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TAXONOMIC NOTES ON SOME GRAPHIUM SPECIES FROM THE SOLOMON ISLANDS

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Among the most intriguing swallowtails of the Solomon Islands are the various species of the genus *Graphium* Scopoli, 1777, a genus closely allied to the New World *Eurytides* Hübner, [1821]. The Solomon species include such widespread *Graphium* as *agamemnon* (Linnaeus, 1758), *codrus* (Cramer, [1780]) and *sarpedon* (Linnaeus, 1758), as well as such endemic *Graphium* as *mendana* (Godman and Salvin, 1888), *meeki* (Rothschild and Jordan, 1901) and *hicetaon* (Mathew, 1886). The notes given herein concern chiefly *meeki* and *mendana*, but additional information is given on other taxa as indicated.

A cautionary word is necessary here. One must not rely on D'Abrera (1971, 1977) as *the* complete source for the study of Australian region butterflies. Impressive as the work is, it is by no means complete, as the following example will show. Rothschild (1915) described some 52 new Papilionoidea from the Admiralty Islands, Vulcan Island and Dampier Island, islands to the west of the Solomons. Of these taxa, 11 (21%) are listed and characterized (occasionally photographed or synonymized) by D'Abrera; another 14 (27%) are mentioned along with their ranges and the remaining 27 (52%) are not mentioned at all. Often in the latter case, it is impossible to ascertain if these species even inhabit the Admiralties, Dampier and Vulcan. It is imperative, therefore, that one search far beyond the pages of the D'Abrera book before reporting impressive "new" finds or describing new taxa.

ACKNOWLEDGEMENTS

We would like to thank many people for assistance in procuring specimens or digging out information included in this paper:

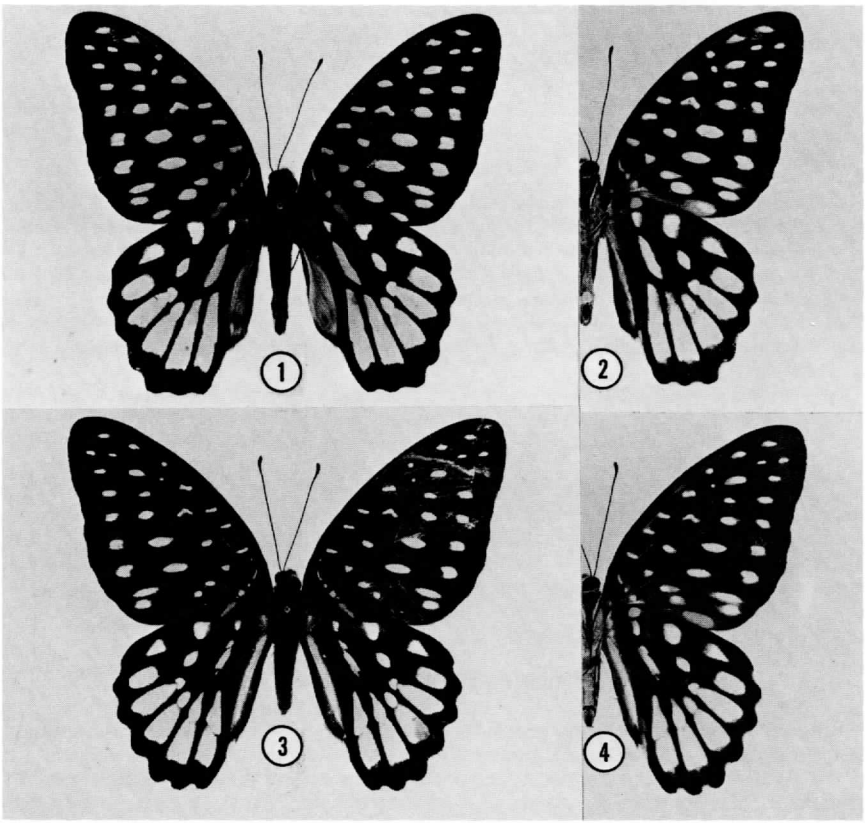
Mr. A. C. Allyn photographed type specimens for us and read the manuscript; Mr. Donald J. Harvey commented on the manuscript; Mr. Chris Samson sought out additional specimens of *G. mendana* for us, as did Mr. Ted Archer; Mr. Phillip Ackery answered interminable inquiries about specimens in the British Museum (Natural History) collection; Mr. Kent Wilson answered additional queries about *Graphium* taxonomy; and Mr. David Matusik secured a pair of *G. meeki* for the Museum collection.

