©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

QUADRIFINA | Band 5 | 153-207 | 15. Dezember 2002

An annotated list of the fruit-piercing moth genus *Eudocima* BILLBERG, 1820 (sensu POOLE) with descriptions of four new species (Lepidoptera: Noctuidae, Catocalinae)

A. Zilli[1] & W. Hogenes

[1] To whom correspondence should be addressed.

Abstract

During revisionary work on the genus *Eudocima* BILLBERG, 1820 (sensu POOLE, 1989) four species were found to be new to science and are here described: *Eudocima mazzeii* sp. n. and *Eudocima behouneki* sp. n., both from the Philippines, where they apparently substitute *Eudocima sikhimensis* (BUTLER, 1895), *Eudocima prolai* sp. n., from New Guinea, not directly related to any other species in the genus, and *Eudocima treadawayi* sp. n., from the Philippines, superficially similar to *Eudocima cocalus* (CRAMER, 1777). *Eudocima apta* (WALKER, [1858]) sp. rev., is considered as a distinct species from *Eudocima materna* (LINNAEUS, 1767) and the following syonymy is reinstated: *Phalaena phalonia* LINNAEUS, 1763 = *Phalaena fullonia* CLERCK, [1764] syn. rev., so that the name *Eudocima phalonia* (LINNAEUS, 1763) comb. n. must be used for the species currently known as *Eudocima fullonia* (CLERCK, [1764]). An annotated list of the world species is also presented.

Zusammenfassung

Während der Revisionsarbeit zur Gattung *Eudocima* BILLBERG, 1820 (sensu POOLE, 1989) wurden vier neue Arten entdeckt, die im folgenden beschrieben werden sollen: *Eudocima mazzeii* sp. n. und *Eudocima behouneki* sp. n., beide Arten kommen auf den Philippinen vor, wo sie offenbar an die Stelle von *Eudocima sikhimensis* (BUTLER, 1895) treten; *Eudocima prolai* sp. n. aus Neu Guinea, die mit keiner anderen Art innerhalb dieser Gattung direkt verwandt ist und *Eudocima treadawayi* sp. n. von den Philippinen, die oberflächlich *Eudocima cocalus* (CRAMER, 1777) ähnlich ist. *Eudocima apta* (WALKER, [1858]) sp. rev. wird als eine von *Eudocima materna* (LINNAEUS, 1767) abgetrennnte Art betrachtet, sodass folgende Synonyme wieder verwendet werden: *Phalaena phalonia* LINNAEUS, 1763 = *Phalaena fullonia* CLERCK, [1764] syn. rev. Die Bezeichnung *Eudocima phalonia* (LINNAEUS, 1763) comb. n. wird nun für die bisher unter dem Namen *Eudocima fullonia* (CLERCK, [1764]) bekannte Art gebraucht. Eine kommentierte Liste der weltweiten Arten wird im Anschluß präsentiert.

Key words: Noctuidae, *Eudocima*, *Othreis*, *Adris*, new species, fruit-piercing moths, Philippines, New Guinea, world species.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Introduction

The genus *Eudocima* BILLBERG, 1820, as defined by POOLE (1989), currently encompasses all the "fruit-piercing moths" which until recently have been placed in *Othreis* HÜBNER, [1823], *Adris* MOORE, 1881, *Khadira* MOORE, 1881, and *Eudocima* s.str., although some species involved were occasionally ascribed to more or less disused synonyms as *Rhytia* HÜBNER, [1823], *Trissophaes* HÜBNER, [1823] and *Elygea* BILLBERG, 1920. Some of these generic names circumscribe species groups which somehow could be considered monophyletic groups within *Eudocima* s.l. However, in spite of the fact that a complete phylogenetic reconstruction still has to be made, we conclude from the general appearance of the species involved and from the available morphological descriptions that there is sufficient transition between these species groups to support POOLE's (1989) lumping, which will be therefore followed in this article.

The study of material from this group preserved in some institutional and private collections led to the discovery of four new species which are here described. This, together with the recent discovery of a spectacular species by YOSHIMOTO (1999), is rather surprising, as due to the size, the noteworthy pattern and the economic importance of several of its members, the group was studied extensively. Therefore, in order to provide a framework for further research on *Eudocima*, the taxonomic information available to the authors is here summarised in an annotated list of species.

