A new species of *Attacus* (Lepidoptera: Saturniidae) from Selayar Island, Indonesia

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Abstract: A new species of the genus *Attacus* Linnaeus, 1767 is described from the Indonesian island of Selayar, off the coastline of South Sulawesi: *Attacus* ***selayarensis*** **sp. n.** Both male holotype and female paratype are figured in colour. The holotype from the senior author's collection will be deposited in Zoologisches Museum der Humboldt-Universität zu Berlin, Germany. The new species is compared with and separated from *A. erebus* Fruhstorfer, 1904 from nearby Sulawesi Island and from two superfically similar taxa, the Philippine *A. lorquinii* C. & R. Felder, 1861, and the Javanese *A. atlas* (Linnaeus, 1758).

Key words: *Attacus selayarensis*, new species, Indonesia, Sulawesi, Selayar Island, atlas moths.

Eine neue *Attacus*-Art (Lepidoptera: Saturniidae) von der indonesischen Insel Salayer

Zusammenfassung: Eine neue Art der Gattung *Attacus* Linnaeus, 1767 wird von der indonesischen Insel Salayer beschrieben, die südlich der Küste von Südsulawesi liegt: *Attacus* ***selayarensis*** **sp. n.** Männlicher Holotypus und weiblicher Paratypus werden farbig abgebildet. Der Holotypus aus der Sammlung Naumann wird in die Sammlung des Zoologischen Museums der Humboldt-Universität zu Berlin gelangen. Die neu beschriebene Art wird verglichen mit und abgegrenzt von *A. erebus* Fruhstorfer, 1904 von der nahegelegenen Insel Sulawesi und den beiden teilweise ähnelnden Arten *A. lorquinii* C. & R. Felder, 1861 von den Philippinen und *A. atlas* (Linnaeus, 1758) von Java.

Introduction

The genus *Attacus* Linnaeus, 1767 contains the largest moths in the world, which are widely distributed in Asia from the Himalaya down to southern India and Sri Lanka, via southern China and the South East Asian mainland to the Philippines, Indonesia, and northern Australia. It was extensively revised by Peigler (1989), providing an overview about the morphology, systematics, ecology, zoogeography, and relationships to other Attacini genera, based on literature and museum specimens. Specimens were beautifully figured in colour by Seitz (1926) and D'Abrera (1998). Since publication of Peigler's revision, preimaginals of several taxa were described and figured in publications, such as those of *A. erebus* Fruhstorfer, 1904, from Sulawesi, Indonesia (Paukstadt et al. 1996).

Three years ago *Attacus* specimens from Selayar, a small island just south of South Sulawesi (the Indonesian Sulawesi Selatan province), were presented to the senior author that apparently did not belong to *A. erebus,* which is widespread all over Sulawesi (Peigler 1989, Naumann 1995). These specimens differed so much, but on the other hand had similarities in pattern with Javanese samples of *A. atlas* that in our discussion we first thought they represented an introduced population or mislabelled dealer's material. After receiving further material from the same source, and with verification of their origin by assistance of S. Jakl, it became clear that there are constant characters in that population which make it different to all other known taxa, so we decided to describe it as a new species.

