

A REVIEW OF THE *ETHMIA LINEATONOTELLA* SPECIES
GROUP, WITH DESCRIPTION OF TWO NEW SPECIES
(LEPIDOPTERA, ETHMIIDAE)

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Descriptions of *Ethmia trifida* sp. n., and *E. thomaswitti* sp. n., from SE Asia, with diagnoses, taxonomic notes and new distribution data of the species of the *E. lineatonotella* species group, including the first complete illustration and re-description of *E. palawana*. With 21 figures.

Key words: Ethmiidae, *Ethmia*, new species, new species group, SE Asia

INTRODUCTION

The systematic interpretation of the *Ethmia* genus group is still debatable: some of the basic works and lists treat it as a distinct family, Ethmiidae (SATTLER 1967, 2002, COMMON 1990, ROBINSON et al. 1994, KUZNEZOV & STEKOLNIKOV 1978) while other authors placed this group only of a subfamily rank into the family Oecophoridae (SCOBLE 1992) or into Elachistidae (MINET 1990, HODGES 1999), based on the structure of the lateral condyles of the pupa. The most comprehensive work of *Ethmia* of the Palaearctic Region was published by SATTLER, (1967). This monographic work mentions 30 *Ethmia* species occurring in SE Asia. Subsequently, further, mostly regional surveys were published (AMSEL 1969, DIAKONOFF 1969, YANG 1977, LIU 1980, DUBATOLOV et al. 1997, ZAGULAJEV 1990, SINEV 1997, WANG & ZHENG 1997, KUN & SZABÓKY 2000, KUN 2001, 2002), therefore in the meantime more than 40 species became known from the territory of south-eastern Asia (including Indonesia). The most fundamental surveys of the Australian and American (New World) *Ethmia* fauna were written by POWELL (1973, 1981, 1985).

Due to the large wingspan and the colourful appearance of the *E. lineatonotella* group, in the last few years many specimens from different parts of the South-East Asia region turned up, and got into the museums by the collectors. This large new material of specimens preserved in good condition gives a chance to re-define the group and clarify the taxonomic position of the taxa belonging to this lineage.

MATERIALS AND METHODS

Material examined originates from the following collections: Natural History Museum, London (BMNH – British Museum, Natural History), Hungarian Natural History Museum, Budapest (HNHM), Natural History Museum, Paris (NHMP), Staatliches Museum für Tierkunde, Karlsruhe (SMTK), Zoological Museum, Copenhagen (ZMUC), Natural History Museum, Geneva (NHMG), Witt Museum, Munich (WMM), Zoologische Staatssammlung, Munich (ZSM) and Museum für Naturkunde, Humboldt-Universität, Berlin (MFN). The scanning electron microscopic images were made on a HITACHI S-4300 FE-SEM microscope (using digital and conventional photo equipments) in the Swedish Museum of Natural History, Stockholm.

SYSTEMATIC PART

The *Ethmia lineatonotella* species group

The well documented Palearctic species, *Ethmia lineatonotella* (MOORE, 1867) was placed to the *E. assamensis* species group by SATTLER (1967). This relegation was based on certain external morphological features and the rather similar distribution patterns of the taxa. The hereby defined *Ethmia lineatonotella* species group is rather compact from a taxonomic point of view, one of the most easily recognizable lineages of the genus, comprising the largest known *Ethmia* species. The group can be characterised by the following morphological and biogeographical characters (Table 1).

Wingspan 40–50 mm. Antenna filiform; scape yellowish with black scales, flagellum yellowish, with brown scales distally. Labial palp yellowish, with black rings on medial and apical segments, proboscis yellowish (Fig 16). Frons and vertex yellowish with black scales on top (apically). Thorax yellowish with characteristic arrangement of six black spots (Fig. 21); tegulae white with a pair of black spots at base. The most typical external feature is the presence of long blackish horizontal striae nearly parallel with fore wing costa. The number of these striae is a specific feature: *E. lineatonotella* has four streaks, *E. trifida* has three, *E. palawana* only one while they are reduced to a single dot in *E. thomaswitti* and lacking in *E. galactarcha*. Hind wing of males with strong costal brushes (Fig 17); cilia yellow. Fore legs and mid legs pale yellow with black rings. Hind leg yellow with black rings; abdomen orange-coloured.

The basic structure of the male genitalia is very homogeneous (Figs 6, 8, 10, 12, 14, 18–20). Uncus sclerotized, very long, bipartite (Fig. 20). Posterior part of gnathos absent, anterior part broad with small spines (Fig. 19). Anellus sclerotized, labis well developed. Valva wide, bean-shaped, covered with bristles, cucullus

with short, strong, acute, variably curved process; sacculus wide. Dorsal margin of aedeagus convex, sclerotized; vesica with cornutus on the side.

In the female genitalia the ovipositor is (Figs 7, 9, 11, 13, 15) heavily sclerotized, the papillae anales are conical, setose. Posterior apophyses thin, anterior apophyses cuneiform, acute. Antrum with sclerotized ventral ring connected with two lateral, quadratic plates. Ductus bursae long, tubular, helicoid. Corpus bursae rather big, spherical, signum very large, trilobate, covered with more or less uniform teeth.