Graphium meeki (Rothschild and Jordan, 1915)

Papilio meeki Rothschild and Jordan (1901: 402). TL — "Isabel" [Sta. Isabel I.], Solomon Island. HT ♀ in BM [examined].

In his first edition, D'Abrera (1971: 112) figured the only specimen of this species that he found in the British Museum and stated that the insect was "exceedingly rare, probably extinct." He recanted slightly in the second edition, stating (D'Abrera, 1977: 112) that *meeki* was very rare, but that four females were known from Sta. Isabel and Bougainville. Bougainville material was stated to be somewhat different and "...appears to be another race..."

When Mr. Matusik brought us a pair of *meeki* (from Bougainville), it was apparent that these specimens did indeed represent a new subspecies, and this is described below. The ♂ of *G. m. meeki* still remains unknown, but the ♂ and ♀ genitalia illustrated herein are expected to be comparable with those of the nominate race.



Figures 1-4: *Graphium meeki inexpectatum*, new subspecies. 1-2, Holotype ♂ upper (1) and under (2) surfaces; SOLOMON ISLANDS: BOUGAINVILLE I.: Buin, 500 m., 11.ii.1978 (Allyn colln.). 3-4, Paratype ♀ upper (3) and under (4) surfaces; Same locality as ♂, 12.ii.1978 (Allyn colln.).

Graphium meeki inexpectatum, new subspecies

Figures 1, 2 (Holotype ♂), 3, 4 (Paratype ♀), 7 (♂ genitalia), 8 (♀ genitalia)

Male-female: Distinguishable immediately from *G. m. meeki* by the shape of the spots in the extradiscal green spotband of the hindwing above. In *m. meeki* those spots in M_2-M_3 to Cu_1-Cu_2 are strongly concave distad; in the present subspecies the same spots are distally squared off, as shown by comparison of our figures with that of D'Abrera (1977: 113). The basal spots of both fore- and hindwings are paler, but more prominent, in the present subspecies than in the nominate subspecies, but most of the other spots are more obscure in *inexpectatum* than in *m. meeki.* The green coloration is a bit duller and bluer than in *m. meeki,* but this may be an artifact as a result of the slightly worn condition of the type series of *inexpectatum.*

Length of forewing of Holotype ♂ 57.0 mm.; forewing lengths of ♂ and ♀ Paratypes approximately the same.

♂ genitalia as illustrated (species not previously figured): uncus and tegumen reduced; valval costa ovoid; cucullus dentate; valvulla smooth, separate from sacculus; ampulla marginally dentate; ventrodistal margin of valva with characteristic setal patch diverted inward; juxta membranous to lightly sclerotized with heavy setal patch; aedeagus with heavy tapered terminal prong; penis lineate.

♀ genitalia as illustrated (species not previously figured): sterigma highly ornamented with forked process (lamella antevaginalis) delineating ostium bursae; ductus brusae with medium sclerotization; bursa copulatrix opaque, semi-membranous with a single heavily sclerotized signa. Entire genitalia looking nothing like those of other *Graphium* in the area.

Described from six specimens, four males and two females, from near Buin, Bougainville, Solomon Islands.

HOLOTYPE ♂: SOLOMON ISLANDS: BOUGAINVILLE I.: Buin, 500 m., 11.ii.1978 (*ex colln.* D. Matuski); ♂ genitalia preparation M-3463 (Jacqueline Y. Miller).