Description and diagnosis

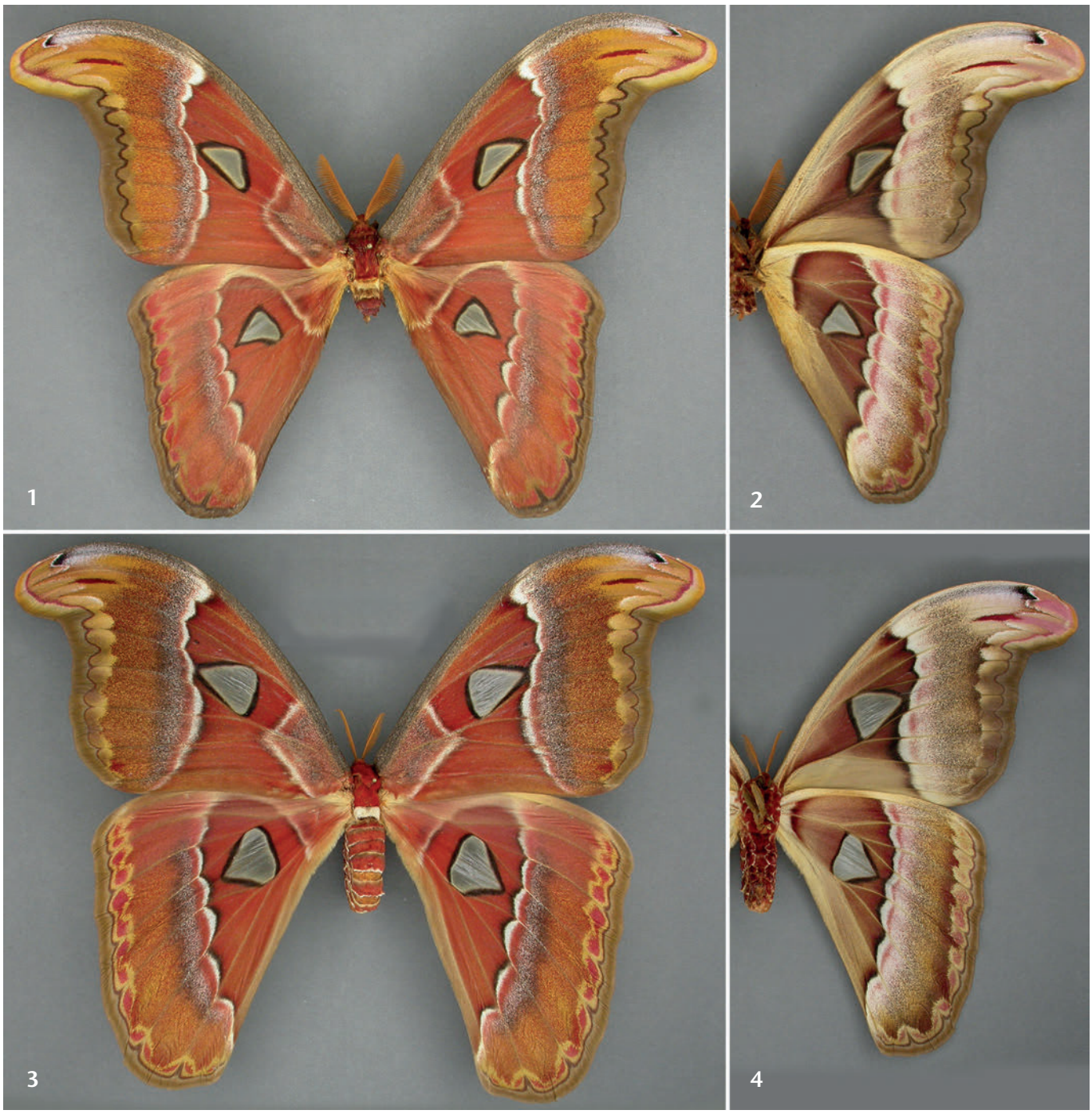
Attacus ***selayarensis*** **sp. n.**

Holotype (Fig. 1 dorsal view; Fig. 2 ventral view): ♂, Indonesia, Sulawesi Selatan Province, Selayar Island, ca. 8 km from Somarisi, Rea-Rea area, Mt. Bontoharu, 400 m, iii. 2008, leg. local collector, via S. Jakl, genitalia no. 1854/08 Naumann, barcode (BC) SNB 1540, coll. S. Naumann. The holotype will be deposited in Zoologisches Museum der Humboldt-Universität zu Berlin, Germany.

