

A NEW SPECIES OF *EPIMORIUS* FEEDING ON BROMELIACEAE IN COSTA RICA (LEPIDOPTERA: PYRALIDAE: GALLERIINAE)

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ABSTRACT.—*Epimorius maylinae* n. sp., reared from *Werahia gladioliflora* (Wendland) (Bromeliaceae) in Costa Rica, is described. The pupa is also described and compared to the pupa of *Epimorius testaceellus* Ragonot, a species which also has been reared from Bromeliaceae. *Athaliptis* Schaus, described from Costa Rica, is newly synonymized with *Epimorius*. *Epimorius cymonia* Schaus, n. comb., is the type species of *Athaliptis* and is reported for the first time from *Pitcairnia* sp. (Bromeliaceae). Other galleriines reared from Bromeliaceae are discussed.

KEYWORDS: *Alpheias*, *Athaliptis*, biology, Bromeliaceae, Cacotherapiini, Central America, *Epimorius maylinae* n.sp., *Genopaschia*, hostplants, immatures, Mesoamerica, Neotropical, Panama, pineapple, pupa, Tirathabini, taxonomy.



Fig. 1-2. Adults of *Epimorius maylinae* Solis, n. sp.: 1) allotype female (forewing length 18mm), left; 2) holotype male (forewing length 18mm), right.

Five species now comprise *Epimorius*: *E. suffusus* (Zeller), the type species *E. testaceellus* Ragonot, *E. prodigiosus* Whalley, *E. caribellus* Ferguson, *E. cymonia* (Schaus), and *E. maylinae* Solis, the new species described in this study. In 1991, Ferguson reviewed the genus *Epimorius* Zeller. The genus belongs in the tribe Tirathabini because it has a broad uncus (not bifurcated) and lacks ocelli (versus present) (Whalley, 1964; Ferguson, 1991). Ferguson (1991) recognized four species: *suffusus* (Zeller), *testaceellus* Ragonot, *prodigiosus* Whalley, and *caribellus* Ferguson. The monotypic type species is *E. suffusus*, described from Nova Friburgo, Brazil (Zeller, 1877: 76, pl. 2, fig. 28). *Epimorius prodigiosus* was described from Peru, and Whalley (1964: 610, figs. 40, 101) tentatively placed it in *Epimorius*. *Epimorius caribellus* and *E. testaceellus* were described from the Caribbean. Ferguson (1991) described *E. caribellus* from Dominica based on one female.

Epimorius testaceellus was described from Jamaica, but in 1991 Ferguson reported the first record of this species and genus in the United States (Florida). Ferguson's study was inspired by a reared series of *E. testaceellus* from *Tillandsia fasciculata* Sw. (Bromeliaceae) in Florida (Heppner, 1992). The new species described here was also reared from Bromeliaceae (*Werahia gladioliflora* (Wendland) J. R. Grant) in Costa Rica, and another specimen was captured in Panama.

Recently, 5 female specimens bred in northwestern Costa Rica from *Pitcairnia* sp. were dissected and compared to *Athaliptis cymonia* Schaus (1913). The type specimen, a female from Juan Vinas, Costa Rica, and the dissection (HWC slide #15,674) are located at the National Museum of Natural History (USNM) and in

poor condition. Another female specimen collected by Schaus and Barnes from Sixola River, Costa Rica was dissected by D. C. Ferguson (USNM slide #57,332), but was misidentified as *E. suffusus* (Ferguson, 1991). Comparison of these two slides, genitalia of one of the females from the recently bred series, and *E. suffusus* specimens from Brazil, the type locality, confirmed that *A. cymonia* belongs in *Epimorius* and all the specimens listed above from Costa Rica are conspecific.

Epimorius maylinae Solis, new species (Fig. 1-13)

Diagnosis.— Entire hindwing bright yellow.

