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NOTES ON CAVE-DWELLING MICROLEPIDOPTERA WITH DESCRIPTION OF A NEW GENUS AND SPECIES FROM EAST JAVA (FAMILY OINOPHILIDAE)

by

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Records of cave-dwelling Lepidoptera are scarce in comparison with those in other orders of Insects, e.g., Coleoptera, of which even a whole subfamily (Silphidae, Bathysciinae) is in a most remarkable way adapted to this peculiar habitat. In the group of the so-called Microlepidoptera we could find examples of some eight species only, belonging to different families. Apparently none of them is a true cave-dweller, i. e., a permanent resident of caves and really adapted to life in total darkness.

Crypsithyris spelaea Meyrick, 1908 (Tinaeidae) only has been regarded as an exception. This species has been described from a large cave in Moulmein, Burma, and originally was reported as "being practically bleached or colourless", but with normally developed eyes and wings (Meyrick, 1908, p. 399). Later on better material has been collected at the same locality, and this time the moth appeared to be not quite colourless (Meyrick, 1916, pp. 602-603). It remains uncertain, therefore, whether there is question of any adaptation to cave-life and whether this species can be regarded as an "obligate cavernicole" insect, the more so as larvae of closely allied species of this genus have been found living in the open, in portable cases on lichens covering rocks.

Furthermore we could find reference to three species of the genus *Tinaea*: *T. antricola* Meyr., 1924, and *T. pyrosoma* Meyr., 1924, both from Siju Caves, Assam, and *T. palaechrysis* Meyr., 1929, from Batu Caves, Selangor

(Malaya). Of the latter was said that it "belongs to the typically unicolorous yellow group, but has probably acquired fuscous colouring as an adaptation to cave life; it may therefore be a true cave-dweller, possibly restricted to these particular caves" (Meyrick, 1929, p. 375). Afterwards, however, Dammerman found the same species in one of the many small caves in the calcareous hill of Tjampea, W of Buitenzorg (1932, pp. 261-263). The three above mentioned Tinaeids feed on bat guano which is abundant in the caves. They may occur also outside the caves.

The Batu Caves at Selangor appeared to house Microlepidoptera of other families than Tinaeidae as well. One specimen of *Tricyanaula augusta* Meyr., 1911 (Gelechiidae), was found. Meyrick states: "Larval habits unknown, but the larva of an allied species feeds on the fungus bed of a Termite". Cosmopterygidae were represented by an undescribed *Pyroderces* spec.: "The larvae of this genus are feeders on dry refuse of various descriptions and could doubtless find pabulum in the caves, but the species probably occurs also outside". An "*Oedematopoda* (?) spec." (Schreckensteiniidae) was also found "too much damaged to describe". *Opogona cerodelta* Meyr., 1911 (Oinophilidae), was common: "In this considerable genus the larvae normally feed on dry vegetable refuse of different kinds and are probably often associated with termites". With regard to the new genus and species described below the occurrence of this insect is of interest to us. (All citations are from: Meyrick, 1929, pp. 374-375).

Little has been done on the extremely interesting subject of the cave fauna in the Malay Archipelago except by Dammerman and Lieftinck (in Java), Leefmans (in Celebes), and by a few others, notwithstanding the fact that caves in limestone rocks are numerous in those islands and offer a rich field for study.

In 1941 the author had the opportunity to visit a small cave of a quite different nature which was discovered only shortly before. This cave is situated in the Tengger Mountains, East Java, that represent an enormous volcanic complex and are devoid of any calcareous formations. It may be stipulated that in this extensive complex no other caves are known. The small cave in question must have been formed in a so-called "lahar" layer [1]) by mere mechanic agency of ground water. The present situation is that a spring enters somewhere in the wall of the cave and streams out as a rivulet at its bottom. The cave has the shape of a rather regular cone, about 7 m high, with a circular bottom of about 10 m in diameter. The walls are corroded to deep vertical crevices inhabited by numerous insectivorous bats. Their

1) Deposits of mud mixed with stones caused by water streams originating from craters during eruptions.

guano covers the bottom in a thick layer that at some places is about 50 cm high.