Descriptions of new species

Symbols and abbreviations for material depositories are as follows:

n = number of sampled specimens
x = mean
CB = collection G. BEHOUNEK (Grafing bei München, to be deposited in the Zoologische Staatssammlung, München)
CT = collection C.G. TREADAWAY (Limbach, to be deposited in the Senckenberg Museum, Frankfurt am Main)
MNB = Museum für Naturkunde der Humboldt Universität zu Berlin
MZR = Museo Civico di Zoologia, Roma
ZMA = Zoölogisch Museum, Universiteit van Amsterdam
ZMK = Zoologisk Museum, Københavns Universitet

Eudocima mazzeii sp. n.

(Figs 1-2, 29-31, 34)

Type material:
Holotype: ♂, Philippines, Luzon, Ifugao, Banaue, 2.VIII.1988, J.H. Lourens leg., ZMA.
Paratypes: 1 ♂, same locality and data as holotype, ZMA; 1 ♂, Luzon, Mt. Amugao, 2280 m, 10.V.1992, C.G. Treadaway leg., CT; 2 ♂♂, 2 ♀♀, Luzon, prov. Chatol, 16 Km SE Bontoc, 1600 m, 24.IX-14.X.1988, K. Cerny & A. Schintlmeister leg., CB; 1 ♀, Luzon, Mtn. prov. Chatol, 2100 m, 16-18.XI.1997, W. Mey, G. Ebert & M. Nuss leg., MNB; 1 ♀, Luzon, Ifugao, Banaue, ca. 20 Km N Laguna, 1200 m, 22.IX-16.X.1988, K. Cerny & A. Schintlmeister leg., CB; 1 ♀, Mindoro, Mt. Halcon, 2000 m, 14.VIII.1992, C.G. Treadaway leg., CT.

Description

Derivatio nominis: The species is named after Paolo Mazzei (Rome), photographer of moths of rare skill.

Male (Fig. 1): Length of forewing 45-51 mm (x = 48.17; n = 6). Head. Dull greenish interspersed by orange and with violet iridescence; antenna greenish-brown, segments cylindrical; labial palpus comparable in size and shape to that of *Eudocima sikhimensis* (BUTLER, 1895), third segment being a little thicker basally, rendering apical dilatation even less prominent. Thorax. Patagium, base of

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

tegula and mesial tuft dull greenish interspersed by orange and with violet iridescence, other areas dark or brownish green; patagium distally bordered by a green brown line and some whitish scales. Underside light orange, with fore- and midleg variously suffused by brownish green and conspicuous white spot on tibiae at one-third from base; androconial brush massive.

Shape of forewing comparable with that of *E. sikhimensis* but broader; background uniformously dark or brownish green, with overimposed blackish rippled pattern and dotting along veins; pigmentation more intense in place of medial band below cell, beyond postmedial line and in submarginal area; antemedial line gently incurved or straight from costa to 1A+2A, then fading; blackish suffusion at lower end of discocellular crossvein; postmedial line obliquely running from apex to anal margin where inner flap joins with concavity; tornal hook little prominent. Fringe dark green or brownish with violet iridescence. Underside light orange with oblique medial and arched postmedial black bands; diffuse orange scaling in-between postmedial and brownish distal area; fringe basally brownish and distally whitish. Hindwing light orange, with brownish basal suffusion, black crescent-shaped discal spot and postdiscal band, this one regularly arched, of uniform width or barely enlarged superiorily, set well apart from wing margin and starting at level of Rs, and with some black rays projecting outward along veins; fringe pale orange. Underside light orange, brownish along costa toward apical area, with discal spot and postdiscal band as on upperside; veins outstanding as orange rays on black band. Abdomen orange, basally brownish on upperside. Posterior abdominal brush on sternum A7 present.

Male genitalia (Figs 29-31): Armature *E. sikhimensis*-like. Tegumen and vinculum stout; valva broad, with costal margin little sinuous and distally produced, and outer margin rounded; juxta elongate, crossed longitudinally by irregular rows of small teeth, ending superiorly with two strongly toothed lateral processi separated by narrow incisure; uncus gibbous dorsally, dilated ventrally before apex and terminating into median tooth; scaphium with mesial depression along its length. Aedeagus stout, with distal triangular process and, on opposite side, spinulose area, this one interrupted at middle in correspondence with protruding vesica; vesica with distinct ovoidal basal swelling and superior conical lobe bearing stout and rather short cornutus; distal tube of vesica on side opposite to that of triangular process of aedeagus.

Female (Fig. 2): Length of forewing 44-52 mm (x = 47.75, n = 5). Essentially as described for male, head, thorax, and legs being more greenish, forewing deep green with moss-green areas and violet iridescence, better defined vivid green discal stigma, median field with gray spot adjoining postmedial at interspace CuA1-CuA2, some irregular gray spotting in distal field and wide gray patch with irregular margins at tornal area. Third segment of palpus with heavier apical tuft than in male.

