# HOST PLANTS, DISTRIBUTION, AND DESCRIPTION OF FIFTH-INSTAR NYMPHS OF TWO LITTLE-KNOWN HETEROPTERA, *ARHYSSUS HIRTUS* (RHOPALIDAE) AND *ESPERANZA TEXANA* (ALYDIDAE)

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ABSTRACT

The host plants of 2 poorly known coreoid Hemiptera are documented. In New England and the Middle Atlantic States, the rhopalid *Arhyssus hirtus* (Torre-Bueno) develops on and under mats of *Hudsonia* spp. (Cistaceae), and in the southern U.S. the alydid *Esperanza texana* Barber is associated with and sometimes damages bermudagrass, *Cynodon dactylon* (L.) Pers. (Poaceae). For both species new locality records are given and the known distribution is reviewed; a diagnosis of the adult and a description of the 5th-instar nymph are provided.

RESUMEN

Son documentadas las plantas hospederas de 2 Hemípteros coreoidos. En New England y los estados del Atlántico medio, el rhopalido *Arhyssus hirtus* (Torre-Bueno) se desarrolla dentro y debajo de *Hudsonia* spp. (Cistaceae), y en el sur de los Estados Unidos el alydido *Esperanza texana* Barber, a veces daña y también es asociado con la gramínea de bermuda, *Cynodon dactylon* (L.) Pers. (Poaceae). Se dan nuevos records de localidad y la conocida distribución de ambas especies; se provee un diagnóstico de los adultos y una descripción del quinto estadío de la ninfa.

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During recent collecting of Hemiptera-Heteroptera in the eastern United States, we discovered the host plants of 2 little-known coreoids: *Esperanza texana* Barber (Alydidae) and *Arhyssus hirtus* (Torre-Bueno) (Rhopalidae). In this paper we record bermudagrass, *Cynodon dactylon* (L.) *Pers.* (Poaceae), as the host of *E. texana* and call attention to 2 previous records from this plant (published in the USDA's Cooperative Economic Insect Report), and associate *A. hirtus* with *Hudsonia* spp. (Cistaceae). For both species we give notes on habitat preferences, present new locality records, and give a diagnosis of the adult and a description of the 5th-instar nymph.

## *Esperanza texana* BARBER

Among broad-headed bugs of the coreoid family Alydidae, habits of the Micrelytrinae, especially the tribe Micrelytrini to which *E. texana* belongs, are poorly known (Schaefer and Mitchell 1983). Barber (1906) described the new genus *Esperanza,* which resembled *Cydamus* Stal but lacked humeral spines on the pronotum, and the species *E. texana* from a male collected at

Brownsville, Texas. Johnston (1927) reported a male from Delta Point, Louisiana, and described the distinctive, spined scutellum, noting Barber had said the scutellum was "imperfect" (the type specimen is pinned through the scutellum). Torre-Bueno (1941), having overlooked Johnston's paper, incorrectly characterized *Esperanza* as having an unarmed scutellum. Hussey (1948) recorded the species from Lakeland, Florida, a female taken at light, and Brailovsky and Zurbia-Flores (1979) gave the first Mexican records. Froeschner (1980) reported this alydid from Georgia, Mississippi, and South Carolina and suggested that it has expanded its range in recent years.

DISTRIBUTION—The type locality of this alydid is the Esperanza Ranch, Brownsville, Texas; the date of collection, not given in the original description, was 29-VII-1904. In addition to records of *E. texana* from Louisiana (Johnston 1927; U.S. Dept. Agric. 1972), Florida (Hussey 1948), Georgia, Mississippi, and South Carolina (U. S. Dept. Agric. 1968; Froeschner 1980), and Mexico (Brailovsky and Zurbia-Flores 1979), the following are new records obtained from our collecting in Florida and Texas (TJH-AGW) and from specimens housed in the collections of Cornell University (CU), University of Connecticut (UC), Florida State Collection of Arthropods (FSCA), University of Georgia (UG), University of Missouri (UM), Pennsylvania Department of Agriculture (PDA), Texas A & M University (TAM), and U. S. National Museum of Natural History (USNM). Our specimens are deposited in the collections of PDA and USNM.

