Journal of the Lepidopterists' Society
58(1), 2004, 51–53

IMMATURE STAGES OF *CALYDNA VENUSTA MORIO* (RIODINIDAE) FROM TRINIDAD

Additional key words: balloon setae, Olacaceae, *Ximenia americana*.

Trinidad, which forms part of Trinidad and Tobago, has a long history of entomological exploration, and successive generations of resident and visiting collectors have together compiled a reasonably complete picture of the butterfly fauna of this species-rich, continental island. The landmark publication for the country, Barcant's (1970) "Butterflies of Trinidad and Tobago", recognized 103 riodinid species from Trinidad. Nevertheless, new records of Riodinidae continue to be added, and the authors are preparing an updated checklist. One of these additions is *Calydna venusta morio* Stichel (Riodininae: *incertae sedis* section), discovered in 1984 by S. Alston-Smith at Point Gourde, on the northwestern peninsula of Trinidad, as indicated in D'Abrera (1994) and Hall (2002). This taxon is poorly represented in collections, but can be locally common in nature from central Panama through northern Colombia and Venezuela to Trinidad, the Guianas, and eastern and southern Brazil, where it occurs in relatively dry habitats (Hall 2002).

MJWC visited Point Gourde, still the only known locality for *C. venusta* in Trinidad, on 16 May 1999, and observed *C. venusta* females flying slowly in amongst the low, dry, scrubby forest, resting beneath leaves with wings outspread and, in the vicinity of the Coast Guard Station on the top of Point Gourde, visiting flowers of *Bidens pilosa* L. (Asteraceae) (Fig. 1). Several late instar caterpillars of *C. venusta* were also found there and reared through to adults. A partial life history for the species is described and illustrated here for the first time.

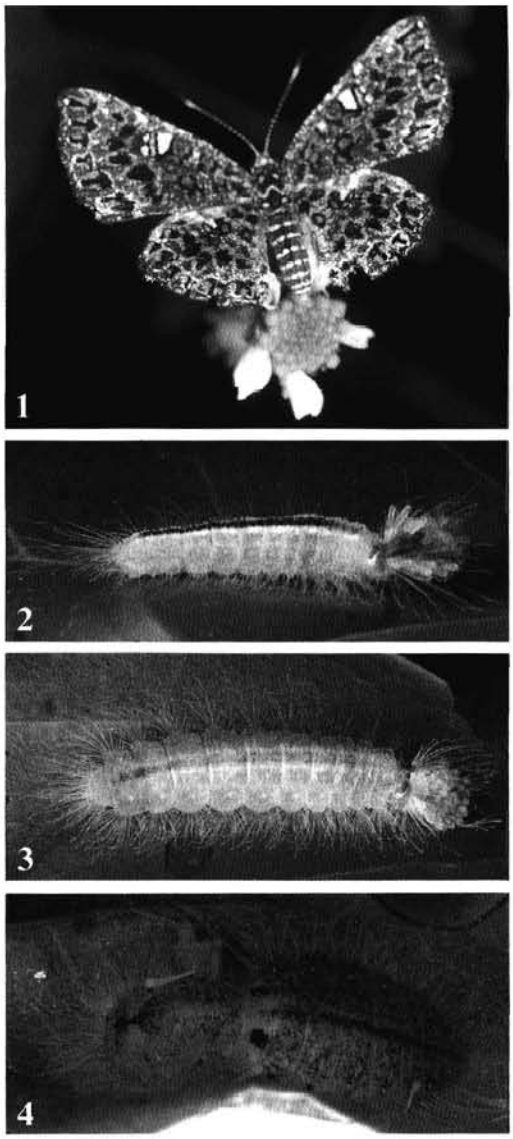
Rearing notes. While searching for caterpillar shelters of Hesperiidae, several fourth and fifth instar caterpillars of *C. venusta* were found in shelters on a single bush of *Ximenia americana* L. (Olacaceae) growing alongside the forest track. This plant is a semi-scandent bush-forming shrub or tree, 2–7 m high, that is sometimes semi-parasitic, with haustoria on the host roots (e.g., Mabberley 1987). The larvae were in leaf shelters, made by rolling one edge of a leaf upwards and tying the edge to the leaf lamina with strands of silk. There were small (2–3 mm) black ants on the bush and in the shelters, but no interactions were observed between the caterpillars and these ants. A herbarium specimen of the food plant was prepared (MJWC 0252) and subsequently identified at the National Herbarium of Trinidad & Tobago.

