The *Antheraea* HÜBNER (Lepidoptera: Saturniidae) of Sulawesi, with descriptions of new species

Part 2: The species of the *frithi*-group[1]

Jeremy D. HOLLOWAY, Stefan NAUMANN, and Wolfgang A. NÄSSIG[2]

Dr. Jeremy D. HOLLOWAY, Department of Entomology, The Natural History Museum, Cromwell Road, London SW7 5BD, United Kingdom

Dr. Stefan NAUMANN, c/o SCHWARZER, Potsdamer Strasse 71, D-10785 Berlin, Germany

Dr. Wolfgang A. NÄSSIG, Entomologie II, Forschungsinstitut und Naturmuseum Senckenberg, Senckenberganlage 25, D-60325 Frankfurt/Main, Germany

Abstract: The status of the members of the *paphia/frithi*-group (sensu NÄSSIG 1991) of the genus *Antheraea* HÜBNER, [1819] from Sulawesi, Indonesia, is discussed. Seven species of this group are known to occur on the island. Three of them are described as new species: *Antheraea (Antheraea)* ***paukstadtorum*** NAUMANN, HOLLOWAY & NÄSSIG **n. sp.**, *A. (A.)* ***taripaensis*** NAUMANN, NÄSSIG & HOLLOWAY **n. sp.** and *A. (A.)* ***viridiscura*** HOLLOWAY, NÄSSIG & NAUMANN **n. sp.** All three ♂ holotypes will be deposited in the collection of Museum Zoologicum Bogoriense, Bogor, Indonesia. These three species are members of a subgroup of closely related and, in some features, very similar species which show clear differences in size, habitus, genitalia and nocturnal flight activity hours. The synonymy of *Antheraea (Antheraea) cordifolia* WEYMER, 1906 and *A. (A.) fickei* WEYMER, 1909 (**n. syn.**, ♂ lectotype **designated,** in Museum für Naturkunde, Freiburg i. Brsg., Germany) and the revised status of *A. (A.) minahassae* NIEPELT, 1926 (♂ lectotype **designated,** in BMNH), as separate species are pointed out. The remaining members of the *paphia/frithi*-group, *A. (A.) celebensis* WATSON, 1915 and *A. (A.) platessa* ROTHSCHILD, 1903 are briefly discussed for comparison; *A. platessa* is probably not indigenous to the island. All species are figured in colour.

Die Arten der Gattung *Antheraea* HÜBNER (Lepidoptera: Saturniidae) von Sulawesi mit der Beschreibung neuer Arten Teil 2: Die Arten der *frithi*-Gruppe

Zusammenfassung: Der Status der Mitglieder der *paphia/frithi*-Gruppe (sensu NÄSSIG 1991) der Gattung *Antheraea* HÜBNER [1819] von Sulawesi, Indonesien, wird diskutiert. Es werden drei neue Arten beschrieben: *Antheraea (Antheraea)* ***paukstadtorum*** NAUMANN, HOLLOWAY & NÄSSIG **n. sp.**, *A. (A.)* ***taripaensis*** NAUMANN, NÄSSIG & HOLLOWAY **n. sp.** und *A. (A.)* ***viridiscura*** HOLLOWAY,

[1] Results of Project Wallace No. 149.

[2] 43rd Contribution to the Knowledge of the Saturniidae.

NÄSSIG & NAUMANN **n. sp.** Die ♂-Holotypen dieser drei Arten werden in die Sammlung des Museums Zoologicum Bogoriense in Bogor, Java, Indonesien, gelangen. Diese drei Arten gehören zu einer Gruppe nahe verwandter und sich untereinander stark ähnelnder Arten innerhalb der *paphia/frithi*-Gruppe, die einzelnen Arten lassen sich jedoch durch Größe, Habitus, Genitalstrukturen und nächtliche Flugzeiten deutlich voneinander unterscheiden. Es wird auf die Synonymisierung von *Antheraea (Antheraea) cordifolia* WEYMER 1906 mit *A. (A.) fickei* WEYMER 1909 (**n. syn.**, ♂ Lectotyp **designiert,** im Museum für Naturkunde, Freiburg i. Brsg.) und die Statusrevidierung von *A. (A.) minahassae* NIEPELT 1926 (Lectotyp **designiert,** im BMNH) auf Artniveau hingewiesen. Die zwei übrigen Mitglieder dieser Gruppe auf Sulawesi, *A. (A.) celebensis* WATSON 1915 und *A. (A.) platessa* ROTHSCHILD 1903, werden zum Vergleich besprochen; *A. platessa* ist wahrscheinlich kein natürlicher Faunenbestandteil der Insel. Alle Arten werden farbig abgebildet.

Introduction

In this second, concluding part on the Sulawesi *Antheraea* (part 1 see HOLLOWAY et al. 1995) we deal with the species of the *paphia/frithi*[3]-group of *Antheraea (Antheraea)*. This is the most numerous species-group of the genus, on Sulawesi alone as well as in total, and the identity of its species is most confusing for both scientists and amateurs. This is due to several factors:

- enormous individual variability in colour and ornamentation of most species,
- lack of illustrations and precise descriptions in most of the earlier publications describing new taxa,
- difficulties arising while searching for the type material of already described taxa, and
- misidentifications of specimens in collections and those listed in publications.

Members of this group mainly share the following characters (see NÄSSIG 1991, NÄSSIG et al. 1996 a): the eggs are usually flattened and in most cases have two light-brown lines ringing the top and bottom (eggs of horizontal type, with the micropyle on the side); the imagines are very polymorphic, and ♂♂ exhibit variability from yellow, orange or red to reddish

[3] The spelling *frithii* (with two "i" at the end) is incorrect; its source is presently unknown (perhaps SEITZ 1926?). The taxon *Antheraea frithi* MOORE was described twice; both descriptions, that in HORSFIELD & MOORE (1858/59) as well as that by MOORE alone in the Proceedings of the Zoological Society of London (dated 28. VI. 1859, according to SCHÜSSLER 1933) consistently used the spelling *Antheraea frithi* with one "i" only. We follow here SCHÜSSLER with respect to the publication dates.

or dark brown ground colour with light yellow highlights and crenulate ornamentation, while variation in ♀♀ ranges from yellow to red, grey or brown, generally without or with less ornamentation, the ♀♀ generally with large hyaline centers in the wing eyespots whereas the ♂♂ vary very much in the size of this hyaline part.

We expect that the study of preimaginal morphology, life-histories, behaviour, and ecology will bring further information about the limits of the different species within this complicated group. The male genitalia within the group often are very similar to each other, but in combination with other data (wing shape, flight activity etc.), can support the determination.

The preimaginal instars of species of the *frithi*-subgroup are only poorly known: NÄSSIG et al. (1996 b) depict the larval instars of *Antheraea (Antheraea) gschwandneri* NIEPELT, 1918 from Sumatra, PAUKSTADT et al. (1996) describe the life history of *A. (Antheraea) rumphii* (C. FELDER, 1861) from Ambon. Partial life histories of a few species are illustrated by HOLLOWAY (1987), NAUMANN (1994 [description only], 1995) and PINRATANA & LAMPE (1990). All known first instar larvae of the group are yellowish, with a black or dark brown head, a black prothoracic shield and, laterally, two black rings per segment (before and behind scoli and spiracles, often interrupted dorsally), at least on the abdominal segments. Second instar larvae are yellowish or green with black scoli encircled with orange or red; later instars are more greenish with reduced scoli, and usually a brownish head.

Abbreviations in addition to part 1:

DMNH	Denver Museum of Natural History, Denver, Colorado, USA
IRB	Institute Royal des Sciences Naturelles de Belgique, Bruxelles, Belgium
ZMHU	Zoologisches Museum der Humboldt-Universität, Berlin, Germany
CPSV	collection Pierre SCHMIT, Videlles, France
CRLN	collection Rudolf LAMPE, Nürnberg, Germany
G., Gn., Gng.	Gunung [Bahasa Indonesia: mountain]
GP no. WNG	genitalia slide no. of the third author (W. A. NÄSSIG)
fw, hw	forewing, hindwing
lfw	length of forewing, measured in a straight line from the wing base to the apex (without the thorax)

The collection of the third author (CWAN) is presently being incorporated in the Senckenberg-Museum, Frankfurt/Main.

Antheraea (Antheraea) celebensis Watson, 1915

Antheraea rumphi [sic] *celebensis* Watson: Tijdschr. Entomol. 58: 280.

Type material: This species was described by Watson (1915) as a subspecies of *A. rumphii* based on a single ♀. This ♀ holotype with the type locality "Gorontalo, N. Sulawesi" is deposited in BMNH (examined). There is also a ♂ specimen in BMNH with a red holotype label. There was never a ♂ "type" of *A. celebensis;* this label was attached wrongly at a later occasion.

Cited in literature and on museum collection labels as: *A. mylitta, A. gschwandneri, A. frithi javanensis, A. cordifolia sumatrana, A. paphia celebensis, A. frithii* [sic]; see Naumann (1995).

Distribution: Here understood as being restricted to Indonesia: Sulawesi and adjacent smaller islands (see discussion below).

Description: ♂♂ (Pl. 2, Fig. 1; b&w figs. 2, 9a): lfw 68.0 mm (n = 7, maximum 72 mm, minimum 65 mm). Specimens from Sulawesi are generally orange-yellowish coloured, only sometimes marked with crenulate brownish median and postocellular fasciae. Antemedian and postmedian band of fw straight, violet, sometimes brownish, in postmedian area often with rosy-whitish shadow. The eyespots on the wings nearly circular, ringed with black.

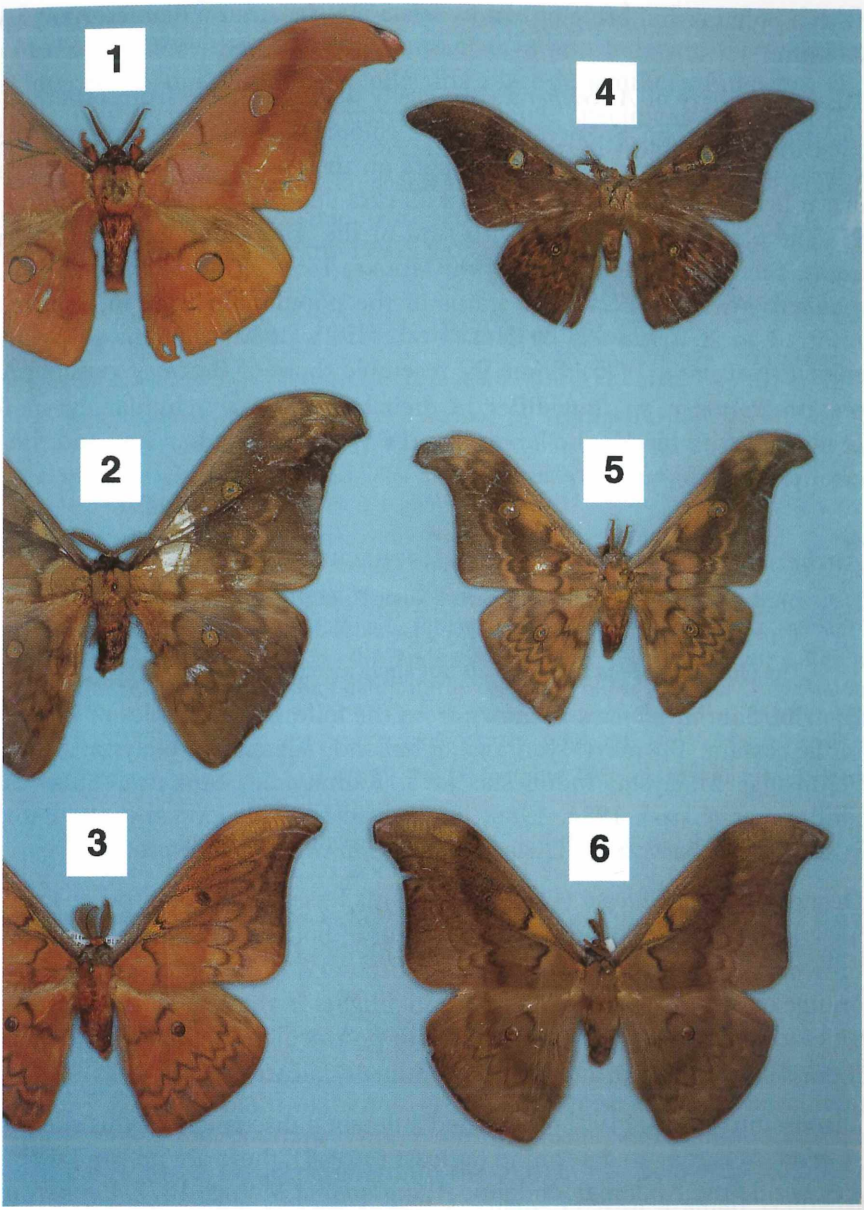
♂ genitalia: much larger (at least twice as large) than in all subsequent species (except *platessa*). The uncus is elongate and fused nearly to the distal end. Looks very distinct from all other species.