UNITED STATES: FLORIDA: *Alachua Co.*, Gainesville, summer 1978 (UM). *Broward Co.*, Pompano Beach, 19-IX-1973 (FSCA). *Columbia Co.*, Lake City, 13-VIII-1979 (USNM). *Dade Co.*, 11-VIII-1954 (FSCA). *De Soto Co.*, Rt. 70 W. of Arcadia, 20-IV-1982; Nocatee, 20, 26-IV-1982 (TJH-AGW). *Hernando Co.*, 13-VIII-1956 (FSCA). *Highlands Co.*, Highlands Hammock State Park, 5-XII-1977 (CU); Sebring, 18-IV-1982 (TJH-AGW). *Hillsborough Co.*, Tampa, 23-V-1981 (TAM). *Jackson Co.*, Greenwood, 22-VIII-, 11-IX-1961 (FSCA). *Leon Co.*, Tallahassee, 26-IX-1956 (FSCA). *Palm Beach Co.*, Rt. 441 1 mi and 9 mi. S. Martin Co. Line, 21-IV-1982 (TJH-AGW). GEORGIA: *Brooks Co.*, Morven, 12-IX-1963 (UG). LOUISIANA: *East Baton Rouge Par.*, Baton Rouge, 10-VIII-1942 (USNM). *Iberville Par.*, St. Gabriel Exp. Stn., 14-VII-1981 (UM). MISSISSIPPI: *Yazoo Co.*, Yazoo City. 27-VII-1929 (TAM). *Sharkey Co.*, Rolling Forks, 23-VII-1929 (TAM). TEXAS: *Anderson Co.*, 10 mi. SW. Elkhart, 2-II-1969 (TAM); *Austin Co.*, 10 mi. SW Brenham, 20-IV-1969 (TAM). *Brazos Co.*, Bryan, 11-VII-1966 (TAM); Rt. 30 at Navasota River, 29-III-1969; College Station, 21-VI-1931 (USNM) and 29-III-1934 (TAM). *Burleson Co.*, 3 mi. E. Old Dime Box, 8-VIII-1968 (TAM). *Cameron Co.*, Brownsville, 21-VI-1969 (TAM); 8-V-1935, 31-V-1939, 21-XI-(USNM); Sabal Palm Grove Sanctuary, nr. Southmost, 30-IV-1979 (UG). *Galveston Co.*, Galveston, 19-I-1908 (USNM). *Gillespie Co.*, 4 mi. E. Doss, 6-VI-1969 (TAM). *Goliad Co.*, 2 mi. N. Goliad, 8-VI-1969 (TAM). *Grimes Co.*, 1/2 mi. E. Carlos, 22-IV-1971 (TAM). *Kleberg Co.*, S. Bishop, 29-III-1972 (TAM). *Madison Co.*, Normangee, 12-IV-1967 (TAM). *Maverick Co.*, Eagle Pass, 8-VIII-1969 (TAM). *Sabine Co.*, 20-XI-1972 (TAM). *San Patricio Co.*, Welder Wildlife Refuge, 28-VI-1969 (TAM) and 19-IV-1983 (TJH-AGW). *Starr Co.*, Falcon State Park, 20-VI-1969 (TAM). *Uvalde Co.*, Uvalde, 11-VIII-1959 (TAM). *Val Verde Co.*, 14-VI-1949

(USNM). *Walker Co.*, Huntsville, 4-IV-1928 (TAM). *Webb Co.*, Laredo, 30-VI-1950 (TAM). *Williamson Co.*, Taylor, 29-III-1969 (TAM).

MEXICO: TAMAULIPAS: 8 mi. W. El Limon, 20-VII-1970 (TAM). SAN LUIS POTOSI: 8 mi. W. Valles, 22-VIII-1974 (TAM).

HOST PLANT AND HABITAT—In Florida during April 1982 we first collected *E. texana* from a small strip of bermudagrass growing at the edge of a parking lot in Sebring. In 2 plantings of bermudagrass in Palm Beach Co., one along a highway and another adjacent to a crop field, we again swept a few adults; in De Soto Co. near Arcadia we collected several adults from bermudagrass growing along the Peace River. At these 4 sites *E. texana* was present with large numbers of a grass-feeding mirid, *Trigonotylus doddi* (Distant).

The largest population of *E. texana*, consisting of several hundred adults and a few 5th-instar nymphs, was found in bermudagrass along Joshua Creek, Nocatee, DeSoto Co. On 20 and 26 April adults were uncommon in a large mowed area exposed to full sunlight but were abundant in a small, shaded patch surrounded by sea myrtle, *Baccharis halimifolia* L. (Asteraceae). It is possible that the bugs had migrated to this unmowed patch from the adjacent mowed area.