Paratypes (Fig. 3: ♀ allotype, dorsal; Fig. 4: ventral): In total 3 ♂♂ and 9 ♀♀ with same origin as holotype, with following data: 2 ♂♂, 4 ♀♀ including ♀ allotype, same data as holotype, BC SNB 1539 (1 ♂, 1 ♀ in coll. S. Jakl, 1 ♂, 3 ♀♀ in coll. S. Naumann); 1 ♀, same locality as holotype, viii. 2007 (Texas A&M University, College Station, Tex.); 2 ♀♀, same locality as holotype, x. 2007 (1 ♀ in coll. S. Naumann, 1 ♀ McGuire Center for Lepidoptera & Biodiversity, Gainesville, Fla.); 1 ♀, same locality as holotype, xi. 2007, BC SNB 297 (coll. S. Naumann); 1 ♂, 1 ♀, Indonesia, Selayar Island, without further data (coll. D. Rolfe, Northfleet, UK).

Etymology: The new taxon is named for its origin, the Indonesian island of Selayar.

Description: ♂ (Figs. 1, 2): Ground colour on dorsal side dark orange brown. Antennae quadripectinate, ochreous, 17.5–18.0 mm long, longest rami 6.0 mm. Head, dorsal parts of thorax and abdomen in ground colour, thorax and abdomen separated by wide white band of long hair, abdomen with intersegmental white stripes. Forewing length, measured from base to tip of apex, 84–93 mm (holotype 92 mm). Costa completely grey, antemedian area suffused with greyish scales, antemedian line white. The median area completely in ground colour, with a triangular fenestra, surrounded black and to hyaline inner part suffused with some yellow scales. Longest expansion of this is 17 mm; there exist no accessory windows or dots in the males. Postmedian line S-shaped, white, in the costal half somewhat indented along the veins. It is followed by a grey long line of greyish scales and a broader portion in ground colour, suffused with yellow scales, in the postmedian area. Marginal area olive with a dark grey zigzag marginal band, apex yellow with carmine dash of 10–14 mm length, the complete apical area is surrounded by a round dark violet marginal band. Hindwing 65–71 mm (holotype 70 mm) maximum length, of same colouration as forewing, but antemedian



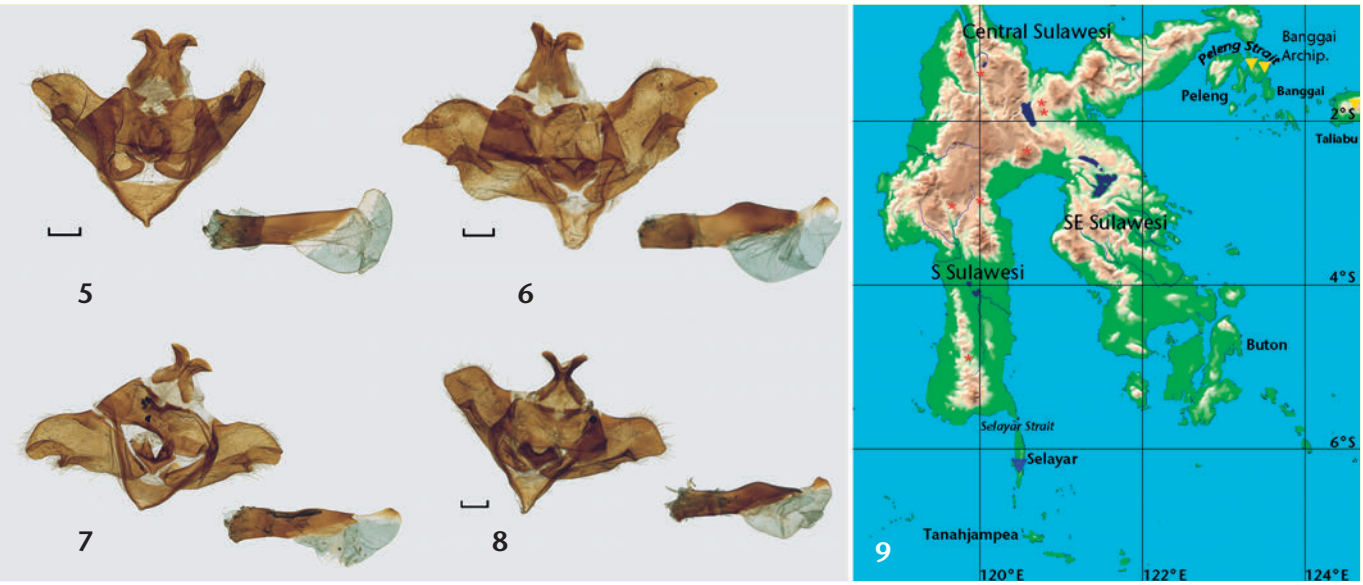
Figs. 1–2: *Attacus selayarensis* sp. n., ♂ holotype. **Fig. 1:** dorsal view. **Fig. 2:** ventral view. **Figs. 3–4:** *A. selayarensis* sp. n., ♀ allotype. **Fig. 3:** dorsal view. **Fig. 4:** ventral view. — Specimens not to the same scale.

