

First records of *Acrotaphus fuscipennis* (Cresson) and of *A. tibialis* (Cameron) from the United States (Hymenoptera: Ichneumonidae)

Julieta Brambila
USDA-APHIS-PPQ
c/o Florida State Collection of Arthropods
P.O. Box 147100
Gainesville, FL 32614-7100 U.S.A.
julieta.brambila@aphis.usda.gov

Charles C. Porter
Florida State Collection of Arthropods
Florida Department of Agriculture and Consumer Services
P.O. Box 147100
Gainesville, FL 32614-7100 U.S.A.

Abstract. *Acrotaphus fuscipennis* (Cresson), distinctive because of its black wings and bright red body, is recorded for the first time from the United States. It was reared from araneid spiders collected in Florida, which constitutes the first host record for this species. *Acrotaphus tibialis* (Cameron), collected in Texas, is also recorded for the first time in the United States. New U.S. localities are given for *A. wiltii* (Cresson). A key is provided for the identification of the three species of *Acrotaphus* in United States. The adults of all three species and the cocoon of *Acrotaphus fuscipennis* are illustrated.

Resumen. *Acrotaphus fuscipennis* (Cresson), especie notable por sus alas negras y cuerpo rojo intenso, se cita por primera vez de los Estados Unidos. Fué obtenida de arañas de la familia Araneidae (género *Neoscona*) colectadas en Florida, lo que constituye el primer registro de los hospederos de esta especie. *Acrotaphus tibialis* (Cameron), que fué colectada en Texas, también se cita por primera vez de los Estados Unidos. Se dan nuevas localidades en los Estados Unidos para *Acrotaphus wiltii* (Cresson). Se presenta una clave para la identificación de las tres especies de *Acrotaphus* para los Estados Unidos. Se ilustran los adultos de las tres especies y el capullo de *A. fuscipennis*.

Key Words: Ichneumonidae, Pimplinae, Ephialtini, Polysphinctini, *Acrotaphus*, *Hymenoepimecis*, Araneidae, *Neoscona*.

Introduction

Acrotaphus Townes and Townes is a New World ichneumonid genus with ten known species, nine of which have a Neotropical distribution, and *A. wiltii*, which is widely distributed in the Nearctic from southern Canada to Texas and Florida. *Acrotaphus* belongs to the *Polysphincta* group of genera (Polysphinctini *sensu* Townes 1969) of the tribe Ephialtini (Wahl and Gauld 1998). Ephialtini is one of four tribes of the subfamily Pimplinae (Wahl and Gauld 1998). It should be noted that one of the authors, C. Porter, prefers to retain the Polysphinctini as a separate tribe in the sense it was recognized by Townes. The polysphinctines comprise a biologically unique clade of ichneumonids because all its members are ectoparasitic on spiders (Gauld 2000). All known hosts of the polysphinctines are

orb-web spiders of the families Araneidae and Tetragnathidae (Gauld 2000).

Acrotaphus may be distinguished from other polysphinctine genera by the following combination of characters (Gauld 1991, Townes and Townes 1960): body and legs slender with long antennae; forewing length 6 to 18 mm; head rounded; eyes glabrous and large, nearly reaching base of mandibles; ocelli large, especially in females (Fig. 1); clypeus distinctly separated from face; gena narrowed; occipital carina complete, strongly raised and reflexed; epomia absent; pronotum elongated; mesoscutum polished with only a few setae and notaulus long but not strongly impressed; epicnemial carina well developed but not reaching anterior margin of mesopleuron; areolet absent; discoidella well developed; tarsal claws of female with large basal lobe; abdomen slender, depressed, polished,

with long, sparse hairs; abdominal tergites 2-4 with a pair of lateromedian convexities; ovipositor sheath about 4 times as long as apical depth of abdomen; ovipositor straight, compressed, with a weak swelling near or at its middle, without a dorsal subapical notch, and tapered gradually to a sharp point (Fig. 2).

