

A REVIEW OF THE NEOTROPICAL MOTH GENUS *CARATHIS* GROTE (LEPIDOPTERA: ARCTIIDAE)

Vitor O. Becker

Reserva Serra Bonita, P. O. Box 001, 45880-970 Camacan, Bahia, Brazil; becker.vitor@gmail.com

Abstract - The neotropical moth genus *Carathis* Grote (Arctiidae) is reviewed. Diagnoses, illustrations of adults and male genitalia and a key to the species identification are presented. Six species are recognized, two new: *C. alayorum* sp. n. endemic to Cuba, and *C. septentrionalis* sp. n. ranging from Amazon north into Mexico; one synonym is established: *C. melamera* Dognin syn. n. (= *C. byblis* Schaus).

Key words: Moths, neotropical, taxonomy, distribution.

Watson & Goodger (1986: 16) included six species in the genus *Carathis* Grote, [1866]. Toulgoët (1999: 151) transferred *C. klagesi* Rothschild, 1909 to *Tessella* Breyer, 1957. Examination of material belonging to the National Museum of Natural History, Washington (USNM) and the author's collection (VOB) revealed that one name is a junior synonym and two species are undescribed. This review updates the classification of the genus and presents a key, diagnosis and illustrations to enable the identification of the species.

Carathis Grote

Carathis Grote, [1866]: 253; Kirby, 1892: 565; Hampson, 1901: 95; Seitz, 1920: 335; Watson & Goodger, 1986: 16. Type-species: *Carathis gortynoides* Grote, [1866]: 253, by monotypy.

Diagnosis. This genus is very similar to *Aemilia* Kirby, 1892, in size, and in shape and colour pattern of forewings, so similar that some *Aemilia* species were originally described in *Carathis*. However, *Carathis* species have opaque, fully scaled hind wings, whereas the hindwings of *Aemilia* species are semitranslucent and thinly scaled. Their male genitalia are also quite distinct: the uncus is long, thin and symmetrical in *Aemilia* whereas the uncus is short and thick towards tegumen and asymmetrical, distorted sideways, in *Carathis*.

KEY TO THE SPECIES

1. Hind wings yellow (Jamaica).....*palpalis*
Hind wing gray or mostly gray.....2
2. Thorax brown dorsally (Cuba).....3
Thorax with yellow patch dorsally.....4
3. Abdomen fuscous above.....*gortynoides*
Last three segments of abdomen yellow above.....*alayorum*
4. Fore wing cream basal area with straight distal margin,
oblique from basal fourth of costa to before tornus (S. Brazil)
.....*australis*
Fore wing cream basal area with incurved distal margin....5
5. Male genitalia with symmetric valvae*byblis*
Male genitalia with asymmetric valvae.....*septentrionalis*

Carathis palpalis (Walker) (Figs. 1, 8)

Halesidota palpalis Walker, 1855: 735. Holotype ♂, JAMAICA: [no further data] (*Gosse*) (BMNH) [not examined]. *Carathis palpalis* (Walker); Hampson, 1901: 95, pl. 37, fig. 12; Seitz, 1920: 335, pl. 42 k; Watson & Goodger, 1986: 16.

This species, endemic to Jamaica, is the only member of the genus with plain yellow hind wings. The illustration by

Hampson, who examined the type, leaves no doubt about its identity.

Material examined. JAMAICA: ♂, Port Antonio, 21.iii.1927 (*Hessel*); ♂, Kingston, 3.vi.1904 (*Maxon*), genitalia slide 115951 (USNM).

Carathis gortynoides Grote (Figs. 6, 9)

Carathis gortynoides Grote, [1866]: 253, pl. 4, fig. 8; Hampson, 1901: 96, fig. 70; Seitz, 1920: 335; Watson & Goodger, 1986: 16. Holotype ♂, CUBA: (ANS) [not examined].

This species, endemic to Cuba, is very similar to the continental *byblis* and *septentrionalis*, but easily distinguished by the solid brown thorax. The illustrations presented in the original description, and by Hampson, combined with its distribution, leave no doubt about its identity.

Material examined. (5 ♂♂, 2 genitalia slides). CUBA: ♂, Baracoa, i.1903 (*Schaus*); ♂, Pinar del Rio (Roberts); genitalia slide 115953 (USNM); 2 ♂♂, Pinar del Rio, Sierra del Rosário, 400 m, 5-15.vi.1990 (*Becker*), genitalia slide VOB 1996 (VOB 71068); ♂, Santiago, Turquino, 470 m, 27-29. vii.1990 (*Becker*) (VOB 73185).

Carathis alayorum sp. n. (Figs. 2, 3, 10)

Diagnosis. Similar to the Cuban *gortynoides* but easily distinguished by the yellow distal third of abdomen and by the male genitalia.