According to our recent knowledge, the group contains five species (*E. lineatonotella* MOORE, 1867, *E. galactarcha* MEYRICK, 1928, *E. palawana* SCHULTZE, 1925, *E. trifida* sp. n., *E. thomaswitti* sp. n.): four of them occur exclusively in the Oriental Region and only *E. lineatonotella*, the most widespread taxon of the group, penetrates into the south-eastern parts of the Palaearctic Region (KUN & SZABÓKY 2000, MORIUTI 1989). The biology of the species is unknown, no host plant was reported yet. An interesting mating couple of *E. lineatonotella* male and a geometrid female was observed and reported (KISHIDA, 1985).

Table 1. Diagnostic characters and the distribution of the *Ethmia lineatonotella* species group.

	<i>E. lineatonotella</i>	<i>E. palawana</i>	<i>E. trifida</i>	<i>E. thomaswitti</i>	<i>E. galactarcha</i>
Distribution	India: Darjeeling, Assam, Kurseong; Vietnam; China; Taiwan	Philippines: Palawan	Burma; India; Thailand; Malaysia; Borneo: Brunei, Sabah, Philippines; Indonesia: Sumatra	Indonesia: Sulawesi	Indonesia: Flores, Sulawesi, Bali, Sumatra, Java, Sumbawa
Wingspan	40–47mm	45–48mm	40–45mm	42–43mm	42–50mm
Number of striae on the fore wing	four	one	three	none (a single dot)	none
Hind wing colour	black, yellow at base	black, yellow at base	black, yellow at base	bright yellow	black, yellow at base
Male genitalia	labis: narrow, the longest within the group	labis: short, wider than in <i>trifida</i>	labis: short, wide	labis: long and slender (finger-shaped)	labis: long narrow

***Ethmia trifida* sp. n.**

(Figs 1, 6–7)

Ethmia palawana sensu DIAKONOFF, 1967, p. 253–254, nec SCHULTZE, 1925*Ethmia palawana* sensu ROBINSON *et al.*, 1994, p. 67, nec SCHULTZE, 1925*Ethmia palawana* sensu KUN & SZABÓKY, 2000, p. 55, nec SCHULTZE, 1925

Holotype: male, "Malaysia, Pahang state, Cameron Highlands, Tanah Rata, 21.III.-2.IV.1995, leg. G. Csorba, O. Merkl & I. Szikossy." KUN Gen. No. 43. The holotype is deposited in the HNHM.

Paratypes. 61 specimens from the following localities: India: Kerala, 6 km N of Munnar, 1700 m, Kodalar Tea Estate, 10°06'N, 77°04'E, 14–15.IV.1997, leg. SCHINTLMEISTER & SINJAEV. Burma: Tenasserim, 800 m, 20.IV.1995, leg. STEINKE. Indonesia. Sumatra: 80 km SSW of Medan, Berantagi, 1000 m, 4.VI.1973, leg. E. DIEHL; Siantar, 1200m, 6.IX.1969, 1050m, 24.VI.1968, 10.XI.1969, leg. E. DIEHL; Dolok Melangir, 250 m, 6.X.1969, 180 m, 10.I.1970, IX. 1970–I.1971, leg. E. DIEHL; Ksbon Balok, NNW from Medan, 24.XI.1968, leg. DIEHL; Pasar Manduge, Pematang Siantar, 30.VIII.1979, leg. ERBER; Prov. S. Borat, Air Sirah, Telephone station, 1200 m, 25 km E of Padong, leg. R. U. ROESLER. Borneo: Kalimantan, Prov. Selatan, 30 km E of Kandangan, 800 m, 15 km NE Loksado, XI.1997, 1–20.XII.1997, I.1998, leg. JÄKL; Mt. Trus Madi, 1150–1200 m, 1–7.IV.1997, IV.1998, leg. B. & K. MARTINI; Philippines: Tawi Tawi, Tarawakan, north of Batu Batu, 20.X.1961, Noona, Dan Exp. 61–21. The paratypes are deposited in the collections of SMTK, ZSM, ZMUC and HNHM.

Slides. Altogether 8 male and 4 female genitalia preparations of *E. trifida* were made by A. KUN Slide Nos 43, 86, 87, 97, 98, 264, 265, 266, 267, 268, 269, 270, respectively.

Diagnosis. The new species is closely related to *Ethmia lineatonotella*, *E. palawana*, *E. thomaswitti* sp. n. and to *E. galactarcha*. At the first sight, *E. trifida* differs from its close relatives by the presence of three characteristically long parallel striae on the fore wing (Fig. 1). *Ethmia lineatonotella* has four striae in the (Fig. 4) same area of the fore wing, while *E. palawana* has only one (Fig. 3); in the case of *E. thomaswitti* these striae are absent (Fig. 2). The fore wing colour and pattern of *E. galactarcha* (Fig. 5) show greater differences compared with those of the other species. The hind wing of *E. thomaswitti* is much brighter yellow than those of all other species of the group.