Female genitalia (Fig. 34): Posterior margin of sternum A7 regularly concave, ostium bursae wide, vase-like, originating distinct subrectangular antrum in ventral view, ductus bursae short, ridged but not sclerotised, bursa in shape of long elongate sack; sternum A8 with narrow unsclerotised area at middle so as to split sternum into two lateral, inferiorly hollow, parts, apophyses anteriores weak, flat and short, recurved; papillae anales subrectangular, apophyses posteriores thin, rod-like. Variability occurs in ventral sclerotised outline of split parts of sternum A8.

Distribution: So far known from Luzon and Mindoro in the Philippines.

Discussion: The new species superficially agrees with members of the *tyrannus*-group of *Eudocima* (= *Adris* MOORE, 1881) encompassing *E. tyrannus* (GUENÉE, 1852), *E. okurai* (OKANO, 1964), *E. sikhimensis* (BUTLER, 1895) and *E. behouneki* sp. n., and is most similar to the latter two in the overall habitus and several anatomical characters as the fairly short labial palpi and the small compact aedeagus vesica. From *E. sikhimensis* (Figs 3-5) it can be differentiated as follows. The wings are broader; the postmedial line of forewing attains the beginning of the concavity of anal margin and does not end directly on this; the black band of the hindwing is set well apart from wing margin, of uniformous width and in shape of a short arc starting at the level of Rs (in one out of nine specimens with a tapering suffusion reaching Sc + R1), while in *E. sikhimensis* it is closer to wing margin, distinctly dilated superiorly and starting from Sc + R1; the distal black band of the forewing underside is followed by

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

yellow for most of its length, and hence does not merge into single blackish distal area as in *E. sikhimensis*. In the male genitalia the juxta of *E. mazzeii* is more elongate with a narrower and more acute mesial incisure between superior lobes; in *E. sikhimensis* (Figs 32-33) the spinulose area of the aedeagus develops all around the distal end of the aedeagus, except where the triangular process occurs, while in the new species it is interrupted mesially to allow protrusion by the vesica; as a matter of fact, in *E. mazzeii* the junction of the vesica with the aedeagus is oblique, in *E. sikhimensis* the vesica follows up in line with the aedeagus; in *E. sikhimensis* there is no inferior ovoidal swelling of the vesica, the distal cornutus is well over one-fourth longer and close to the base of the distal tube there is a finely spinulose area; last but not least, the tube lies immediately above the apex of the triangular process of the aedeagus, while in *E. mazzeii* it is on the opposite side. In the female genitalia of *E. mazzeii* there is a distinct antrum and the ductus bursae and midventral area of sternum A8 are not sclerotised, in contrast with *E. sikhimensis* (Fig. 35), which also has a longer ductus and the overall shape of segments A8-A9 less laterally compressed. It has also to be noticed that *E. mazzeii* is little variable as to both colour and pattern, the forewing being of uniform dark or brownish green in the male and dark green with regularly placed gray spots in the female. In contrast, *E. sikhimensis* occurs in several variants ranging from vivid yellowish green to leaf-green or chocolate brown with green areas and irregularly present whitish speckles. For diagnosis with *E. behouneki* sp. n. see under this species.

Eudocima behouneki sp. n.

(Figs 6-7, 36-39)

Type material:
Holotype: ♂, Philippines, Mindanao, Danao, Mt. Apo, 29.II.1990, C.G. Treadaway leg., CT.
Paratypes: 1 ♂, 2 ♀♀, same locality as holotype, 1.III.1990, 3.III.1990 (1 ♂, 1 ♀), C.G. Treadaway leg., CT; 1 ♀, Leyte, Mt. Balocaue, Hilusig Mahaplag, 400 m, 22.V.1987, C.G. Treadaway leg., CT; 1 ♀, Panay, Mt. Banag, 6.XII.1995, C.G. Treadaway leg., CT.

Additional material examined: 1 ♂, Palawan, Mantalingajan, Tagembung, 1150 m, 17.IX.1961, Noona Dan exp. 61-62, ZMK; 2 ♀♀, Palawan, Mt. Gantung, 200 m, 9°01'N, 117°57'E, 19.I-21.I.1988, K. Cerny & A. Schintlmeister leg., CB.

Description

Derivatio nominis: The species is named after the noctuid specialist Gottfried Behounek (Grafing bei München), responsible for detailed accounts of Indoaustralian Noctuidae.