Description. Male 17 mm. Labial palpi brown, 1st and 2nd segments ferruginous distad; frons brown, vertex white, ferruginous at middle posteriorly; antennae brown, scape white, tinged ferruginous. Thorax brown; patagia with pair of ferruginous dots anteriorly; tegulae white, edged brown dorsally; legs brown, ferruginous ventrally; fore and mid tibiae mostly white dorsally; tarsi ringed ferruginous. Forewings brown; basal third of costa, above cell, termen, and mid dorsum patches white, reticulated brown and ferruginous. Hind wings dark fuscous. Abdomen dark fuscous, ferruginous laterally; four distal segments ochreous.

Female 18 mm. Forewings with brown reduced to broad bands. Hind wings with pale patches between veins. Abdomen wholly yellow.

Genitalia ♂. Uncus flat dorso-ventrally, lateral margins nearly parallel, apex obliquely cut; tegumen and vinculum slender, round. Valvae broad, nearly symmetrical, lateral margins nearly parallel, apex ending in a round lobe on ventral margin; juxta an equilateral triangle pointing distad. Aedeagus long, evenly arched, gradually expanded towards both ends; vesica with oval area densely spinose.

Material examined. (2 ♂♂, ♀). Holotype ♂, CUBA: Guantánamo, Imías, Farola, 15.vii.1990 (*Becker*, 72560), genitalia slide VOB 2000 (VOB);



Figs. 1-7 *Carathis* adults. 1) *palpalis*, male (Jamaica); 2-3) *alayorum*, paratypes, male and female (Cuba); 4) *septentrionalis*, paratype male (Costa Rica); 5) *australis*, male (Brazil); 6) *gortynoides*, male, (Cuba); 7) *byblis*, male (Brazil).

Paratypes, ♂, Holguín, Pin[ares] [de] Mayari, 750 m, vii.1990 (Becker, 72054) (VOB); ♀, [Holguín], Moa, La Breña, vi.1954 (Zayas & Alayo) (VOB).

Remarks. This is the only species in the genus showing strong sexual dimorphism. Male genitalia closest to those of *C. australis*.

Etymology. Named after Pastor Alayo, his wife Doña Blanca, and son Rafael for their help and hospitality during the author's expedition to Cuba.

Carathis australis Rothschild (Figs. 5, 11)

Carathis australis Rothschild, 1909: 208, 1910: pl. 12, fig. 8; Hampson, 1920: 209; Seitz, 1920: 335; Watson & Goodger, 1986: 16. Holotype ♂, BRAZIL: SC (BMNH) [examined].

Diagnosis. Easily distinguished from all the others in the genus by the large basal creamy reticulated area that extends obliquely outwards, from basal fourth of costa to near tornus.

Material studied. (13 ♂♂, 2 genitalia slides). BRAZIL: PR, ♂, Curitiba, 920 m, 2.vi.1975 (Becker, 2357) (VOB); ♂, Quatro Barras, 900 m, 31.i.1993 (Becker, 86897) (VOB); SC, ♂, Joinville, 500 m, 3.i.1989 (Becker, 60639), genitalia slide 1999 (VOB); ♂, Jaraguá do Sul, viii.1934 (Hoffmann) (USNM); 7 ♂♂, [Jaraguá do Sul] [no further data], (Hoffmann), genitalia slide 115949 (USNM); ♂, [Seara], Nova Teutônia (Plaumann) (USNM); ♂, St. Catherines' [no further data] (USNM).

Carathis byblis (Schaus) (Figs. 7, 12)

Ameles byblis Schaus, 1892: 279. Lectotype ♂, [BRAZIL: RJ], Rio de Janeiro (Schaus), genitalia slide AW 271 (USNM), designated by Watson, 1971: 18 [examined].

Carathis byblis (Schaus); Hampson, 1901: 95; Seitz, 1920: 335, pl. 42 k; Watson, 1971: 18, pl. 18c, 109 a, b; Watson & Goodger, 1986: 16.

Carathis melamera Dognin, 1916: 7; Hampson, 1920: 208, pl. 66, fig. 3; Seitz, 1925: 475; Watson, 1971: 57, pl. 18d, 232 a; Watson & Goodger, 1986: 16. Holotype ♀, BRAZIL: SP, São Paulo (USNM), g. s. AW 270 [examined]. **Syn. n.**

Diagnosis. This and *C. septentrionalis* are almost identical externally (see below for differences).

Material examined. (23 ♂, 2 ♀♀, 2 genitalia slides). BRAZIL: ♂, BA, Camacan, 600-800 m, 13-14.iv.1992 (Becker, 84590) (VOB); ♂, RN: Pipa, 20 m, 28-31.iii.1994 (Becker, 91276) (VOB); 6 ♂♂, 2 ♀♀, [SC] 'St. Catherines', [Corupá] 'Hansa Humboldt' (Hoffmann), genitalia slide 115945 (USNM); SP, ♂, Bertioga, 5.xi.1995 (Becker, 99059) (VOB); ♂, Ubatuba, Picinguaba, 20 m, 18.iii.2001 (Becker, 132544) (VOB); 13 ♂♂, VENEZUELA: [Bolivar], Caura Valley (Klages) (USNM).

