

Brown Lacewings (of Florida) (Insecta: Neuroptera: Hemerobiidae)¹

Ellis G. MacLeod and Lionel A. Stange²

The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.

Introduction

Brown lacewings are small to medium-sized insects (forewing length 3 to 9 mm (~1/8 to 1/2 in) in Florida) that are predaceous both as adults and larvae. They prefer soft-bodied insects such as aphids, mealybugs, and also insect eggs. Because of the longevity of the adults, months in some species; voracious appetites, for example *Micromus posticus* (Walker) larva consumed an average of 41 aphids during its life (Cutright 1923); and high reproductive capacity, one female *Hemerobius humulinus* Linnaeus can lay 460 eggs (Smith 1923); they are useful biological control agents. Some species have been used for this purpose, but limited work has been done. In Texas, *Symphorobius barberi* Banks is mass reared for control of the citrus mealybug (Hart, personal communication). Florida has a small fauna of 10 species in four genera, and this publication provides keys to identification of the adults. There are 58 species in North America.

Distribution

All the Florida species are found in northern Florida, and three of these, *Symphorobius occidentalis*, *Symphorobius gracilis*, and *Boriomyia fidelis*, were recorded for the first time for Florida from Gainesville. *Boriomyia speciosa* has not been rediscovered in Florida since Carpenter (1940) recorded it from Sanibel Island. *Symphorobius amicus*, *Soriomyia barberi*, and *Hemerobius stigma* are known as far south as Highlands County, whereas both species of *Micromus* are found throughout peninsula Florida. *Micromus subanticus* is also found in the Keys and in the Caribbean. *Hemerobius humulinus* and *Hemerobius stigma* are Holarctic, but the former is relatively uncommon in Florida.

Biology

Females lay non-stalked eggs, usually singly or in small groups. There are three larval instars. The 1st instar is active in all species. It can run fast, moving the head from side to side as it moves. In *Symphorobius* spp. and especially *Boriomyia* spp., the later instars are relatively immobile. A white cocoon of double structure (outer loose thread, inner compact structure) is constructed in protected areas. Most groups appear to prefer aphids, but *Symphorobius* spp. may prefer coccid insects (especially mealybugs). Spiders are considered one of the most important natural enemies of

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2. Ellis G. MacLeod and Lionel A. Stange, Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL.

lacewings. References on biology for species occurring in Florida are:

- Cutright, 1923: *Micromus posticus*
- Smith, 1923: *Symphorobius amicus*, *Hemerobius humulinus*, *Hemerobius stigma* and *Micromus posticus*
- Smith, 1934: *Soriomyia barberi*
- MacLeod, 1960: *Boriomyia fidelis*

Identification

Adults have a wing venation with two or more branches arising directly from the fused stem of R1 + Rs. The wing membrane has microtrichia (contrasted with Chrysopidae), ovipositor not exerted, antenna moniliform, and front legs not raptorial.



Figure A. Adult brown lacewing (Neuroptera: Hemerobiidae).
Credits: University of Florida



Figure B. Adult brown lacewing *Hemerobius* sp. (Neuroptera: Hemerobiidae).
Credits: Ken Gray, Oregon State University

Larvae have jaws that are fairly straight basally and curved apically, mandibles lacking teeth along medial margin, pretarsal claws lacking a trumpet-shaped empodium (a spine or lobelike process) (except 1st instar), and are not trash bearers, in contrast to many statements in older literature (e.g., Comstock 1925, *Introduction to Entomology*, p. 297).

Detection and Survey

Adults are commonly attracted to lights. Adults and larvae can be found by beating or sweeping plants, especially oaks and pines and plants with high aphid infestations such as alfalfa. Brown lacewings resemble green lacewings (Chrysopidae) but are brownish and are less common. There are 58 North American species. The eggs are laid on plants, but not stalked. The brown lacewing larvae differ from green lacewing larvae in that they do not possess tubercles (a small knoblike or rounded protuberance). Both adults and larvae prey on aphids, other soft-bodied insects and mites.