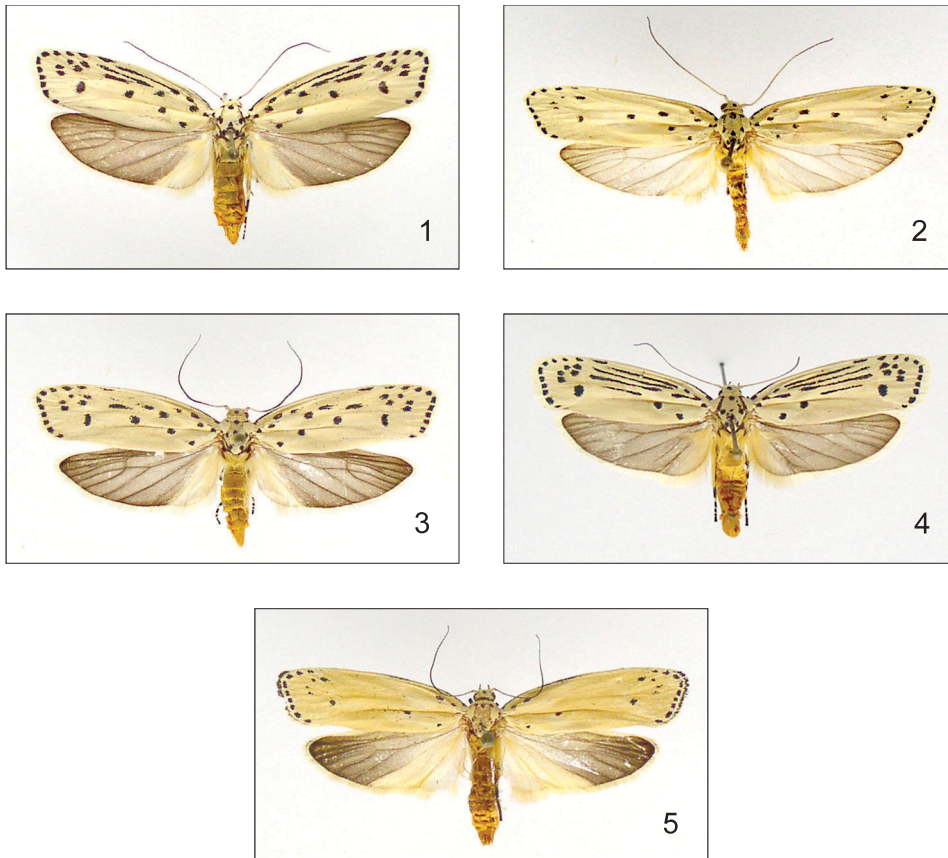
The basic structure of the male genitalia is homogeneous within the species-group, even in the externally conspicuously different taxa, showing only slight but constant differences in the shape of the labis and sclerotization of the valva (see Figs 6, 8, 10, 12, 14). The labis of *E. palawana* is not so long and slender as that of *E. thomaswitti* sp. n. (digitiform) or in *E. lineatonotella* where the labis is very narrow, rather as in *E. trifida*. The most interesting and usable character for the separation of the species by their male genitalia is the shape of the valva and the pattern of more and less sclerotised areas between the costal, saccular and cucullar parts of the valva (Fig 6).

The female genitalia of the members of the species-group are very similar (Figs 7, 9, 11, 13, 15), the main differences lie in the shape of the apophyses anteriores.

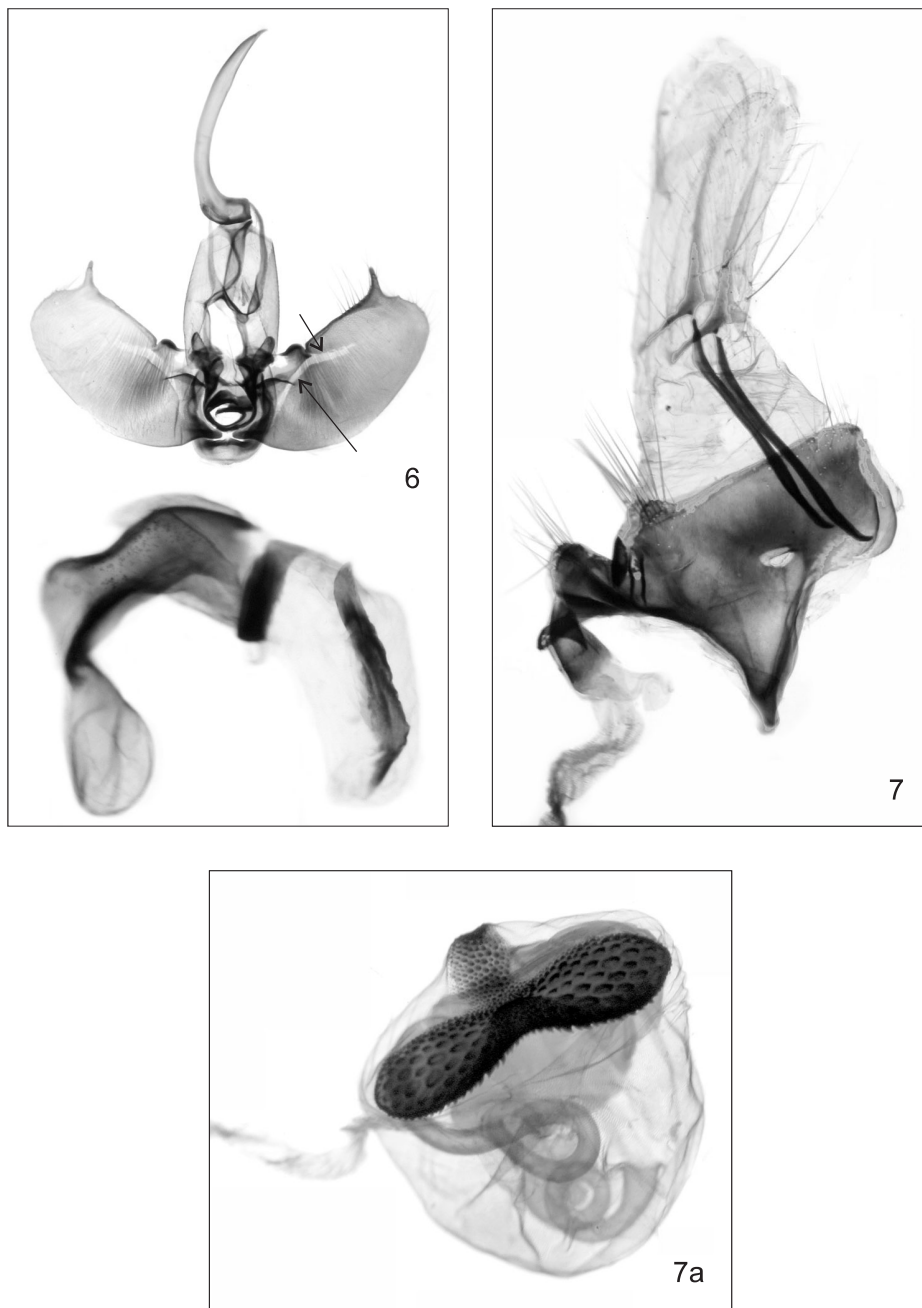
Description (Fig. 1). Wingspan 42–43 mm. Fore wing ornamented by seven spots at basal part and five additional spots (“apical spots”); three characteristic comparatively long black striae running parallel with costa; one spot at middle of wing. Hind wing black, yellow at base. Valva wide, bean-shaped, with slight concave curve on distal edge covered with bristles, cucullus with a short but strong, acute and curved process (Fig. 6). Labis wide and short. The apophyses anteriores of the female genitalia (Fig. 7) are cuneiform, acute.