Acrotaphus is considered the sister group to the neotropical genus *Hymenoepimecis* Viereck, with which it shares all the characters given above, except that the adult *Hymenoepimecis* has a unique pocket-like structure dorsally on the neck region of the pronotum (Townes and Townes 1960, Gauld 2000). Prior to 1960, all species in these two genera were treated as either *Hymenoepimecis* or *Epimecis* Brulle (name preoccupied).

Key to the *Acrotaphus* species in United States

- 1a. Forewing yellow with black transverse bands, stigma yellow; thorax and abdomen orange; mid tibia without black 2
- 1b. Forewing black, unicolorous, stigma black; thorax and abdomen bright red; mid tibia partly black *Acrotaphus fuscipennis*
- 2a. Wings bright yellow; hind wing with a broad black transverse band; hind femur black
..... *Acrotaphus tibialis*
- 2b. Wings pale yellow; hind wing without a broad black band; hind femur orange or yellowish brown *Acrotaphus wiltii*

Acrotaphus wiltii (Cresson) 1870 (Fig. 3)

Acrotaphus wiltii, the type species of *Acrotaphus*, is known in eastern North America from Florida north to Quebec and west to Manitoba, Kansas, and Texas. It is mostly bright orange in color with the antennae, head, and apex of abdomen black. The wings are pale yellow with two transverse black bands on the forewing and a weak blackish area on the hind wing at the origin of the radial vein. It is similar to *A. tibialis*, from which it may be easily distinguished by the black hind femur. Townes and Townes (1960) and Cushman and Rohwer (1920) give complete descriptions with good illustrations of *A. wiltii*. Although sometimes collected by day, *A. wiltii* seems nocturnal in habits and has been collected at lights, including mercury vapor and black light traps. This species has been

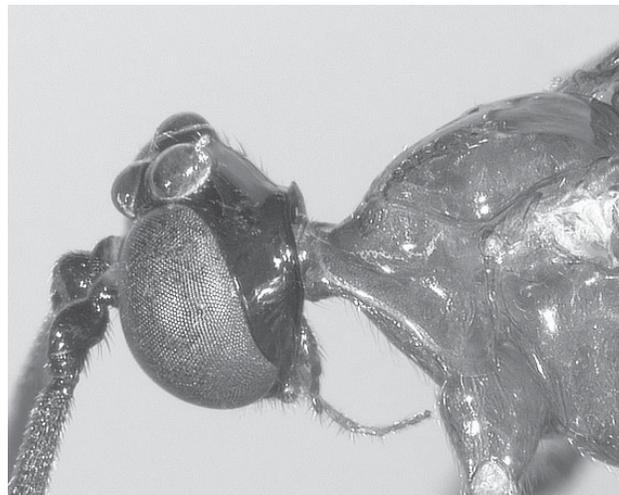


Figure 1. Head of *A. fuscipennis*, lateral view. Photo by J. Brambila.

reared from the orb weaving spider *Neoscona arabesca* (Walckenaer) (Araneae: Araneidae) in Virginia (reported as *Epeira trivittata* Keyserling) (Shannon 1913) and Kansas (Gordh 1971). It inhabits moist, shady, mature temperate hardwood forests.