♀♀ (Pl. 2, Figs. 2 + 3): lfw 76.7 mm (n = 12, maximum 84 mm, minimum 69 mm). Ground colour variable from clear yellow (most specimens) over olive-ochreous to dark brown; antemedian and postmedian band red or violet with pink-and-whitish fasciae merging into postmedian area, median line slightly crenulate in some specimens. Eyespots of the wings large, with ochreous and outer black ring. Hyaline centre nearly circular,

---

Colour Plate 1

Figs. 1–6: Sulawesi *Antheraea,* all specimens from Dumoga-Bone N.P., Sulawesi Utara. **Fig. 1 (top left):** *Antheraea (Antheraea) rosemariae* Holloway et al. 1995 ♂, paratype. **Fig. 2 (centre left):** *Antheraea (Antheraea) cordifolia* Weymer 1906 ♂, damaged fw apex. **Fig. 3 (bottom left):** *Antheraea (Antheraea) paukstadtorum* n. sp. ♂, paratype, orange variant. **Fig. 4 (top right):** *Antheraea (Antheraea) viridiscura* n. sp. ♂, holotype. **Fig. 5 (centre right):** *Antheraea (Antheraea) minahassae* Niepelt 1926 ♂. **Fig. 6 (bottom right):** *Antheraea (Antheraea) paukstadtorum* n. sp. ♂, paratype, yellow-olive variant. — All specimens in BMNH. — Colour plate 1 by Bernard D'Abrera.



with a light central bridging, on fw 5.5–8 mm maximum diameter, on hw 2–4 mm.

Discussion: ♂♂ of *A. celebensis* are easily distinguishable from other *Antheraea* species on Sulawesi by their colourful ground colour and the colour, size and shape of the eyespots on the wings. The male genitalia are at least twice as large as those of all taxa described below (see b&w fig. 9). There is more similarity with taxa of the *frithi*-subgroup from other areas, such as *A. rumphii*, *A. frithi* MOORE, 1858, *A. gschwandneri* or *A. moultoni* WATSON, 1927 The status of the populations west of Sulawesi referred to *A. celebensis* by HOLLOWAY (1981, 1987) remains to be resolved (NAUMANN 1995). Some ♀♀ resemble those of the very variable *A. paukstadtorum* n. sp., but differ in their bigger, nearly circular eyespots (encircled with black), the larger lfw, the violet postmedian line and their clear ground colour.

Antheraea (Antheraea) platessa ROTHSCHILD, 1903

Antheraea jana platessa ROTHSCHILD: Novit. Zool. **10:** 309
Type material: The ♂ holotype of *A. platessa* is deposited in BMNH (examined).

The older name *jana* Stoll, 1782 is not applicable (see NÄSSIG 1992).

Distribution: *A. platessa* is known from the following countries or islands: India: Assam; Burma (Myanmar); Thailand; Vietnam; Malaysia: Sabah, Peninsular Malaysia; Indonesia: Java, Kalimantan, Sumatra, Sulawesi; Philippines (LAMPE 1984, 1985, NÄSSIG 1992, 1994, PAUKSTADT & PAUKSTADT 1991, PINRATANA & LAMPE 1990, TREADAWAY pers. comm.).

Description: *A. platessa* (Pl. 2, Fig. 4, ♂) is less variable than other members of the *frithi*-group, the ground colour of both sexes being always dark brownish (e. g., LAMPE 1984, 1985, HOLLOWAY 1987), but never yellow, orange or red (NÄSSIG 1992) or with highlights in these colours. Typical is a broad dark median band, a crenulate postmedian line, and in ♂ specimens a small antenna and a very prominent, falcate fw apex.

Discussion: NÄSSIG (1992) published a detailed discussion on this species. *A. platessa* is easy to determine (at least the ♂♂), there are no similar species beside the Andaman endemic *A. andamana* MOORE, 1877. PAUKSTADT & PAUKSTADT (1991) reported a single ♂ of this species collected near Bantimurung, Sulawesi Selatan. No further specimens are known from Sulawesi, and there is presently no evidence that this species occurs currently

or permanently on this island. There is a lot of trade of wood and agricultural products between Kalimantan, Java and Sulawesi by Makassar schooners in the area of the collecting place in southern Sulawesi, and there may be possibilities of introducing single specimens or small founder populations in this way by accidentally transporting cocoons or eggs. An active migration of this singleton from Kalimantan across the Makassar strait is next to impossible, with 350 km of open sea in between (compare PAUKSTADT & PAUKSTADT 1991, NAUMANN 1995).

Antheraea (Antheraea) cordifolia WEYMER, 1906

Antheraea cordifolia WEYMER: Dtsch. entomol. Z. Iris, Dresden, **15**: 71.

Type material: *A. cordifolia* was described by WEYMER (1906) after a single ♀ with data "Celebes 1906" (most likely from N. Sulawesi, where most material of this time was collected). This holotype specimen, with a red type label, is deposited in ZMHU (examined, Pl. 2, Fig. 8).

= *Antheraea fickei* WEYMER, 1909 (**new synonymy**) (Dtsch. entomol. Z. Iris, Dresden, **22**: 21): NAUMANN (1995: 52).

Type locality: Sawangan, N. Sulawesi. We hereby **designate** the lectotype ♂ (Pl. 2, Fig. 5) with the following labels: "*fickei* ♂ WEYM. Celebes" [in WEYMER's handwriting; and:] "4, 5, 48" [and:] "Sawangan, N. Celebes, H. ROLLE, Berlin, S. W. 11." [no collecting date], in the collection of Museum für Naturkunde, Freiburg i. Br., Germany. The present whereabouts of the second ♂ syntype specimen cited in WEYMER's description ("Koll. Prof. KOCH, Freiburg i. Br.") is unknown (see also LEMAIRE 1978: 178, footnote 2); if this specimen still exists, it would become the only paralectotype.

Antheraea minahassae: HOLLOWAY (1981: 124; following mislabelling in BMNH of *minahassae* specimens as types of *cordifolia*).

Distribution: *A. cordifolia* is known from all parts of Sulawesi and from the adjacent southeastern Pulau [island] Kabaena from elevations ranging from 280 to 1800 m.

Description: ♂♂ (Pl. 1, Fig. 2; Pl. 2, Fig. 5, lectotype of *fickei*, Fig. 6; b&w figs. 3, 9b, 9c): lfw 71.2 mm (n = 24, maximum 79 mm, minimum 64 mm). Ground colour ochreous, grey or brownish olive, all specimens with a typical oblique dark stripe from the costal fw base along median stem below the eyespot merging into the margin just below the roundish fw apex (damaged in the specimen on plate 1) with a small yellowish highlight in the triangle beneath the costa. There are intensive crenulate ornamentations on both wings. Eyespots small, oval and with hyaline area of 2 mm maximum diameter. Antennae 13 mm long, 6.5 mm broad.

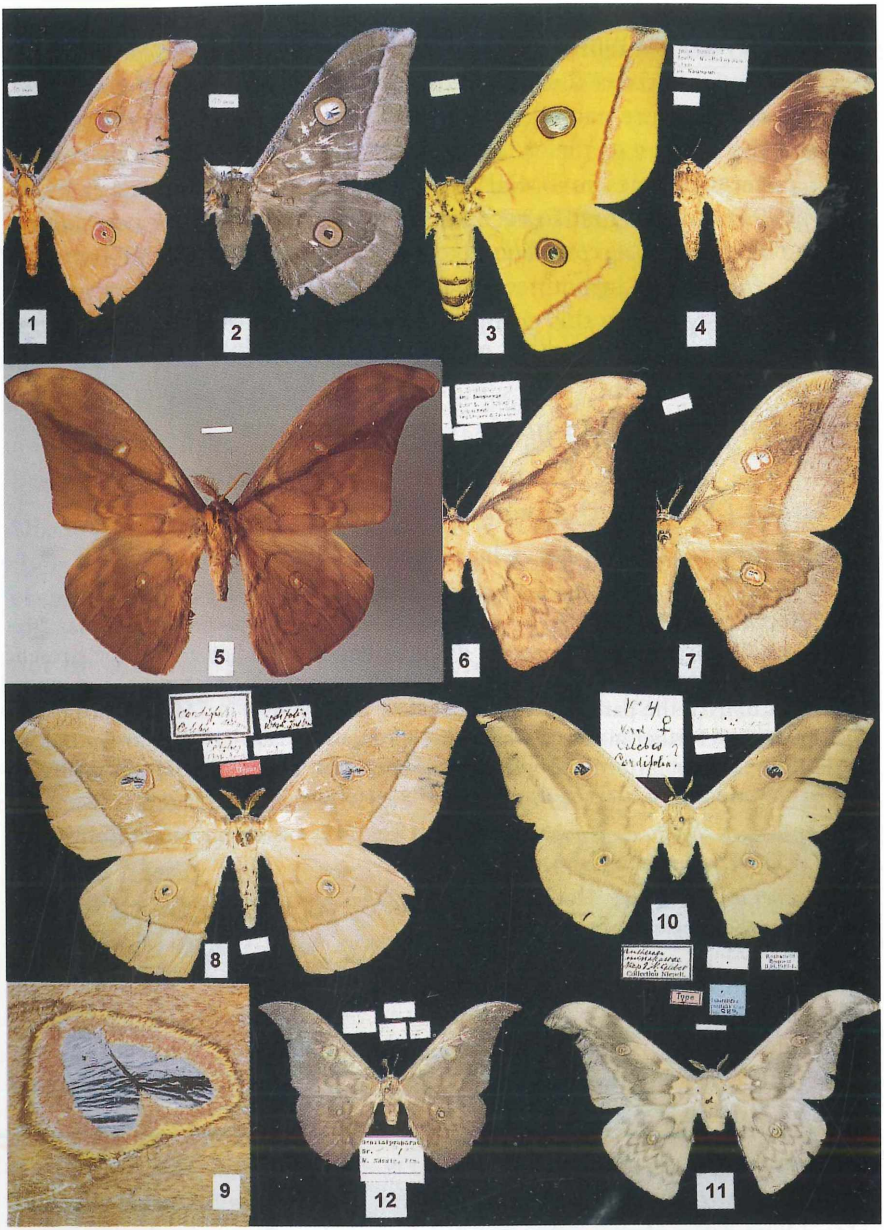
♂ genitalia: overall size distinctly smaller than in *A. celebensis*, but larger than in all subsequent species. Dorsal lobe of the valve bipartite distally. *A. cordifolia* and all subsequent species have a broadly bifurcate uncus. *A. cordifolia* is a rare example of an *Antheraea* species in which the valves can be opened during preparation without much damaging.

♀♀ (Pl. 2, Fig. 7, Fig. 8, holotype of *cordifolia*): lfw 81.5 mm (n = 6, maximum 92 mm, minimum 76 mm). Ground colour either grey olive or ochreous reddish brown with pale pink postmedian area. Eyespots of fw and hw with two hyaline areas, heart-shaped and ringed with red, yellow and black (Pl. 2, Fig. 9). Antenna about 13 mm long, 4 mm broad, quadripectinate as usual in most *Antheraea* ♀♀, but the rami are approximately equally long; superficially looking like a ♂ antenna. That is why WEYMER (1906) conditionally proposed a separate genus *Carmenta* (a homonym of *Carmenta* EDWARDS, 1881, Sesiidae) in his publication. There is no justification for this purely typologically based genus.

Discussion: *A. cordifolia* belongs to an endemic subunit of *Antheraea* species on Sulawesi within the *paphia/frithi*-group with similar ornamentation but differences in size, wing shape, male genitalia, colour and flight activity pattern. Typical are, in ♂♂: the longitudinal stripe of the fw from the base through the wing into the postmedian area or sometimes into the fw apex which is found outside Sulawesi only in *A. (A.) rosieri* (TOXOPEUS, 1940); a yellowish highlight along the costa from the base to the fw eyespot; and dentate lines on both wings. In this group we recognize, besides *A. cordifolia*, *A. minahassae* and the three new species described below.

Colour Plate 2

Figs. 1–3: *Antheraea (Antheraea) celebensis* WATSON, 1915. **Fig. 1:** ♂, GP WNG 934/95, Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 2:** ♀, dark brown form, Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 3:** ♀, yellow form, Puncak Palopo, Sulawesi Selatan, CSNB. **Fig. 4:** *Antheraea (Antheraea) platessa* ROTHSCHILD, 1903, ♂, Ipoh, West Malaysia, CSNB. **Fig. 5–9:** *Antheraea (Antheraea) cordifolia* WEYMER, 1906. **Fig. 5:** ♂, lectotype of *A. fickei* WEYMER, 1909, Sawangan, Sulawesi Utara, in coll. Museum für Naturkunde, Freiburg i. Brsg. **Fig. 6:** ♂, GP WNG 936/95, Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 7:** ♀, Pulu Pulu, Sulawesi Selatan, CSNB. **Fig. 8:** ♀, holotype, Sulawesi [no further data], ZMHU. **Fig. 9:** ♀, holotype, details of the heart-shaped fw ocellus, ZMHU. **Fig. 10 & 11:** *Antheraea (Antheraea) minahassae* NIEPELT, 1926. **Fig. 10:** ♀, Minahassa, Sulawesi Utara, ZMA. **Fig. 11:** ♂, holotype, GP BMNH Sat. 283, Manado, Sulawesi Utara, BMNH. **Fig. 12:** *Antheraea (Antheraea) viridiscura* n. sp., paratype ♂, GP WNG 847/95, Danau Moaat, Sulawesi Utara, ZMA. — Scale bars 1 cm. — Colour plates 2–4 by S. NAUMANN, photo of *A. fickei* ♂ lectotype by K. SANDEBECK. Specimens from BMNH, MZB, ZMA, ZMHU, CSNB.