Distribution. The species occurs in the southern part of South-East Asia, it is known from: India, Burma, Thailand, Malaysia, Borneo (Brunei, Sabah), the Philippines, and Indonesia (Sumatra).

Etymology. The specific name refers to the three parallel striae of the fore wing.



Figs 1–5. *Ethmia* imagoes: 1 = *E. trifida* sp. n., 2 = *E. thomaswitti* sp. n., 3 = *E. palawana* SCHULTZE, 1925, 4 = *E. lineatonotella* MOORE, 1867, 5 = *E. galactarcha* MEYRICK, 1928



Figs 6–7. *Ethmia trifida* sp. n., genitalia: 6 = male, KUN Gen. No. 264. The arrows show the differently sclerotized elements between the costal, saccular and cucullar parts of the valva, 7 = female genitalia, KUN Gen. No. 266

Remarks. Based on the original description of *E. palawana* where SCHULTZE stated (1925) “in the middle along the subcosta an elongate black streak” (illustrated in a colour plate 1, figure 6), and on the fact that during my study more than 75 specimens were examined and I could not find any specimen originating from Palawan island, and only one from the Philippines (the same specimen which DIAKONOFF figured in his paper from Tawi Tawi with three striae), this circumstance was confirmed that *E. palawana* was constantly misidentified. The night collectings on several localities and periods of recent years resulted in the capture of *E. palawana* only from Palawan island (see below).

***Ethmia thomaswitti* sp. n.**

(Figs 2, 8–9)

Holotype: male, “S. Sulawesi (Celebes) Puncak, Palopo, 2.55°S 120.05° E.L. I.1997, 900–1300 m, leg. local collector, coll. Dr. R. Brechlin, Museum Witt”; KUN Slide No. 96. The holotype is deposited in the HNHM, Budapest.

Paratypes. 46 specimens from: Indonesia: Sulawesi (Celebes): Puncak, Palopo, 2.55S 120.05 E.L. I.1997, 900–1300 m, leg. local collector coll. Dr. R. BRECHLIN; Puncak, Palopo, 900–1300 m, VI.1998, X.1997, leg. local collector; Puncak, 2.59°S 120.00°E, 17 km W Palopo, 10–19.V.1984, leg. A. SCHINTLMEISTER; Goa, Malino, 3600 ft, VI.1938, J. P. A. KALLIS; Dumoga-Bone N. P., Site 11A, Edwards Camp, 664 m, 9.VIII.1985, J. D. HOLLOWAY, R. Ent. Soc. Lond., Project Wallace; Dumoga-Bone N. P., Clarke Camp, 1140 m, III. 1985. Goa, Lampobattang, Parang-bobo, 5000 ft, V. 1938, J. P. KALIS; G. Muagat, 1780 m, 7–8.XI.1985; G. Mogogonipa summit, 1068 m, 18–20.X. 1985; Puncak, Palopo, 2.55°S, 120.05°E, 1000 m, 13–14.,.II., 25–31. I. 1995, leg. SINJAEV & TARASOV. Two male, handwriting, illegible, 1927. Vi. 24, 27. coll. Ch. J. PITARD.

The paratypes are deposited in the Museum Zoologicum Bogoriense, the BMNH, MFN, NHMG and the HNHM.

