

A POPULATION OF *ANTHANASSA FRISIA* IN CENTRAL FLORIDA (LEPIDOPTERA: NYMPHALIDAE)

JOHN V. CALHOUN¹

263 Milwaukee Ave. #307, Dunedin, Florida 34698, USA

ABSTRACT.— The distribution in Florida of *Anthanassa frisia* (Poey) is discussed and a new site in central Florida is reported.

KEY WORDS: Acanthaceae, *Achalarus*, *Appias*, Bahamas, biology, *Cyllopsis*, *Cybaenae*, *Danaus*, distribution, *Dryas*, ecology, *Electrostrymon*, *Enodia*, Hesperidae, hostplants, *Hypolimnna*, *Incisalia*, *Kricogonia*, Lycaenidae, *Marpesia*, *Ministrymon*, *Mitoura*, *Phoebis*, *Phyciodes*, Pieridae, *Poanes*, population biology, Satyrinae, *Siproeta*.

Anthanassa frisia frisia (Poey) is widespread throughout much of the Greater Antilles, ranging northward into the Bahamas and southern Florida (Smith *et al.*, 1994). In Florida, the species is most common in the Keys (see Leston *et al.*, 1982; Schwartz, 1987; Minno and Emmel, 1993). Lenczewski (1980) listed several records from the mainland within Everglades National Park in Dade, Monroe and Collier Counties. Despite her comments that the species does not occur elsewhere on the mainland, *A. frisia* is sporadic northward into Lee and Palm Beach counties (Grossbeck, 1917; Burris, 1973; Baggett, 1992) (Fig. 1). In Lee County, the species is most frequently encountered on Sanibel Island (Brewer, 1982). More northerly records of *A. frisia* are generally believed to represent strays.

Only three northern records of *A. frisia* have been reported from Florida in over a century of intensive collecting in the state (Fig. 1). Grossbeck (1917) listed a record from Brevard County ("La Grange, Sept. 9") that was based on material probably collected in 1911, 1912 or 1913 during an expedition sponsored by the American Museum of Natural History (Kimball, 1965). Kimball (1965) noted at least one specimen from Gainesville, Alachua County, which was collected around 1920 by J. R. Watson, Entomologist of the University of Florida Agricultural Experiment Station. No additional unusual Florida captures were reported until 24 October 1962 when L. L. Martin collected a single female near Eustis in Lake County (Roman, 1979). It is unknown if populations of *A. frisia* were established in these areas or the captures were the result of chance encounters with stray individuals.

On 20 February 1994, I discovered a population of *A. frisia* near Oak Hill in coastal Volusia County, over 300km north of the species' normal breeding range in Florida (Fig. 1). Ironically, this area is located only 16km north of the Brevard County collection site reported by Grossbeck (1917). The Volusia