We later learned that *E. texana* had been reported from coastal bermudagrass in South Carolina (U.S. Dept. Agric. 1968) and in Louisiana where large numbers in several fields were suspected of killing this important pasture plant (U.S. Dept. Agric. 1972). In 1977 a farmer in southern Georgia submitted specimens of *E. texana* to the University of Georgia's Coastal Plain Experiment Station at Tifton, noting that the insect in question was "damaging his pastures"; the specimens were identified by F. W. Mead (FSCA, Mead, pers. comm.). Insects, including sucking forms like leafhoppers and planthoppers, have been shown to reduce yields of coastal bermudagrass (Byers 1967, Hawkins et al. 1979). Although Byers did not list *E. texana* among the most numerous insects collected from bermudagrass fields at Tifton, GA, he did take one specimen there, presumably during his surveys (USNM). In 1979, *E. texana* was collected from pastures at the Tifton station (FSCA). Specimens also have been collected from bermudagrass at Albany (USNM) and Morven, GA (UG) and from Greenwood and Tallahassee, FL (FSCA); Dunavin (1982) recorded adults from "grass plots" at Jay, FL.

These records and observations support Schaefer's (1972) suggestion that *E. texana*, an elongate alydid, should be a grass feeder. On the basis of shape and an index of "width/length x 100," he placed the Micrelytrinae in 3 grades: ant mimics, primitive grass feeders (e.g., *Esperanza* with an index of 23.2), and advanced grass feeders (most streamlined form, lacking thoracic spines). According to Schaefer, "the lower the index, presumably the better adapted a relatively large bug is to clinging to, or remaining within the axis of, a grass." The consistent association of *E. texana* with bermudagrass essentially confirms the prediction Schaefer had made without the benefit of host-plant information.

IDENTIFICATION OF ADULT—*Esperanza* can be keyed in Torre-Bueno (1941) with only minor modification of couplet 3 in the Micrelytrini key (p. 78). As discussed above, Torre-Bueno did not realize that *Esperanza* has a relatively short, weakly upturned scutellar spine. Couplet 3 will work if

"the presence or absence of the scutellar spine" is omitted. *Experanza* lacks the distinct humeral spines found on *Cydamus* Stal.

Slater and Baranowski's (1978) key can be modified in couplet 1 by omitting the jugal character and leaving only "hind femora with or without spines." This will allow *Esperanza* to key out with *Protenor* Haglund and *Stenocoris* Burmeister (as *Leptocorisa* Latreille.) *Esperanza* is easily separated from these genera by the shorter jugae that do not extend beyond the apex of the tylus.

DESCRIPTION OF FIFTH INSTAR (Fig. 1)—Length 4.80 mm. *Head*: Width 1.12 mm, vertex 0.60 mm. *Rostrum*: Length 2.80 mm, extending to posterior