Material not previously reported: FLORIDA (16). ALACHUA CO.: 1 F, Gainesville, Pine Hill Estates, 31-X-1971, in BL (black light) trap, H. V. Weems, Jr.; 1 F, Gainesville, Beville Hghts., 1-VI-1982, L. A. Stange; 1 F, Gainesville, Spring Forest Subdivision, 2-VII-1988, G. R. Buckingham; 1 F, Gainesville, near DCB (Doyle Conner Building, 1911 SW 34 St.), 15-X-1998, pine and hardwoods, C. Porter; 1 F, same except 28-VI-1989; 1 F, Serenola Forest, 20-III-1989, P. J. Landolt; 1 F, same except 10-IV-1989; 1 M, Gainesville, 610 NW 54 Ter., 30-XI-1994, L. Stange. JACKSON CO.: 1 F, Florida Caverns SP (State Park), 18-IV-1963, BL trap, R. E. Woodruff; 1 M, Florida Caverns SP, 15-VI-1978, L. A. Stange. LIBERTY CO.: 1 F, Torreya SP, 19-V-1966, BL, H. V. Weems, Jr.; 1 F, Torreya SP, 18-V-1963, H. V. Weems, Jr.; 1 F, Torreya SP, 23-V-1981, H. D. Baggett; 1 F, same except MV (mercury vapor) light trap. OKALOOSA CO.: 1 F, 1 mi N. Holt, Blackwater SF (State Forest), 14-X-1978, BL trap, L. Stange. ORANGE CO.: 1 F, 22 mi SE Orlando, 1-IV-1975, BL, J. B. Heppner. **MARYLAND** (1): 1 M, Dorchester Co., Hudson, 12-VIII-1964, C. Porter. **MINNESOTA** (1): 1 F, Anoka Co., Carlos Avery W. A., 2-IX-1964, J. S. Nordin. **NEW YORK** (1): 1 F, Westchester Co., Armonk, Calder Estate, 4-X-1973, C. Porter. **TEXAS** (2): 1 F,

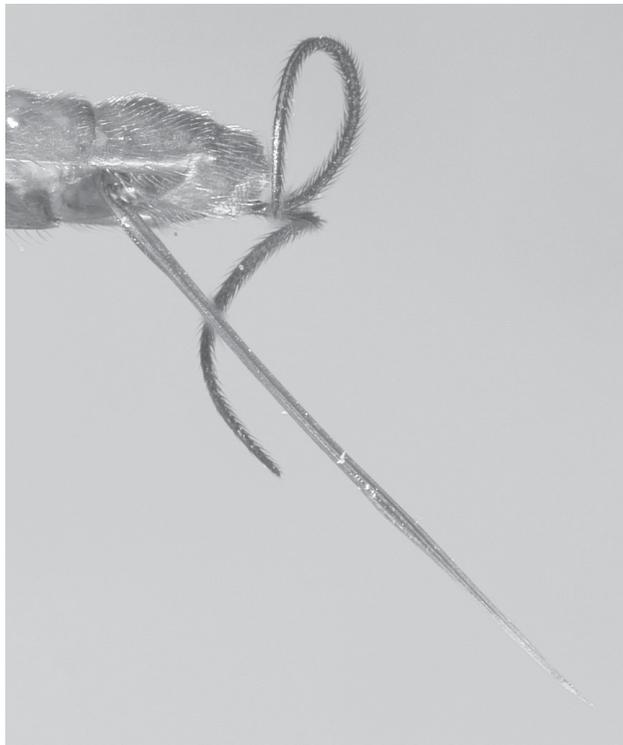


Figure 2. Ovipositor of *A. fuscipennis*, lateral view. Photo by J. Brambila.

Uvalde Co., Garner SP, 17-VI-1968, at light, G. H. Nelson and family; 1 F, Washington Co., Brenham, 18-VI-1979, E. C. Knudson.

***Acrotaphus tibialis* (Cameron) 1886**

(Fig. 4)

Acrotaphus tibialis has been recorded from Mexico, Guatemala, Panama, and Costa Rica (Gauld 1991). We now report it from the Lower Rio Grande Valley of south Texas, on the basis of five specimens collected by C. Porter. *Acrotaphus wiltii*, to which it seems closely related, also has been recorded from Texas as far south as Austin. It is characterized by its bright yellow wings with a broad transverse band on the hind wing, its mostly black hind femur, and apically black hind tibia.