area without greyish and postmedian area without yellow scales. Fenestra triangular, 12–13 mm maximum length. Postmedian line bordered black to median area. In postmedian area, just in front of marginal line, a row of reddish orange dots, marginal area with a dark grey to black marginal line.

On ventral side with same ornamentation, but of much lighter colour. Thorax and abdomen still in ground colour, but legs of greyish ochreous colour. Costal, postmedian parts and lower margin of both fore- and hindwings greyish white, median area violet brown, apex whitish with carmine dash, outer margin similar to dorsal side.

♂ genitalia (Fig. 5): Uncus bifid with pointed tips, curved to ventral side. Dorsal process of the valves somewhat rounded triangular, the ventral one tall and long, sacculus well developed. Juxta with two symmetrical triangular processes. Saccus triangular, with small apical tip. Phallus straight, vesica with two lobes without any sclerotisation.

♀ (Figs. 3, 4): Colour and ornamentation as in ♂♂, but with some differences due to sexual dimorphism, such as wider, more square-like wing expanse with wider lines of ornamentation, larger, egg-filled abdomen, and narrower antennae which are also quadripectinate, 17.0–17.5 mm long, with longest rami of ca. 1.8 mm length. Forewing length 87–114 mm (allotype 112 mm). The forewing



Figs. 5–8: ♂♂ genitalia of the genus *Attacus*. **Fig. 5:** *A. selayarensis* sp. n., genitalia no. (GP) 1854/08, all fec. Naumann. **Fig. 6:** *A. erebus*, Sulawesi, GP 1851/08. **Fig. 7:** *A. atlas*, Java, GP 1852/08. **Fig. 8:** *A. lorquinii*, Luzon, GP 1855/08. — Genitalia figures almost to the same scale, 1 scalebar = 1 mm. — **Fig. 9:** Map showing distribution of *Attacus* species in the southern half of Sulawesi and adjacent islands. Localities: Red asterisks: *Attacus erebus*. Yellow triangles: *A. paraliae*. Blue triangle: *A. selayarensis*.

fenestra is much bigger, also of triangular form, but on basal side with rounded margin, 20–23 mm maximum length; it is followed apically in most ♀♀ by a small black dot or a very small accessory fenestra. The forewing marginal band is much lighter than in ♂♂, in some specimens even violet, similar to the apical portion of that band which tends to be broader in that part in ♀♀. Apex of similar ornamentation, violet dash 16–22 mm long. Hindwing with same colour and ornamentation as in ♂♂, but again with much bigger, somewhat drop-like fenestra of 17–22 mm maximum expansion. Submarginal band as in forewing in some specimens of dark violet colour.

On ventral side entirely with same ornamentation and colour as ♂♂, but again with the differences described already for dorsal side. The abdomen shows some ornamentation with reddish violet dots which are surrounded with white hairs; this ornamentation may have been lost in the ♂♂ due to migration of fat from inside the abdomen onto the hairs and scales of the abdomen.

Diagnosis: *A. selayarensis* sp. n. is well defined in both sexes by the combination of its intensive dark orange brown colouration, an ochreous to yellowish forewing apex with a completely surrounding violet marginal line in that area, which is coloured dark grey (in all ♂♂) to dark violet (in all ♀♀) in the lower forewing parts and the hindwing. ♂♂ have no accessory fenestrae, while ♀♀ bear a black accessory dot or a small accessory fenestra in the forewing.