Male (Fig. 6): Length of forewing 43-44 mm (x= 43.33; n = 3). Habitus and pattern as in *Eudocima sikhimensis* (BUTLER, 1895), except for hindwing, characterised by reduced extension of black discal spot and narrower postdiscal band distinctly toothed externally at veins. Posterior abdominal brush on sternum A7 present.

Male genitalia (Figs 36-37): Armature *E. sikhimensis*-like with costal part of valva distinctly produced apically in shape of acute process and and main outline of superior processi of juxta uniformously round. Aedeagus *mazzeii*-like, with basal swelling of vesica in shape of pocket rather than ovoidal and cornutus long and slender.

Female (Fig. 7): Length of forewing 42-45 mm (x = 44; n = 6). Habitus and pattern reminescent of female *Eudocima bathyglypta* (A.E. PROUT, 1928), except for slightly more produced apex of forewing, straighter postmedial, not sinuous below cell, absence of iridescent green speckles and white trait adjoining postmedial between CuA1-CuA2 in median field, less pronounced concavity of anal margin, more extended gray suffusion in tornal area, and black postdiscal band of hindwing set more far apart from wing margin.

Female genitalia (Fig. 38-39): Like *E. sikhimensis* but more slender as a whole, with ventral sclerotised area of sternum A8 posteriorly in shape of two adjoining lobes and junction between bursa and ductus less sclerotised.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Distribution: So far known from Mindanao, Leyte, Panay and Palawan in the Philippines.

Discussion: External characteristics of the females have long been challenging the authors and only the tracing of males allowed to assess that *Eudocima behouneki* sp. n. is a species closely related with both *E. sikhimensis* (BUTLER, 1895) and *E. mazzeii* sp. n. As a matter of fact, the female of *E. behouneki* shows in external appearance the greatest similarities with the female of *E. bathyglypta* (A.E. PROUT, 1928) (Fig. 8), a strongly sexually dimorphic species, with the exceptions noted above. Nevertheless, characteristics of the male, the hindwing pattern of which is reminescent of *E. bathyglypha* as well, clearly indicate a closer relationship with *E. sikhimensis* and *E. mazzeii*, e.g. the juxta being crossed longitudinally by irregular rows of small teeth, aedeagus with triangular apical process and compact vesica. In contrast, the male of *E. bathyglypta* (Fig. 9) is a very different looking organism from both its female and the triplet *E. sikhimensis-E. mazzeii-E. behouneki*, with a smooth juxta and the configuration of aedeagus and vesica being totally diverse (Fig. 41). Interestingly, the male of *E. behouneki* sp. n. resembles *E. sikhimensis* (Fig. 3) in size, shape, and colour and pattern of forewing (e.g. trend of postmedial), but the configuration of the aedeagus is definetely closer to *E. mazzeii* (Figs 29-31). The main differences with regard to the latter consist of a pronounced apical expansion of the costa of valva, a pointed socket-shaped basal swelling of the vesica and a longer, thinner cornutus. Other diagnostic differences reside in the shape of lateral processi of the juxta, basally broad and distally rounded in *E. behouneki*, slender and sharp in *E. mazzeii*, and the overall size of the armature, greater in *E. mazzeii*. The female genitalia of *E. behouneki* sp. n. show a greater similarity to those of *E. sikhimensis* (Fig. 35) in their sclerotised ventral part of sternum A8 and ductus bursae, with the exceptions noted above. Another difference between *E. behouneki* and *E. mazzeii* is, in both sexes, the shape and position of the black postdiscal band of the hindwing, which is more dilated superiorly, set closer to wing margin and distinctly thooted in *E. behouneki*, while in *E. mazzeii* it is "C"-shaped, shifted proximally and externally emitting rays rather than teeth. In *E. behouneki* the distal black band of the forewing underside usually merges into single blackish distal area like in *E. sikhimensis*, but this trait does not appear as constant, as one male specimen shows evident yellowish scaling like in *E. mazzeii*. From a biogeographical view it is worth noting that both *E. mazzeii* sp. n. and *E. behouneki* sp. n. apparently substitute *E. sikhimensis* in the Philippine Archipelago, with *E. behouneki* occurring in the Central-Southern Philippines and *E. mazzeii* being restricted to the Northeastern sector.

The unique male specimen from Palawan which was available for study shows reduced costal expansion of valva and basal swelling of the aedeagus that is pointed but not clearly angled in shape of socket, all other traits being well characteristic of typical *E. behouneki* (e.g. overall configuration of vesica, cornutus, juxta, hindwing pattern). Females from Palawan do also agree with *E. behouneki*. The complex biogeographical situation of Palawan, lying on the Sunda shelf in-between the quarters of *E. sikhimensis* (e.g. Borneo, HOLLOWAY, 1976), *E. mazzeii* (e.g. Mindoro) and typical *E. behouneki* (e.g. Panay), might account for an introgressive origin of its populations. For this reason and pending upon examination of further material, it is here preferred to exclude the Palawan material from the type series.