Gauld (1991) describes and illustrates Costa Rican material which he attributes to *A. tibialis*, but which differs from specimens collected in Texas and México in several features: hind wing without a dark band; hind femur black with orange narrowly at base and apex; and mid tibia entirely orange instead of partly black. These differences probably do not indicate the Costa Rican material belongs to

a different species, but rather that *A. tibialis* shows geographic variation in color.

Acrotaphus tibialis has been collected by sweeping understory vegetation during the day, and also at light and Malaise traps. In south Texas it inhabits semihumid subtropical gallery forest along the Río Grande. It has been reported from Costa Rica (Gauld 1991) as a parasite of the orb-weaving spider *Meta zigia* (prob. *Metazygia* sp., G.B. Edwards 2003, pers. comm.) (Araneae: Araneidae).

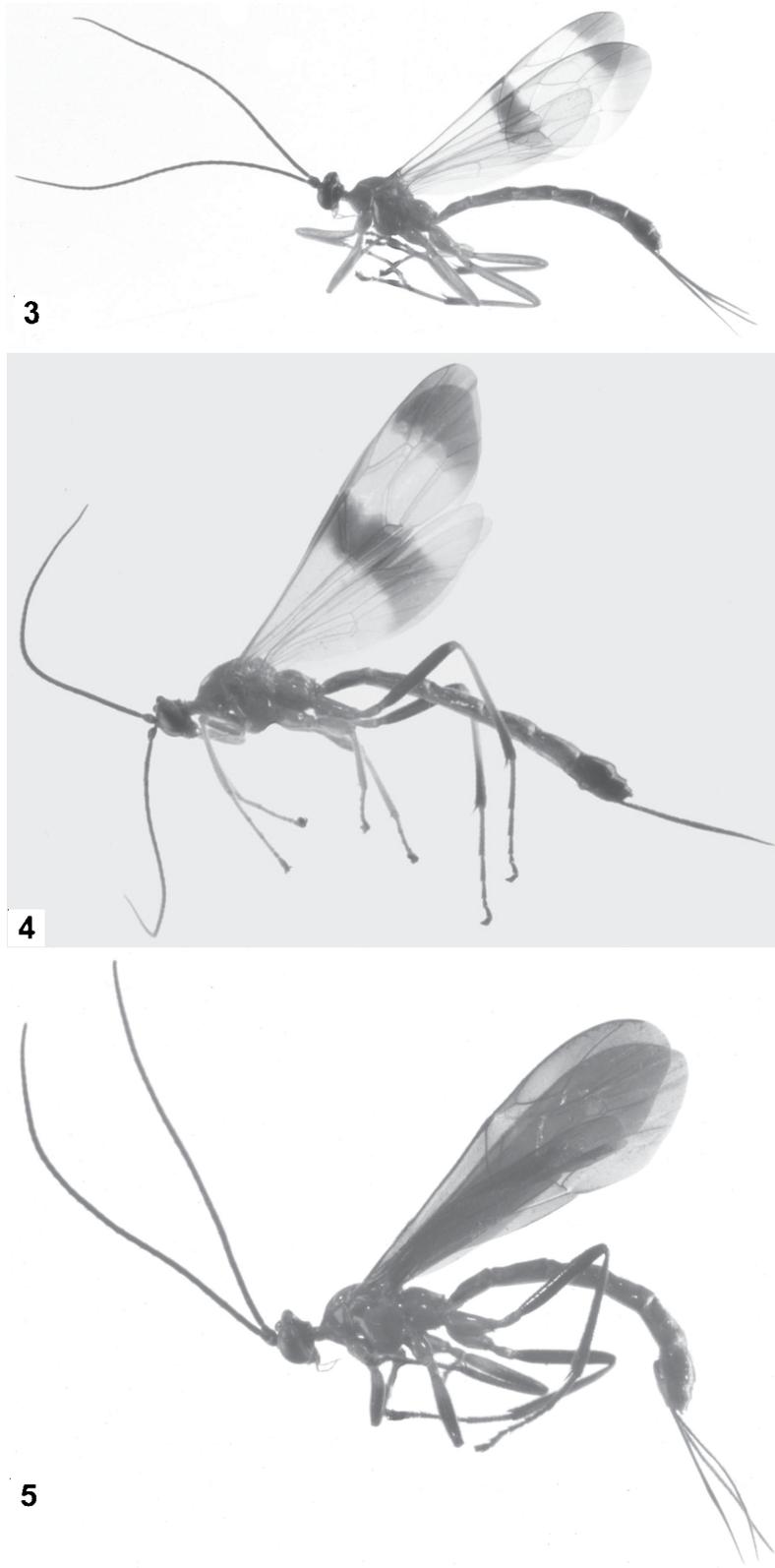
Material not previously reported: TEXAS (5): 1 F, Hidalgo Co., Bentsen Rio Grande Valley State Park, 2-IX-1976, C. Porter (PORTER); 1 F, 2 M, same except 8-VI-1977 (PORTER); 1 F, same except 23-V-1977 (PORTER). These are the northernmost records for this species.

