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The Green Lacewings of Florida (Neuroptera:Chrysopidae). 1. Genera[1]

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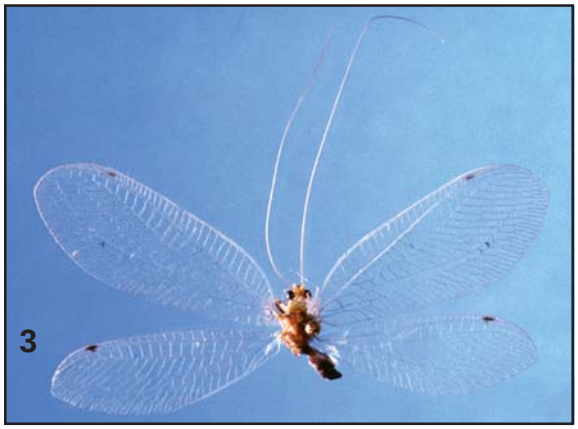
INTRODUCTION: The Chrysopidae are one of the largest and economically most important families of the Neuroptera. There are about 1,300 currently recognized species included in about 87 genera and 3 subfamilies (Brooks and Bernard 1990) in the world. In Florida there are 22 species in 9 genera, all placed in the subfamily Chrysopinae (Penny *et al.* 1997). The larvae are voracious predators of small, comparatively soft-bodied arthropods such as aphids, scale insects, whiteflies, thrips, insect eggs and other prey (Muma 1959; Canard *et al.* 1984). For this reason they are widely used in biological control. The adults are usually predators, but a few species feed on pollen.



Figs. 1-4. 1. Dorsal view of head and pronotum, *Plesiochrysa brasiliensis* (Schneider); 2. Frontal view of head, *Chrysopodes collaris* (Schneider); 3. *Leucochrysa insularis* (Walker); 4. Larva, *Ceraeochrysa valida* (Banks).

Photography credit: Jeffrey Lotz, DPI

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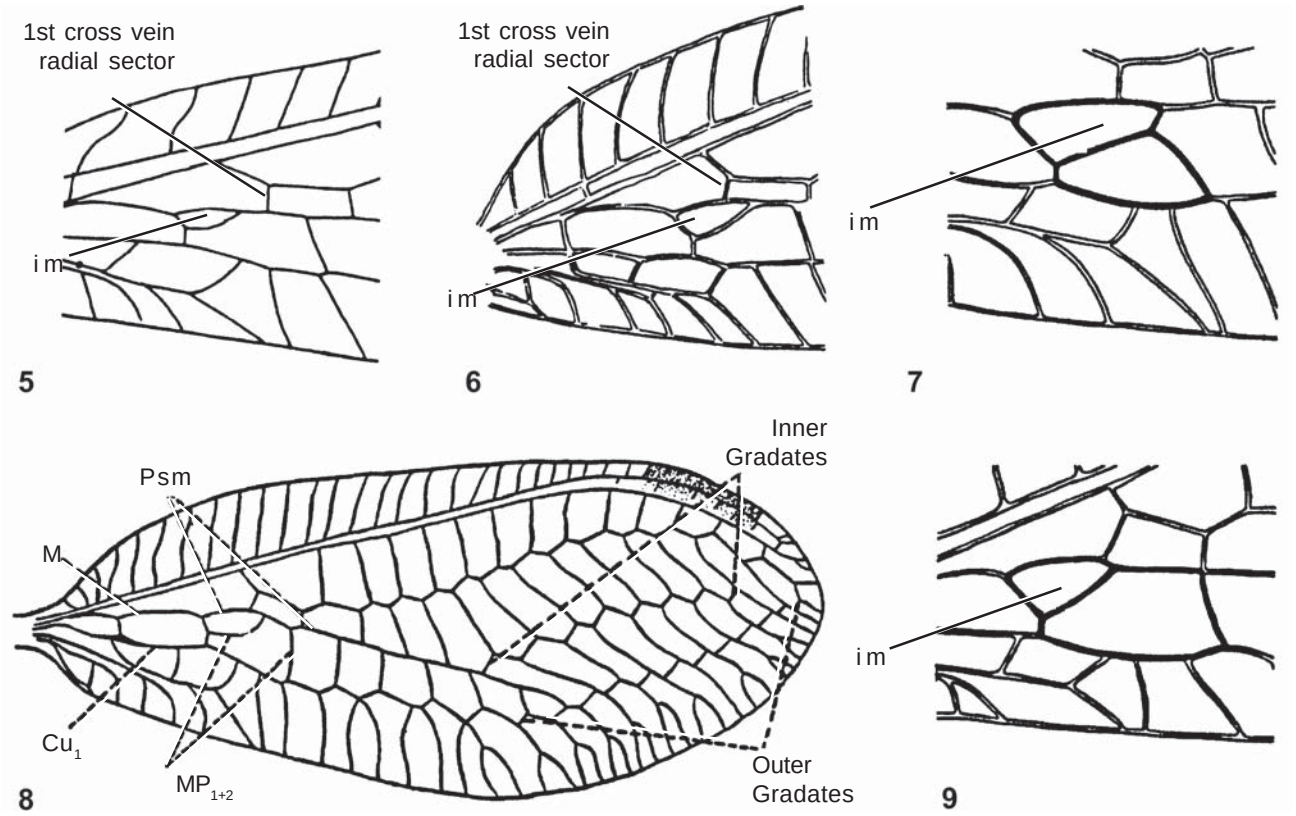