Revisional work within the group has been thwarted because WEYMER (1906, 1909) did not figure the types of his two new *Antheraea* taxa, and, therefore, later authors did not know the true identity of these. Thus, different species were named (and even eventually labelled as "types") as *A. cordifolia* (see, e.g., SEITZ 1926, HOLLOWAY 1981, 1987, specimens under different names in BMNH, ZMA and probably elsewhere). NAUMANN (1995) was the first to recognize the synonymy of the two names, with the older name *A. cordifolia* given priority, based on the large overall size of the antennae in both sexes, on the generally largest wingspan of both ♂♂ and ♀♀ within this group of *Antheraea,* and on some similarities in pattern and wing shape. Only PAUKSTADT & PAUKSTADT (1991) and NAUMANN (1995) figured the species; the ♀ holotype of *A. cordifolia* and the ♂ lectotype of *A. fickei* are figured here for the first time.

Antheraea (Antheraea) minahassae NIEPELT, 1926

Antheraea minahassae NIEPELT: Int. entomol. Z., Guben, **19** (48): 386

Type material: *A. minahassae* was described by NIEPELT (1926 a) after two ♂♂ from Manado, N. Sulawesi; he did not explicitly designate one of them as "the type". The lectotype (by **present designation,** in accordance with the present labelling as "type" and after comparison with the original description) is deposited in BMNH, the paralectotype (labeled as "Paratypus") in ZMHU (both examined). Two further males on which NIEPELT reported later (1926 b) are in BMNH bearing red labels "Cotype" These specimens are not valid type specimens. In his second article NIEPELT also figured the lectotype.

Antheraea cordifolia minahassae: SEITZ (1926: 511; misinterpretation), SCHÜSSLER (1933: 175; misinterpretation).

Antheraea cordifolia: HOLLOWAY (1981: 124; misinterpretation, see the note under the species *A. cordifolia* above).

Distribution: Known mainly from North Sulawesi, where it seems to be more common than in other parts of the island; a very few specimens were collected recently in central and southern Sulawesi. No records exist from South East Sulawesi. *A. minahassae* has been found at elevations between 210 and 1440 m.

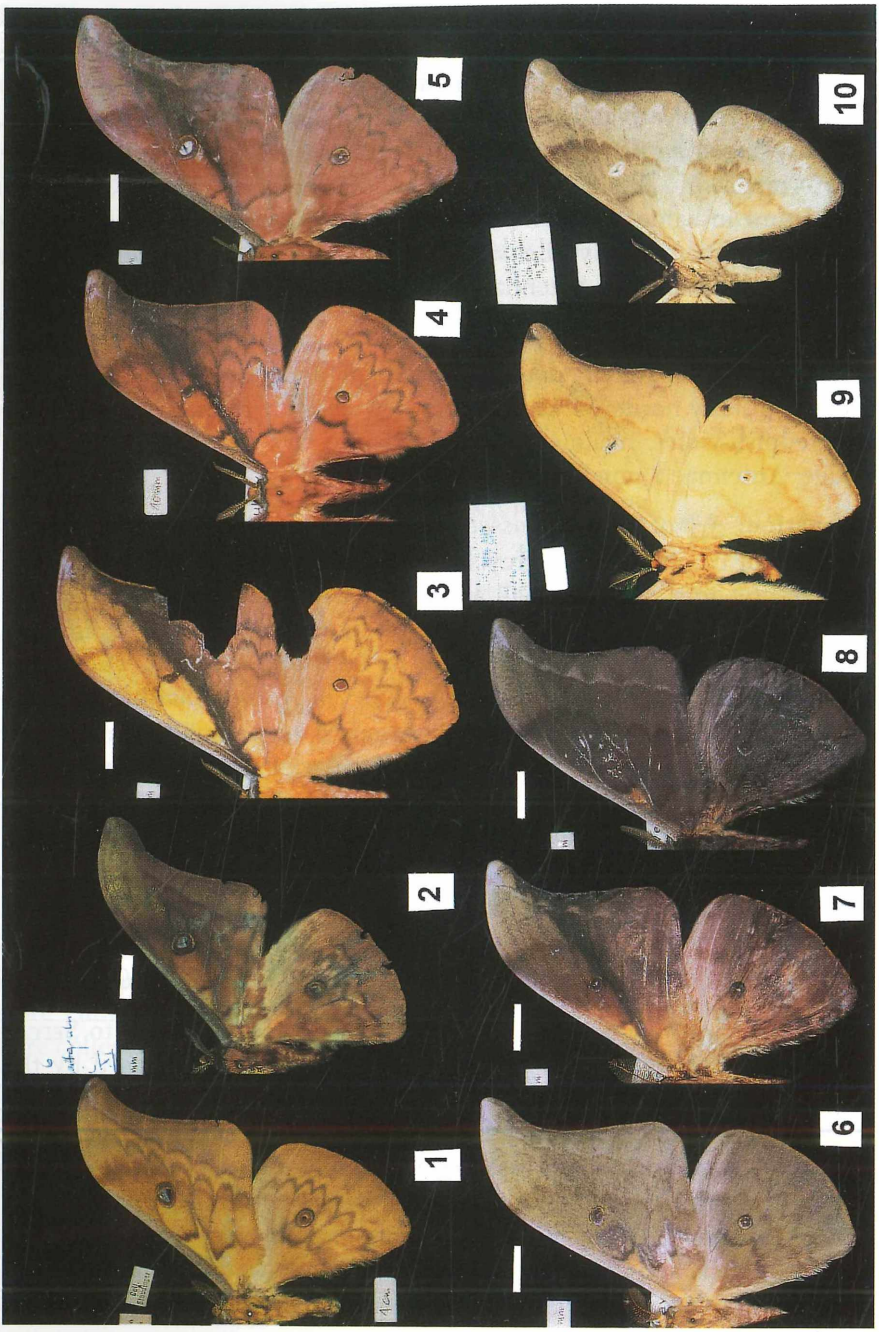
Description: ♂♂ (Pl. 1, Fig. 5 ♂; Pl. 2, Fig. 11, holotype; b&w figs. 4, 9d): lfw 55.5 mm (n = 13, maximum 59 mm, minimum 52 mm). Ground colour diagnostic: always olive-grey with an pale ochreous-orange pattern (the wavy lines typical for the *frithi*-subgroup); this coloration is very constant, only the proportions of the olive-grey and ochreous-orange

components vary. On fw antemedian area, discal cell and proximal postmedian line partially or totally suffused; on hw ground colour more orange with crenulate bands. Postmedian area of fw whitish grey, the fw apex strongly falcate and recurved. Fw eyespots circular or rounded triangular, ringed dark grey, yellow and red; hyaline centre small round or heart-shaped, 1–3.5 mm in maximum diameter. Hw eyespots smaller, round and in same colours. Underside less intensively coloured, more ochreous grey, basically the same pattern as on upperside, eyespots without coloured rings. Antennae 7.0–7.5 mm long, 2.8–3.0 mm broad.

♀♀ (Pl. 2, Fig. 10): lfw 67 mm (n = 1); ground colour light greyish brown, with little darker antemedian, postocellular and postmedian lines, the latter is distally bordered whitish grey. Fw eyespot round, ringed yellow and reddish-violet, hyaline part divided into two fenestrae by a small bridge. Antennae 9 mm long, 2 mm broad.

Discussion: ♂♂ of *A. minahassae* show very constant characteristics in their colour combination of greyish and ochreous-orange, the falcate and recurved fw apex and the small antennae. *A. paukstadtorum* and *A. taripaensis* have a similar pattern but never show this colour combination, nor the antennae size and the form of fw apex and eyespots. The differences from *A. cordifolia* are even clearer: ♂♂ of *A. cordifolia* have a more rounded and not so prominent fw apex, only a very small hyaline centre in the eyespots, a typical and more intensive dark longitudinal line on fw, never that orange colour, much bigger antennae, show differences in genitalia morphology, and generally have larger wingspan. The illustrated ♀ of *A. minahassae* is the currently only known ♀ specimen which can fairly reliably be associated with *A. minahassae;* it can be separated from *A. cordifolia* ♀♀ by its smaller antennae and smaller size and different form of eyespots. Therefore there is no information on variability in ♀♀.

In literature, *A. minahassae* has been confused repeatedly due to Seitz's placement of *minahassae* as a subspecies of *A. cordifolia,* caused by the heart-shaped eyespot in some specimens, although certainly he did not know the type material of both species. Seitz did not explicitly state the new status, and *A. cordifolia* was described only after a single ♀; no ♂ of this species was cited in literature earlier. Different authors followed this error: Schüssler (1933), van den Bergh and Lemaire (determination labels in BMNH and ZMA), or Holloway (1981).



Antheraea (Antheraea) paukstadtorum Naumann, Holloway & Nässig n. sp.

Antheraea fickei: Holloway (1987: 103; tentative association)

Antheraea spec. nov. 1 [undescribed species]: Naumann (1995: 59)

Holotype: ♂, S. Sulawesi, Mt. Sampuraga, 2.10'S./120.45'E. [sic], 1.-6. II. 1995, 1400 m, leg. Sinjaev & Tarasov, ex CSNB, MZB.

Paratypes (all specimens from Indonesia, Sulawesi), males, 458 ♂♂:

2 ♂♂, Sawangan, N. Celebes, [no collecting data], Rothschild Bequest 1939-I, [1 specimen with additional label:] Genit. S-prep. C. Lemaire no. 3589 *Antheraea cordifolia* Weymer, Armure partiellement de'truite (formol), GP Sat. Spirit. no. A411, [the other specimen with additional label:] Saturniidae genitalia slide GP no. 282, BMNH; 1 ♂, *Fickei* (Wey.), N. Celebes, [and:] Type J. H. W. [Watson], *A. moultoni,* [no collecting data][and:] Levick Bequest 1941-83, BMNH; 2 ♂♂, Sulawesi Utara, Dumoga-Bone N. P., site 7, 540 m, 9.-11. II. 1985, Tumpah Transect., leg. J. D. Holloway, [Project Wallace], BMNH; 1 ♂, Sulawesi Utara, Dumoga-Bone N.P., site 13, 1300 m, Transitional for. 5.-6. III. 1985, leg. J. D. Holloway, [Project Wallace], BMNH; 2 ♂♂, Sulawesi Utara, Dumoga-Bone N.P., site 14, 1440 m, medium *Casuarina* for., 7.-8. III. 1985, leg. J. D. Holloway, [Project Wallace], BMNH; 1 ♂, Sulawesi Utara, Dumoga-Bone N.P., Camp 1440, 24. March 1985, leg. T. Harman/ [M. G.] Allen, [Project Wallace], BMNH; 1 ♂, Sulawesi Utara, Dumoga-Bone N.P., site 15, 1140 m, Hill '1440', 6.-8. VIII. 1985, leg. J. D. Holloway, [Project Wallace], BMNH; 4 ♂♂, Sulawesi Utara, Dumoga-Bone N.P., site 17, 1520 m, G. Poniki/Zebra, 12. VIII. 1985, leg. J. D. Holloway, [Project Wallace], BMNH; 8 ♂♂, Sulawesi Utara, Dumoga-Bone N.P., site 18, 1817 m, G. Poniki/summit, 13.-14. VIII. 1985, leg. J. D. Holloway, [Project Wallace], [and:] GP no. 636, BMNH; 1 ♂, Sulawesi Utara, Dumoga-Bone N.P., site 22, 1080 m, PHPA chalet open habitat, Danau Moaat, 31. Aug. 1985, leg. J. D. Holloway, [Project Wallace], [and:] GP no. 635, BMNH; 1 ♂, Sulawesi Utara, Gunung Muajat summit, 1760 m, 7.-9. IX. 1985, leg. Robinson, [Project Wallace], BMNH;

8 ♂♂, Sulawesi Selatan, Gunung Sampuraga, 1400 m, Juli 1995, leg. Alam & Hakim (?), ex CSNB, DMNH;

8 ♂♂, Sulawesi Selatan, Gunung Sampuraga, 1400 m, Juli 1995, leg. Alam & Hakim (?), ex CSNB, MZB;

Colour Plate 3

Figs. 1–10: *Antheraea (Antheraea) paukstadtorum* n. sp., ♂ paratypes, **Figs. 1–8,** uppersides, **Figs. 9 & 10,** undersides. **Fig. 1:** Minahasa, Sulawesi Utara, ZMHU. **Fig. 2:** Pulau Kabaena, Sulawesi Tenggara, RMNH. **Fig. 3:** Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 4:** Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 5:** Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 6:** Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 7:** Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 8:** Gn. Sampuraga, Sulawesi Selatan, CSNB. **Fig. 9:** Gn. Tambusisi, Sulawesi Selatan/Tengah, CSNB. **Fig. 10:** Puncak Palopo, Sulawesi Selatan, CSNB. — Scale bars 1 cm.

