

THE BIOLOGY AND IMMATURE STAGES OF *AUTOMERIS GRANULOSA* (LEPIDOPTERA: SATURNIIDAE: HEMILEUCINAE)

EURIDES FURTADO AND CLAUDE LEMAIRE *

C. P. 97, 78400-000 Diamantino, MT., Brazil; and
La Croix des Baux, F-84220 Gordes, France

ABSTRACT.— The biology and immature stages of *Automeris granulosa* Conte (Lepidoptera: Saturniidae) are described from Mato Grosso, Brazil. Notes are provided on the range and the larval hosts, and systematic relationship is discussed. In the laboratory the larvae fed on *Erythroxylum anguifugum* Mart. (Erythroxylaceae) and *Vatairea macrocarpa* (Benth.) Ducke (Leguminosae). Generation (oviposition to imago) lasted 88 days. Egg, larval instars, pupa, cocoon and adults are illustrated in color.

RESUMO.— A biologia e os estágios imaturos de *Automeris granulosa* Conte são descritos de Mato Grosso, Brasil. Dados sobre as plantas hospedeiras e distribuição espacial são informados; também é discutida a posição sistemática da espécie. Em laboratório as larvas foram criadas com *Erythroxylum anguifugum* (Erythroxylaceae) e *Vatairea macrocarpa* (Leguminosae). A duração do ciclo evolutivo foi de 88 dias. Ovos, todos os sete instares larval, o casulo, a pupa e os imagos são ilustrados a cores.

RESUMÉ.— La biologie et les états préimaginaux d'*Automeris granulosa* Conte sont décrits du Mato Grosso, Brésil. Des précisions sont apportées sur la répartition géographique et les plantes nourricières, ainsi que sur la position systématique de l'espèce concernée. Les chenilles décrites ont été élevées sur *Erythroxylum anguifugum* (Erythroxylaceae) et *Vatairea macrocarpa* (Leguminosae). Durée du cycle (de la ponte à l'imago): 88 jours. L'oeuf, les différents stades larvaires, la chrysalide, le cocon et l'imago sont illustrés en couleurs.

KEY WORDS: Argentina, Brazil, Cerrados, eggs, Erythroxylaceae, geographical distribution, hostplants, larvae, Leguminosae, Malpighiaceae, Mato Grosso, Neotropical, phylogeny, South America, taxonomy.

Automeris granulosa was described by Conte (1906), based on a single female specimen from Brazil, with no further locality data; the holotype that was then in the collection of Charles Oberthür is now preserved in the Muséum national d'Histoire naturelle, Paris. Within the group of *Automeris cecrops* (Boisduval), a subdivision of the plethoric (ca. 125 species) genus *Automeris*, *A. granulosa* forms with *Automeris oberthurii* (Boisduval) and *A. castrensis* Schaus a small subgroup, the most distinctive trait of which is the presence on the underside of an as large discal spot on the hindwing as on the forewing. *Automeris granulosa* (Fig. 12-13) is an especially beautiful moth, unmistakable, based on the bright orange brown coloration of the forewing and the pure yellow periocellar area on the hindwing. It is apparently endemic to the Brazilian cerrados; there are records from Distrito Federal, and from the states of Alagoas, Goiás and Mato Grosso (Lemaire 1973); it is not uncommon in the area of Alto Rio Arinos, Mato Grosso (elevation ca. 450m), from where originates the studied material.

DESCRIPTIVE NOTES

EGG (Fig. 1): 1.8mm long, 1.4mm wide. Ovoid, flattened on the two sides, yellowish; micropyle black. Hatched 13 days after being laid. On an average 150 eggs were laid by the studied females.

LARVA

First instar (Fig. 2): Head yellowish brown, adfrontal sutures black. Integument lemon colored, middorsal band greenish. Scoli yellowish, spinulae dark chestnut. Length: 3.5-7.5mm. Duration: 6 days.

Second instar (Fig. 3): Head as in first instar. Integument lemon colored with one middorsal and one pair of subdorsal, narrow, dark green longitudinal stripes; ventral area lighter than remainder of the body. Thoracic legs dark chestnut, prolegs and anal legs yellowish. Scoli black. Length: 11 mm. Duration: 6 days.

Third instar (Fig. 4): Head as before but sutures darker. Integument as in the previous instar; longitudinal stripes darker. Thoracic legs now chestnut or cream. Basal portion of the scoli colored as the integument. Length: 16mm. Duration: 5 days.

Fourth instar (Fig. 5): Head as in third instar. Integument light yellow with green spots between the dorsum and the spiracular area; there are dark green dots on the ventral area. Coloration of the basal portion of the scoli lighter than in the third instar, spinulae tipped black; subspiracular scoli as long as the corresponding dorsal and subdorsal scoli. Length: 22mm. Duration: 7 days.

Fifth instar (Fig. 6): Head light olive green, sutures black. Integument light green; are now distinct on each side three yellow, discontinuous (interrupted at base of the scoli) longitudinal stripes, respectively dorsal, subdorsal and lateral, expanding from T2 to A8, and one, slightly broader, subspiracular band, expanding from A1 to A8. Thoracic legs, prolegs and anal legs yellowish. Scoli and spinulae light yellow, the latter tipped black; prothoracic scoli shorter than the meso- and metathoracic and falling down the head; scoli of A8 and A9 (except for the middorsal of the latter) much longer than the corresponding scoli of A1 to A7, and tending to fall laterally and down the tenth segment. Spiracles oval, light chestnut. Length: 27 mm. Duration: 6-7 days.