Description.— **Head** (Fig. 1-2): Ocelli and chaetosemata absent. Antenna of both sexes filiform, finely pubescent ventrally, scaled dorsally. Labial palpus sexually dimorphic, that of male upcurved to about middle of frons, segment 3 highly sclerotized appearing hook-like, ordinarily concealed by long, conical, frontal scale tuft, but specimen worn and frontal scale tuft not present; female labial palpus porrect, longer than that of male, length 3.5 times diameter of eye, frontal tuft with reddish scales. Proboscis present, length unknown, coiled. Extremely small maxillary palpus, about 1/8 length of first labial palp segment, present in female, not seen in male because labial palpus closely appressed to head. Vertex of female without scales; vertex of male with mostly white scales, but with tufts of yellow scales as long as scape behind antenna. **Forewing** (Fig. 3): Tegula with white and yellow scales. Wing venation complete (Fig. 3-4); R_3 and R_4 with a common base, intersecting with R_5 ; M_1 intersecting with base of $R_{2+3+4+5}$, discal cell closed; 1A and 2A forming a closed cell at base of wing. Pale-brown and darker brown scales; brown scales on costa from base of wing to distal end of discal cell and then from costa posteriorly to middle of discal cell to outer margin of wing, all other areas with beige scales including costa be-

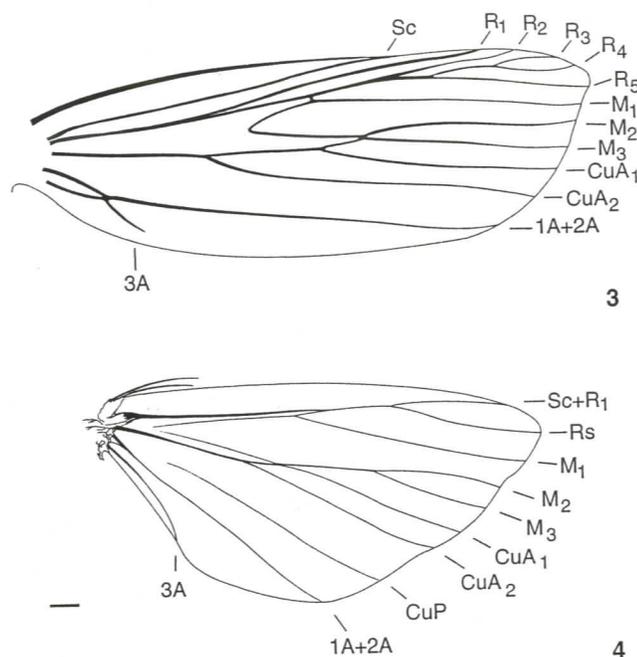


Fig. 3-4. Wing venation of *E. maylinae*: 3) forewing of female; 4) hindwing of male.

beyond discal cell; underside with mostly light brown scales; male with dense, compact tuft of lustrous-white specialized scales on underside near costa, at about 1/3 of wing length from base. Forewing length of male and female 18.0mm (n=2). *Hindwing* (Fig. 6): Wing venation complete although CuP only slightly visible. Female frenulum with 3 bristles; male frenulum with 1 bristle. Upperside bright yellow, underside bright yellow except costa, which has light brown scales similar in color to underside of forewing. *Abdomen*: Tympanal organ present with secondary venulae. Eighth abdominal sternite entirely sclerotized, anterior and posterior margins of 8th tergite sclerotized with a medial bar. *Male genitalia* (Fig. 5-6): Uncus simple, broad, and rounded with a small hook at apex; gnathos absent; valvae simple, transtilla prominent; juxta plate-like, rounded. Vesica of aedeagus with plate-like scobination. *Female genitalia* (Fig. 7): Ostial opening at bottom of rounded, bowl-shaped depression; posterior margin membranous, not sclerotized. Ductus bursae twice as long as corpus bursae; corpus bursae a distinct sac without signa. Posterior and anterior apophyses almost equal in length (1.5 mm). *Pupal exuvia* (Fig. 8-9): Length: 18mm. Ventral view: Labial palpus a small triangle posterior to labrum; pilifers prominent; maxillary palpus not present; femur of prothoracic legs, prothoracic legs (fore leg), mesothoracic legs (mid leg), and antennae visible; proboscis visible about 7/8 length of mesothorax; hind tarsi extend to anterior margin of abdominal segment 6; abdominal segment 5 barely visible under mesothoracic segment; abdominal segments 6-8 with various densities of conical spines, density decreasing posteriorly; abdominal segment 7 with 2 lateromedial large conical spines; abdominal segments 9-10 with many large conical spines in circular patterns; anal opening visible in segment 10. Lateral view: Front with large conical structures; prothoracic segment with strongly sclerotized scalloped medial ridge continuing to abdominal segment 4; dark spot located anteromedially on mesothorax; abdominal segments 2-4 with spiracles protruding; very short, lateral setae present on metathorax to abdominal segment 3 and dorsal to spiracles on abdominal segment 2 to 4. **Types**.— HOLOTYPE, adult male and associated pupal exuvia, Estación Biología La Selva, Heredia, Costa Rica, May 1995, 50-150m, 10°26'N, 84°01'W, Maylin Paniagua. Deposited at the Instituto Nacional de Biodiversidad (INBio), Santo Domingo, Costa Rica [CRI001, 253623]. ALLOTYPE, adult female and associated pupal exuvia, same data as above except [CRI001, 253638]; also deposited at INBio. PARATYPE, adult female, Panama, Cerro Campana, 800m, 7 Jan 1988, MacDonald & Schiefer (William W. Cross Expedition); deposited at the Mississippi Entomological Museum (MEM).