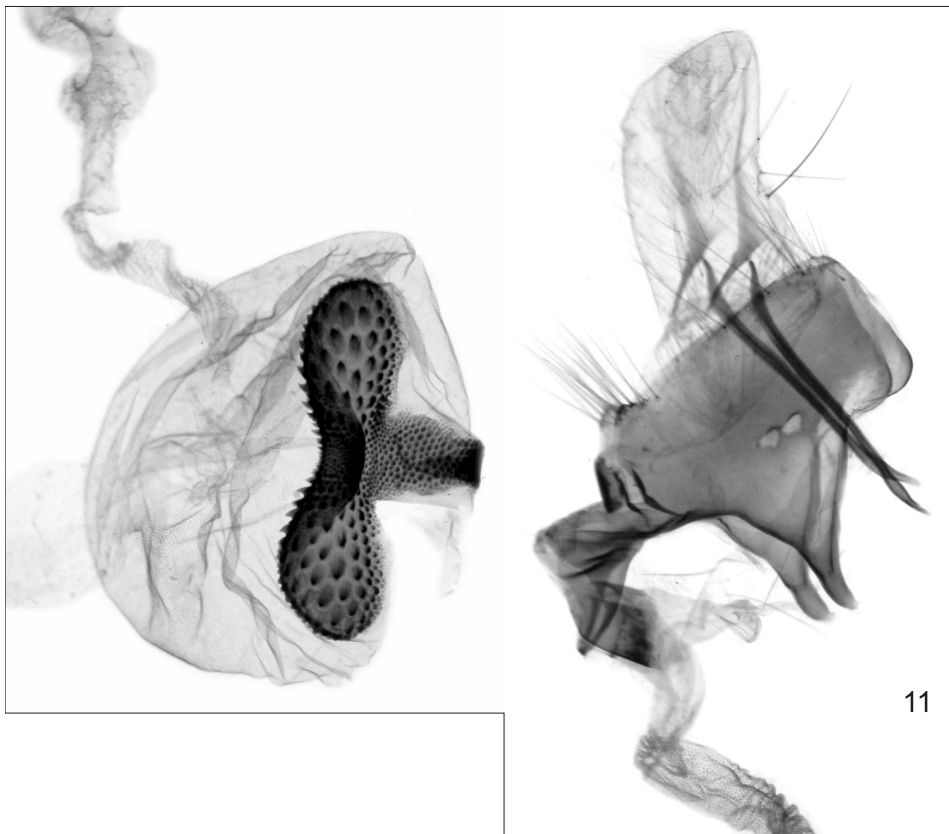
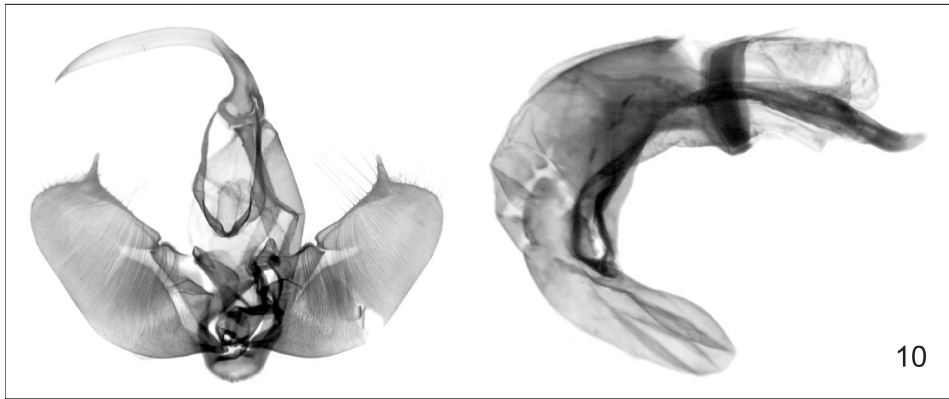
Slides. Altogether 6 male and 1 female genitalia preparations were made (KUN Slide Nos 95, 142, 143, 273, 274, 275, 276; BMNH Microlep. Slide No. 29712 (KUN Slide No. 143), Slide No. 29711 (KUN Slide No. 142).

Diagnosis. The diagnostic feature of the species is the reduction of the subcostal striae of the fore wing; the comparison of the external and internal features of the members of the *E. lineatonotella* group is given under the diagnosis of the preceding taxon and in the Table 1.