Two fifth instar and one fourth instar caterpillars were collected and reared (ref. MJWC 99/4) using leafy twigs of *X. americana* that were cut at the time of larval collection and stored in refrigerated plastic bags until used. The caterpillars were kept in individual plastic screw-top jars (5.7 cm height × 5.8 cm diameter) at ambient conditions in Trinidad until 19 May, and thereafter at 25°C in a constant-temperature quarantine room. When not feeding, the caterpillars rested in leaf shelters. The caterpillar collected as fourth instar took approximately 10 days to complete the fifth instar. Pupation was in a silk-lined shelter between two leaves, and adults eclosed between 10 and 13 days later. The three reared adult females are currently in the collection of MJWC, but voucher specimens will be deposited in the collections of the National Museum of Natural History, Washington, and CABI Bioscience, Curepe, Trinidad and Tobago.

The egg and first through third instar caterpillars remain unknown, and here we briefly describe only the fifth instar caterpillar and pupa. The fourth instar caterpillar (total length 10 mm on 16 May, moulted by 20 May) (Fig. 2) differs primarily from the fifth instar (Fig. 3) by having a red-purple dorsal line.

Fifth instar (total length 17 mm on 15 May, prepupa on 20 May) (Fig. 3): The head is approximately circular and slightly translucent pale brown. The prothoracic shield is pale brown, medially desclerotized dorsally, and bears two types of setae anteriorly that form a prominent corona over the head. The first type of seta, known as a balloon seta (first described by Guppy (1904) in two *Theope* species from Trinidad), is long, inflated, pinkish-fawn and slightly distally expanded to a rounded tip. The second type is longer, slender and whitish. T2 and T3 are pale green and evenly scattered with tiny wedge-shaped setae (Hall et al. 2004). The abdomen is pale green, with a slightly darker green, dorsal, longitudinal stripe, bounded on each side with a narrower whitish band that continues to the posterior edge of A9. The dorsal surface is generally smooth, with scattered wedge-shaped setae as on T2–T3, and each segment has a lateral fringe of long white setae. The spiracles are white. At the prepupal stage, the caterpillars turned reddish-purple.

Pupa (total length 10 mm) (Fig. 4): The pupa is slightly dorso-ventrally compressed and pale brown with variably dense darker brown speckling. The abdomen has a dark brown dorsal line, and the metathorax has a pair of large, round, black spots. The spiracles are white and surrounded by dark brown. Each abdominal and thoracic segment has long, whitish, lateral setae, and the mesothorax has a small cluster of fawn-colored balloon setae that project laterally on each side.



FIGS. 1–4. *Calydna venusta morio* at Point Gourde, Trinidad. **1,** Adult female feeding on *Bidens pilosa* flowers near the coastguard station on the hilltop at Point Gourde. **2,** Lateral view of fourth instar caterpillar (10 mm) 1–3 days before moult. **3,** Dorsal view of fifth instar caterpillar (17 mm) 3 days before prepupa. **4,** Dorsal view of pupa (10 mm).

Discussion. This is only the second species of *Calydna* to be reared. Dan Janzen and co-workers have reared *Calydna sturnula* (Geyer) on *Schoepfia schreberi* J.F. Gmel., also in the Olacaceae, numerous times since 1987 in the dry forest of northwestern Costa Rica, and the results are presented on their website (Janzen & Hallwachs 2003), briefly in Hall (2002), and in detail in Hall et al. (2004). This last paper included SE images of surface ultrastructure and a discussion on the phylogenetic implications of these findings. Although the caterpillars of *C. venusta* and *C. sturnula* are very similar, the most conspicuous difference being the pinkish-fawn instead of dark purple color of the balloon setae in *C. venusta*, the pupa of *C. venusta* is notable for also having balloon setae. This trait is found elsewhere in the Riodinidae only in *Helicopis* (Helicopini), but in that genus they are present on the prothorax instead of the mesothorax (Harvey 1987, Hall et al. in press). The absence of balloon setae on the pupa of *C. sturnula* might be explained by the fact that it belongs to a different species group than *C. venusta* (Hall 2002).