Figure C. Larva of a brown lacewing (Neuroptera: Hemerobiidae) preparing to attack and feed on an aphid. The black-colored aphid to the right was probably parasitized by a wasp.
Credits: Lyle J. Buss, UF/IFAS

Key to Genera and Species of Brown Lacewings of Florida

(Wings and male terminalia after Carpenter 1940)

1. Forewing with costal area quite narrow at base, lacking a recurrent humeral vein (Figures 1, 2) *Micromus*
Rambur 2

1'. Costal area of forewing much broader basally (Figure 7), often abruptly broadened (Figures 4, 10) and always with a recurrent humeral vein 3

2 (1). Inner gradate veins of forewing much more than their lengths apart (Figure 1); male terminalia as in Figure 3a . . . *Micromus subanticus* (Walker)

- Observations: *M. subanticus* is found throughout Florida and also in the Caribbean (Cuba, Dominican Republic, etc.). It occurs in a variety of habitats including both trees

and grasses. It is often found in alfalfa fields where both larvae and adults feed on aphids.

2'. Inner gradate crossveins of forewing at most only their lengths apart (Figure 2) ; male terminalia as in Figure 3b . . . *Micromus posticus* (Walker)

- Observations: In most of the Nearctic Region this is the most common *Micromus*, but in Florida it is apparently somewhat less common than *subanticus* and does not occur in the Keys. Its habitats are similar to those of *M. subanticus*. Smith (1923) and Cutright (1923) published biological observations.

3 (1'). Forewing with three or more branches arising from the fused stem of R1 and Rs distal to separation of MA (Figure 4); maxillary palpus 5-segmented, labial palpus with three segments *Boriomyia* Banks 4

3'. Forewing with fewer than 3 branches arising from R1 + Rs distal to separation of MA (Figure 7), most-basal branch arising from R1 + Rs often stalked with MA (Figure 10); maxillary and labial palpi with a small peg-like apiculus so that they appear 6- and 4-segmented respectively (Figure 16) 5

4 (3). Male paramere with lateral process not forked distally (Figure 6a); forewing usually lacking dark brown spots around distal crossveins between branches of Cu (although light brown cloudings of the membrane adjacent to the crossveins may be present), usually with 2 broad transverse light brown bands paralleling the inner and outer series of gradate crossveins *Boriomyia fidelis* (Banks)

- Observations: Recorded here for the first time from Florida (34 specimens from Gainesville, March to September).
- 4'. Male paramere with lateral process forked distally (Figure 6b); forewing usually with discrete dark brown spots around distal crossveins of Cu and the M-Cu crossvein, pale brown maculations sometimes present elsewhere, especially around the inner and outer series of gradate crossveins *Boriomyia speciosa* (Banks)
- Observations: Carpenter (1940) recorded female specimens from Sanibel Island but we know of no new records from Florida. Few specimens are known so that the constancy of the wing markings must still be verified.

5 (3'). Forewing with five or more outer gradate veins (Figure 7); forewing without crossvein between MP and MA *Hemerobius* Banks 6

5'. Forewing with four or fewer outer gradate veins (Figure 10); MP and MA connected by crossvein shortly after origin of former (Figure 10) *Symphorobius* Banks . . . 7

6 (5). Pronotum and mesonotum with broad yellow stripe; upper process of male ectoproct forked distally (Figure 8) . . *Hemerobius humulinus* Linnaeus

- Observations: This holarctic species appears to be uncommon in Florida. Killington (1937) and Smith (1923) provided biological data.

6'. Pronotum and mesonotum with, at most, a narrow median stripe (this is often absent); mesonotum without defined stripe (Figure 17); upper process of male ectoproct not forked (Figure 9) *Hemerobius stigma* Stephens

- Observations: This is the most common *Hemerobius*, ranging from the Panhandle to Highlands County. Smith (1923) gave some biological data. Adults hibernate. Tjeder (1960) synonymized *stigmaterus* Fitch.