Figs. 5-9. 5. Base of fore wing, *Chrysoperla* sp.; 6. Base of fore wing, *Chrysopa* sp.; 7. Base of fore wing, *Leucochrysa insularis;* 8. Fore wing of *Chrysopa* sp.; 9. Base of fore wing of *Nodita* sp. (after Bickly and MacLeod 1956).

IDENTIFICATION: The members of this family are usually greenish in color when alive but often turn yellowish after death. Some groups are brownish in color. Nearly all members of this family have a tympanic organ located ventrally on the base of the radial vein (except species of Nothochrysinae) which is unique among insects. Adult green lacewings have biting mouthparts, the mandibles can be symmetrical or asymmetrical; long, filamentous antennae; and the wings have abundant and characteristic venation including usually the intramedian cell (im, Fig. 5-7, 9), the shape of which has generic value. In contrast to many Neuroptera, the chrysopid wing membrane is transparent and without microtrichia.

Key to Genera of Florida Chrysopidae: Adults

1. Flagellomeres 6-10 very broad, at most 1.1 times longer than broad; pretarsal claws simple; eye large, greatest diameter nearly as much as interocular diameter; larvae associated with ants (Belanopterygini) 2
1'. Flagellomeres 6-10 narrower, at least 1.25, usually more than 1.5 times longer than broad; pretarsal claws often with subbasal tooth; eye usually smaller, greatest diameter much less than interocular diameter; larvae not associated with ants 3

2. Pronotum twice as broad as long, with 8 large dark brown spots; antennal flagellum black at base .....*Abachrysa* Banks (*Abachrysa eureka* Banks 1931, only species in the genus, is found in the southeastern U.S.A. (AL, AR, Fl, GA. MS, TX)
2'. Pronotum about 1.5 times as broad as long, lacking spots but with broad dark red or purplish marginal or submarginal band; antennal flagellum completely pale brown ..... *Nacarina* Navás (Only 1 species in Florida, *Nacarina robusta* (Banks) 1905; known from the Panhandle and Highlands County.)

3. Hind wing pterostigma with dark brown spot (Fig. 3); antenna longer than fore wing (Leucochrysini); fore wing cell im quadrangular or foot of basal sectoral cross vein of fore wing about same level as origin of radial sector; larvae are trash-carriers 4
3'. Hind wing pterostigma without dark brown spot; antenna usually shorter than fore wing; fore wing cell im triangular, basal sectoral crossvein distal to origin of radial sector; larvae not trash-carriers (except *Ceraeochrysa*) 5

4. Fore wing cell im quadrangular (Fig. 7) ..... *Leucochrysa* McLachlan (Only 1 Florida species, *Leucochrysa insularis* (Walker) 1853; widespread in eastern United States and the Caribbean.)