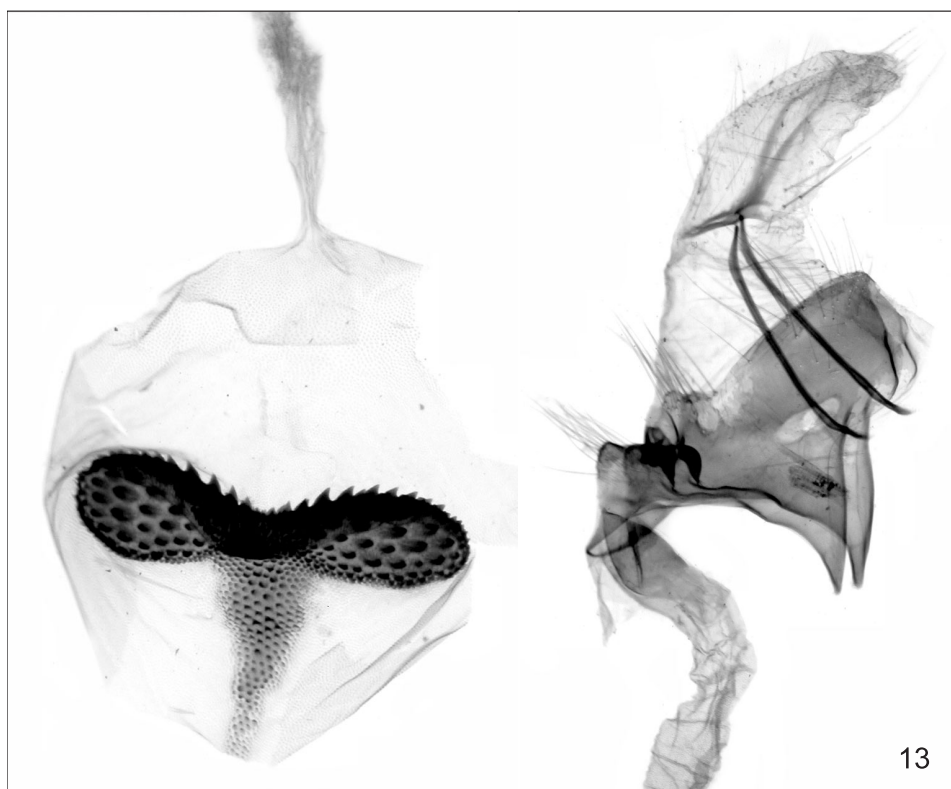
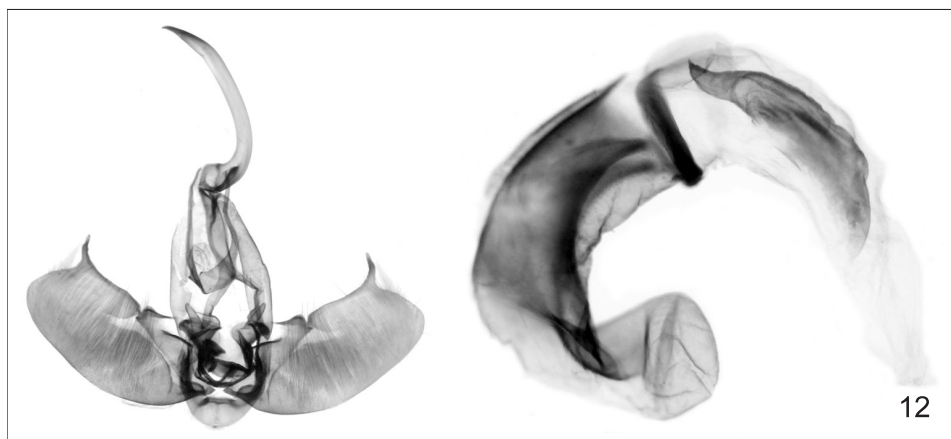
Description (Fig. 2). Wingspan 42–43 mm. Comparing with the general description of the species group, fore wing overlaid with black markings on yellowish background: one spot at middle of wing. Hind wing yellow, brighter yellow at base; cilia yellow. Male genitalia (Fig. 8) valva wide, bean-shaped, with slight concave curve on distal edge covered with bristles, cucullus with a short, strong, acute, curved process. Labis long, slender (digitiform). The anterior apophyses of the female genitalia are cuneiform, acute (Fig. 9).



Figs 8–9. *Ethmia thomaswitti* sp. n., genitalia: 8 = male, KUN Gen. No. 274, 9 = female, BMNH Microlep. Slide No. 29711



Figs 10–11. *Ethmia palawana* SCHULTZE, 1925, genitalia: 10 = male, KUN Gen. No. 271, 11 = female, KUN Gen. No. 272



Figs 12–13. *Ethmia lineatonotella* MOORE, 1867, genitalia: 12 = male, KUN Gen. No. 263, 13 = female, KUN Gen. No. 251

Distribution. Indonesia: Sulawesi (Celebes).

Bionomics. The recently collected specimens from Dumoga-Bone National Park were collected in lowland rain forest and lower mountain forest (O'DONOVAN 1990).

Etymology. The species is dedicated to Mr THOMAS WITT, founder of the Witt Museum, Munich, who has donated large ethmiid material to the Hungarian Natural History Museum.

Ethmia palawana SCHULTZE, 1925
(Figs 3, 10–11)

Ethmia palawana SCHULTZE, 1925, Philippine Journal of Science **28**: 574. The type specimen was probably lost during the Civilian War in Manila (DIAKONOFF 1969).

Material examined. Philippines. 29 specimens from Palawan: Mt. Matalingaham, 800 m, December 1997, leg. BAL., coll. Dr. RONALD BRECHLIN; Mt. Magacasaw, Mainit Brook's point, 6–900 m, 3–6.X.1996, leg. BAL., coll. Dr. R. BRECHLIN; Mt. Lolwagan, Brook's point, 600–900 m, 15–26.XI.1998, coll. Dr. R. BRECHLIN; Napsan, Mt. Salakot, 700 m, 19–20.II.1996, J. S. PETERSEN; S-Palawan, Mt. Mantalingajan, 600–800 m, 2–12.VIII.2000, leg. D. MOHEGAN; Mount Salakot, 500 m, 19.VII.1984, leg. B. TURLIN. The specimens are deposited in the BMNH, ZMUC, NHMP, ZSM and HNHM.

Slides. Altogether 3 male and 2 female genitalia preparations were made (KUN Slide Nos 84, 102, 271, 272, 407).