1 ♂, Minahassa, [and:] No. 5, ♂ N. Celebes, *A. Fickey* [sic][no collecting data], RMNH; 2 ♂♂, Sulawesi Tengah, Lore Lindu N. P., [and:] Rano Rano, 1600 m, 10 km NE Gimpu, 12. III. 1985, leg. J. P. & M. J. DUFFELS, [and:] stat. 40, lower montane forest, MV-light, RMNH; 1 ♂, Sulawesi Tengah, Lore Lindu N. P., [and:] Rano Rano, 1600 m, 10 km NE Gimpu, 15. III. 1985, leg. J. P. & M. J. Duffels, [and:] stat. 43, lower montane forest, MV-light, RMNH; 1 ♂, Sulawesi Tengah, Lore Lindu N. P., [and:] Dongi Dongi, 950 m, 90 km SE Palu, 23. III. 1985, leg. J. P. & M. J. DUFFELS, [and:] stat 52, margin secondary forest, MV-light, RMNH; 2 ♂♂, RMNH-Project Wallace, N. Sulawesi, 9.–15. V. 1985 at light, leg. R. DE JONG, [and:] Dumoga-Bone N. P., Clark's Camp, 1000–1140 m, 0°37'N 123°51'E, multistr. evergreen forest, monsoon forest, RMNH; 1 ♂, Sulawesi Tenggara, P. [Pulau] Kabaena, 1500 m, Gn. Sambapolulu, 3. XI. 1989 at light, leg. R. DE JONG & J. HUISMAN, [and:] S8926 Wind Camp, open grassy south slope close to forest edge, RMNH;

3 ♂♂, Celebes Noord, Minahassa 1919, *Anth. fickey* [sic] ♂ WEYMER, coll. V. D. BERGH, ZMA; 1 ♂, Bolaang Mongondow [Sulawesi Utara, without collecting data], [and:] GP no. 851/95 WNG, ZMA; 1 ♂, Bol. Mon., [N.] Celebes, coll. V. D. BERGH, N° 6, [and:] N° 6, Nord Celebes, *A. fickey* [sic], ZMA; 1 ♂, [Sulawesi Utara], Tondano, 1935, *rumphi celebensis* [sic], ZMA; 1 ♂, Sulawesi Tenggara, leg. J. P. DUFFELS, [and:] Centipede Camp, c. 3°49'S 121°40'E, nr. Gng. Watowila, NE of Kolaka, 1100 m, 1. XI. 1989, [and:] Sample Sul. 29, canopy undisturbed hilly rainforest, at light, ZMA; 3 ♂♂, Sulawesi Tenggara, leg. J. P. DUFFELS, [and:] Sopura Camp, c. 3°49'S 121°40'E, nr. Gng. Watowila, NE of Kolaka, 1600 m, 4. XI. 1989, [and:] Sample Sul. 33, *Pandanus* forest, at light, [and:] GP no. 848, 849 & 850/95 WNG, ZMA; 1 ♂, SW Sulawesi, c. 30 km NE of Enkerang, Gn. Rantemario, Gowa Camp, 1800 m, 7. XI. 1993, [and:] Undisturbed lower montane forest along Sg. Gowa Sarumpa'pa, 3°24'45''S 120°00'00E, at light, leg. J. P. & M. J. DUFFELS, ZMA; 1 ♂, SW Sulawesi, Onan, 58 km N of Majene, 19. XI. 1993, Gardens, leg. J. P. & M. J. DUFFELS, ZMA; all these specimens in ZMA, drawer *Antheraea* 7, with heading: "*Antheraea* ♂♀ *fickei* WEYM. Det. Tox. [TOXOPEUS, handwritten] 1948";

4 ♂♂, [Sulawesi Utara], Minahassa [18]86, PLATEN, coll. STAUDINGER, [and:] *Copaxa nobilis* [sic] MOORE in lit., ZMHU;

1 ♂, Sulawasi [sic] Selatan, Luwu, Puncak, 1200 m, 21. VII. 1993, No. 1124, CPSV; 11 ♂♂, Sulawasi [sic] Tengah [recte: Selatan], Sampuraga, 10./11./12. V. 1994, No. 1125–1135, CPSV;

19 ♂♂, Sulawesi (C) [recte: Selatan], Mt. Sampuraga, 1400 m, 2,10'S/120,45'E [sic], 25.02.–30.03.[19]95, leg. SALK, CRBT;

7 ♂♂, ex ovo, 3. II./9. II./2× 13. II./9. III./11. III./1. IV. 1996, an Zierapfel [*Malus hilleri*, Rosaceae], Sulawesi Selatan, Tanah Toraja, Puncak Palopo, ca. 1300 m, Straße Rantepao-Palopo, CRLN;

2 ♂♂, Südsulawesi, 8/[19]95, CSKL; 6 ♂♂, Pulu Pulu, nördliches Torajaland, Grenze Süd- zu Zentral-Sulawesi, VII/[19]95, leg. TAJUDDIN, CSKL;

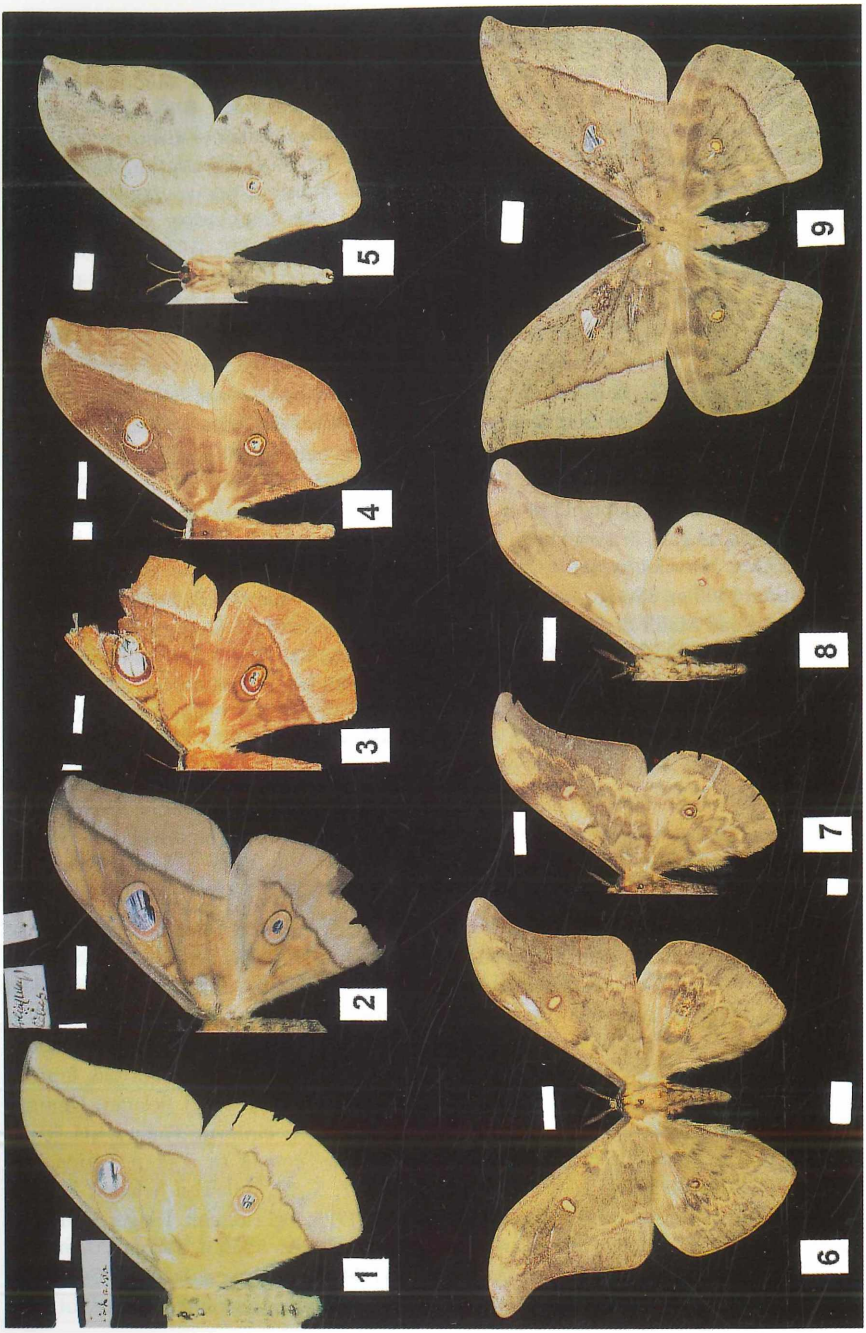
1 ♂, N.-Celebes [recte: Tengah], Palu, 15.9.1985, leg. KAGER, CSKN;

5 ♂♂, *Antheraea minahassae* NIEPELT ♂ (?), 27. August 1991, Batas, 1100 m, Mt. Tambusisi, Zentral-Sulawesi, leg. Bernard TURLIN, [and:] 1 GP No. 722/94 WNG,

CSNB; 13 ♂♂, Juni 1994, Puncak Palopo, 1200 m, Straße Rantepao-Palopo, Tana Toraja, Süd-Sulawesi, leg. BADEWI, CSNB; 6 ♂♂, 31. Juli 1994 an Quecksilberlampe, Puncak Palopo, 1200 m, Straße Rantepao-Palopo, Tana Toraja, Süd-Sulawesi, leg. GALA, CSNB; 7 ♂♂, 2. August 1994 an Quecksilberdampflampe, Gunung Sampuraga, ca. 1250 m, ca. 500 m Stichstraße zur Telecomstation, Batas (= Grenze) Süd-/Zentral-Sulawesi, leg. Stefan NAUMANN, CSNB; 24 ♂♂, S. Sulawesi, Mt. Sampuraga, 2.10'S./120.45'E. [sic], 1.–6. II. 1995, 1400 m, leg. SINJAEV & TARASOV, CSNB; 2 ♂♂, Z. Sulawesi, Kulawi, 1.26'S./120.00'E. [sic], 7.–8. II. 1995, 1000 m, leg. SINJAEV & TARASOV, CSNB; 1 ♂, S. Sulawesi, Puncak, Palopo, 2.55'S./120.05'E. [sic], 13.–14. II. 1995, 1000 m, leg. SINJAEV & TARASOV, CSNB; 8 ♂♂, Sulawesi Selatan, Tanah Toraja, Pulu Pulu, ca. 20 km NNW Rantepao, ca. 1800 m, Juli 1995, leg. Samsul ALAM & Abdulah HAKIM, CSNB; 5 ♂♂, Sulawesi Selatan, Puncak Palopo, ca. 1300 m, Juli 1995, leg. GALA, CSNB; 18 ♂♂, Sulawesi Selatan, Gunung Sampuraga, 1400 m, Juli 1995, leg. ALAM & HAKIM (?), CSNB; 2 ♂♂, Sulawesi Selatan, Tanah Toraja, Pulu Pulu, 1800 m, August 1995, leg. einheim. Fänger (via GALA), CSNB; 7 ♂♂, Sulawesi Selatan, Puncak Palopo-Telekomstation, 1300 m, August 1995, leg. einheim. Fänger, CSNB; 7 ♂♂, Sulawesi Selatan, Puncak Palopo, 1300 m, August 1995, leg. GALA, CSNB; 1 ♂, Sulawesi Selatan, Puncak Palopo, 1300 m, 19. Aug. 1995, leg. NAUMANN & AMIN, CSNB; 1 ♂, Sulawesi Tengah, Transsulawesi Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 20. Aug. 1995, leg. NAUMANN & AMIN, CSNB; 3 ♂♂, Sulawesi Selatan, Puncak Palopo-Telekomstation, 1300 m, 25.–31. August 1995, leg. einheim. Fänger, CSNB; 3 ♂♂, Sulawesi Selatan, Road Malili-Soroako km 23, 280 m, 30. August 1995, [2 specimens with collecting time] 03.50 & 04.05 h, leg. NAUMANN & AMIN, CSNB; 1 ♂, Zentral-Sulawesi (1), Straße Palu-Gimpu, Namo, 650 m, 21.–22. IX. 1995, leg. H. SCHNITZLER, CSNB; 3 ♂♂, Süd-Sulawesi (3), Straße Palopo-Rantepao, Puncak (Gipfel) Palopo, 1100 m, 25. IX. 1995, leg. H. SCHNITZLER, CSNB; 6 ♂♂, Süd-Sulawesi (4), Quarles Mts., ca. 30 km N Rantepao, Polo Polo, 2200 m, 26.–28. IX. 1995, leg. H. SCHNITZLER, CSNB;

1 ♂, [Sulawesi Selatan], Bantimurung, II-1994 (lg. CASTELEYN), CTBL; 10 ♂♂, Sulawesi C. [Sulawesi Selatan], Samplaga [Gn. Sampuraga; stock of Japanese dealers), 15-18-IV-1994 (J.-M. CADIOU), CTBL; 2 ♂♂, Sulawesi C. [Sulawesi Selatan], Pulu Pulu 2000 m or Puncak Palopo 700 m, IV-1994 (J.-M. CADIOU), CTBL;