There exist major differences to *A. erebus* which is widespread on whole mainland of Sulawesi, but not on Selayar Island. This taxon is of much darker, more chocolate brown colouration on dorsal side, has a pinkish-violet (in ♂♂) or grey (in ♀♀) forewing apex with intensive pink outer margin in that area, a black submarginal line in both fore- and hindwings and in almost all ♂♂ an accessory forewing fenestra. ♂ genitalia of *A. erebus* (Fig. 6) differ by their bigger size, rounded processi of the uncus, tapering dorsal valve process, a dorsal hook of the aedeagus and a dorsal sclerotisation on the vesica. *A. lorquinii* C. & R. Felder, 1861 which is widespread in the northern Philippines, sometimes shares the orange brown ground colour, but easily can be separated by a violet forewing apex and non-dentate forewing postmedian line; its ♂ genitalia (Fig. 8) generally are more slender, the ventral process of the valves much reduced, with rounded juxta processes, and a dorsal hook on the phallus, plus dorsal sclerotisation of the vesica. Javanese specimens of *A. atlas* sometimes share the ground colour, but have an non-dentate postmedian line of the forewing, thinner submarginal lines, dark dots in the hindwing submarginal area, usually well-developed accessory fenestrae, and again differences in the ♂ genitalia (Fig. 7), such as bigger size, less pronounced processi of the uncus, a shorter ventral process of the valves, a hinted dorsal hook on the phallus plus dorsal sclerotisation on the vesica. None of the aforementioned taxa has a submarginal band which is spread over the complete rounded apex along to the costal margin.

Discussion

At first glance it is somewhat surprising to find a well defined species in the well known genus *Attacus* just 15 km southward to the coastline of mainland Sulawesi on a small island; at the second glance, after consulting literature, the same phenomenon could be observed with another representative of the genus, *A. paraliae* Peigler, 1985, described from Peleng Island in the Banggai Archipelago, also just 15 km off the coastline of Sulawesi, and also quite distinct (Peigler 1985). Both Selayar and Peleng Straits have deep water, so were geologically isolated from Sulawesi, thereby forming a biogeographical

boundary for certain insects (but not for all), yet smaller island distances obviously let species cross such straits, as can be observed for, e.g. the Sulawesi *Cricula trifenestrata kransi* Jurriaanse & Lindemans, 1920, described from Galla and Buton Islands in South East Sulawesi which occurs also in the whole mainland of Sulawesi (Naumann 1995). Six representatives of Sulawesi Saturniidae were noted by Naumann (2000) for Tanahjampea Island, which lies even farther south of Selayar Island in the Flores Sea, but in this material no *Attacus* specimens were found. On Selayar itself saturniids of the Sulawesi *Samia vandenberghi* (Watson, 1915) were recorded (Naumann 1995: 32, Peigler & Naumann 2003: 153) that were found to be conspecific with Sulawesi representatives.

Attacus selayarensis is probably an endemic to Selayar Island, or at least to that group of islands. Other animals, including butterflies in the genera *Troides, Cyrestis,* and *Euploea* (D'Abrera 1982: 16, 217, 2003: 232), are endemic to this island, and some have also been named *selayarensis*. The zoogeographical relationship between Sulawesi (which has long been isolated geologically) and Java and Flores (which have had past land connections to mainland Asia and other larger islands) presents a tantalizing subject for study. *Attacus selayarensis* may be a relict taxon that can elucidate the phylogenetic relationships and dispersal events of better known species like *A. atlas, A. erebus,* and *A. inopinatus* Jurriaanse & Lindemans, 1920.

We have no information about preimaginal instars or ecology of the new taxon. Due to the good quality of all type specimens, complete complement of eggs in the ♀♀, and the unusual ratio of ♂♂ to ♀♀ we are certain that the specimens were reared from cocoons by the local collector instead of being attracted to a light trap in their natural habitat. We anticipate that additional specimens of this new species can be found in Japanese collections.

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