Biology (Fig. 10-11).— Feeding by larvae was not observed, but it presumably occurs in the fruit capsules of *Werauhia gladioliflora* (Bromeliaceae). Head capsules of early instar larvae were found in

the fruit capsules. Pupation occurs in the capsule; the exuvia of 1 pupa was found in each capsule. The fruit capsule has a capped hole, basally located in the only complete capsule available (Fig. 12-13). Position of the pupa with respect to the orientation of the capsule does not seem to be significant because in one capsule the anterior part of the pupa is towards the apex of the capsule and in the other capsule it is pointing basally.

Comparison to other species.— This new species appears to be closely related to *E. prodigiosus* as revealed by similarities of the female genitalia. Whalley (1964) described this species based on 5 females from Peru and tentatively placed it in *Epimorius*. *Epimorius prodigiosus* and *E. maylinae* share a long ductus bursae, twice as long as the distinct corpus bursae, and a deep ostial cavity. *Epimorius caribellus* and *E. testaceellus* share a much shorter ductus bursae, not even as long as the non-distinct corpus bursae and an ostial cavity that is broader than deep. *Epimorius prodigiosus* and *E. maylinae* also have posterior and anterior apophyses that are almost equal in length (1.5mm). *Epimorius caribellus* (3.5 and 2.5mm) and *E. testaceellus* (2.0 and 1.0mm) have posterior apophyses that are about 1mm longer than the anterior apophyses. *E. prodigiosus* and *E. maylinae* are larger moths, with forewing lengths of 31 and 18mm, respectively; *E. caribellus* and *E. testaceellus* have maximum wing lengths of 15mm and 12mm, respectively. *Epimorius caribellus* and *E. testaceellus* are reddish-brown moths with simple, diffuse, darker brown forewing patterns. In the forewing of *E. prodigiosus*, there is a bit of yellow centrally which "extends between veins almost to margin" (Whalley, 1964) and it has a brown hindwing; the *E. maylinae* forewing has a beige area centrally, and it has a bright yellow hindwing.

Externally, *E. cymonia* is less reddish than, but most similar to *E. testaceellus*, *E. caribellus* and *E. suffusus*. *Epimorius cymonia* has a bursa copulatrix that just extends to the anterior margin of the 7th segment, about the same length as that of *E. testaceellus*. The corpus bursae of *E. cymonia* is clearly globular in shape, but that of *E. testaceellus* tapers out gradually from the ductus bursae. The ostial cavity of *E. cymonia* and *E. caribellus* is twice as deep as that of *E. testaceellus*. The forewing length of female *E. cymonia* is variable: the type has a length of 11.0mm, the 3 specimens collected by Schaus vary from 11.0mm to 13.0 mm, and the recently reared specimens from Costa Rica vary from 13.0mm to 16.0m. Males of *E. cymonia* are unknown.