7 (5'). Forewing without radial crossvein; male ectoproct with three processes, none bifurcate; upper process shorter than lower one (Figure 11) *Symphorobius barberi* Banks

- Observations: This is the most widespread U.S. species and has been introduced into Hawaii for biological control. It is being released in Texas for control of citrus mealybug. In Florida there are records from Escambia County to Hillsborough County.

7'. Forewing with radial crossvein (Figure 10, "rc"); male ectoproct either with two processes, or, if three, one is bifurcate or the upper as long as lower one 8

8 (7'). Forewing vein Cul forks nearer hindmargin than to crossvein m-cu; male ectoproct with two processes *Symphorobius occidentalis* Fitch

- Observations: This is an uncommon species recorded here from Florida for the first time (two males, Gainesville, March, October). Besides the distinctive wing venation and male ectoproct, the forewing markings are characteristic with veins dark brown and cell pattern similar to *S. gracilis*, but with the gradates more boldly margined.

8'. Forewing vein Cul forks at or near crossvein m-cu (Figure 10); male ectoproct with three processes 9

9 (8'). Most cells of forewing pale in centers and along margins of veins; veins nearly uniformly dark with at most slightly darker points at bases of setae; male ectoproct with

lower process bifurcate (Figure 13) *Sympherobius gracilis* Carpenter

- Observations: This uncommon species is recorded here from Florida for the first time (14 specimens from Gainesville, May to July).

9'. Ells of forewing membrane hyaline with irregular gray or brown blotching; veins pale with dark spots at setal bases (especially along Cu and A) and where crossed by membrane maculations; male ectoproct without bifurcate process (Figure 14) *Sympherobius amicus* (Fitch)

- Observations: This appears to be the most common species in Florida, ranging from the Panhandle south to Highlands County. Smith (1923) described its biology. Both male terminalia and wing maculation are distinctive.

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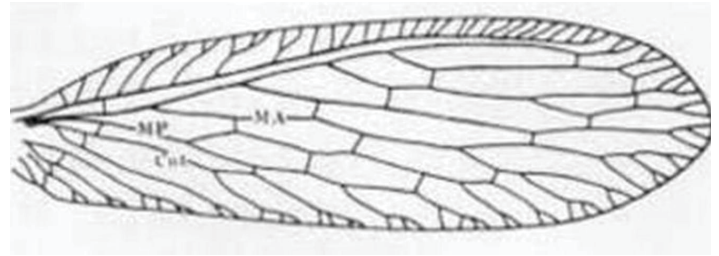


Figure 1. Forewing - *Micromus subanticus* (Walker).

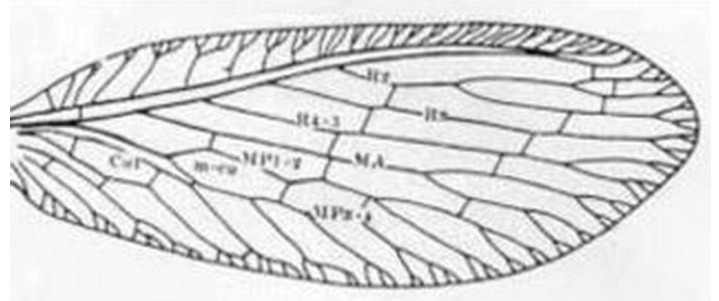


Figure 2. Forewing - *Micromus posticus* (Walker).
Credits: Division of Plant Industry

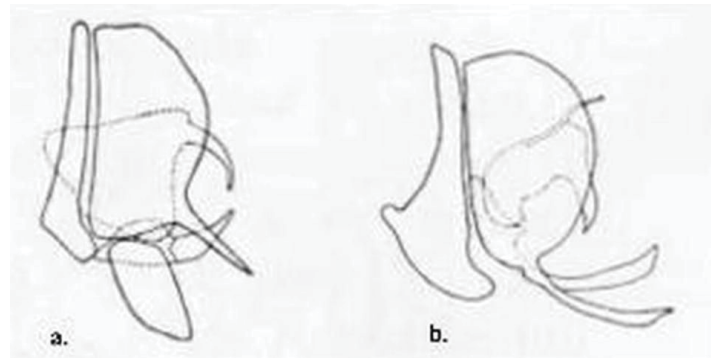


Figure 3a/b. Male terminalia - a. *Micromus subanticus* (Walker) b. *Micromus posticus* (Walker).