Remarks. All males examined match the type of *byblis* whereas all females, from the same localities, match the type of

melamera. Fore wing pattern similar in both sexes; female with abdomen yellow dorsally and hind wings base and costa tinged yellow.

Carathis septentrionalis sp. n. (Figs. 4, 13)

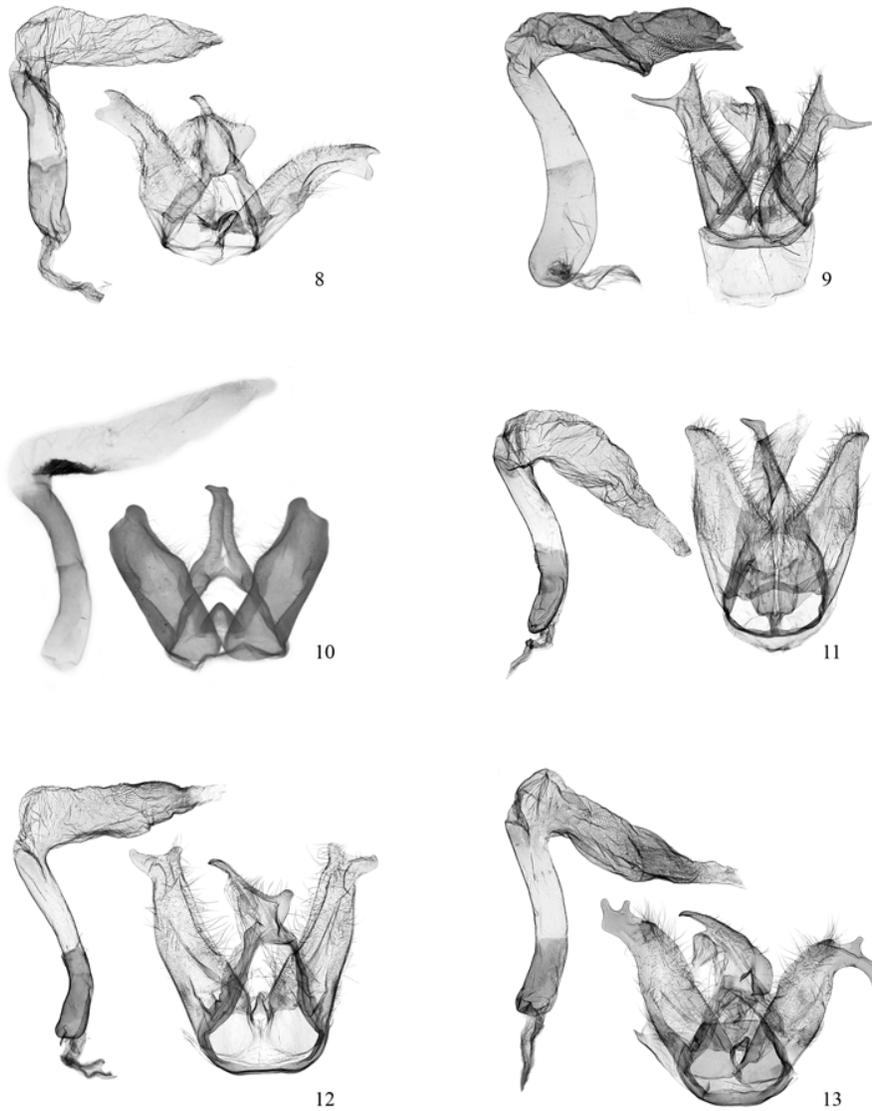
Diagnosis. This species is almost identical externally to *C. byblis* and cannot be easily distinguished without examination of the genitalia. Males have the cream patch on thorax and on dorsum of forewings more reduced and usually have a thick line of brown scales on vertex, connecting the antennae. However the male genitalic valvae are conspicuously distinct: strongly asymmetric in this and almost symmetric in *byblis*.

Females are easily distinguished by the colour of abdomen: wholly yellow in *byblis* and dark fuscous dorsally in *septentrionalis*. Also, it seems that their distribution overlaps only in part of their range: all specimens from Central America and Mexico belong to *septentrionalis*, whereas all from the Atlantic Forest of Brazil are *byblis*. Males from the Amazonian region should have their genitalia checked for reliable identification, which can be done easily by brushing off the scales of the tip of their abdomen in pinned specimens.