The pupa of *E. testaceellus* was described by Heppner (1992), and I have before me a pupal exuvia from the original reared series. This and *E. maylinae* lack maxillary palpi, although *Galleria mellonella* (Linnaeus), used by Mosher (1916) to define pyraloids with the exception of epipaschiines, has maxillary palpi. Mosher also stated: "Maxillae [= proboscis] never more than three-fifths the length of the wings" (1916:72). This is true for *G. mellonella* and other species I examined in the Galleriinae but not for *E. testaceellus* and *E. maylinae*, in both of which it consistently extends to at least 7/8 the length of the wings. Although *E. testaceellus* and *E. maylinae* have a ridge from the prothorax to abdominal segment 8, becoming less prominent posteriorly, *E. testaceellus* has a double ridge, and *E. maylinae* has a single ridge as does *G. mellonella*. Also, the prothorax of *E. maylinae* is completely and highly sclerotized with ridges, but *E. testaceellus* has only another highly sclerotized lateral ridge about three-quarters the length of the prothorax. Mosher (1916) also used the presence of a medial ridge to define the Galleriinae, but not all galleriines have highly sclerotized ridges (e.g., *Corcyra cephalonica* (Stainton)). The terminal segment of *E. testaceellus* has a "pronounced cup-like protrusion with sharp lateral points and side spur" (Heppner, 1992) and this protrusion is present in other galleriines (e.g., *G. mellonella*,