1 ♂, Südsulawesi, 8/[19]95, ex CSKL, CUPW; 8 ♂♂, Sulawesi Selatan, Tanah Toraja, Pulu Pulu, ca. 20 km nnw Rantepao, ca. 1800 m, Juli 1995, leg. Samsul ALAM & Abdulah HAKIM, CUPW; 6 ♂♂, Sulawesi Selatan, Puncak Palopo, ca. 1300 m, Juli 1995, leg. Gala, CUPW; 33 ♂♂, Sulawesi Selatan, Gunung Sampuraga, 1400 m, Juli 1995, leg. ALAM & HAKIM (?), CUPW; 8 ♂♂, Sulawesi Selatan, Puncak Palopo-Telekomstation, 1300 m, August 1995, leg. einheim. Fänger, CUPW; 8 ♂♂, Sulawesi Selatan, Puncak Palopo, 1300 m, August 1995, leg. GALA, CUPW; 1 ♂, Sulawesi Selatan, Gunung Sampuraga-Telekomstation, 1400 m, August 1995, leg. einheim. Fänger, via GALA, CUPW; 1 ♂, Sulawesi Tengah, Transsulawesi Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 20. Aug. 1995, leg. NAUMANN & AMIN, CUPW; 5 ♂♂, Sulawesi Selatan, Puncak Palopo-Telekomstation, 1300 m, 25.–31. August 1995, leg. einheim. Fänger, CUPW; 2 ♂♂, Sulawesi Tengah, Transsulawesi Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 29. August 1995, leg. NAUMANN & AMIN, CUPW; 14 ♂♂, Sulawesi Selatan, Gn. Sampuraga, 1400 m, 1. XI., 2× 3. XI., 9× XI. 1995, 2× II. 1996, leg. einh. Fänger, CUPW;



60 ♂♂, Sulawesi Selatan, Pulu Pulu, 1800 m, 9× XI. 1995, 35× II. 1996, 16× III. 1996, leg. einh. Fänger, CUPW; 24 ♂♂, Sulawesi Selatan, Puncak Palopo, 1050 m, 4× XI. 1995, 2× II. 1996, 18× III. 1996, leg. GALA, CUPW;

2 ♂♂, [Sulawesi Selatan], Puncak, 27 km W. Palopo, 10.-19. v. 1984, 2°59′ südl. Br., 120°00′ östl. L., Bergwald (Sekundärwald), 1000-1200 m, Südhang, leg. A. SCHINTLMEISTER, [and:] GP no. 720 & 721 WNG, CWAN; 2 ♂♂, Zentral-Sulawesi (1), Straße Palu-Gimpu, Namo, 650 m, 21.-22. IX. 1995, leg. H. SCHNITZLER, CWAN; 4 ♂♂, Süd-Sulawesi (3), Straße Palopo-Rantepao, Puncak (Gipfel) Palopo, 1100 m, 25. IX. 1995, leg. H. SCHNITZLER, CWAN; 7 ♂♂, Süd-Sulawesi (4), Quarles Mts., ca. 30 km N Rantepao, Polo Polo, 2200 m, 26.-28. IX. 1995, leg. H. SCHNITZLER, CWAN; 25 ♂♂, Süd-Sulawesi, Straße Rantepao-Palopo, Puncak Palopo, 1050 m, II. 1996, leg. H. SCHNITZLER, CWAN.

Female paratypes, 44 ♀♀:

1 ♀, Menado, N. Celebes [no collecting data], ROTHSCHILD Bequest BM 1939-I, BMNH; 1 ♀, North Celebes [no collecting data], ROTHSCHILD Bequest BM 1939-I, BMNH; 1 ♀, Type J. H. W. [WATSON], *A. cordifolium* [sic], N. Celebes, LEVICK Bequest 1941-83, [and:] Type, [and:] *cordifolia* (WEY.), N. Celebes, [and:] recte *Anth.* "sp. 1", Holotype of *cordifolia* in Berlin, Germany, SN 1995, BMNH; 1 ♀, Sulawesi Utara, Dumoga-Bone N. P., site 7, 540 m, 9.-11. II. 1985, Tumpah Transect., leg. J. D. HOLLOWAY, [Project Wallace], BMNH; 1 ♀, Sulawesi Utara, Dumoga-Bone N. P., site 17, 1520 m, G. Poniki/Zebra, 12. VIII. 1985, leg. J. D. HOLLOWAY, [Project Wallace], BMNH; 2 ♀♀, Sulawesi Utara, Dumoga-Bone N.P., site 18, 1817 m, G. Poniki/summit, 13.-14. VIII. 1985, leg. J. D. HOLLOWAY, [Project Wallace], [and:] GP no. 636, BMNH; 1 ♀, Sulawesi Utara, Dumoga-Bone N. P., Oct. 1985, [and:] 'Clarke' Camp, lower montane forest, 1140 m, and: R. Ent. Soc. Lond. Project Wallace B. M. 1985-10, leg. HOLLOWAY, BMNH;

1 ♀, [Sulawesi Utara], Minahassa, [no collecting data], RMNH;

1 ♀, Celebes Noord, Minahassa, 1919, *Anth. rumphi* [sic] ♀, coll. v. D. BERGH, ZMA; 1 ♀, Bolaang Mongondow, Nord Celebes, [no collecting data] *A. cordifolia, A. rumphi* [sic], coll. v. D. BERGH, ZMA; 1 ♀, Tanggari bij Tondano, [N.] Celebes, Juni [19]31, P. RADEMAKERS, coll. Pastor MUNSTERS, ZMA; all these specimens in ZMA, Box *Antheraea* 7, with heading: "*Antheraea* ♂♀ *fickei* WEYM. Det. TOX. [TOXOPEUS, handwritten] 1948";

Colour Plate 4

Figs. 1–5: *Antheraea (Antheraea) paukstadtorum* n. sp., ♀ paratypes, **Figs. 1–4,** uppersides, **Fig. 5,** underside. **Fig. 1:** Minahasa, Sulawesi Utara, ZMA. **Fig. 2:** Sulawesi Utara, BMNH. **Fig. 3:** Puncak Palopo, Sulawesi Selatan, CSNB. **Fig. 4:** Puncak Palopo, Sulawesi Selatan, CSNB. **Fig. 5:** Puncak Palopo, Sulawesi Selatan, CSNB. **Figs. 6–8:** *Antheraea (Antheraea) taripaensis* n. sp., ♂ paratypes, **Figs. 6–7,** uppersides, **Fig. 8,** underside. **Fig. 6:** Taripa, Sulawesi Tengah, CSNB. **Fig. 7:** Taripa, Sulawesi Tengah, CSNB. **Fig. 8:** Taripa, Sulawesi Tengah, CSNB. **Fig. 9:** *Antheraea (Antheraea)* sp. indet. (unclear status), ♀. Puncak Palopo, Sulawesi Selatan, CSNB. — Scale bars 1 cm.

1 ♀, [Sulawesi Utara], Minahassa, [18]86, PLAT., [and:] coll. STAUDINGER, ZMHU;

1 ♀, Sulawasi [sic] Tengah [recte: Selatan], Sampuraga, 12.05.1994, No. 1136, CPSV;

1 ♀, ex ovo 20. III. 1996, an Zierapfel [*Malus hilleri*], Sulawesi Selatan, Tanah Toraja, ca. 1300 m, Straße Rantepao-Palopo, CRLN;

2 ♀♀, Sulawesi (C)[recte: Selatan], Gn. Sampuraga, 1400 m, 2.10'S/120.45'E [sic], 25.02.-30.03. [19]95, leg. SALK, CRBT;

1 ♀, Juni 1994, Puncak Palopo, 1200 m, Straße Rantepao-Palopo, Tana Toraja, Süd-Sulawesi, leg. BADEWI, CSNB; 3 ♀♀, Sulawesi Selatan, Gunung Sampuraga, 1400 m, Juli 1995, leg. ALAM & HAKIM (?), CSNB; 1 ♀, Sulawesi Selatan, Puncak Palopo-Telekomstation, 1300 m, August 1995, leg. einheim. Fänger, CSNB; 1 ♀, Sulawesi Selatan, Puncak Palopo, 1300 m, August 1995, leg. GALA, CSNB; 3 ♀, Sulawesi Selatan, Puncak Palopo-Telekomstation, 1300 m, 25.-31. August 1995, leg. einh. Fänger, CSNB;

2 ♀♀, Sulawesi Selatan, Gunung Sampuraga, 1400 m, Juli 1995, leg. ALAM & HAKIM (?), CUPW; 2 ♀, Sulawesi Selatan, Puncak Palopo, 1300 m, August 1995, leg. GALA, CUPW; 1 ♀, Sulawesi Selatan, Gunung Sampuraga-Telekomstation, 1400 m, August 1995, leg. einheim. Fänger, via GALA, CUPW; 6 ♀♀, Sulawesi Selatan, Pulu Pulu, 1800 m, 10. XI., 11. XI., XI. 1995, II. 1996, 2× III. 1996, leg. einh. Fänger, CUPW; 2 ♀♀, Sulawesi Selatan, Gn. Sampuraga, 1400 m, XI. 1995, leg. einh. Fänger, CUPW; 2 ♀♀, Sulawesi Selatan, Puncak Palopo, 1050 m, III. 1996, leg. GALA, CUPW;

1 ♀, Süd-Sulawesi (3), Straße Palopo–Rantepao, Puncak (Gipfel) Palopo, 1100 m, 25. IX. 1995, leg. H. SCHNITZLER, CWAN; 2 ♀♀, Sulawesi Selatan, Gng. Sampuraga und Umgebung, leg. einh. Sammler, via H. SCHNITZLER, CWAN.

Description

♂♂ (Pl. 1, Figs. 3 & 6, paratypes; Pl. 3, Figs. 1-8, upperside paratypes, Figs. 9 & 10, underside paratypes): Antennae ochreous, 10-12 mm long, 5 mm broad. Costae connected by a whitish grey band across prothorax; rest of thorax and abdomen of ground colour. Lfw: 60.0 mm (n = 80, maximum 68 mm, minimum 52 mm). One of the most variable species of *Antheraea,* ground colour ranging from yellow, ochreous, pure orange, orange or reddish brown to dark brown or olive and in any combination of these colours. Typical pattern characteristics include the dark oblique band from fw base along eyespot to the postmedian line or even into postmedian area in most specimens (similar to the stripe in *A. cordifolia*), a lighter, mostly, at least basally, yellow or orange coloured discal cell from the base of the longitudinal stripe to the eyespot; a greyish brown antemedian line; a reddish or orange brown (in dark brown specimens darker brown), more or less crenulate postocellular line with associated greyish shadow distally; postmedian line more or less crenulate dark greyish brown with pinkish white shadows in the postmedian area (in

yellow, brown and some of the olive specimens these shadows sometimes faded). Postmedian area generally with more or less grey or olive scales in between the ground colour, the fw apex not as strongly curved back and falcate as in *A. minahassae,* but not as round as in *A. cordifolia,* generally paler than ground colour, often with greyish scales, costally suffused with white, black and violet scales. Costa whitish grey, outer margin of fw with yellow scales. Fw eyespots variable, from lenticular with maximum diameter of 3.5 mm and without hyaline area to pyriform or round eyespots with maximum diameter of 7.0 mm and hyaline central part, proximally always ringed dark grey, whitish blue and orange or reddish brown, distally dark grey, yellow part sometimes missing, and reddish brown. Hw in same ground colour as fw, with antemedian, postocellular and associated line as in fw, but the postmedian band often interrupted at wing venation and more diffuse than in fw, and outer margin again with yellow or orange scales and often proximal with dark shadow. Hw eyespot nearly round, with same colour as in fw but broader whitish blue part. Underside paler, coloured brown or grey with a lot of white scales, basally often suffused with pinkish hairs; only slightly visible, crenulate antemedian and associated line, postocellular line darker reddish brown; Postmedian line visible only as row of blackish or violet dots with whitish shadow distally, in the fw apex and on the upper edge of the hw ending in a black dot. Postmedian area with broad darker margin. Eyespots ringed broad whitish and only little reddish brown.

♂ **genitalia** (b&w figs. 5, 9e): A bit smaller and less sclerotized than those of *A. minahassae.* The tube of juxta/vinculum is significantly narrower than in *minahassae;* the aedeagus is slightly bent. There are some differences in details of the shape of the valves (the ventral lobe of the valves is narrower, more elongate than in *A. minahassae*) and of the labides (i.e., the dorsolateral processes of the transtilla), but in general the differences in male genitalia between *A. minahassae, paukstadtorum, taripaensis* and *viridiscura* are minor.