PARATYPES: 3♂ 2♀, same locality as Holotype or "Biros Village, Buin", various dates.

Holotype ♂ and one ♀ Paratype in Allyn Museum of Entomology; two ♂ and one ♀ Paratypes in collection of D. Matusik; one ♂ Paratype in collection of M. Simon.

The name is derived from the unexpected nature of the discovery of a new *meeki* subspecies on Bougainville, perhaps the best collected of the Solomon Islands.

The characteristics cited in the description will separate *inexpectatum* from nominate *meeki.*

We have not seen the ♂ of *meeki* reported in the literature. There are few significant differences between the sexes, judging by the condition in *inexpectatum,* though the intensity of the green hindwing patches is somewhat greater in the ♂, and the basal markings o both wings above a bit stronger in the ♀. The abdominal fold of the upper hindwing of the ♀ is replaced by a fold containing creamy white androconical hairs in the ♂, these hairs being fairly typical for the genus.

Variation in *Graphium codrus* (Cramer, [1780])

This species varies geographically, having green forewing spots on some islands, yellow ones on others. Most of the subspecies are so defined in the literature, except those from the Solomon Islands. D'Abrera (1977: 118) lumps all of the Solomon populations under *pisidice* (Godman and Salvin, 1888: 100), but reports, "Fenner (pers. comm.) is of the opinion that *codrus* from Malaita is different to *pisidice* from Bougainville, the former being larger, with more elongate wings and rich gold spots that are not the result of discolouration."

Fenner is partially correct. Certainly his comparison of the Malaita and Bougainville populations is valid, but the subspecies *pisidice* was described from Malaita, not

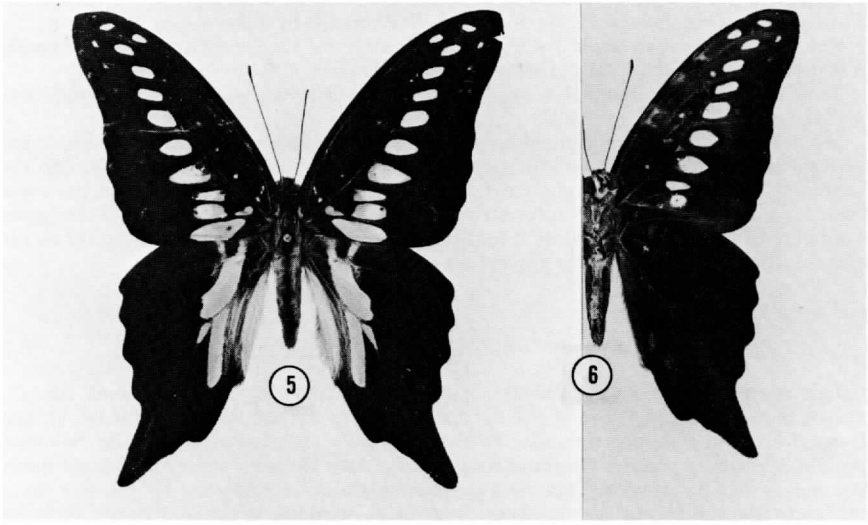
Bougainville. One must look to Rothschild (1895: 426) for a probably faulty explanation of why the yellow-spotted Malaita population was considered the same as the Guadalcanal-Bougainville one. Rothschild stated, "The type-specimen of *pisidice* has the band of the forewing golden instead of green; the golden colour, if not due to bad preservation, must be explained by individual variation..." This statement is diametrically opposed to that of Fenner, and one must doubt seriously that the type of *pisidice* is discolored. Godman and Salvin (1888: 213) also described the green-spotted morph as *Papilio solon*, and that name is the one that should be applied to material from most of the Solomons (with the exception of Malaita and perhaps Alu). *G. c. solon* was described from Guadalcanal, and material from at least Bougainville agrees with it.