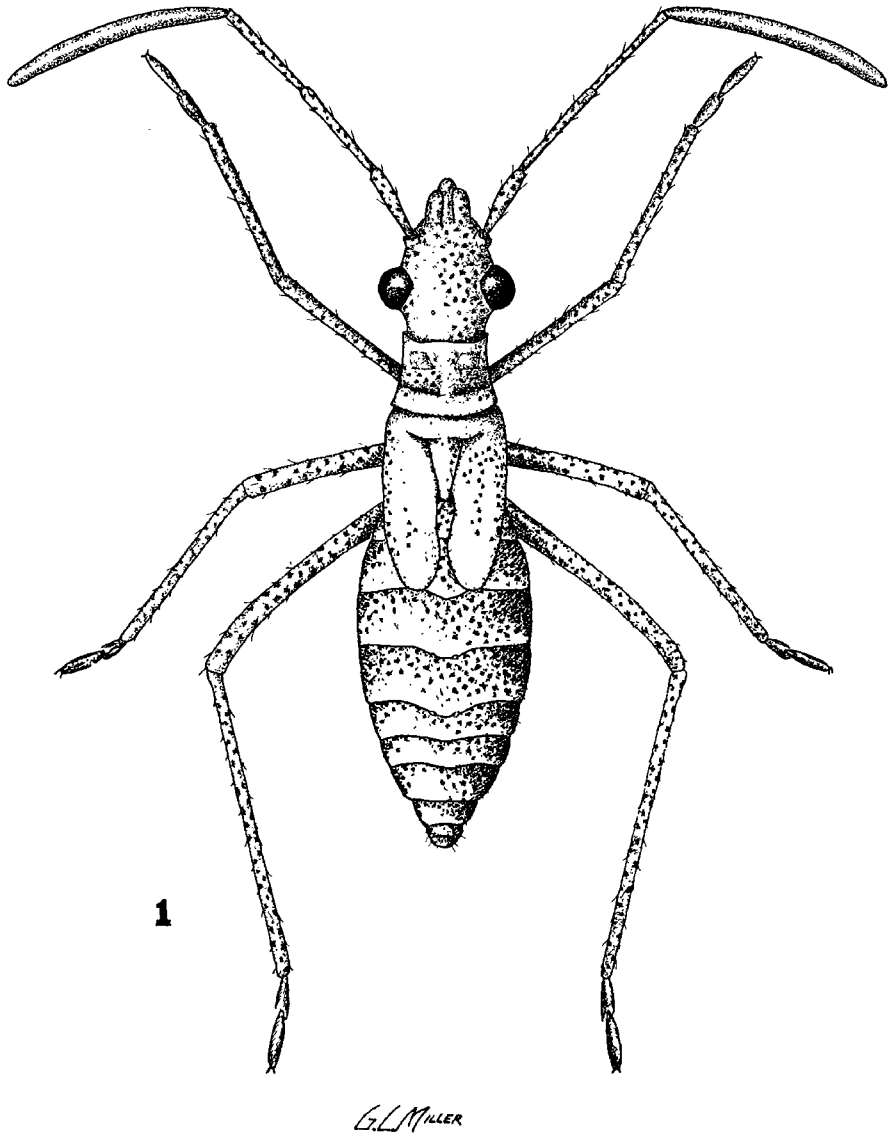


Fig. 1. Fifth-instar nymph of *Esperanza texana*.

margin of metacoxae. *Antenna*: Segment I, length 0.60 mm; II, 1.04 mm; III, 0.88 mm; IV, 2.08 mm. *Pronotum*: Length 0.64 mm, basal width 0.88 mm.

Overall coloration testaceous or yellowish brown, red speckled throughout body, legs, and antennae (except segment IV), with red spots on abdomen deeper red, some tending to coalesce into larger spots; 4th antennal segment uniformly reddish brown, with base yellowish brown and apex pale or whitish; pronotum with brown, almost quadrate, blotches at humeral angles. Head longer than wide; pronotum rectangular, wider than long, basal 1/3 inclined posteriorly upward and separated from anterior 2/3 by a transverse ridge, calli subquadrate and distinct; wing pads extending to 3rd or 4th abdominal segment; abdomen subovate, with divided dorsal scent gland openings present between segments 3 and 4 and 4 and 5; legs elongate, femora and tibiae with distinct erect setae, tibial spines obscured by longer and more densely placed setae; tarsi 2-segmented.

### *Arhyssus hirtus* (TORRE-BUENO)

Torre-Bueno (1912) described the species (as *Corizus hirtus* in Coreidae) from Yaphank, Long Island, New York. Macropterous and brachypterous specimens were swept from a "sandy, grassy spot" in pine woods. Parshley (1917) recorded *A. hirtus* from Nantucket, Massachusetts; the specimens, collected 19-VIII-1909, predated those of Torre-Bueno's type series. The New Jersey record of Chopra (1968) is easily overlooked. Under "Material Examined" he listed *A. hirtus* from Yaphank, but under "Total Length" he also mentioned specimens from Lakehurst, New York; undoubtedly he was referring to material from Lakehurst, New Jersey (USNM).

DISTRIBUTION—The following represent new records for *A. hirtus*. Collection data are included for the "New Jersey" record given by Chopra (1968).

MARYLAND: *Worcester Co.*, Assateague Island National Seashore, 22-VIII-1982 and 16-VII-1983 (TJH-AGW). MASSACHUSETTS: *Essex Co.*, 6-IX (UC). NEW JERSEY: *Ocean Co.*, Lakehurst, 9-VII-1911 (USNM); Rt. 37 near Lakehurst, 14-VI-1977 (TJH-AGW). NEW YORK: *Nassau Co.*, Bayville, -VIII (USNM). *Suffolk Co.*, Riverhead, 1-VI- and 7-X-1953 (USNM); Smith's Point, Fire Island, 19-VII-1913 (UC).