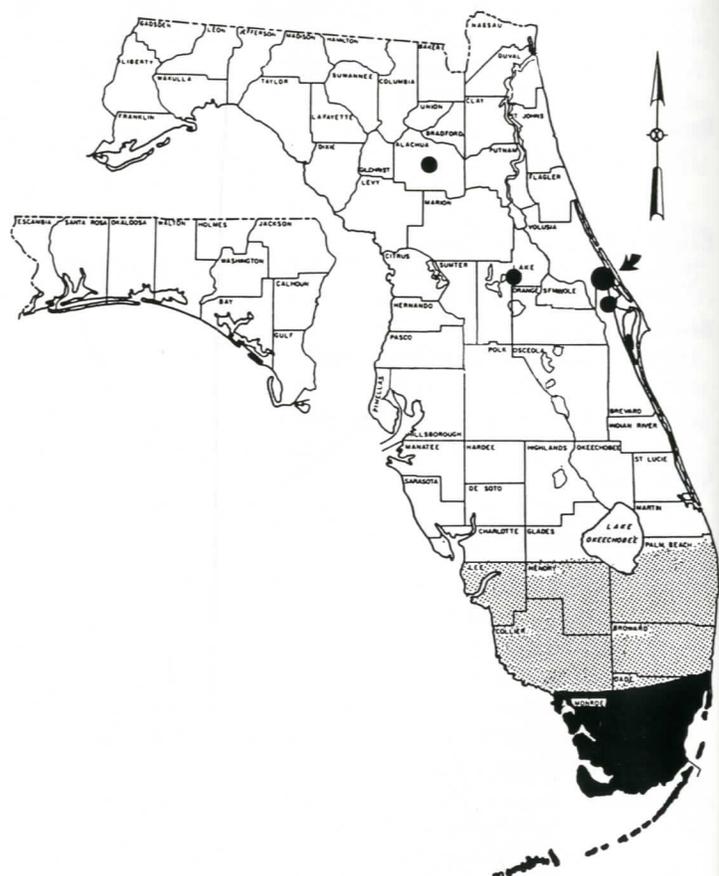


Fig. 1. Distribution of *A. frisia* in Florida showing the normal breeding range (black area), range of sporadic occurrence (shaded area), unusual historical records (small dots) and location of the Volusia County population (large dot with arrow).

County population was found in an open, weedy citrus (*Citrus* sp., Rutaceae) grove that is partially surrounded by hydric hammock swamp forest. Adults of *A. frisia* were most often observed near the margins of the swamp forest where they flew

1. Research Associate, Florida State Collection of Arthropods, DPI, FDACS, Gainesville, Florida 32614, USA.

near the ground and visited the abundant nectar sources *Bidens alba* (L.) DC, *Geranium carolinianum* L. and *Youngia japonica* (L.) DC. They were also frequently seen dorsal basking on *G. carolinianum* leaves which formed a dense groundcover in many portions of the grove. Fresh and slightly worn individuals of both sexes were present and one pair was observed in copula at 1100 h. An examination of adjacent citrus groves did not yield *A. frisia*, suggesting that this population was very localized. Adults were still present on 20 March, 10 April, 24 September, and 16 October 1994. During autumn, adults were observed dorsal basking on sunlit leaves of elephant-ear, *Xanthosoma sagittifolium* (L.) Schott. (Araceae), and visiting the flowers of *B. alba*. *Anthanassa seminole* (Skinner) (Nymphalidae) was also found at this location [due to the consistent differences in the immature stages described by Watts and Habeck (1990) as well as marked ecological and behavioral differences, this taxon is herein treated as a species, rather than a subspecies of *Anthanassa texana* (W. H. Edwards)]. This species is usually associated with clearings within swamp forests but the abundance of nectar sources at the site attracted adults into the more open grove habitat. Brood timing of these two species at the site appeared to be overlapping and nearly synchronous. This may be the only occasion in which these closely related and normally allopatric species have interacted in Florida. The habitat and behaviors of *A. frisia* and *A. seminole* were recorded on 8mm videotape.

On 25 September 1994, a single female *A. frisia* in good condition was found at the edge of a salt marsh located 1.2km east of the grove population. This individual may have emigrated from the grove population, suggesting that females range widely in search of host plants. A tract of hydric hammock forest, approximately 0.8km in width, separates the second collection site from the grove population. Dispersing females of *A. frisia* are probably capable of flying through, or even over, barriers of unsuitable forested habitat. The second site did not appear to support any potential host plants.

Both *A. frisia* and *A. seminole* utilize various species of Acanthaceae as primary host plants (Opler and Krizek, 1984). In Volusia County, Florida, the shared host may be *Dicliptera brachiata* (Pursh.) Spreng. (Acanthaceae) which grows in patches along the edges of the swamp forest. No other species of Acanthaceae were found in the area. One male *A. frisia* was seen patrolling around the plants and a female was disturbed from a large patch. *Anthanassa seminole* also occurs in close proximity to *D. brachiata*. Although no early stages were found on the plants, leaf damage and frass accumulation suggest that larvae were present. The patches of *D. brachiata* are largely shaded during the morning and early afternoon, when they are perhaps most attractive to forest-inhabiting *A. seminole*. However, these patches are sunlit during the late afternoon, probably increasing the acceptability of the plants to females of *A. frisia*. *Dicliptera brachiata* serves as a host plant of *A. texana* in Texas (Kendall, 1964). *Dicliptera assurgens* (L.) Juss. (Acanthaceae) is a known host plant of *A. frisia* in extreme southern Florida (Minno and Emmel, 1993) and *Dicliptera sexangularis* (L.) Juss. (Acanthaceae) is utilized in Jamaica (Smith *et al.*, 1994). The exotic *Beloperone guttata* Brandeg. (= *Justicia brandegeana* Wasshausen & Smith) is also fed upon in southern Florida (Chermock and Chermock, 1947). *Anthanassa seminole* has been found to utilize

Justicia ovata (Walt.) Landau (Acanthaceae) in northern Florida (Watts and Habeck, 1990). *Ruellia caroliniensis* (J. F. Gmel.) Steu. (Acanthaceae) is also a suspected host of in *A. seminole* in Florida (Baggett, 1980).