At least one other *Graphium* has forewing maculae green on some islands and yellow on others. *G. mendana* is a rather rare endemic to the Solomons and the New Georgia group (D'Abrera, 1977: 116). A clear yellow-spotted morph is found on Malaita, suggesting that there might be an abscure mimetic association between it and *G. codrus pisidice*. Some Bougainville specimens of *mendana*, however, seem to have some yellowing of this spotband, thus tending to discount a strong mimicry complex built around *codrus*: the Bougainville subspecies is *G. mendana acous* (Ribbe), and a pale yellow-spotted morph from Rendova is *G. m. neyra* (Rothschild). The Malaita subspecies is described below:

Graphium mendana malaitae, new subspecies

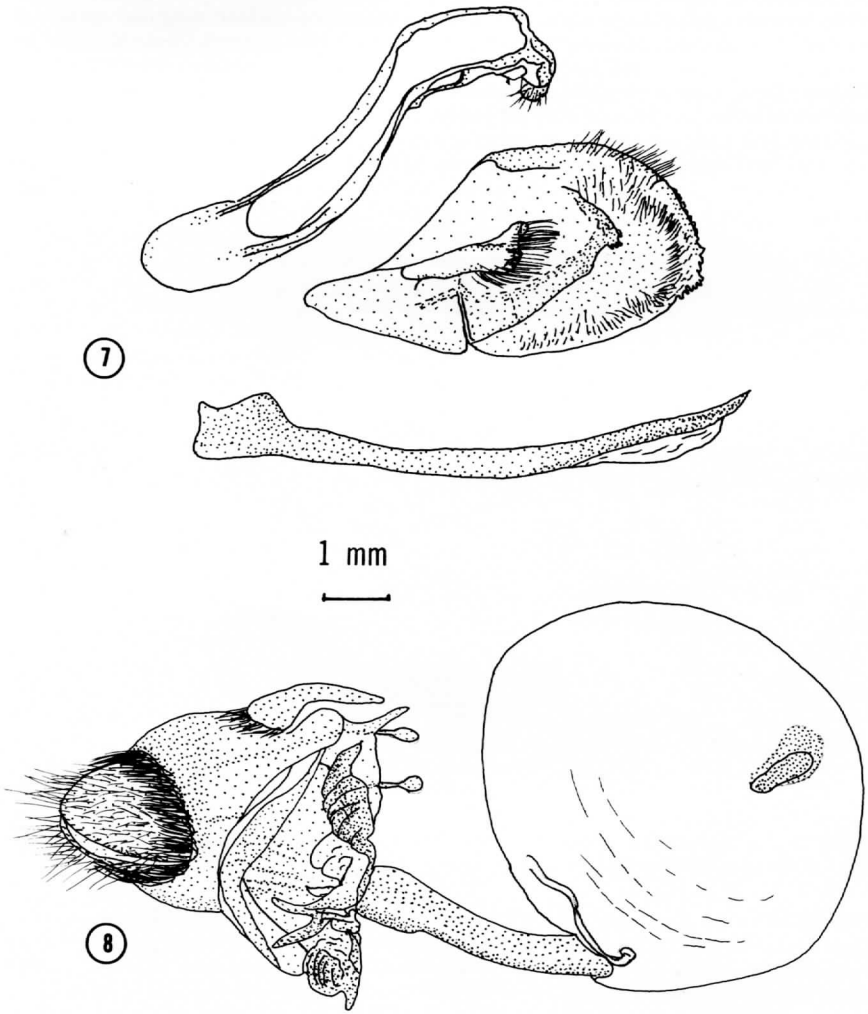
Figures 5, 6 (Holotype ♂), 8 (♂ genitalia)

Male-female: Upper surface similar to that of *G. m. mendana*, but the light spotting is clear, bright yellow (not green) on the forewing and off-white overscaled with yellow basally on hindwing. The hindwing yellow is not so extensive as the green overscaling in this are in *m. mendana*, being restricted to apex of cell and spaces M_3-Cu_1 and Cu_1-Cu_2. Basal spotting of forewing more prominent than in nominate *mendana*, but the cell end spots obsolescent in the present subspecies. Under surface as in *m. mendana*, but the spots are somewhat larger.