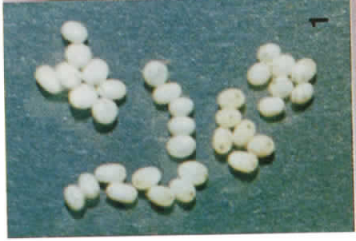
Sixth instar (Fig. 7): Head as in fifth instar. Integument light olive green on T1-T2 and A8 to A10, turquoise on T3 to A7; ventral area pale olive green; longitudinal stripes and bands yellow as in the previous instar. Thoracic legs yellowish, prolegs and anal legs lighter than the remainder of the body; anal shield greenish, lighter on the margin. Scoli light green with a bluish tinge. Spiracles as in the previous instar. Length: 53mm. Duration: 6 days.

Seventh instar (Fig. 8): Ground color lighter than in the sixth instar; otherwise similar. Length: 74-75mm. Duration: 10-13 days.

Larvae are gregarious during the first instars but after the fourth or fifth instars they tend to live singly.

COCOON (Fig. 10): Oval-type, light brown, double walled, reticulate with the pupa visible through the mesh. The larva spins the cocoon among leaves and (or) debris giving it a solidity unusual for the genus.

*Correspondant du Muséum national d'Histoire naturelle, Paris, France.



1



2



3



4



5



6



7



8



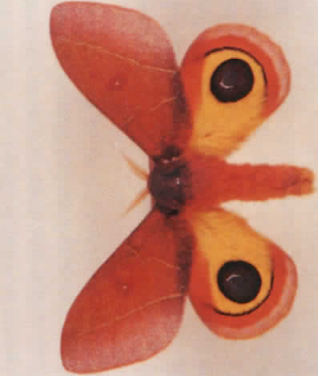
9



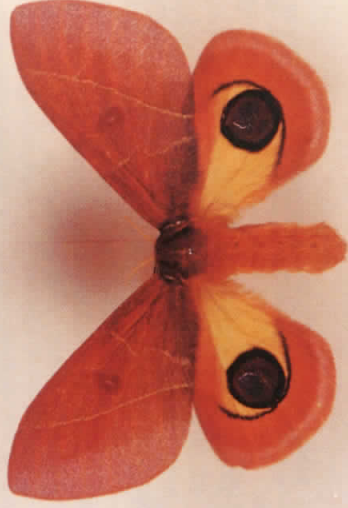
10



11



12



13

Length: 40-45mm; largest width: 25-30mm.

PUPA (Fig. 11): Yellowish chestnut; A9, A10 darker than the other segments. Clypeo-labral sutures, antennae, legs, and wings, well-defined. Vertex, thorax and wing areas with micro-rugosities; veins not very apparent. Spiracles oval, surrounded with black. Cremaster simple, black, with a tuft of hook-like terminal setae. Length: 31mm; largest width: 13mm. Pupal stage: ca. 26 days.

GENERATION TIME (egg to imago): 88 days.

HOSTS: The larva was observed by Diniz and Morais (1995), feeding on *Erythroxylum tortuosum* Mart. (Erythroxylaceae), *Bauhinia* and *Chamaechaerista* sp. (Leguminosae), and *Byrsonima verbascifolia* L. Rich. (Malpighiaceae). The studied sample was reared in the laboratory on *Erythroxylum anguifugum* Mart. (Erythroxylaceae) and *Vatairea macrocarpa* (Benth.) Ducke (Leguminosae).

SYSTEMATIC RELATIONSHIP

The comparative study of the immature stages of *Automeris granulosa* and of the western Argentinean species *Automeris oberthurii*, these previously described and illustrated by Schreiter (1943), confirms the close relationship observed in the adults by Lemaire (1973), based on the habitus and the male and female genitalia. Although very distinct by the coloration, the last instar larvae of both species share the very characteristic arrangement on each side of the body of the three longitudinal stripes and the subspiracular band, and the long decumbent prothoracic and terminal scoli. The most remarkable trait that both species have otherwise in common is the very strong reticulate cocoon, which very much differs from the usually thin but opaque cocoon of the *Automeris* (however, members of the unrelated *Automeris janus* species-group have also reticulate (much larger) cocoons).

LITERATURE CITED

Conte, A.

1906. Essai de classification des Lépidoptères producteurs de soie (5^e fasc.). *Ann. Lab. Etud. Soie* (Lyon), 12:107-227, 32 pl. (1903-05) [1908 reprint. 121pp].

Diniz, I. R., and H. C. Morais

1995. Larvas de lepidoptera e suas plantas hospedeiras em um cerrado de Brasília, DF, Brazil. *Revta. Bras. Ent.* (São Paulo), 39:755-770.

Lemaire, C.

1973. Révision du genre *Automeris* Hübner et des genres voisins. Biogéographie, éthologie, morphologie (Lep. Saturniidae Hemileucinae) (suite). *Mém. Mus. Natl. Hist. Nat.* (Paris), 79:233-422, pl. 30-49.

Schreiter, R.

1943. Notas entomo-biologicas y otras. *Acta Zool. Lilloana* (Tucumán), 1943:7-44, 26 pl.

Fig. 1-13. *Automeris granulosa*: 1) Eggs. 2) First instar larvae (dorsal view). 3) Second instar larvae (dorsal view). 4) Third instar larvae (dorsal view). 5) Fourth instar larvae (dorsal view). 6) Fifth instar larvae (dorsal view). 7) Sixth instar larva (dorsal view). 8) Seventh instar larva (laterodorsal view). 9) Head capsules (1-7 instars). 10) Cocoon (length 40-45 mm). 11) Pupa (dorsal view, length 31 mm). 12) Male (expanse 58mm). 13) Female (expanse 75mm).