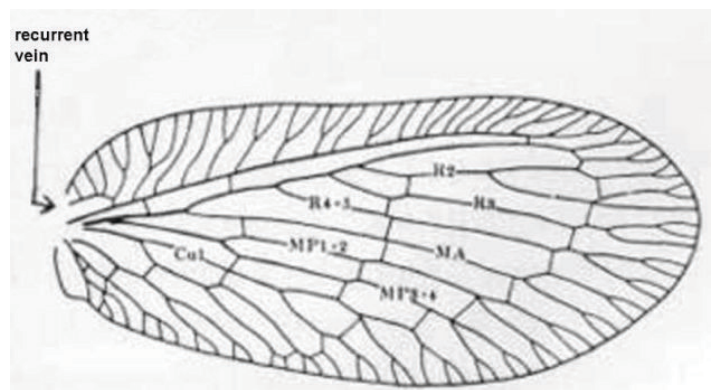


Figure 4. Forewing - *Boriomyia fidelis* (Banks).
Credits: Division of Plant Industry

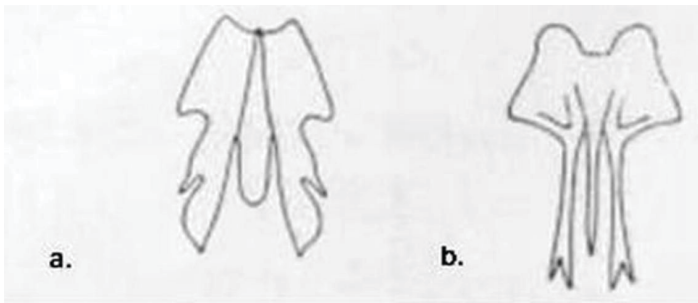


Figure 6 a/b. Male paramere - a. *Boriomyia fidelis* (Banks) b. *Boriomyia speciosa* (Banks).

Credits: Division of Plant Industry

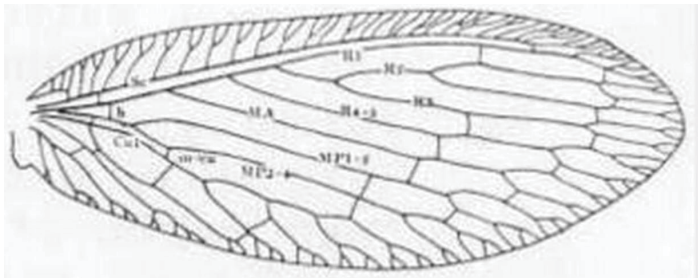


Figure 7. Forewing - *Hemerobius stigma* Stephens.

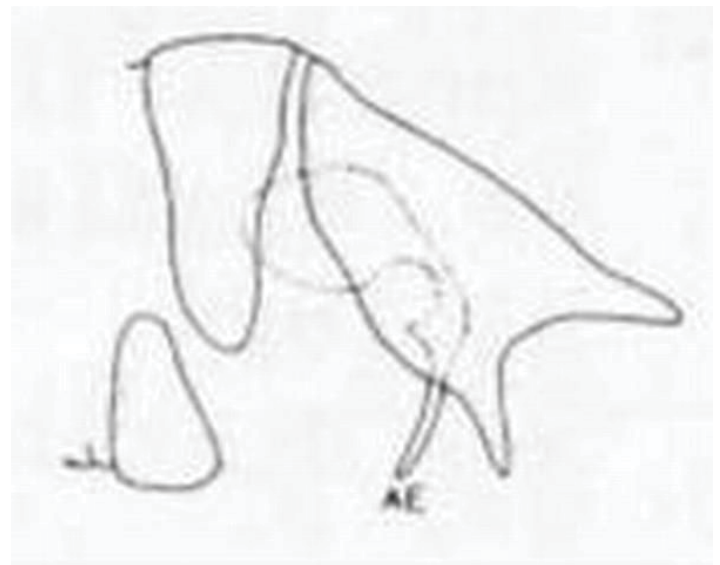


Figure 9. Male terminalia - *Hemerobius stigma* Stephens.