Description (Fig. 3): Wingspan 45–48 mm. As compared to the general description of the species group, the fore wing is overlaid with seven spots at basal part, and with a single short black stria running parallel with costa. Hind wing black, yellow at base, with strong costal brushes; cilia yellow. In the male genitalia (Fig. 10) the labis is broad and short. Valva wide, bean-shaped, distal edge strongly curved, cucullus with short, strong, acute, curved process; sacculus wide with a less prominent weakly sclerotized field. Female genitalia (Fig. 11) the apophyses anteriores are cuneiform, not as acute as in the other species.

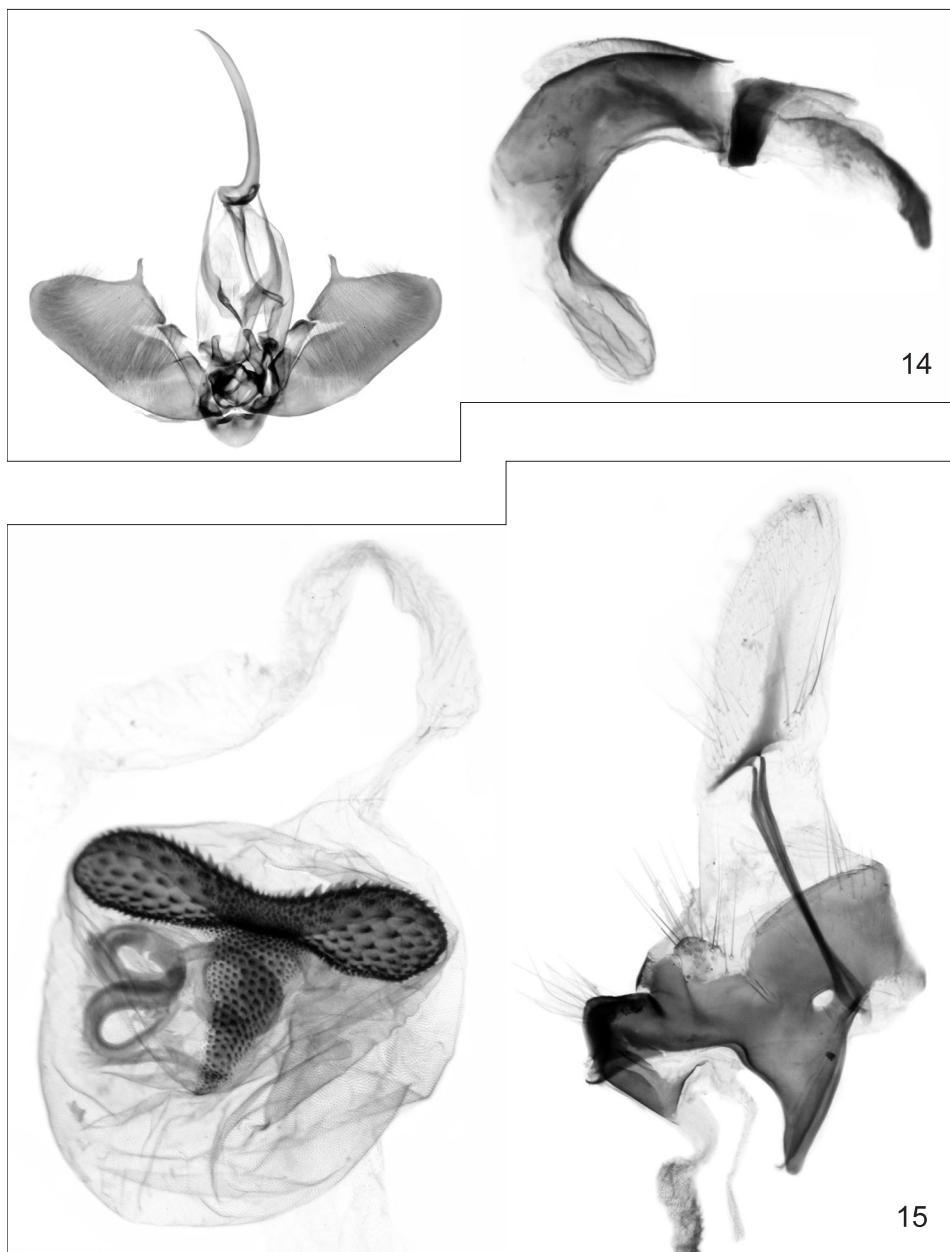
Distribution. Philippines: Palawan Island.

Bionomics. The newly recorded specimens were collected during the winter period (from November to February), at lower altitudes, mostly by UV light-traps.