♀♀ (Pl. 4, Figs. 1-4, upperside paratypes, Fig. 5, underside paratype): Antennae ca. 11 mm long, 1.2-1.7 mm broad; lfw 65.2 mm (n = 18, maximum 75 mm, minimum 56 mm). The ground colour is not as variable as in males, it ranges from yellow or orange to reddish and dark brown with less intense pattern: In fw only dark antemedian line, less crenulate postocellular line with only a weak dark shadow in some specimens; postmedian line straight, 1-2 mm broad, dark grey, apically ending in a broader

blackish field with pinkish-white suffusion distally. Distal from this line a broad white to pinkish shadow, more or less dentate between wing veins, rest of postmedian area in ground colour. Fw apex nearly rectangular. Eyespots medium or large, 8 to 19 mm in maximum diameter, round to ellipsoid, with same coloration as in ♂♂, central part divided into two fenestrae, often with a central constriction of the hyaline centre so that the fenestra becomes eight- or heart-shaped as in *A. cordifolia*. Hw with same colour and pattern, but associated line of postmedian stronger than in fw. Eyespots round or ellipsoid and larger than in ♂♂, with 4.5 to 10 mm in maximum diameter. Underside again suffused with a lot of whitish scales and distally the pattern with more dark greyish or black parts than in ♂♂. Eyespots ringed white and reddish brown, on the hw an additional inner thin yellow ring beneath hyaline part.

Preimaginal morphology: The first larval instars are illustrated in NAUMANN (1995). A more detailed description will follow soon (NAUMANN, PAUKSTADT & PAUKSTADT, in preparation). The larvae largely resemble those of other species of the *paphia/frithi*-group in coloration and pattern (PINRATANA & LAMPE 1990, NAUMANN 1994, NÄSSIG et al. 1996 b), but show some small, club-shaped reddish hairs.

Etymology: *A. paukstadtorum* n. sp. is named in honour of our friends Ulrich and Laela Hayati PAUKSTADT, Wilhelmshaven, Germany, both specialists on the Saturniidae fauna of Indonesia.

Discussion: It is very surprising that this, at least in recent decades, most common *Antheraea* species from Sulawesi was not recognized as new earlier. Some of the paratypes are specimens which were collected in the 19th century. This is very different from the situation for the recently described *A. rosemariae* HOLLOWAY et al., 1995, of which the first known specimen was collected only in 1980. The reasons for this are probably the following:

- *A. paukstadtorum* is a member of a group of species with very similar characteristics (see above);
- most of the earlier descriptions did not illustrate the specimens; and
- there was much confusion due to the fact that WEYMER gave two names for one species (*A. cordifolia*), one for each sex.
- Further, no single early collection contained a series of this species big enough to recognize that the extreme morphs belong to the same

species. These extremes were determined as different species because nobody expected the huge variability of *A. paukstadtorum*. Consequently, specimens of *A. paukstadtorum* often are found under names like "*cordifolia*?", "*A. moultoni*", "*A. fickey*" [sic], "*rumphi celebensis*" and "*A. minahassae*" in collections (see list of paratypes).

Only in two publications was this species correctly recognised as distinct: HOLLOWAY (1987) suggested it might be *A. fickei*, and NAUMANN (1995) cited it as an undescribed "*A.* spec. nov. 1". After examination of longer series (the paratype series: 458 ♂♂ and 44 ♀♀) we found all transitional stages between the extremes of the different colour forms with no differences in genitalia structures. Consequently, we interprete all these forms as being conspecific.

A. paukstadtorum is known from all parts of Sulawesi plus the close southeastern island Pulau Kabaena at elevations from 540 to 2200 m (see map, b&w fig. 1). Observed flight activity covers all months except January (perhaps an artifact?); in August 1995 ♂♂ were found at light between 03.10 and 04.35 h local time only (at all other collecting dates the arrival times at light were not recorded).

Differences to the other species of this group of closely related species are the following:

- *A. paukstadtorum* has smaller lfw, on average a little more falcate fw apex, smaller antennae and different eyespots than *A. cordifolia*. In ♂ specimens there are also differences in genitalia structures and a different colour variability. Females of *A. cordifolia* have much broader antennae and are less variable.
- *A. taripaensis* and *A. viridiscura* are even smaller species which are each confined to a small area and the specific altitudes of their biotopes. *A. taripaensis*, which at least is similar to some olive variations of *A. paukstadtorum*, shows flight activity of male specimens before 01.00 h at night.
- Differences to *A. minahassae* are the pale orange colour, smaller antennae, and the very falcate and recurved fw apex of this species, and in the genitalia structures.
- *A. celebensis* is totally different in wing shape, form and size of eyespots and some pattern characteristics as well as in the size of the genitalia.

B&W Fig. 1, map: Known distribution of the three new *Antheraea* species and the unidentified ♀ form in Sulawesi. — Scale bar 100 km. Map by S. NAUMANN. ● *Antheraea paukstadtorum* n. sp., ▲ *Antheraea taripaensis* n. sp., ✸ *Antheraea viridiscura* n. sp., □ *Antheraea* sp. ♀ of unclear identity.

Antheraea (Antheraea) taripaensis NAUMANN, NÄSSIG & HOLLOWAY n. sp.

Antheraea spec. nov. 2 [undescribed species]: NAUMANN (1995: 63)

Holotype: ♂, Indonesia, Sulawesi Tengah, Transsulawesi, Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 20. Aug. 1995, leg. NAUMANN & AMIN, ex CSNB, in MZB.

Paratypes (all specimens from Indonesia, Sulawesi): 25 ♂♂

4 ♂♂, 4. August 1994 an Quecksilberdampflampe, Pompangeo Mts., ca. 700 m, Straße Pendolo-Tentena, ca. 2 km nördl. Taripa, Zentral Sulawesi, leg. Stefan NAUMANN, [and:] GP no. 932 & 933/95 WNG, CSNB; 1 ♂, Sulawesi Tengah, Transsulawesi Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 20. August 1995, 22.30 h, leg. NAUMANN & AMIN, CSNB; 3 ♂♂, Sulawesi Tengah, Transsulawesi Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 29. August 1995, [1 specimen with collecting time] 0.00 h, leg. NAUMANN & AMIN, CSNB; 1 ♂ Sulawesi Selatan, Road Malili-Soroako km 23, 280 m, 30. August 1995, leg. Naumann & Amin, [and:] GP no. 935/95 WNG, CSNB; 5 ♂♂, Zentral-Sulawesi (2), Straße Tentena-Taripa, Pompangeo Mts., ca. 5 km N Taripa, 700 m, 24. IX. 1995, leg. H. SCHNITZLER, CSNB;

2 ♂♂, Sulawesi Tengah, Transsulawesi Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 20. August 1995, leg. NAUMANN & AMIN, CUPW; 4 ♂♂, Sulawesi Tengah, Transsulawesi Taripa-Tentena, ca. 5 km n. Taripa, 700 m, 29. August 1995, leg. NAUMANN & AMIN, CUPW;

5 ♂♂, Zentral-Sulawesi (2), Straße Tentena-Taripa, Pompangeo Mts., ca. 5 km N Taripa, 700 m, 24. IX. 1995, leg. H. SCHNITZLER, CWAN.

Description

♂♂ (Pl. 4, Figs. 6 & 7, upperside paratypes; Fig. 8, underside paratype): Antennae light brown, 9 mm long, 4 mm broad. Thorax frontally and ventrally grey, otherwise lighter ground colour; lfw 52.7 mm (n = 20, maximum 55 mm, minimum 50 mm). All specimens in the same greyish-olive ground colour, but with variable portions of the *frithi*-typical pattern in creamy-yellowish: an extremly coloured specimen shows only some yellow parts basally in discal cell of fw. At the other extreme are specimens with a lot of yellow areas: the discal cell of fw totally yellow from base to eyespots, continued along the grey costa into the apical end of the crenulate postmedian line. Also yellow are the basal parts of the antemedian line and shadows of a postocellular line. On hw yellowish in antemedian, median and basal parts of postmedian area with olive grey crenulate ante- and postmedian band and marginal area. Outer margin of both fw and hw orange. Most specimens show variability of the yellow parts in between these two extremes, often the olive-greyish parts suffus-

ed with yellow scales. The falcate and relatively pointed fw apex suffused with white and pinkish scales. Fw eyespots oval, ringed grey and reddish-brown, often suffused with white scales, the inner part mostly with yellow scales, only in some specimens with small hyaline parts. Hw eyespots round, narrower ringed grey, yellow, reddish-brown with yellow and sometimes small hyaline inner part. Fw and hw underside basal of the median band in ground colour (the proportion of the yellowish and dark colour is mostly similar to the proportion of these on the upperside), distal of this brighter with greyish and violet scales. Dark grey area in fw apex and in a dot on the upper margin of hw. Eyespots without grey ring outside.

♂ genitalia (b&w figs. 6, 9f, 9g): Overall size slightly smaller than *A. paukstadtorum*. The "grip" for the aedeagus retractor muscles (coecum penis) is slightly more strongly bent downward than in any other species including *A. minahassae*. The bristles on top of the dorsal valve branch (usually 3-4) slightly bent.

♀♀, preimaginal morphology: Unknown.

Etymology: *A. taripaensis* is named after the collecting locality of the holotype and most other specimens.

Discussion: *A. taripaensis* shares typical elements of the *paphia/frithi*-goup in genitalia structures and pattern. It is the only species besides *A. viridiscura*, described next, where yellow scales are dominant over the hyaline area of the eyespots, but shows clear differences in size, coloration and habitat to the latter.

The following species of the *paphia/frithi*-group are known to occur sympatrically in the same localities:

- *A. cordifolia*, which is much bigger, differently coloured, with more rounded fw apex and differences in genitalia morphology;
- *A. minahassae*, which shares similarities in size and form of wings, but has a different coloration, genitalia structures and smaller antennae;
- *A. paukstadtorum* shows a broader colour variability, but never this oliv-greyish morph with yellow pattern, and is on average slightly larger. There are further differences in genitalia morphology and in the time of male flight activity: ♂♂ of *A. taripaensis* were observed between 20.00 and 01.00 h, whereas ♂♂ of *A. paukstadtorum* showed activity only after 03.00 h.

A. taripaensis is known only from two nearby places in lowland rain forest of Central and South Sulawesi (280 and 700 m; see map, b&w fig. 1). There are no records from the well explored areas around Puncak Palopo, Gn. Sampuraga or from northern Sulawesi where most other material was collected. Like *A. viridiscura, A. taripaensis* could be a species adapted to a special biotope.

Antheraea (Antheraea) viridiscura Holloway, Nässig & Naumann n. sp.

Antheraea spec. nov. 3 [undescribed]: Naumann 1995: 65.

Holotype: ♂, Indonesia, Sulawesi Utara, Dumoga-Bone N.P., 21 March 1985, Camp 1440 m, at MV light, leg. M. G. Allen & T. Harman [Project Wallace], ex BMNH in MZB.

Paratypes (all specimens from Indonesia, Sulawesi): 16 ♂♂

3 ♂♂, Sulawesi Utara, Dumoga-Bone N. P., site 14, 1440 m, medium *Casuarina* for., 7.-8. iii. 1985, leg. J. D. Holloway, [Project Wallace], [and:] 1 GP no. 634 BMNH, BMNH; 1 ♂, Sulawesi Utara, Dumoga-Bone N.P., Camp 1440 m, 21. March 1985, leg. T. Harman & [M. G.] Allen, [Project Wallace], BMNH; 2 ♂♂, Sulawesi Utara, Minahasa, Sept. 1985, [and:] Gunung Muajat summit, 1760 m, 7.-9. ix. 1985, leg. Robinson, [and:] R. Ent. Soc. Lond. Project Wallace B.M. 1985-10, BMNH; 6 ♂♂, Sulawesi Utara, Dumoga-Bone N. P., Oct. 1985, [and:] 'Clarke' Camp, lower montane forest, 1140 m, and: R. Ent. Soc. Lond. Project Wallace B.M. 1985-10, leg. Robinson, BMNH;

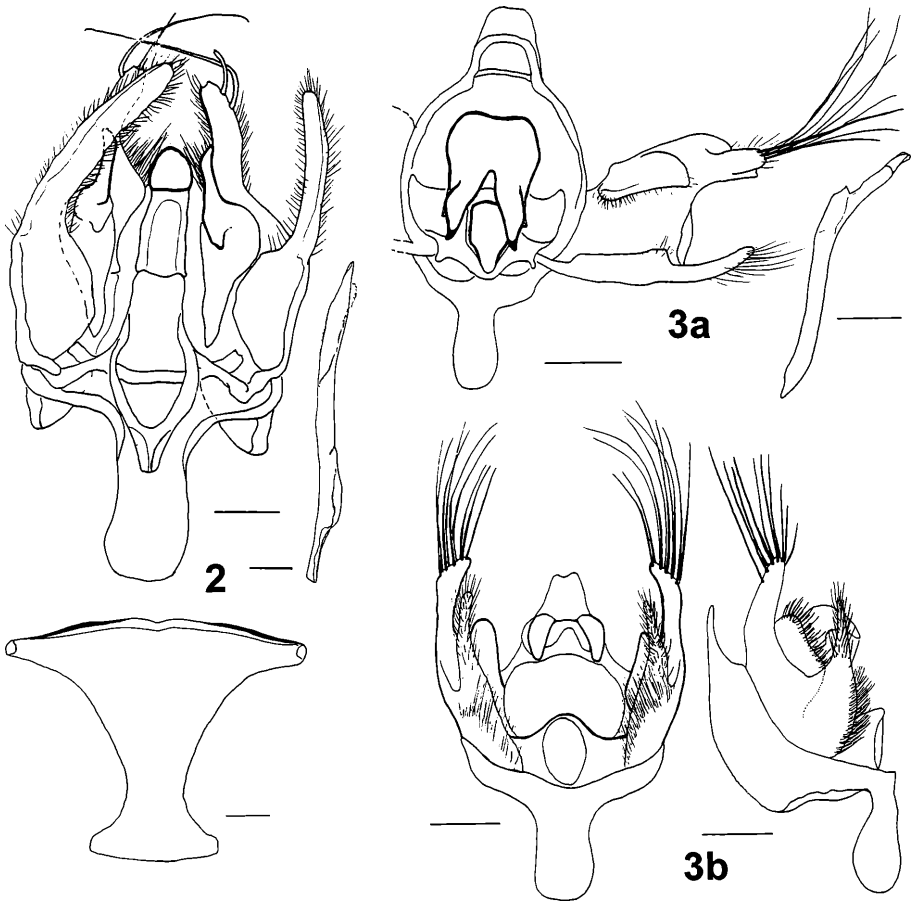
1 ♂, Sulawesi Utara, Dumoga-Bone N.P., Ice Station Zebra (1570 m), 3. xi. 1985, Station 081, [and:] Project Wallace, leg. R. Rosmans & J. van Stalle, IG N° 26977, IRB;