HOST PLANTS AND HABITAT—A definite association of *A. hirtus* with plants of the genus *Hudsonia* (Cistaceae) is indicated by our collecting and the unpublished host records attached to museum specimens. *Hudsonia* spp. are low-growing, heathlike plants having persistent, scalelike leaves. The most common species found in eastern North America are *H. ericoides* L., golden (or false) heather, and *H. tomentosa* Nutt., beach heath or poverty grass. Golden heather grows on dry sands, mostly in upland pinelands, whereas beach heath is characteristic of dunes and sand-blows (Fernald 1950). These plants, although not members of the heath family (Ericaceae) or related families, are "ecological heaths" adapted to acid, infertile soils (Whittaker 1979).

We first encountered *A. hirtus* near Lakehurst, New Jersey, while collecting mirids in the Pine Barrens. Two adults were taken beneath *H. ericoides* with large numbers of *Polymerus rostratus* Henry, a mirid that may be restricted to *Hudsonia* spp. in barrens habitats (Henry 1978). The site was a burned patch typical of disturbed areas of pine-oak forests in

the Pine Barrens (Little 1979, McCormick 1979). We collected nymphs and adults of *A. hirtus* under and in mats of *H. tomentosa* on Assateague Island National Seashore. The plants formed extensive, isolated mats on low, open dunes of this barrier island.

The hemipterist H. G. Barber collected *A. hirtus* "under *Hudsonia*" at Lakehurst, N.J.; on Long Island, N. Y., Nathan Banks found a nymph and an adult at Bayville "in and under *Hudsonia*" (USNM). The only other records of this rhopalid are from additional localities on eastern Long Island and from Nantucket Island, Mass. *Arhyssus hirtus* apparently is a specialist herbivore associated with *Hudsonia* spp. growing in sandy, upland areas of pine barren communities or along coastal dunes. The use of a cistaceous host deviates from the composite-feeding trend apparent among harmostine rhopalids (Schaefer and Mitchell 1983).

IDENTIFICATION OF ADULT—*Arhyssus hirtus* can be identified to genus using keys provided by Chopra (1967), Hoffman (1975), Slater and Baranowski (1978), and Hoebeke and Wheeler (1982). Of these, Hoebeke and Wheeler's key separates *A. hirtus* from all Rhopalidae found in eastern North America. Chopra's (1968) key will distinguish *A. hirtus* from all known species of *Arhyssus*. From other species of *Arhyssus*, *A. hirtus* is best diagnosed by the small size (less than 5 mm), the proportionately long, dark-colored scutellum (apex extending beyond apex of clavus), lack of conspicuous antenniferous tubercles, the broadened abdomen, the elongate slender shape of the parameres, and the relatively long head that is more than 3 times the length of antennal segment I.

DESCRIPTION OF FIFTH INSTAR (Fig. 2)—Length 3.84 mm. *Head*: Width 1.00 mm, vertex 0.72 mm. *Rostrum*: Length 1.48 mm, extending to middle of mesocoxae. *Antenna*: Segment I, length 0.28 mm; II, 0.40 mm; III, 0.32 mm; IV, 0.48 mm. *Pronotum*: Length 0.52 basal width 1.40 mm.

General coloration pallid to yellowish brown, accented with pinkish red, more reddish along meson of head, pronotum, area between wing pads, and basal margins of abdominal segments; area surrounding mesal line of dorsum speckled with red; apices of wing pads, dorsal scent gland openings, and apex of genital segment dark brown or fuscous; legs pallid with small red spots on femora and tibiae, claws fuscous; antennae pallid, weakly tinged with pink or pale red, 4th segment dark brown or fuscous. Head wider than long, vertex wide and broadly rounded; pronotum trapeziform, with a transverse linear impression behind each callus; anterior margin weakly notched on meson, posterior margin emarginate, wing pads extending to base of 3rd abdominal segment, front wing pads with 3 or 4, shallow, longitudinal impressions; abdomen subovate with two dorsal scent gland openings, one between segments 4 and 5, one between 5 and 6, segment 5 constricted dorsally at middle; legs relatively short, tarsi 2-segmented. Dorsum thickly set with short, erect, black, bristlelike setae; lateral margins, antennae, legs, and anterior 1/2 of head with longer, more slender, pallid setae.