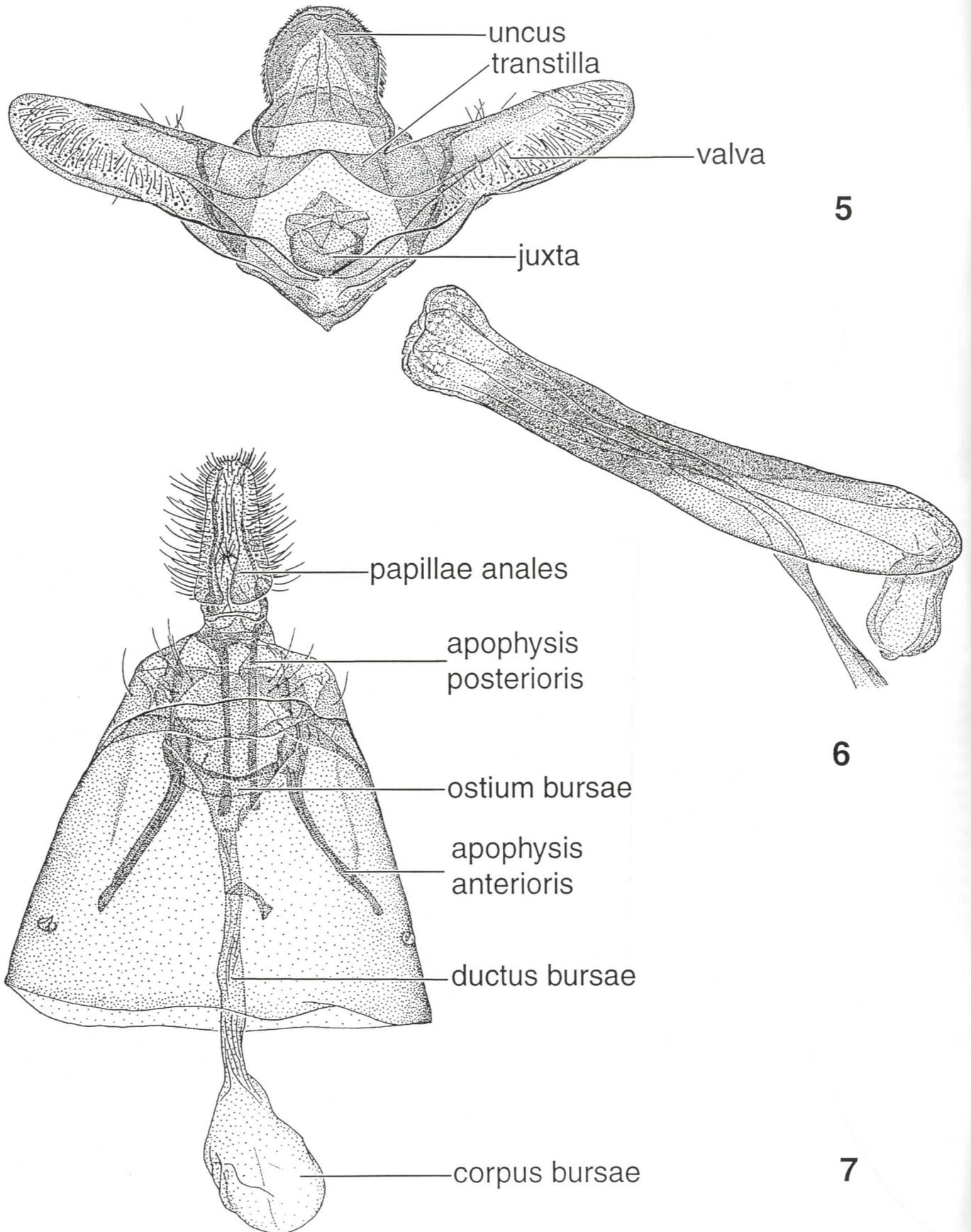


Fig. 5-7. Genitalia of *Epimorius maylinae*: 5) male genitalia; 6) detail of aedeagus; 7) female genitalia.

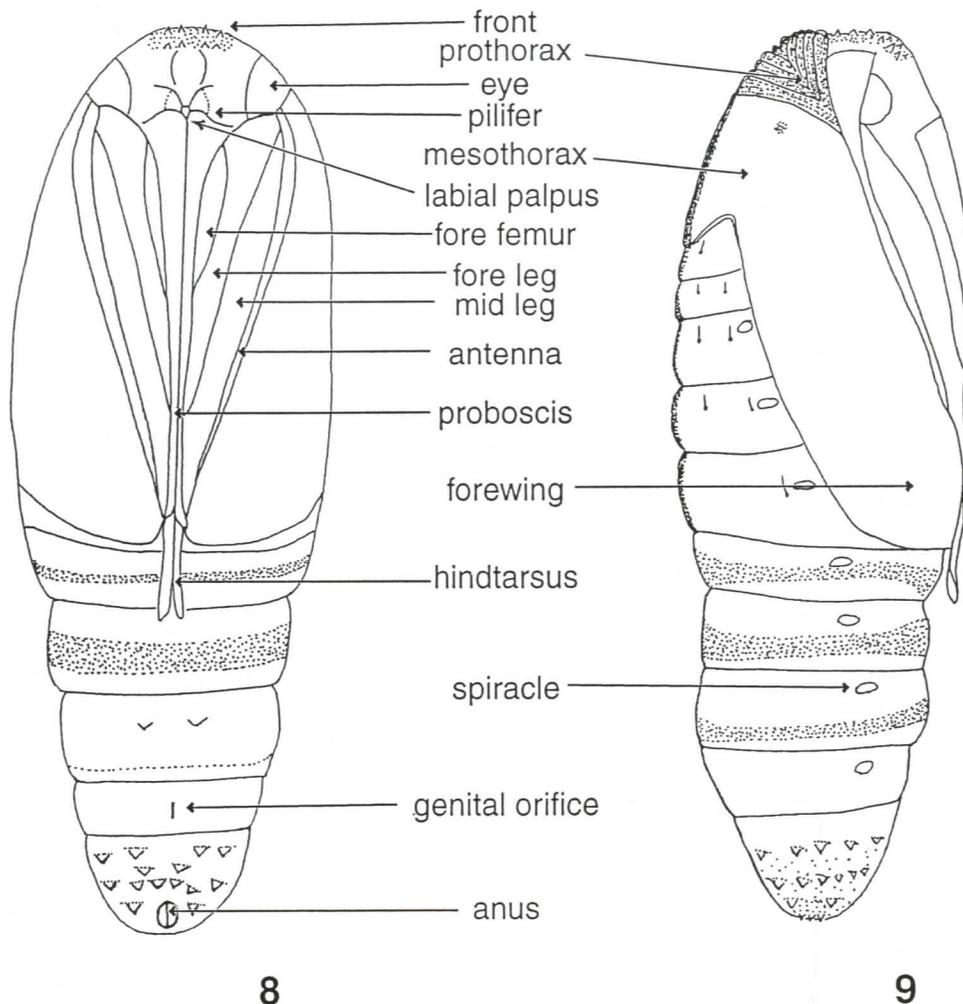


Fig. 8-9. Pupa of *Epimorius maylinae*: 8) ventral view; 9) lateral view.