4'. Fore wing cell im triangular (Fig. 9) ..... *Nodita* Navás
(There are 3 species in Florida: *N. callota* Banks 1915, *N. floridana* (Banks) 1897 and *N. pavida* (Hagen) 1861)

5. Hind wing lacking inner gradate cross veins ..... *Eremochrysa* Banks
(There is 1 unconfirmed record from the Florida Panhandle of *E. punctinervis* (McLachlan) 1869)
5'. Hind wing with many inner gradate cross veins (Fig. 8) 6

6. Fore wing with first RS cross vein meeting vein MA distal to apex of cell im (Fig. 5); pronotum without red or orange marginal or submarginal bands (often yellow median band); antennal flagellum pale, gradate cross veins usually green; male sternites VIII and IX fused, apex with distinct lip ..... *Chrysoperla* Steinmann
(The 4 Florida species are *C. externa* (Hagen) 1861, *C. harrisii* (Fitch) 1855, *C. plorabunda* (Fitch)1855, and *C. rufilabris* (Burmeister) 1839. All species are probably widespread in Florida since they are used for biological control.)
6'. Fore wing with first RS cross vein meeting vein MA before apex of cell im (Fig. 6); pronotum usually with red or orange marginal or submarginal bands; antennal flagellum sometimes dark brown, gradate cross veins often dark brown; male sternites VIII and IX not fused, without distinct lip 7

7. Fore wing with radial gradates oblique; pronotum with 4 reddish spots (Fig. 1) ..... *Plesiochrysa* Adams
(The widespread Neotropical species, *P. brasiliensis* (Schneider), has been reported for Florida.)
7'. Fore wing with gradates straight; pronotum marked differently 8

8. Gena unmarked; antennal scape with 1 or more red, brown, or black lines or else colored with homogeneous reddish pigment ..... *Ceraeochrysa* Adams
(Most speciose genus in the New World with 6 species in Florida: *C. cincta* (Schneider) 1851, *C. claveri* (Navás), *C. cubana* (Hagen) 1861, *C. lineaticornis* (Fitch) 1855, *C. smithi* (Navás), and *C. valida* (Banks) 1895. Both the adults and trash-carrying larvae have been keyed by Tauber *et al.* (2000)
8'. Gena marked with red or antennal scape completely unmarked 9

9. Face marked with red or pink transverse lines between the anterior tentorial pits and below the antennal fossae (Fig. 2); eyes relatively large; wings narrow ..... *Chrysopodes* Navás
(*C. collaris* (Schneider) 1851 is found in South and Central Florida)
9'. Face without such lines or if lines present, colored dark brown; eyes small; wings broad ..... *Chrysopa* Leach
(Penny *et al.* (2000) have keyed the U.S. species including the Florida species *C. incompleta* Banks, *C. nigricornis* Burmeister 1839, *C. oculata* Say, *C. quadripunctata* Burmeister 1839, and *C. slossonae* Banks)

Larvae

(unknown: *Abachrysa; Nacarina; Chrysopodes; Plesiochrysa*)

1. Non-trash carriers; abdomen long and slender, longer than head and thorax together, without hooked setae; thorax with scoli no longer than wide 2
1. Trash carriers; abdomen short and broad (not much longer than head and thorax together), with many hooked setae (Fig. 4); thorax with scoli at least twice as long as wide, bearing elongate setae 3

2. Head capsule with two prominent, black, elongate spots ..... *Chrysoperla*
(Larvae are described by Tauber 1974)
2'. Head capsule with 3 or 4 black or reddish spots ..... *Chrysopa*

3. Prothoracic scolus over 5 times longer than wide, extending beyond head (third instar) (Fig. 4) .....
..... *Leucochrysa; Nodita*
(Notes on larvae by Muma 1959)
3'. Prothoracic scolus less than 4 times longer than wide, not extending forward beyond head 4

4. Hooked setae on abdomen very long; scolus short, setae not fan shaped; thorax with purplish-red color pattern .....
..... *Eremochrysa*
(Larva described by Smith 1926)
4'. Hooked setae on abdomen shorter, inconspicous; scolus longer with setae arranged fan-like ..... *Ceraeochrysa*

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