Credits: Division of Plant Industry

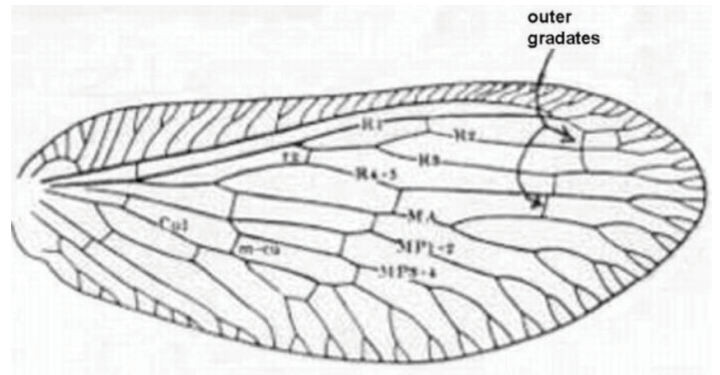


Figure 10. Forewing - *Sympherobius amicus* (Fitch).

Credits: Division of Plant Industry



Figure 8. Male terminalia - *Hemerobius humulinus* Linnaeus.

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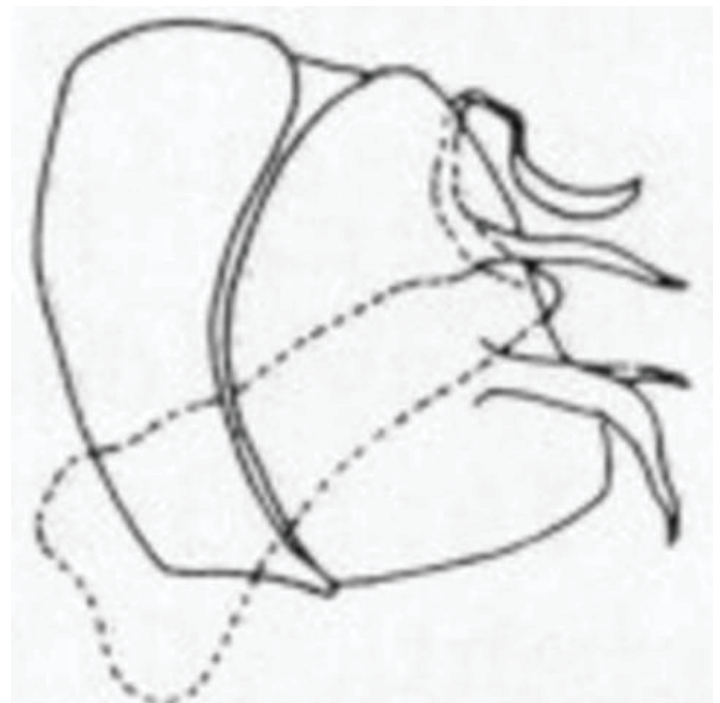


Figure 11. Male terminalia - *Sympherobius barberi* Banks.

Credits: Division of Plant Industry

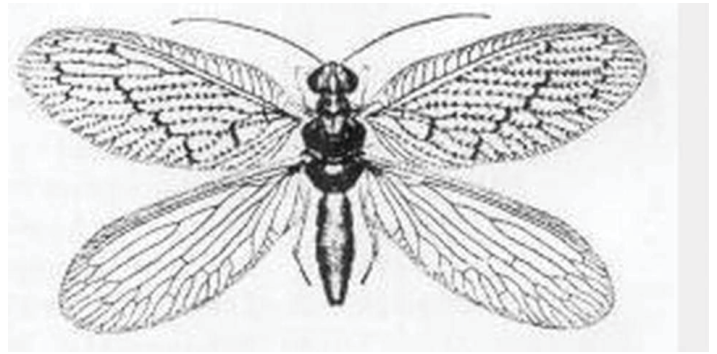


Figure 17. *Hemerobius stigma* (after Smith, 1923).
Credits: Division of Plant Industry