C. cephalonica) although not in *E. maylinae* which has only circular sets of conical spines. The pupal exuviae of *E. cymonia* recently bred from *Pitcairnia* sp. were not available.

Etymology.— This species is named in honor of Maylin Paniagua, a parataxonomist associated with INBio, who reared the adults from Costa Rica.

Discussion.— *Epimorius maylinae* has not been collected at lights despite intensive collecting by other parataxonomists throughout Costa Rica. It might be inferred that this species may not be attracted to lights, although the Panama specimen was presumably caught at light. The types are the only known specimens, although the host plant is known to be common in Central America: "My own observations in the field in Costa Rica have shown this [plant] species to be one of the most common next to *G. monostachia*. . ." (Grant, 1995). In addition, the known distribution of the host plant, southern Mexico to Ecuador and French Guiana (Grant, 1995), implies that this galleriine species may have a concurrent, broad distribution. Visual inspection of opened capsules in herbarium specimens at the National Museum of Natural History (Smithsonian Institution, Washington, D.C.) did not reveal similar insect damage.

Epimorius cymonia was recently bred at Estación Pitilla, Area Conservation de Guanacaste, Costa Rica by Calixto Moraga. Five pupae in silken cocoons were collected 12 Nov 1999 within the fruit capsules of *Pitcairnia* sp. (Bromeliaceae). The adults eclosed between 17 Nov 1999 and 28 Nov 1999.

One other species, *Schistotheca canescens* Ragonot, in the Tirathabini has recently been reported to have been reared on *Puya chilensis* (Bromeliaceae) in Chile (Angulo and Olivares, 2003).

Two other species of Galleriinae in the tribe Cacotherapiini (=Macrothecini) have been reported, and verified with reared adults, to feed on Bromeliaceae, *Alpheias conspirata* Heinrich and *Genopaschia protomis* Dyar. The following records are from specimens at the National Museum of Natural History, Smithsonian Institution (USNM).

The original type series of *Alpheias conspirata* Heinrich (1940) was reared from *Ananas cosmosus* (L.) Merr. (pineapple). The caterpillars of *A. conspirata* were intercepted and reared at Texas ports from localities in Mexico (Oaxaca, Veracruz). The National Collection (USNM) also has larvae identified by H. W. Capps as *Alpheias bipunctalis* Hampson on pineapple, on bulbs and roots from orchids from Jamaica, and from pineapple stems from Jamaica, but these identifications were not based on reared adults and therefore the identifications are not reliable.

Genopaschia protomis Dyar, intercepted from Puerto Rico on pineapple, was reared to the adult stage at the New York port. In addition, material of *G. protomis* from Puerto Rico and Colombia was sent in for identification; one specimen from Puerto Rico has a note by C. Heinrich "from *Pseudococcus brevipes* on pineapple," and the specimen from Colombia has a note stating "Fruto madroño" (= *Arbutus menziesii* Persch). Larvae of *G. protomis* identified by H. W. Capps include an interception at the New York port from Puerto Rico with a note stating "on sapodilla with mealybugs";



Fig. 10-13. Pupal exuvia details of *Epimorius maylinae*: 10) pupal skin (arrow) in capsule of *W. gladioliflora*; 11) pupal exuvia (arrow) in capsule of *W. gladioliflora*; 12) capsule of *W. gladioliflora* showing capped hole (arrow); 13) close-up of capped hole (arrow) on capsule of *W. gladioliflora*.

various interceptions at the Boston port from Jamaica, Montserrat, and the British West Indies on pineapple; and from unknown ports of interception on pineapple from Martinique, Jamaica, and Cuba (all of the above identifications are unverified by reared adults).

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