The cave has been discovered by Mr. A. M. R. Wegner, insect collector and well-known specialist on the fauna of Tengger Mts., in 1938. It is situated in a steep rock wall in Kletak Pass, at an elevation of ca. 1800 m on the western slope of the Tengger. The entrance was entirely overgrown and concealed by plants. Apparently the thick guano layer has never been disturbed before.

An interesting fact is that the rich fauna of this cave appeared to be entirely different from that encountered with in any calcareous caves which we happened to visit. The animal life in the guano was so abundant, that everywhere in the cave its surface seemed literally alive with insects and other small animals. Most remarkable was the occurrence in mass of a Microlepidopteron that appeared to belong to a new genus and species of the family Oinophilidae. These insects flew around our lights or sat everywhere on the guano. The long antennae of the moths in repose, gleaming like gold against the dark background in the light of our lamps, were in continuous vibration which gave a remarkable effect to the whole picture of this cave. Their larvae and cocoons were abundant in the upper layer of the rather dry guano. On the other hand, not a single specimen of *Tinaea palaechrysis* Meyr., the commonest insect in every calcareous cave in Java, has been found.

Several species of insects of other orders were also found. A striking inhabitant of the guano was a very large pink species of a Pseudoscorpion which possibly fed on the larvae of the moth. This species has never been encoutered with by us elsewhere.

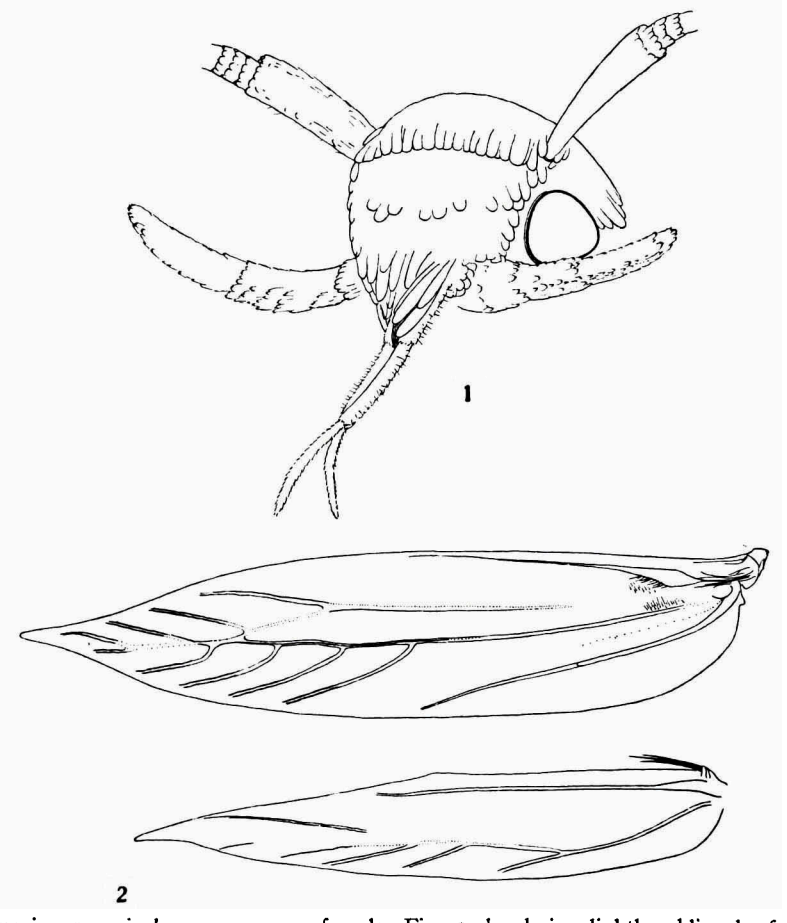
Which of the following factors: (1) the difference of the geological formation together with the peculiar ecological conditions of this special cave, (2) its extreme isolation, or (3) its high elevation, or all these factors together are responsible for its peculiar fauna that so typically differs from what one usually finds in limestone caves elsewhere in Java — we are not able to say.

Extensive material of the guano-inhabitants has been collected. Unfortunately all the material which was preserved in alcohol, has been lost during the war. As the Tengger Mountains are not accessible at this time no further data can be communicated about this interesting fauna. Fortunateiy a large series of the adults of the moth mentioned above remained intact, and it can be described now.