***Acrotaphus fuscipennis* (Cresson) 1865**

(Figs. 5, 6)

Acrotaphus fuscipennis is known from Cuba where it has been collected south of Bayamo in Santiago de Cuba (known today as Granma Province) (Gundlach 1886); at Maniadero in Matanzas Province; Soroa y Viñales in Pinar del Río, and Cuabitas in Santiago de Cuba (Alayo 1973; J. Genaro 2002, pers. comm.). Morley (1914) also reports it from Brazil but his record probably represents a misidentification. *Acrotaphus fuscipennis* (Cresson) and *A. ferruginosus* (Cresson) also were described from Cuba. *Acrotaphus fuscipennis* differs from these two species in that the wings are unicolorous and black instead of banded with yellow and black. Florida specimens closely match Cresson's description (1865) of Cuban material. *Acrotaphus fuscipennis* appears to be a Cuban species that extends into Florida like *Theronia bicincta* and *Lymeon bicintus*.

This little-known species is reported herein as reared from spiders in Dade and Highlands Counties in Florida. The specimen from Archbold Biological Station (Highlands Co.), which represents the most northern locality from which this species is known, was reared from a subadult male spider, the remains of which are stored glued to the locality label. Since the spider has a longitudinal groove on the cephalothorax and is small, it is most likely *Neoscona arabesca* (Walckenaer) (Araneae: Araneidae) (G. B. Edwards 2001, pers. comm.), an orb-weaver common in Florida.



Figures 3-5. *Acrotaphus* spp. 3) *A. wiltii* (Cresson), female. Photo by J. Brambila; 4) *A. tibialis* (Cameron), female. Photo by J. Lotz; 5) *A. fuscipennis* (Cresson), female. Photo by J. Lotz.

The cocoon, which was spun inside a gelatine capsule, is white, 15 mm long by 5 mm wide and consists of loose silk loops. The posterior end of the cocoon, attached to the inside of the capsule, does not have a clear opening; nonetheless, the meconium was pushed out of the posterior end, probably through the thin wall of the cocoon. The anterior end of the cocoon has an irregular opening made by the adult for exiting.

Two specimens were reared from Kendall (Dade Co.). The first specimen was reared from an immature *Neoscona* (Araneidae) spider found on a leaf of *Ficus religiosa* L. (Moraceae). The spider was placed in a 9 dram plastic snap vial; it did not spin a web in the rearing container. The larva was attached to the side of the abdomen of the spider, near the base; it was creamy white, with dorsal protuberances. It developed rapidly, feeding on the spider, which apparently did not attempt to remove the parasite. The spider remained alive for 3 to 4 days. The larva detached from the entirely consumed abdomen 4 days after collection and the dead spider dropped to the bottom of the container. The mature larva rapidly (2 to 3 hours) spun its cocoon and suspended it with white silk strands inside a curled dry leaf. The cocoon (Fig. 6) is fusiform or bottle-shaped, 15 mm by 5 mm, with the widest point near the posterior end, from which it quickly tapers to its apex. The cocoon has a small hole at the posterior end. The adult exited through the anterior end of the cocoon; the "neck" of the cocoon is cut throughout, though the "lid" remains attached by white silk strands. The cocoon is shiny golden brown with two thin layers of silk. The inner layer