2 ♂♂, Dumoga-Bone N.P., Clark's Camp, 1000-1140 m, 0°37'N 123°51'E, multistr. evergreen forest, monsoon forest, [and:] RMNH-Project Wallace, N Sulawesi, 9.-15. v. 1985 at light, leg. R. de Jong, RMNH;

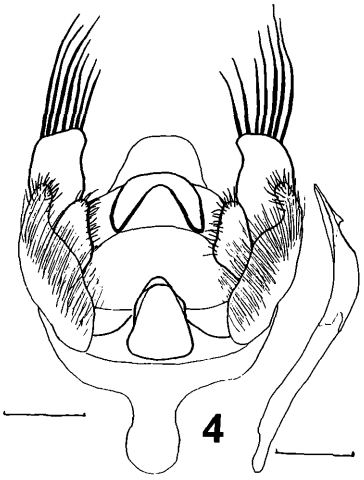
1 ♂, Sulawesi Utara, [and:] Danau Moaat, E. of Kotomobagu, 1080 m, 4.-6. x. 1985, leg. M. R. de Jong, [and:] gardens PPA resthouse at light, [and:] GP no. 847/95 wng, ZMA.

Description

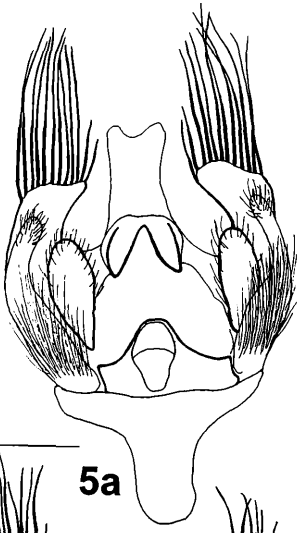
♂♂ (Pl. 1, Fig. 4, holotype; Pl. 2, Fig. 12, paratype): Antennae 7.5 to 8 mm long; lfw 46.8 mm (n = 16, maximum 50 mm, minimum 43 mm). The smallest of the Sulawesi *Antheraea* species (and probably the smallest *Antheraea* species world-wide, often slightly smaller than *A. rosieri* (Toxopeus, 1940)). Dark greenish-olive to reddish-olive brown specimens are typical, with strongly crenulate fasciae, particularly on the hw where the



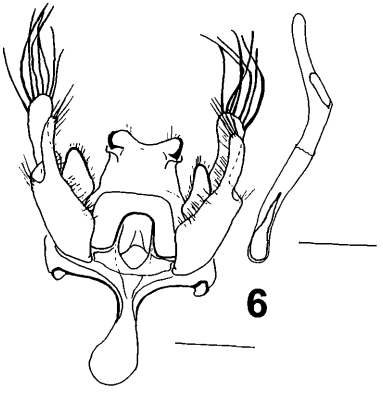
B&W Figs. 2–8: ♂ genitalia of *Antheraea* species. Different scales, scale bars 1 mm. All drawings by J. KLEIN, Würzburg. **Fig. 2:** *A. celebensis,* GP 934/95 WNG, ventral view, aedeagus in ± lateral view; sclerotized "hood" of the 8th tergite, caudal end: bottom. **Fig. 3:** *A. cordifolia,* **3a:** GP 936/95 WNG, valve opened, ventral view, aedeagus in lateral view; **3b:** GP BMNH Sat. 633, ventral and lateral view. **Fig. 4:** *A. minahassae,* GP BMNH Sat. 632, ventral view, aedeagus lateral view. **Fig. 5:** *A. paukstadtorum,* **5a:** GP 722/94 WNG, ventral view; **5b:** GP BMNH Sat. 635, ventral view (including aedeagus). **Fig. 6:** *A. taripaensis,* GP 932/95 WNG, ventral view, aedeagus lateral view. **Fig. 7:** *A. viridiscura,* GP BMNH Sat. 634, ventral view, aedeagus lateral view. — **Fig. 8:** *A. rosieri,* GP 566/87 WNG, West Malaysia, for comparison. Shape and proportions distinctly different from the Sulawesian species (compare figs. 3–7). The extreme prolongation of the ventral part of the juxta/vinculum tube of *A. rosieri* is well illustrated in HOLLOWAY (1987: fig. 133).



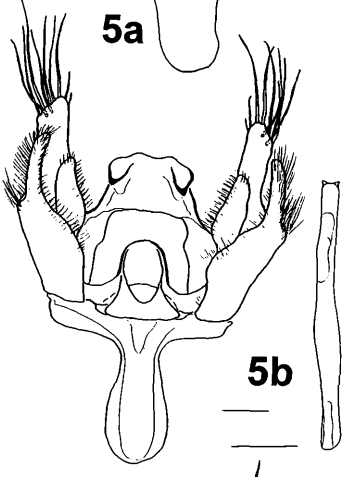
4



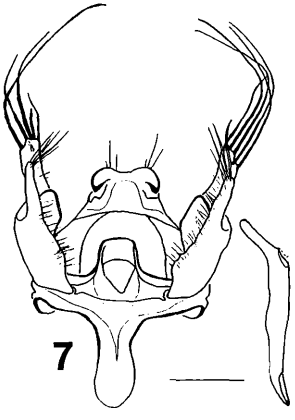
5a



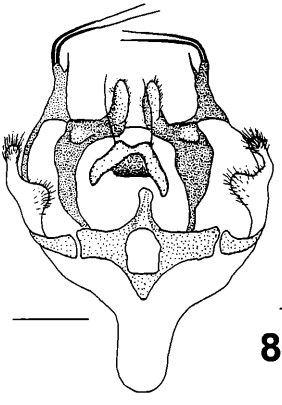
6



5b



7



8

fasciae are picked out by a yellowish or orange highlight to the ground colour in between, and basally on the fw between base and eyespot. The fw apex is strongly pointed, slightly suffused with violet. The fw eyespot is diagnostically triangular in most specimens, diffusely ringed with dark brown, and the hyaline area suffused with more or less yellowish scales, in some specimens without hyaline part at all. The hw eyespot is much smaller, more clearly encircled with dark brown, yellow and brown concentric rings, the hyaline area again most often covered with yellow scales. A variant (2 specimens) occurs with reduced eyespots, that of the fw reniform, totally filled with yellow scales, and that of the hw also narrowed. In one specimen the fw eyespot is indicated only by a brown dot. The underside is a darker, paler greyish brown, but with same pattern as on the upperside. The more basal fasciae are more clearly delimited here by pale greyish ground colour.

♂ **genitalia** (b&w figs. 7, 9h): The smallest genitalia in the group; the branches of the valves, especially the dorsal ones, are widely expanded, in shape somehow resembling the much larger *A. cordifolia*. In spite of the small size, the bristles (ca. 2-3) on top of the dorsal branch of the valves are usually bent. Aedeagus short, coecum penis bent, similar to the three preceding species. Juxta/vinculum tube slightly shorter, ending more rectangularly than in *A. taripaensis*. Seen all together, the genitalia of *A. minahassae, A. paukstadtorum, A. taripaensis* and *A. viridiscura* are very similar.

♀♀, **preimaginal morphology:** Unknown.

Etymology: The name reflects the darkly shaded green facies.

Discussion: The records of this species are all from the Dumoga-Bone National Park and adjacent areas in Northern Sulawesi during "Project Wallace" in 1985 (see map, b&w fig. 1). Further research should be conducted, especially further westward, to assess the boundary between this species and *A. taripaensis*. These two species may well be sister-species. Both species are the only *Antheraea* with yellow scales covering most or all of the hyaline area of their eyespots, and also both are the smallest species in Sulawesi.

A. viridiscura occurs with *A. cordifolia, A. minahassae* and *A. paukstadtorum*, all of which are easily distinguishable from it by size, colour and pattern.

Antheraea species ♀, unclear status

Antheraea species ♀ unklarer Zugehörigkeit: NAUMANN (1995: 70); see discussion

Material studied: 2 ♀♀, Project Wallace, Oct. 1985, leg. ROBINSON, BMNH; 1 ♀, Sulawesi Utara, Dumoga-Bone N.P., RMNH-Project Wallace, 1140 m, May 1985, leg. R. DE JONG, RMNH; 1 ♀, Sulawesi Tengah, Ramo Ramo, Lore Lindu N.P., NE Gimpu, 1600 m, March 1985, leg. J. P. & M. J. DUFFELS, RMNH; 1 ♀, Sulawesi Tenggara, Gn. Watowila, 1250 m, leg. R. DE JONG & HUISMAN, RMNH; 1 ♀, NE Kolaka, 3° 49' S, 121° 40' E, 1100 m, Nov. 1989, leg. DUFFELS, ZMA; 2 ♀♀, Sulawesi Selatan, Gn. Sampuraga, 2° 10' S, 120° 45' E [sic], Feb./March 1995, leg. SALK, CRBT; 3 ♀♀, Puncak Palopo, 1200 m, 2× July 1994, Aug. 1995, leg. GALA, CSNB; 2 ♀♀, Sulawesi Selatan, Puncak Palopo, Telekomstation, 1300 m, Aug. 1995, 25.-31. Aug. 1995, leg. einh. Fänger, CUPW; 1 ♀, Sulawesi Selatan, Puncak Palopo, 1050 m, Dec. 1995, leg. GALA, CUPW; 1 ♀, Süd-Sulawesi, Straße Rantepao-Palopo, Puncak Palopo, 1050 m, Feb. 1996, leg. H. SCHNITZLER, CWAN.

Description

♂♂: Unknown.

♀♀ (Pl. 4, fig. 9): lfw 60.9 mm (n = 7, maximum 67 mm, minimum 57 mm). Ground colour is a medium to pale dull olivaceous grey-brown with reduced pale ochreous *frithi*-pattern. Straight or a little crenulate, violet and pinkish postmedian band on fw and hw. Outer margin yellow-orange. The fw eyespot in most specimens shows lambda-form, rarely is rounded triangular with dark violet and yellow circulation around hyaline area, the hw eyespot small, triangular or drop-shaped, with dark grey, yellow, violet rings, the hyaline part with yellow scales with small central fenestra in some specimens. On the underside brighter colours with same pattern.

Preimaginal morphology: Unknown.

Discussion: During the last decade, females of this type have been collected in all parts of Sulawesi without particular concentration anywhere (see map, b&w fig. 1). They have been recorded in March, May, July, August, October and November at elevations from ca. 1100 to 1600 m.