Wegneria gen. nov. (figs. 1-7)

Head (fig. 1) rather broad, flattened, vertex with smoothly appressed

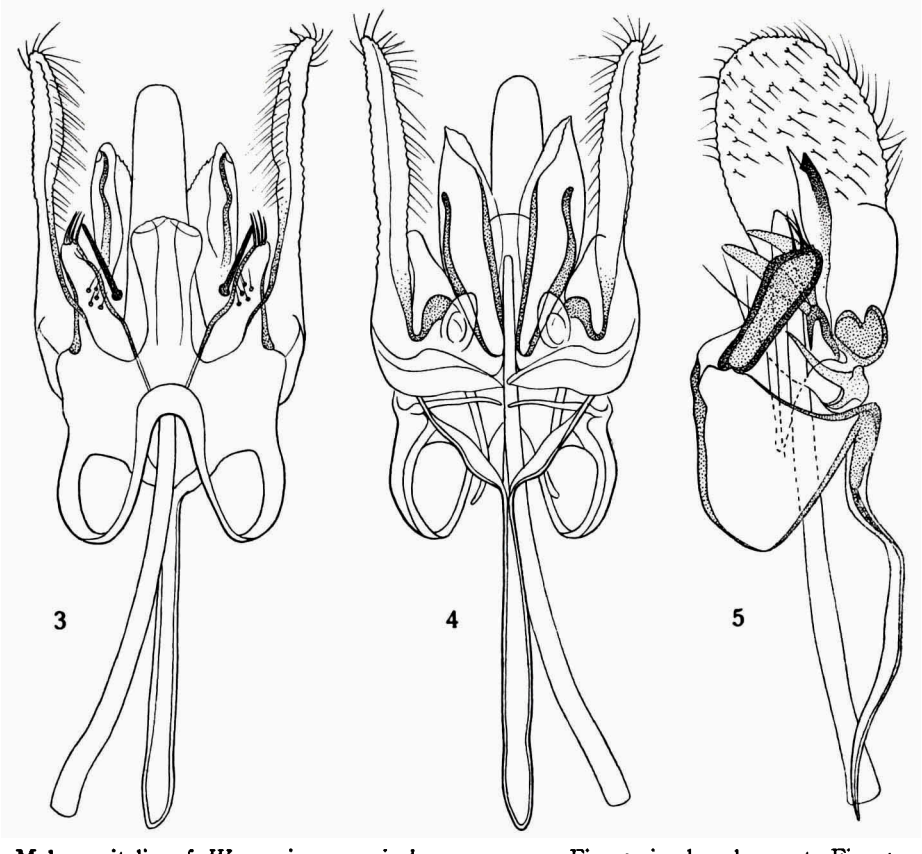
scales, a polished fillet between bases of antennae present, but little protruding; face broad, retreating, hardly convex, smooth. Eyes small, round, slightly protruding, widely apart. Ocellus absent. Antenna slightly over 1, smooth, slightly thickened, filiform, scape moderate, rather thick, clavate, flattened ventrally, compressed and markedly excavated at the side of the eye, smooth



Wegneria cavernicola g. n. sp. n., female, Fig. 1, head, in slightly obliquely frontal aspect. Fig. 2, wing neuration.

without pecten, but with a few microscopic hairs. Labial palpi moderately long, exceeding scape of antenna, porrect, widely diverging, gently curved mediad, without setae; terminal segment as long as median, smooth-scaled, flattened laterally, especially at apex which is rounded. Maxillary palpus long, drooping, apparently three-jointed, not folded, joints long, finely scaled and haired. Proboscis rudimentary, short.

Fore wing (fig. 2) lanceolate, top produced, acute; without tufts of scales on surface; underside of costa with a basal fold forming the retinaculum. Vein 1b strong, simple; 1c traceable at base, cell very narrow, curved (convex towards dorsum), margins obliterate along basal $^1/_5$ of cell, top pointed, no tornal angle. Vein 2 from beyond middle of cell, 2-5 tolerably parallel and



Male genitalia of *Wegneria cavernicola* g. n. sp. n. Fig. 3, in dorsal aspect. Fig. 4, in ventral aspect. Fig. 5, in lateral aspect, with left valva and valvula with their appendages removed, right arm of uncus omitted.

equidistant, slightly curved; 6 and 7 long-stalked, 7 to costa, 5 out of stalk near base, 8 out of stalk before its middle, 9 rather approximated to top of cell, 10 remote, continued as upper edge of cell, 11 absent; 12 long, but not reaching margin, with a strong dilatation along its second fifth, coinciding with edge of costal fold, along lower edge of this dilatation a row of fine bristles, two longitudinal groups of fine setae on lower surface of wing membrane below dilatation of vein 12: above cell and in cell, respectively.