## ACKNOWLEDGMENTS

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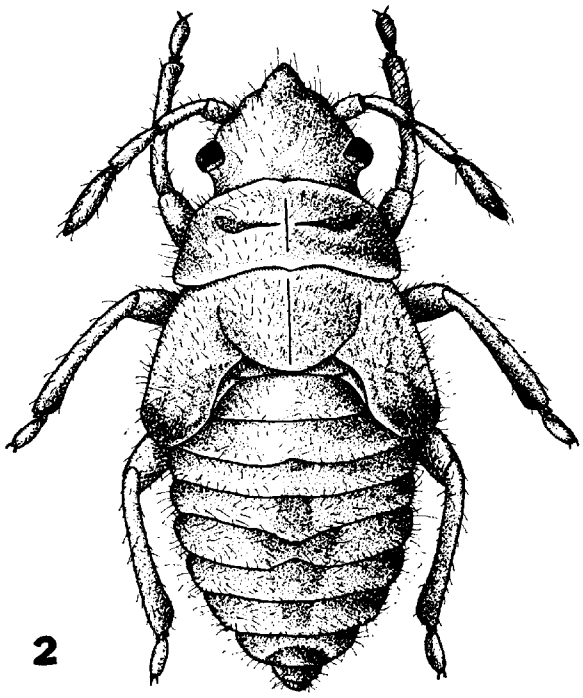


Fig. 2.—Fifth-instar nymph of *Arhyssus hirtus*.

of Zoology-Entomology, Auburn University, Alabama) for illustrating the nymphs. F. W. Mead also allowed us to cite unpublished collection data for *E. texana*.

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# BIOLOGY OF THE FIREFLY *PYRACTOMENA LUCIFERA* (COLEOPTERA: LAMPYRIDAE)

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## ABSTRACT

The firefly *Pyractomena lucifera* (Melsh.) occurs in fresh water marshes throughout the eastern half of temperate North America. Larvae captured prey both above and below the water surface and dragged it above water to feed. Prey records included: snails (n = 38) (Gastropoda: Pulmonata), freshwater limpets (n = 5) (Gastropoda: Ancylidae), a jumping spider (Salticidae), a damselfly nymph (Odonata) and a leech (Annelida: Hirudinea). Cryptically pigmented pupae were found on emergent vegetation and did not glow when probed. The pupal stage lasted 6.8 days for males and 6.4 days for females. At dusk males flew over the vegetation emitting single flashes (0.2 sec long, 27°C) at 2.9-5.1 sec intervals (17-24°C). Females answered male flashes with single flashes (ca. 1 sec long) at delays of 0.7-1.5 sec (17-27°C). Mated females seldom answered male flashes. Females oviposited when they were 5-6 days old, but 2-4 days after mating. They laid 30-194 eggs (mean = 102) and the number of eggs laid correlated with pupal weight of the female (correlation coefficient = 0.82). Eggs measured 0.8 mm and hatched in 15 days. They became faintly luminescent 2 or 3 days after oviposition and remained luminescent until they hatched. Six predators of this firefly were recorded: wolf spiders (n = 2) (Lycosidae), an orb weaver spider (Argiopidae), a harvestman (Phalangida), a giant water bug (Belostomatidae) and a tree frog (*Hyla* sp.).

## RESUMEN

La luciérnaga *Pyractomena lucifera* (Melsh.) ocurre en pantanos de agua dulce a través de la mitad éste de la zona templada de Norteamerica. Las larvas capturan la presa arriba y debajo de la superficie del agua y la llevan arriba del agua para comérsela. Se han reportados como presas: caracoles (n=38) (Gastropoda:Pulmonata), "limpets" de agua dulce (n=5) Gastropoda:Ancylidae), una araña saltadora (Salticidae), una ninfa "damselfly" (Odonata) y una sanguijuela (Annelida:Hirudinea). En vegetación nueva se encontraron pupas crípticamente pigmentadas y no brillaron cuando se tocaron. El estado pupario duró 6.8 días en los machos y 6.4 días en laś hembras. Al anochecer, los machos volaron sobre la vegetación emitiendo destellos individuales (0.2 segundos, 27° C) a intervalos de 2.9 a 5.1 segundos (17-24°C). Las hembras le contestaron a los machos con destellos individuales (aprox. 1 segundo de duración) con demoras de 0.7-1.5 segundos (17-27° C). Hembras que habían copulado, rara vez le contestaban al destello de los machos. Las hembras pusieron los huevos cuando eran de

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