Brevard and Volusia Counties lie within an ecotone between temperate and tropical lepidopteran elements similar to that found in central Texas (Neck, 1978). Many temperate butterfly species reach their southern range limit in this region of Florida, including *Achalarus lyciades* (Geyer) (Hesperiidae), *Poanes zabulon* (Boisduval & LeConte) (Hesperiidae), *Mitoura grynea* (Hübner) (Lycaenidae), *Incisalia niphon* (Hübner) (Lycaenidae), *A. seminole*, *Enodia portlandia* (Fabricius) (Satyridae), and *Cyllopsis gemma* (Hübner) (Satyridae) (H. D. Baggett and J. V. Calhoun, unpubl.). A number of tropical species have also been recorded in this region, far north of their usual ranges, including *Cybaeus tripunctus* (Herrich-Schäffer) (Hesperiidae), *Appias drusilla* (Cramer) (Pieridae), *Phoebis statira* (Cramer) (Pieridae), *Kricogonia lyside* (Godart) (Pieridae), *Hemiargus thomasi* Clench (Lycaenidae), *Dryas iulia* (Fabricius) (Heliconiidae), *Hypolimnys misippus* (L.) (Nymphalidae), *Siproeta stelenes* (L.) (Nymphalidae), *Eunica tatila* (Herrich-Schäffer) (Nymphalidae), *Marpesia petreus* (Cramer) (Nymphalidae), and *Danaus eresimus* (Cramer) (Nymphalidae) (Edwards, 1881, 1885; Grossbeck, 1917; Roman, 1982; Baggett, 1983; Jenkins, 1990; Baggett and Calhoun, unpubl.). Tropical influences extend further north in Florida along the coasts than inland (Wunderlin, 1982). The distribution of tropical butterfly species in Florida closely approximates that of tropical woody plants (Platt and Schwartz, 1990).

Brown and Opler (1990) proposed that the colonization of tropical butterfly species in Florida is contingent upon host plant availability and their persistence is determined by low temperature thresholds. In Florida, most extralimital populations of tropical butterfly species probably become established toward the end of the wet season (Aug-Oct) when host plant availability and population densities are usually at their peak. Although the host plants of *A. frisia* are widespread in Florida, they are generally unavailable during the winter dry season. Despite this seasonal reduction of available hosts, *A. frisia* has been recorded during every month of the year in Florida (Minno and Emmel, 1993; H. D. Baggett, unpubl.). This may suggest that adults overwinter in reproductive diapause. Other tropical members of the Nymphalidae are also believed to enter reproductive diapause during the dry season in Florida (see Opler and Krizek, 1984). In addition, *A. frisia* could possess a higher threshold to low temperatures than other species such as *E. angelia* and *M. azia*, Neotropical species which may only recently have colonized Florida (Anderson, 1974, Fisher, 1974, Bennett and Knudson, 1976). The early capture date of *A. frisia* in Volusia County implies that this population became established prior to 1994. Although *A. frisia* possesses the potential to persist in Volusia County until low temperatures become intolerable, the nature of the habitat will probably prevent long-term survival.

Anthanassa frisia typically exploits ruderal open habitats with low-growing vegetation. These habitats are often artificially maintained (e.g., vacant lots and roadsides). If these areas remain fallow for extended periods, the habitat becomes overgrown and unacceptable to *A. frisia*. In the autumn of 1994, the grove habitat in Volusia County was considerably more overgrown than on 20

February 1994, thus the population could succumb to natural succession. However, grove soils in the area are routinely turned with a disc harrow to control weed growth. Unless ample host plants and nectar sources are unaffected, this activity would probably eradicate *A. frisia*. If the population is ultimately extirpated, the apparent isolation of the habitat from other populations of *A. frisia* may inhibit the species from becoming re-established at the location. It is likely that such temporary populations are regularly established, but remain undetected. The resemblance of *A. frisia* to the widespread and common *Phyciodes phaon* (W. H. Edwards) (Nymphalidae) and *Phyciodes tharos* (Drury) (Nymphalidae) increases the probability that these populations are overlooked.

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