Hind wing (fig. 2) $^2/_3$, lanceolate, with costa almost straight to before middle, slightly angularly prominent there, apex pointed, cilia under 2. Upper edge of cell obliterate, lower edge strong as far as base of vein 2, thence weak, convex towards dorsum. Vein 2 from cell at $^1/_3$ of wing length, 3 from cell at $^1/_2$, 4 and 5 gently converging but hardly approximated, 6 traceable as a short spur towards margin, with base obliterate, 7 curved downward anteriorly and traceable as far as base of 5, to costa; 8 straight, strong.

Body moderately flattened. Thorax smooth. Legs, all coxae strongly flattened, smooth, with a marginal fringe of scales, longest caudally; all femora smooth-scaled, strongly flattened, dilated, especially anterior femur, but less dilated than coxae; tibiae, anterior short, rough, with bristly scales above, spurs somewhat thickened with fine bristly scales; posterior tibia with sparse bristly scales ending in an apical whorl, and dense very long bristly hairs above; basal spurs before $^1/_3$, inner one very long, both dilated with rough bristly scales, forming a thick rough brush along apical half of inner spur (top of which exceeding apex of tibia); apical spurs not dilated, with bristly scales only above. Tarsi, anterior normal, median and posterior moderately thickened with bristly scales forming moderate whorls at apices of segments, posterior tarsus longer than tibia.

Male genitalia complicated, uncus small, tegumen and vinculum continuous, valva cardinate, separate valvula present. Female with signum.

Typus generis: *Wegneria cavernicola* spec. nov., ♂, ♀.

The genus belongs to the *Opogona* group, notwithstanding the long antennae, and is probably nearest to *Phaeoses* Forbes, 1922, from North America, with which it distinctly agrees in the shape of the male genitalia, but differs by longer antennae, absence of vein 11 in fore wing, the origin of 5 out of 6, and the presence of 3 in hind wing. From *Eurytyla* Meyr., 1893, and from *Coeliometopa* Turn., 1923, it can readily be discriminated by not tufted head; from *Asymplecta* Meyr., 1921, and *Opogona* Zell., 1853, by longer antennae, and differences in neuration; from *Mitrogona* Meyr., 1920, by neuration of hind wing; from *Amphixystis* Meyr., 1901, which also has long antennae, by smooth vertex, flattened labial palpi and remote veins 4 and 5 in fore wing.

Dedicated to my friend, Mr. A. M. R. Wegner, Museum Zoologicum Bogoriense, Bogor, Java, who discovered the locality and assisted in the collecting of this species.

Wegneria cavernicola spec. nov. (figs. 1-7)

