema otiosana* (Clemens)
Platynota rostrana (Walker)
Sparganothis sulfureana (Clemens)

Coleophoridae

Coleophora n. sp.

Gelechiidae

"*Aristotelia*" *absconditella* (Walker)
Chionodes discoocellella (Chambers)

Pyralidae

Ostrinia penitalis (Grote)
Parapoynx obscuralis (Grote)
Sylepta penumbralis (Grote)
Synclita obliteralis (Walker)

Papilionidae

**Battus philenor* (Linnaeus)

Lycaenidae

**Lycaena thoe* (Guérin-Méneville

Geometridae

Anacamptodes defectaria (Guenée)
**Apicia confusaria* (Hübner)
**Euphyia centrostrigaria* (Wollaston)
**Euphyia multiferata* (Walker)
**Haematopsis grataria* Fabricius
**Melanolophia canadaria* (Guenée)
**Nycterosea obstipata* (Fabricius)
**Prochoerodes transversata* (Drury)
[*Synchlora frondaria denticularia* (Walker)]
**Timandra amaturaria* (Walker)

Sphingidae

**Hyles lineata* (Fabricius)

Arctiidae

**Apantesis arge* (Drury)
Diacrisia virginica (Fabricius)
Estigmene acraea (Drury)
**Isia isabella* (Abbot & Smith)

Noctuidae

Acronicta oblinita (Abbot & Smith)

[*Anticarsia gemmatilis* (Hubner)]
Argyrogramma verruca (Fabricius)
**Dipterygia scabriuscula* (Linnaeus)
**Feltia subterranea* (Fabricius)
**Heliothis zea* (Boddie)
**Lithacodia carneola* (Guenée)
Neoerastria apicosa (Haworth)
Palthis asopialis (Guenée)
**Peridroma saucia* (Hübner)
**Plathypena scabra* (Fabricius)
**Simyra henrici* (Grote)
Spodoptera dolichos (Fabricius)
Spodoptera eridania (Cramer)

Acknowledgments

We thank R. W. Hodges (Systematic Entomology Laboratory, USDA, c/o Smithsonian Institution, Washington, D. C.) for determination of the Gelechiidae, B. Wright (Nova Scotia Museum, Halifax, Canada) for determination of the Coleophoridae, and J. A. Powell (University of California, Berkeley) for help with the Tortricidae. Research for this study was funded largely by a grant from the Florida Department of Natural Resources (D. H. Habeck, principal investigator) to investigate insect enemies of aquatic weeds in Florida. The critical reviews of the manuscript provided by H. V. Weems, Jr. (Florida State Collection of Arthropods, Division of Plant Industry, Gainesville) and C. A. Musgrave (University of Florida) are gratefully acknowledged. D. W. Hall, of the University of Florida Herbarium, provided many plant identifications.

Literature Cited

Ferguson, D. C. 1969. A revision of the moths of the subfamily Geometrinae of America north of Mexico (Insecta, Lepidoptera). Peabody Mus. Nat. Hist. Bull. 29:1-251. 49 pl.

Forbes, W. T. M. 1923. Lepidoptera of New York and neighboring states. Primitive forms, microlepidoptera, pyraloids, bombyces. Cornell Univ. Agr. Exp. Sta., Mem. 68:1-729.

Forbes, W. T. M. 1948. Lepidoptera of New York and neighboring states. Part II. Geometridae, Sphingidae, Notodontidae, Lymantriidae. Cornell Univ. Agr. Exp. Sta., Mem. 274:1-263.

Forbes, W. T. M. 1954. Lepidoptera of New York and neighboring states. Part III. Noctuidae. Cornell Univ. Agr. Exp. Sta., Mem. 329:1-433.

Forbes, W. T. M. 1960. Lepidoptera of New York and neighboring states. Part IV. Agaristidae through Nymphalidae, including butterflies. Cornell Univ. Agr. Exp. Sta., Mem. 371:1-188.

Habeck, D. H. 1974. Caterpillars of *Parapoynx* in relation to aquatic plants in Florida. Hyacinth Control J. 12:15-8.

Kimball, C. P. 1965. The Lepidoptera of Florida. An annotated checklist. Fla. Dept. Agr. & Consumer Services, Div. Plant Industry, Arthropods of Florida and Neighboring Land Areas 1:1-363. 26 pl.

Muenscher, W. C. 1944. Aquatic plants of the United States. Cornell Univ. Press, Ithaca. 374 p.

Matuura, A., and E. Munroe. 1970. Taxonomy and distribution of the European corn borer and allied species: genus *Ostrinia* (Lepidoptera: Pyralidae). Mem. Ent. Soc. Can. 71:1-112.

Stegmaier, C. E., Jr. 1971. Lepidoptera, Diptera, and Hymenoptera associated with *Ambrosia artemisiifolia* (Compositae) in Florida. Fla. Ent. 54:259-72.

Tietz, H. G. 1972. An index to the described life histories, early stages and hosts of the macrolepidoptera of the continental United States and Canada. Allyn Mus. Ent., Sarasota. 2 vol.