of the cocoon is slightly wrinkled longitudinally while the second layer consists of loose loops. The adult ichneumonid is slender and highly polished with thorax, abdomen, coxae, and bases of fore and mid femora bright red; head, antennae, and legs in great part shining black; and the wings shining black with metallic reflections.

The second specimen from Dade Co. was reared from a mature larva collected from a spider web on *Ficus benjamina* L. The larva was no longer attached to its host spider. The larva spun an irregular cocoon within tissue paper in a container. The cocoon is approx. 11 mm by 6 mm, golden brown and consists of loose silk threads. The meconium is partially extruded from the posterior end of the cocoon and the anterior end of the cocoon is chewed open for emergence.

The cocoons examined are apparently similar to that of the male *A. wiltii* reared by Shannon (1913) and described by Townes and Townes (1960). For example, they note that the cocoon is fusiform, loosely woven, somewhat transparent, and with a small hole at the posterior end. The account of the rearing by Shannon (1913) is interesting in that he found the parasite on the cephalothorax of the spider; however, he believed the larva had hatched recently. Later he observed it feeding on the abdomen of the spider. My observations are similar to those of Gordh (1971), who found a mature female spider with a larva on its abdomen and that the "adult wasp emerged by chewing through the neck of the cocoon", and differ from Gauld's (1991) observations, who described two Costa Rican cocoons of *Acrotaphus* that had no caudal orifice.

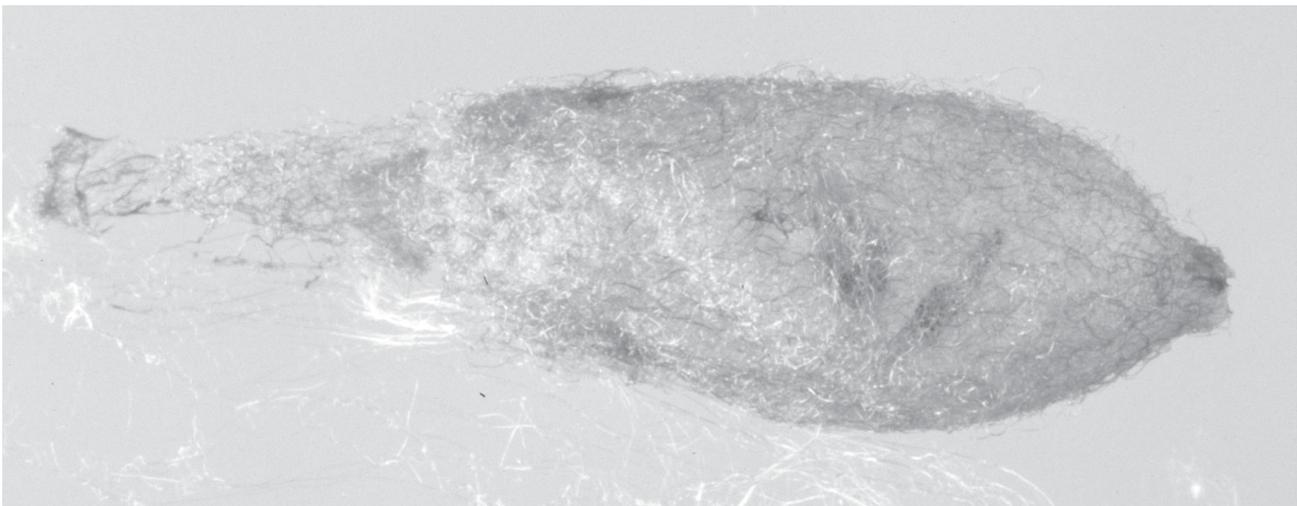


Figure 6. *Acrotaphus fuscipennis* cocoon. Photo by J. Brambila.