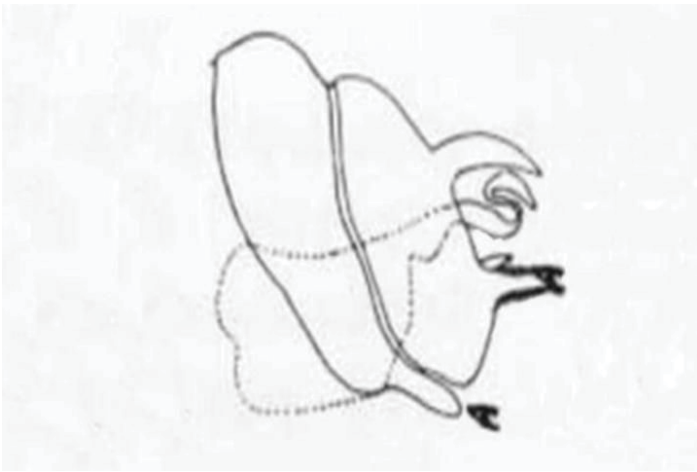


Figure 13. Male terminalia - *Symphorobius gracilis* Carpenter.
Credits: Division of Plant Industry

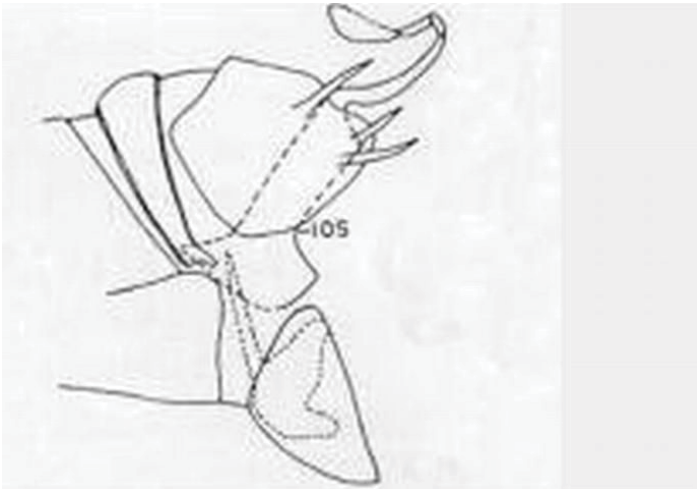


Figure 14. Male terminalia - *Symphorobius amicus* (Fitch).

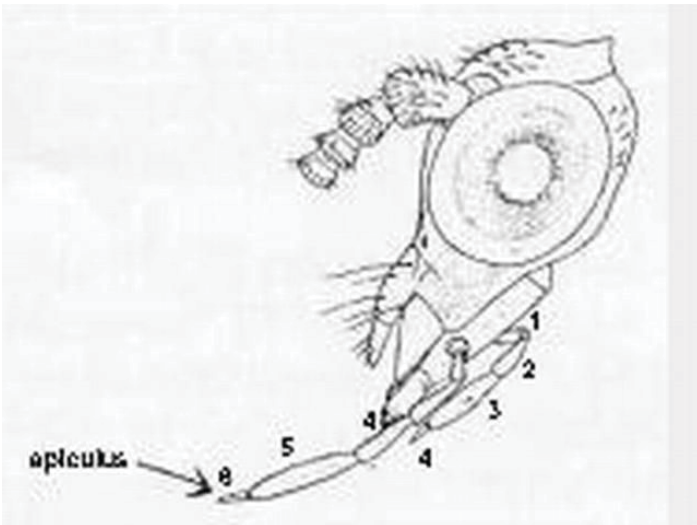


Figure 16. Head of *Hemerobius* (after Tjeder, 1961).
Credits: Division of Plant Industry