Figures 5, 6: *Graphium mendana malaitae*, new subspecies, upper (5) and under (6) surfaces; SOLOMON ISLANDS: MALAITA I.: no further locality, 22.iv.1968 (Mrs. R. H. Morgan; Allyn Mus.).

Length of forewing of Holotype ♂ 48.2 mm., those of two ♀ Paratypes about 51 mm. ♂ genitalia as illustrated: uncus and tegumen reduced; valval costa ovoid; cucullus dentate, especially ventrad; ampulla lobate with fine setae; valvula smooth, separate from sacculus; characteristic setal patch along ventral distal margin of valva; juxta with dense setal patch dorsad, few setae ventrad; penis slightly curved dorsad; aedeagus moderately sclerotized with long tapered terminal prong. Genitalia compare favorably with those of *m. mendana*: shape of lateral margin of ampulla somewhat variable.



Figures 7, 8: *Graphium meeki inexpectatum*, new subspecies. 7, ♂ genitalia of Holotype (see Figs. 1, 2); preparation M-3463 (Jacqueline Y. Miller). 8, ♀ genitalia of Paratype (see Figs. 3, 4); preparation M-3474 (Jacqueline Y. Miller).

♀ genitalia not available.

Described from three specimens, one male and two females, from the island of Malaita, Solomon Islands.

HOLOTYPE ♂: SOLOMON ISLANDS: MALAITA I.: no further locality, 22.iv.1968 (Mrs. R. H. Morgan); ♂ genitalia preparation M-3464 (Jacqueline Y. Miller).

PARATYPES: both SOLOMON ISLANDS: MALAITA I.: 1 ♀, nr. Dalu (in bush), 1974 (T. Archer); 1 ♀, no further locality (*ex* pupa), 18.xii.1969 (collector unknown).

Holotype ♂ in Allyn Museum of Entomology; one ♀ Paratype in National Butterfly Museum, Bramber, Sussex, England[1]; one ♀ Paratype in collection of Ted Archer, Barnet, Herts., England.

The brilliant yellow coloration of the forewing upper surface diagonal spotband separates the Malaita insect from all other known *mendana*, though this is hinted at in Bougainville *m. acous* and Rendova *m. neyra*. We have some doubts whether *talboti* (Niepelt) from New Ireland is conspecific with *mendana* from the Solomons, but material of *talboti* is not available for study.

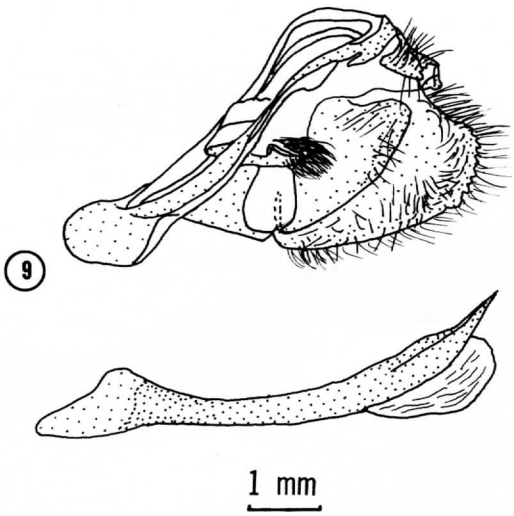


Figure 9: *Graphium mendana malaitae*, new subspecies, ♂ genitalia of Holotype (see Figs. 5, 6); preparation M-3464 (Jacqueline Y. Miller).

[1] This specimen is the one erroneously figured as *G. mendana acous* from "Bougainville" by Smart (1975: 123). Mr. C. Samson (*pers. comm.*) informs us that the specimen so figured is neither *acous* nor from Bougainville, bearing instead a Malaita label. *Acous* is immediately distinguishable by the two red dots near the anal angle of the hindwing cited by D'Abrera (1977: 116), rather than the single one in the present subspecies.

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