Gauld (1991) stated that, in contrast to *Acrotaphus*, all species of *Hymenoepimecis*, and in general, all polysphinctine species, have cocoons with a well-crafted caudal orifice. Townes (1969) explained that "through this opening at the hind end of the cocoon the last larval excrement is pushed, and often also the exuvia of the molt at pupation." They also stated that cocoon formation is highly specialized in the polysphinctines because it is spun in an exposed position in the host's web. Shannon (1913) observed that the mature larva spun its cocoon among the threads of the spider's web after it dropped the remains of the spider. The two Costa Rican species reared by Gauld also spun their cocoons in the host's web. Gauld (1991) said that the cocoon resembles a wrapped dead fly of little interest for its potential enemies.

Of interest is a report from Colombia by Palacio (1999) of three specimens of *Acrotaphus* sp. inside an empty cell in the nest of the sphecid *Trigonopsis violascens* (Dalla Torre), which provisions its cells with paralyzed, live spiders. Since no records are known of polysphinctines attacking aculeate wasps, Palacio (1999) assumes that this was a chance event, in that a sphecid paralyzed and collected spiders that had been already parasitized by the ichneumonids.

In 1997, Aubert synonymized *Acrotaphus* Townes and Townes with *Hymenoepimecis* Viereck without explanation. *Acrotaphus* is not a synonym for *Hymenoepimecis*. Although closely related and superficially similar, *Hymenoepimecis* is considered a monophyletic group of species characterized in part by a unique pocket-like fold dorso-medially on the pronotum, a structure not present in *Acrotaphus* (Fig. 1) (Gauld 1991, 2000). An excellent scanning electron micrograph (SEM) of this pronotal structure in *Hymenoepimecis* is in Fig. 204 in Gauld 1991; in Fig. 205 he shows an SEM of the pronotum in *Acrotaphus*.

Material not previously reported: FLORIDA (5): 1 M, Monroe Co., 15 NE Key Largo City, Key Largo Key, 16-VI-1974, BL trap, J. B. Heppner; 1 F, Highlands Co., ABS, Spring 1986, reared, M. Deyrup (WAHL); 1 F, Highlands Co., ABS, 20-III-1987, at light, V. Golia (WAHL); 1 F, Dade Co., Kendall, 13601 Old Cutler Road, collected 3-VIII, pupated 7-VIII, emerged 17-VIII-2000, from an araneid spider on *Ficus religiosa*, J. Brambila (FSCA #E2000-2558); 1 F, Dade Co., Kendall, 13601 Old Cutler Road, emerged 27-V-2003, from spider web on *Ficus benjamina*, J. Brambila. **CUBA** (1): 1 F,

Maniadero, C. Zapata, Prov. L. V. [in Matanzas Province], VI-1962 (AEI).

A recent publication by Eberhard (2000) presents detailed descriptions from many close-up observations on a Costa Rican polysphinctine, *Hymenoepimecis argyraphaga* Gauld. The entire life cycle of this parasite is included, with behavior observations, SEM photographs and drawings to illustrate the interactions between the wasps and their host spiders.

Collections

Specimens are, unless otherwise noted, in the FSCA.

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| AEI | American Entomological Institute, 3005 SW 56th Avenue, Gainesville, Florida 32608. |
| FSCA | Florida State Collection of Arthropods, Division of Plant Industry, Florida Department of Agriculture and Consumer Services, P.O.Box 147100, Gainesville, Florida 32614-7100. |
| PORTER | Collection of Charles C. Porter, currently housed at FSCA. |
| WAHL | Collection of David B. Wahl, currently housed at AEI. |

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