Ximenia americana, the food plant of *C. venusta*, is widespread in the tropics of the Americas, Africa, Asia and Australasia, and is especially associated with dry forests and coastal areas (World Agroforestry Centre 2003). Williams (1930) recorded it in the Flora of Trinidad and Tobago from only one locality in Trinidad, on the south coast beach between Erin and Chatham. However, more recent records include Erin Beach, Quoin Beach and Chacachacare Island (Y. Comeau pers. com). Point Gourde is therefore a new locality record. There is a small group of Trinidad butterfly species that have been found only on Chacachacare Island (to the west of Trinidad's northwestern peninsula, mid-way to the Paria Peninsula of Venezuela), Point Gourde and/or Gasparee Island (just south of Trinidad's northwestern peninsula): *Heliopyrgus domicella* (Erichson) (Hesperiidae), *Anteros carausius* Westwood (Riodinidae), and *Ascia* (*Ganyra*) *menciae janeta* Dixey (Pieridae) (Cock 1981, MJWC unpublished data, S. Alston-Smith pers. com.). These three localities represent the driest parts of Trinidad and its offshore islands where butterflies have been collected. It seems likely that *C. venusta* will eventually be found on Chacachacare Island, and perhaps at the south coast localities for *X. americana*.

MJWC thanks Scott Alston-Smith for introducing him to the Point Gourde site and sharing his experiences of this butterfly, and Winston Johnson and Yasmin Comeau at the National Herbarium of Trinidad & Tobago for identifying and checking the distribution of the food plant, respectively. JPWH thanks the National Science Foundation (DEB 0103746) for financial support.

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Received for publication 11July 2003, revised and accepted 29 October 2003.

Journal of the Lepidopterists' Society
58(1), 2004, 53–55

IMMATURE STAGES OF *AMPHIDECTA REYNOLDSI* (NYMPHALIDAE: SATYRINAE)

Additional key words: Bamboo feeders, Pronophilini.

Immature stages of butterflies are increasing in importance as sources of systematic characters, and often give important clues as to the placement of species in major groups (DeVries et al. 1985, Freitas et al. 2002). The Satyrinae genus *Amphidecta* Butler, 1867 has been placed in the Pronophilini by Miller (1968), although Viloria (2003, and in press) removed the genus from this tribe without assigning it to any other group. The species in this genus differ from all other known Pronophilini in morphology, habits and distribution (Miller 1968, Viloria pers. com.), with two species most common in Amazonian lowlands, and a third species, *A. reynoldsi* Sharpe, 1890 (Fig. 1), recorded from low to medium elevation sites in the states of Goiás, Mato Grosso, Minas Gerais, São Paulo and Santa Catarina, and in the Distrito Federal, in Brazil. The habitat of *A. reynoldsi* is riparian forest (including the populations in the Cerrado biome in Goiás, Mato Grosso, Minas Gerais and Distrito Federal), and dense rain forest (São Paulo and Santa Catarina).

The present paper describes the early stages of *A. reynoldsi*, comparing them with those of other known Pronophilini.

Study sites and methods. Adults of *Amphidecta reynoldsi* were studied in the field in two different localities in São Paulo State, SE Brazil: Montane forests in Intervales Park, Sede (Capão Bonito, 900–1100 m), and in the riparian forests of Monte Mor (600–650 m). One fertile egg was expressed from a very old wild caught female from Monte Mor on 10 November 2002 (no additional eggs were found in the abdomen). The larva was reared in a plastic container cleaned daily; fresh plant material was provided every two or three days (following Freitas 1991). Data were taken on behavior and development times for all stages, and head capsules and pupal casting were preserved (AVLF collection). Taxonomic nomenclature follows Miller (1968) and Viloria (in press).

Description of early stages. Egg. Spherical; cream, without visible ridges or marks under the optic microscope. Height 1.0 mm, diameter 0.9 mm. Duration: 5 days.

First instar (Figs. 1, 2). Head capsule light green with a transverse dark stripe in the front and a darker area between the pair of short scoli on vertex; five pairs of conspicuous pointed black setae (Fig. 2). Head capsule width 0.88 mm; head scoli 0.12 mm. Body beige (light green after feeding), with short black setae; a pair of subdorsal white stripes and additional longitudinal red stripes conspicuous on the last abdominal segments; a pair of short caudal filaments on A10. Maximum length 8.5 mm. Duration: 5 days.

Second instar. Head green with two long red diverging scoli on vertex. Head capsule width 1.16 mm; scoli 1.4 mm. Body slender, light green with many longitudinal white stripes; caudal projections salmon, long, parallel and fused. Maximum length 15 mm. Duration: 4 days.

Third instar. Head as in previous instar; width 1.8 mm, scoli 3.5 mm. Body slender, light bluish green with many longitudinal white lines; caudal projections salmon, long (similar to head scoli) parallel and fused. Maximum length 25 mm. Duration: 6 days.

Fourth (last) instar (Fig. 1). Head green with two long diverging scoli on vertex; these brown with black tips. Head capsule width 2.67 mm; scoli 5.67 mm. Body slender, light bluish green with many longitudi-