Material examined. (17 ♂♂, 3 ♀♀, 3 genitalia slides). Holotype ♂, COSTA RICA: [Cartago], Turrialba, [600 m], 2-5.xi.1967 (Todd) (USNM). Paratypes: COSTA RICA, [Cartago], 4 ♂♂, same data as holotype, genitalia slide 115942; 2 ♂♂, ♀, Turrialba, 600 m, 15.vii.1971, vii.1981 (Becker, 31488, 45678), genitalia slide 1997 (VOB, USNM); ♂, [Cartago], [El] Sitio, ix [no further data] (Schaus & Barnes) (USNM); ♂, [Cartago], Tuis, v [no further data] (USNM); ♀, Alajuela, Bijagua, 2-4.xi.2000 (Becker, 129562) (VOB); GUATEMALA: ♂, Petén, Sta. Ana Vieja, 16.ix.1973 (Becker, 31936) (VOB); MEXICO: ♀, V[era]c[ruz], viii.1906 (Schaus); ♂, Cordoba, 7.vi.1966 (Flint & Ortiz) (USNM); ♂, Ver[acruz], 7 mi SW Poza Rica, 200', 20-22.vii.1963 (Duckworth & Davis), ♂, Chiapas, Tacana, San Gerónimo, 450 m, 3.xi.1970 (Welling) (USNM); Misantla, vii. [19]11 (Miller), genitalia slide 115946; 2 ♂♂, S[an] L[uis] P[otosi], Palitla, 5.vi, 5.viii.1966 (Flint) (USNM); ♂, Q[uintana] Roo, 27.ix.1973 (Becker, 31994) (VOB); ♂, BRAZIL: MT: Chapada dos Guimarães, 800 m, 7-8.iv.1996 (Becker, 106485) (VOB).

ACKNOWLEDGEMENTS

Without the collaboration provided by the following persons, this work could not have been completed: Karolyn Darrow (USNM), prepared the genitalia images; Don Harvey (USNM) and Klaus Sattler (BMNH) supplied data of type specimens; Inge Willems, Porto Seguro, Bahia prepared the plates; Anthony Raw, Universidade Estadual de Santa Cruz, Bahia, read and corrected the manuscript. The Conselho Nacional de



Figs. 8-15. *Carathis* male genitalia (aedeagus on left). 8) *palpalis* (Jamaica); 9) *gortynoides* (Cuba); 10) *alayorum*, holotype (Cuba); 11) *australis* (Brazil); 12) *byblis* (Brazil); 13) *septentrionalis*, paratype (Costa Rica).

Desenvolvimento Científico e Tecnológico (CNPq) provided a grant (478567/2004-9) to purchase optical equipment.

REFERENCES

- Grote, A. R.**
[1866]. Notes on the Bombycidae of Cuba I. *Proceedings of the Entomological Society of Philadelphia* 5: 227-264.
- Hampson, G. F.**
1901. *Catalogue of the Lepidoptera Phalaenae in the British Museum. III.* London, Taylor & Francis, 690 pp.
- Hampson, G. F.**
1920. *Catalogue of the Lepidoptera Phalaenae in the British Museum. Suppl. II.* London, Taylor & Francis, 592 pp.
- Kirby, W.**
1892. *A synonymic catalogue of the Lepidoptera-Heterocera.* London, Taylor & Francis. xii + 952 p.
- Rothschild, L. W.**
1909. Descriptions of South American Arctiinae. *Annals and Magazine of Natural History* (Ser. 8) 4: 205-229.
- Rothschild, L. W.**
1910. Descriptions of new Arctiinae in the Tring Museum. *Novitates Zoologicae* 17: 172-188.
- Schaus, W.**
1892. Descriptions of new species of Lepidoptera Heterocera from Brazil. *Proceedings of the Zoological Society of London* 1892: 272-291.
- Seitz, A.**
1919-1925. Spilosomini. In A. Seitz, ed. *Die Gross-Schmetterlinge der Erde. VI.* Stuttgart, Alfred Kernen. Pp. 306-325, 471-474.
- Toulgoët, H.**
1999. Descriptions de nouvelles arctiides d'Amérique du Sud avec recapitulation du genre *Tessella* Breyer 1957 (Lépidoptères Arctiidae Arctiinae). *Lambillionea* 94: 149-152.
- Walker, F.**
1855. List of the specimens of lepidopterous insects in the collection of the British Museum 3: 582-775.
- Walker, F.**
1865. List of the specimens of lepidopterous insects in the collection of the British Museum 31: 1-322.
- Watson, A.**
1971. An illustrated catalog of the neotropical Arctiinae types in the United States National Museum (Lepidoptera: Arctiidae). Part I. *Smithsonian Contribution to Zoology* 50: 1-361.
- Watson, A. & D. T. Goodger.**
1986. Catalogue of the Neotropical tiger-moths. *Occasional Papers on Systematic Entomology* 1: 1-71.