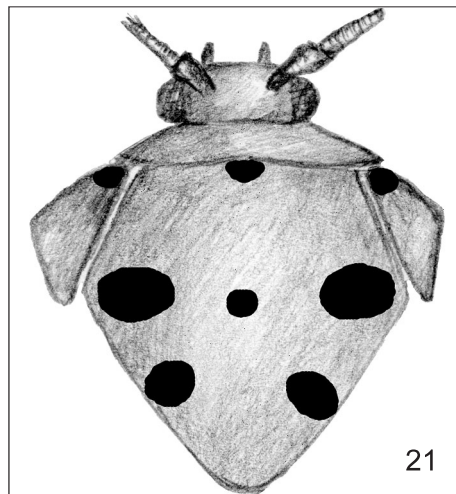
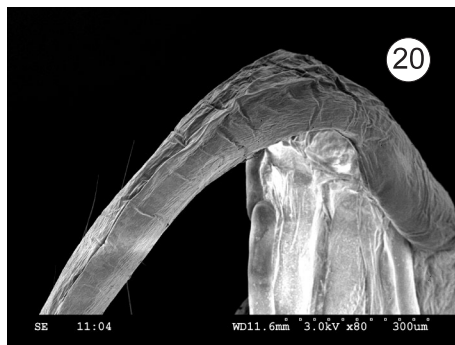
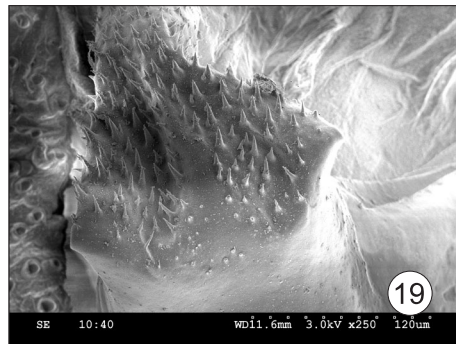
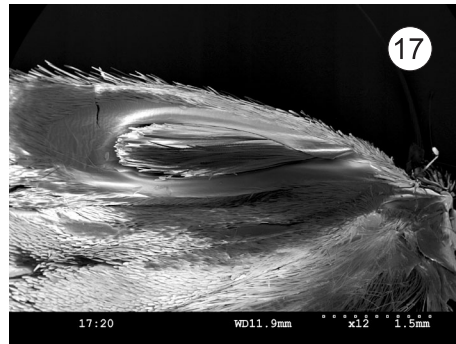
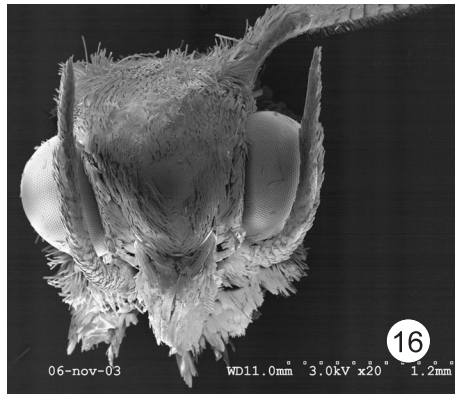
Ethmia galactarcha MEYRICK, 1928
(Figs 5, 14–15)

Ethmia galactarcha MEYRICK, 1928, Exotic Microlepidoptera **3**: 418. The type locality of the species lies in Java (Tjibodas, Mt. Gede).

The new data of distribution are as follows: 119 specimens from Indonesia. Sumatra: W., Mt Talang 30 km SW of Solok, 1600 m, Nebelwald, 7–9.XI.1981, leg. SCHINTLMEISTER A. & WIDAGDO; Dairi E, 1830 m, 25.IV.1961, leg Dr. DIEHL. Peureulak, 80 m, 30.VIII.1961, leg. Dr. DIEHL; Flores:



Figs 14–15. *Ethmia galactarcha* MEYRICK, 1928, genitalia: 14 = male, KUN Gen. No. 250, 15 = female, KUN Gen. No. 253



Figs 16–21. 16–20 = *Ethmia lineatonotella* MOORE, 1867, 16 = head, 17 = costal brushes, 18 = clasp ing organs, 19 = anterior part of gnathos, 20 = uncus; 21 = thoracic pattern of the *E. lineatonotella* species group

W, Prov. Nusa Tenggara, Timur, Mt. Ranaka (E), 3 km S of Mano, 18 km SE of Ruteng, 1270 m, 17–21.IV.1996, leg. Dr. E. BRECHLIN; Prov. Nusa, Tenggara, Timur, Mt. Ranaka (E), 9 km E of Ruteng, 1140 m, 14–15.IV.1996, leg. Dr. E. BRECHLIN; Prov. Nusa Tenggara, Timur, Rangawattu, Telecom-Stat., 900 m, 33 km E of Labuhanbajo, 12.IV.1996, leg. Dr. E. BRECHLIN; Prov. Nusa Tenggara, Timur, 15 km E of Labuhanbajo, 200 m, 9–12.IV.1996, leg. Dr. E. BRECHLIN; Sumbawa, Prov. Nusa Tenggara, Barat, Mt. Tambora (W), 1020 m, 10 km E Tambora, primary forest, 14–15.III.1996, leg. Dr. E. BRECHLIN. Sulawesi (Celebes): Puncak, Palopo, 900–1300 m, I.1997, VI.1998, leg. local collector. Java: Meru Betiri National Park, 25 km S of Kaliburu village, 300–500 m, V–VI.1996. Bali: 1 km N lake Bulyan, Desa Vanagiri, Pura Tirta, Ketipat, 1340 m, 14–16. I.1999, leg. CERNY. The specimens are deposited in the BMNH, SMTK and HNHM.

Slides. Altogether 3 male and 10 female genitalia preparations were made (KUN Slide Nos 93, 94, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259).

Remarks. The species shows slight variability throughout the Indonesian islands. Some specimens from Java are larger in size and the apical spots are reduced to three spots while specimens found in Flores and Sulawesi are smaller having the typical five apical spots.

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