♂ 12.5-13.5 mm, ♀ 12.5-16 mm. Head (fig. 1) and thorax rather dark

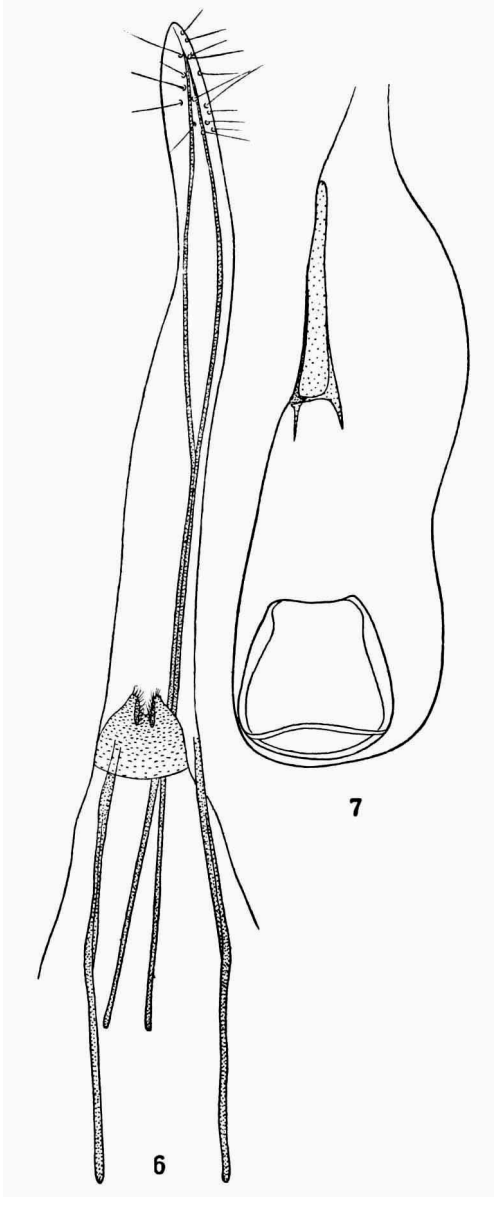
fuscous with faint purplish gloss, fillet shining coppery-fuscous, face shining ochreous-whitish. Antenna fuscous, in ♀ becoming pale fuscous posteriorly. Palpus glossy fuscous, whitish medianly. Abdomen dark bronze-fuscous, somewhat paler in ♀, apical half of valva and venter pale ochreous. Legs glossy whitish-ochreous, fuscous-grey above, posterior tibia clothed with dense, rather short, fuscous hairs in ♂, with longer light fuscous hairs in ♀, posterior tarsus dark grey, strong whorls of moderately long bristles at apices of segments in both sexes. Fore wing (fig. 2) lanceolate, pointed, in ♂ somewhat stronger narrowed than in ♀. Deep fuscous with purplish gloss, darker in ♂, bases of scales pale fuscous, causing fine irregular mottling. An elongate pale yellow patch along dorsum from beyond base to middle of wing, moderately narrowed posteriorly, in middle reaching halfway across wing, with its anterior third in ♂, its anterior fourth in ♀, suffused with glossy fuscous and rather paler than ground colour, with hardly any purple tinge; anterior edge of patch indefinite, upper edge becoming well-defined along posterior half, posterior edge well-defined, somewhat irregular, outwardly oblique. Cilia dark fuscous. Hind wing $^2/_3$; deep bronze, glossy; cilia fuscous, somewhat paler than in fore wing.

Male genitalia (figs. 3-5). Tegumen a trilateral pyramid; a narrow transverse rod at each side ventrally, below base of valva. Uncus bipartite, each arm strong, with dilated base, a few slender bristles in middle, and a group of spikes at apex. Gnathos(?) dilated posteriorly almost tubular and covering aedoeagus from above; the latter very long, slender. Valva ovate, moderately bristled, sacculus swollen, labis a strong knob with two curved, long, rising blades that articulate with its top, a cardiform, small plate at base of sacculus; valvula large, semimembraneous, a slender rod along both lower and upper edge, the latter ending in a short hook. Vinculum moderate, triangular, saccus long. Anus long, tubular. Slide No. 922 D, holotype.

Female genitalia (figs. 6-7). Ovipositor very long, erectile. Limen a broad plate, narrow above, upper rim incised, with two small longitudinal, short-bristled pads. Ductus bursae moderate, simple. Bursa copulatrix elongate, signum a narrow plate, dilated posteriorly and folded longitudinally. (Spermatophore rather small, subspheroid, with thick refracting wall). Slide No. 921 D, allotype.

East Java, Tengger Mts., in a small cave in Kletak Pass, 1800 m, 26. IX. 1940. Holotype ♂, allotype ♀, paratypes 13 ♂, 17 ♀. Holotype and allotype in the Leiden Museum, Netherlands. Resembling *Opogona pandora* Meyr., 1911, from Assam, life-habits of which are unknown (in that species the yellow dorsal blotch begins from base of wing and reaches $^2/_3$ of wing breadth, while the hind wing is rather dark grey).

We are inclined to assume that also this species is an inobligate cavernicole insect, and that it can be expected to occur outside the cave as well. The small size of the latter furnishes a rather limited habitat and seems to confirm this



Female genitalia of *Wegneria cavernicola* g. n. sp. n. Fig. 6, in ventral aspect. Fig. 7, bursa copulatrix with signum and a spermatophore.

conclusion. However, we did not find *W. cavernicola* elsewhere, notwithstanding extensive collecting in the Tengger Mountains during some three years.

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