Presently, the specimens cannot be associated with any other taxon with certainty. There are similarities to *A. taripaensis* and *A. viridiscura*, such as the yellow scales in the eyespots, the pattern and colour, but ♂♂ of these two species are known from very limited, localized areas only. If

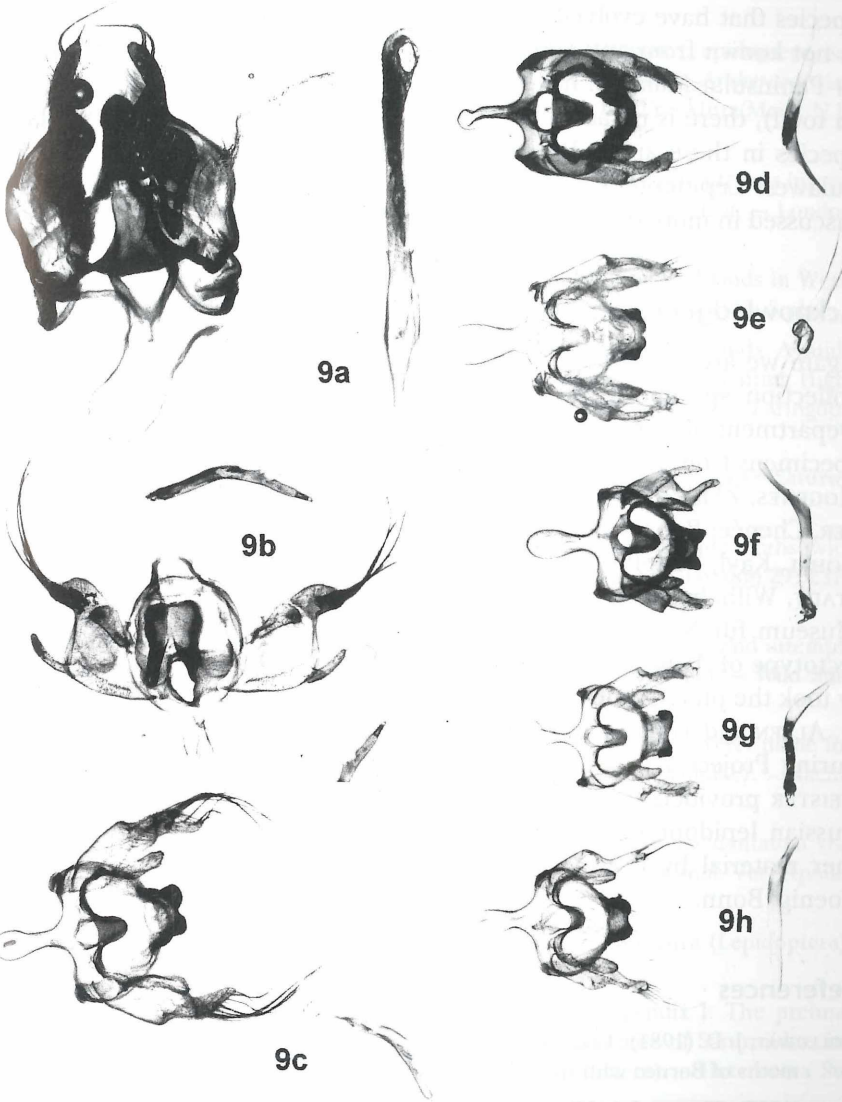
they are, in fact, the females of these taxa, then perhaps other taxa in the complex will be found elsewhere in the island. From the size of the antennae the specimens could be interpreted as a colour form of *A. minahassae* ♀, but this species also occurs at lower elevations as well. Furtheron, it could be an olive-grey morph of *A. paukstadtorum,* but other females of this species normally have round-shaped eyespots and never yellow scales in the center of these. Females of *A. cordifolia* are clearly characterized by their broader antennae.

A clarification of the taxonomic status probably can best be gained by rearing from eggs from such females. Here (following NAUMANN 1995) we treat these specimens as of unclear status.

Conclusive discussion

Together with *Antheraea (Antheraea) rosemariae* HOLLOWAY, NÄSSIG & NAUMANN, 1995, the species of the *helferi*-group described in part 1 of the present publication, seven species of the genus *Antheraea* are known to be indigenous to Sulawesi. In addition, one record of a probably introduced specimen of an eighth species and one ♀-form of unclear identity are known. Five of these seven indigenous species are endemic to Sulawesi and belong to an evidently closely related group of taxa within the *paphia/frithi*-group: *A. paukstadtorum, A. taripaensis, A. viridiscura, A. cordifolia* and *A. minahassae.* The sixth member of the *paphia/frithi*-group, *A. celebensis,* has close relatives in Sundaland and S. Maluku (Ambon, Seram, Buru) of unclear status and thus may also be present outside the island of Sulawesi. *A. rosemariae* is the sixth clear Sulawesian endemic, with close relatives on the Philippines, S. Maluku (Seram), and in Sundaland. The subgenus *Antheraea (Antheraeopsis),* known from Sundaland, the Philippines and further north, has not been recorded from Sulawesi.

When we (JDH & WAN) found the first specimens of *A. viridiscura* and recognized them as being undescribed, we expected this species to be a close relative of the Sundanian species *A. (A.) rosieri,* due to the similar ground coloration and dead-leaf mimicry as well as the shape and coloration of the eyespots. But when dissecting the species, we found that the ♂ genitalia morphology of *A. rosieri* (see b&w fig. 8) is distinct from that of these Sulawesian endemics, which may perhaps best be called "*cordifolia*-subgroup" after the earliest described member.



B&W fig. 9: ♂ genitalia of Sulawesi *Antheraea,* photographs (taken from NAUMANN 1995). All genitalia are to the same scale for size comparison. Photographs W. NÄSSIG. **Fig. 9a:** *A. celebensis,* GP 934/95 WNG; aedeagus in ± dorsoventral view. **Fig. 9b:** *A. cordifolia,* GP 936/95 WNG. **Fig. 9c:** *A. cordifolia,* GP 937/95 WNG. **Fig. 9d:** *A. minahassae,* GP 928/95 WNG. **Fig. 9e:** *A. paukstadtorum,* GP BMNH Sat. 635. **Fig. 9f:** *A. taripaensis,* GP 933/95 WNG. **Fig. 9g:** *A. taripaensis,* GP 932/95 WNG. **Fig. 9h:** *A. viridiscura,* GP BMNH Sat. 634.

It is remarkable in the Saturniidae that there is a group of five endemic species that have evolved within the island of Sulawesi. Such a situation is not known from any other South-East Asiatic island. Although Borneo or Peninsular Malaysia have more *Antheraea* species than Sulawesi (nine in total), there is no actively speciating group of so many closely related species in these areas. However, such speciation is seen in many other Sulawesi Lepidoptera groups where it is lacking in Sundaland. This is discussed in more detail by HOLLOWAY (1991).

Acknowledgements

Again we are grateful to the entomologists who gave us access to their collection, specimens and data: the staff of the Lepidoptera section of the Department of Entomology of the BMNH, London, who also made some specimens from the IRB available; Rienk DE JONG, RMNH, Leiden; Willem HOGENES, ZMA, Amsterdam; Wolfram MEY, ZMHU, Berlin; Thierry BOUYER, Chenée; Ronald BRECHLIN, Tegernsee; Stefan KAGER, Nürnberg; Steve KOHLL, Kayl; Rudolf E. J. LAMPE, Nürnberg; Ulrich and Laela Hayati PAUKSTADT, Wilhelmshaven; Pierre SCHMIT, Videlles. Kurt SANDEBECK from the Museum für Naturkunde, Freiburg i. Br., located and photographed the lectotype of *A. fickei* in the museum's collection. Bernard D'ABRERA kindly took the photograph for plate 1 with specimens of BMNH. Col. Michael G. ALLEN and Tony HARMAN made particular efforts to collect Saturniidae during Project Wallace on the Minahasa Peninsula. Alexander SCHINTLMEISTER provided support for obtaining Sulawesi saturniids collected by Russian lepidopterologists, and also Hermann SCHNITZLER provided further material by the mediation of Dieter STÜNING, Museum Alexander Koenig, Bonn.

References

HOLLOWAY, J. D. (1981): Taxonomic appendix. – *In:* ALLEN, M. G. (1981): The saturniid moths of Borneo with special reference to Brunei. – Brunei Mus. J. 5: 121-126.

—— (1987): The moths of Borneo, part 3, Lasiocampidae, Eupterotidae, Bombycidae, Brahmaeidae, Saturniidae, Sphingidae. – Kuala Lumpur (Southdene), 199 pp., 163 figs., 20 col. pls.

—— (1991): Patterns of moth speciation in the Indo-Australian archipelago. – *In:* DUDLEY, E. C. (ed.), The unity of evolutionary biology (Proceedings of IVth Inter-

national Congress of Systematic and Evolutionary Biology), pp. 340-363. – Portland (Oregon) (Dioscorides Press).

——, NÄSSIG, W. A., & NAUMANN, S. (1995): The *Antheraea* HÜBNER (Lepidoptera: Saturniidae) of Sulawesi, with descriptions of new species. Part 1: *Antheraea (Antheraea) rosemariae* n. sp. – Nachr. entomol. Ver. Apollo, Frankfurt/Main, N.F. **16** (2/3): 297-308.

HORSFIELD, T., & MOORE, F. (1858/59 [1860?]): A catalogue of the lepidopterous insects in the Museum of Natural History at the East-India House, vol. II. – London (Allen), 440 pp.

LAMPE, R. E. J. (1984): Die Saturniiden der Cameron- und Genting-Highlands in West-Malaysia (Lepidoptera. Saturniidae). – Neue Entomol. Nachr. **11**: 2-15, 8 pls.

—— (1985): Malayan Saturniidae from the Cameron and Genting Highlands. A guide for collectors [internal title: The Saturniidae of the Cameron and Genting Highlands of Western Malaysia]. [English translation of LAMPE 1984.] – Faringdon (E. W. Classey), 16 pp., 8 pls.

LEMAIRE, C. (1978): Les Attacidae américains – The Attacidae of America (= Saturniidae). Attacinae. – Neuilly-sur-Seine (C. Lemaire), 238 pp., 49 pls.

MOORE, F. (1859): Synopsis of the known Asiatic species of silk-producing moths, with descriptions of some new species from India. – Proc. Zool. Soc. London **27**: 237-270.

NÄSSIG, W. A. (1991): New morphological aspects of *Antheraea* HÜBNER and attempts towards a reclassification of the genus (Lepidoptera, Saturniidae). – Wild Silkmoths '89/'90 (eds. H. AKAI & M. KIUCHI): 1-8.

—— (1992): *Antheraea (Antheraea) platessa* ROTHSCHILD 1903: The correct name for *Antheraea jana* auctorum, nec STOLL 1782 (Lepidoptera: Saturniidae). – Nachr. entomol. Ver. Apollo, Frankfurt/Main, N.F. **13** (2 a): 157-163.

—— (1994): Vorläufige Anmerkungen zur Saturniiden- und Brahmaeidenfauna von Vietnam mit Neubeschreibungen (Lepidoptera). – Nachr. entomol. Ver. Apollo, Frankfurt/Main, N.F. **15** (3): 339-358.

——, LAMPE, R. E. J., & KAGER, S. (1996 a): The Saturniidae of Sumatra (Lepidoptera). – Heterocera Sumatrana **10**: 3-110.

——, ——, & —— (1996 b): The Saturniidae of Sumatra, Appendix I: The preimaginal instars of some Sumatran and South East Asian species of Saturniidae, including general notes on the genus *Antheraea* (Lepidoptera). – Heterocera Sumatrana **10**: 111-170.

NAUMANN, S. (1994): Bemerkungen zu einer rotbraunen Form von *Antheraea brunei* ALLEN & HOLLOWAY 1985 sowie zu den Präimaginalstadien der Art (Lepidoptera: Saturniidae). – Nachr. entomol. Ver. Apollo, Frankfurt/Main, N.F. **15** (3): 359-362.

—— (1995): Die Saturniiden-Fauna von Sulawesi, Indonesien. – Dissertation, Freie Universität Berlin, 145 pp., 15 col. pls., 2 b. & w. pls.

NIEPELT, W. (1926 a): Eine neue *Antheraea* von Celebes. – Int. entomol. Z., Guben, 19 (48): 386-387.

—— (1926 b): Zwei neue indo-australische Saturniden [sic]. – Int. entomol. Z., Guben, 20 (29): 257-259, 1 pl.

PAUKSTADT, L. H., PAUKSTADT, U., & NAUMANN, S. (1996): Die Präimaginalstadien von *Antheraea rumphii rumphii* C. FELDER 1861 von Ambon, Indonesien, sowie taxonomische Bemerkungen (Lepidoptera: Saturniidae). – Entomol. Z. **106** (5): 165-176.

PAUKSTADT, U., & PAUKSTADT, L. H. (1989): Reisen und entomologische Aufsammlungen auf Celebes (Indonesien). 1. allgemeiner Teil: Ein entomologischer Reisebericht. – Nachr. entomol. Ver. Apollo, Frankfurt/Main, N.F. **10** (3): 193-214.

——, & —— (1991): Reisen und entomologische Aufsammlungen auf Celebes (Indonesien). 2., spezieller Teil: Saturniidae (Lepidoptera) von Celebes. – Nachr. entomol. Ver. Apollo, Frankfurt/Main, N.F. **12** (1): 17-27

PINRATANA, A., & LAMPE, R. E. J. (1990): Moths of Thailand, vol. one, Saturniidae. – Bangkok (Brothers of St. Gabriel in Thailand/Bosco Offset), v + 47 pp., 33 col. pls.

SCHÜSSLER, H. (1933): Saturniidae: 2. Subfam. Saturniinae I, *in:* STRAND, E. (ed.), Lepidopterorum Catalogus, Pars **56:** 85-324. – Berlin (W. Junk).

SEITZ, A. (1926): 14. Familie, Saturniidae, Nachtpfauenaugen, *in:* SEITZ, A. (ed.), Die Gross-Schmetterlinge der Erde, 10. Die indoaustralischen Spinner und Schwärmer, pp. 497-520, pls. 52-56A. – Stuttgart (A. Kernen).

WATSON, J. H. (1915): Some new forms of Malayan Saturnidae [sic]. – Tijdschr. Entomol. **58:** 279-280.

WEYMER, G. (1906): Zwei neue Saturniden [sic]. – Dtsch. entomol. Z. Iris, Dresden, **15:** 71-76.

—— (1909): Exotische Lepidopteren. II. Aus dem indoaustralischen Faunengebiet. Fam. Saturnidae [sic]. – Dtsch. entomol. Z. Iris, Dresden, **22:** 21-24.

 ISSN 0723-9912