Eudocima prolai sp. n.

(Figs 10-11, 40, 42-45)

Type material:
Holotype: ♂, Irian Jaya, Star Mountains, Abmisibil, 1890 m, 27.II-1.III.1989, H.v. Mastrigt leg., ZMA.
Paratypes: 1 ♂, Ned.[erlands] N[ieu]W Guinea, Jafi District, Keerom Rivier, 29.X.1938, W. Stüber leg., coll. J.M.A. v. Groenendael, ZMA; 3 ♂, 1 ♀, Papua New Guinea, Central Province, Fane, 1400 m, 17.I.1987, 19.I.1987 (1 ♂, 1 ♀), 26.I.1987, B. Willner leg., CB.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Description

Derivatio nominis: The species is named after the leading Italian lepidopterist Carlo Prola (Rome), in recognition of his extensive activity in the survey of world species.

Male (Fig. 10): Length of forewing 44.5-45 mm (x = 44.80; n = 5). Head, thorax and background color of forewing varying from pale to reddish or dark brown; head, patagium, base of tegula and superior part of mesial tuft with lilac iridescence. Antenna brownish, antennal socket with white patch, segments cylindrical; labial palpus with second segment slender, third thin and distally clubbed. Thorax varying from fore- to hindleg on underside from brownish to dull orange; fore- and midtibia with faint traces of whitish spots at one-third from base of tibiae; androconial brush present. Forewing shape reminescent of *Eudocima okurai* (OKANO, 1964), less elongate, with produced apex and short concavity along anal margin; background interspersed with dark brown rippled pattern and conspicuous dotting along veins; pigment deposition pattern irregular and variable between specimens, with some clearing in median field and basal half of interspace CuA1-CuA2; basal field with some shiny green scaling at costa; antemedial line not evident; faint traces of median line; some pale greenish or yellowish scaling at discocellular; postmedial irregularly oblique from just before apex to middle of disc, then smoothly excurved toward base of concavity of anal margin; fringe concolorous with background. Underside orange at base, then entirely blackish brown but a little paler along costa and leaving orange discal irregular "m"-shaped spot; fringe brownish.

Hindwing orange with oval black discal spot and broad black terminal band reaching margin, starting from middle of costa and progressively tapering toward 1A+2A; fringe blackish at veins and white in interspaces. Underside as on upperside, distal band being superiorly little distinct and fading into pale beige, and extension of discal spot very variable from as nearly on the upperside to very small. Abdomen orange, dull orange on underside. Posterior abdominal brush on sternum A7 absent.

Male genitalia (Figs 42-45): Tegumen broad; vinculum weak; valva simple, a little wrinkled on costal margin before apex, externally regularly round; juxta smooth, with superior paired processi finely and shortly setose, of variable shape, from short and apically rounded to elongate and pointed. Aedeagus simple and tubular, vesica consisting of tube-like diverticulum bearing small thin cornutus and distal tube.

Female (Fig. 11): Length of forewing 43.5 mm (n = 1). Essentially as described for male, third segment of labial palpus bearing heavier tuft, head, thorax, and forewing deeper dark brown with purplish hue; forewing more extensively irrorated by shiny green, noticeably in basal field, along costa and beyond postmedial line; conspicuous white spot in interspace CuA1-CuA2 adjoining postmedial, minuscule white dot at interspace M3-CuA1 and some grayish submarginal irroration in interspace CuA2-(1A+2A); abdomen underside brownish.

Female genitalia (Fig. 40): Posterior margin of sternum A7 sligthly concave, ostium bursae medium-sized, U-shaped, weakly sclerotised; ductus bursae long and narrow, consisting of two portions, tubular posterior, not sclerotised, and flattened and cupular anterior, sclerotised and little coiled, connecting dorsally on bursa immediately after small posterior appendix from which departs ductus seminalis; bursa in shape of long elongate sack, broader posteriorly. Sternum A8 weakly sclerotised; apophyses anteriores weak, flat and short; papillae anales subrectangular; apophyses posteriores very thin, rod-like.

Distribution: New Guinea (Irian Jaya and Papua New Guinea).

Discussion: *Eudocima prolai* sp. n. does not seem to be directly related to any other species of the genus, although the vesica shows topological relationships with those of *Eudocima bathyglypta* (A.E. PROUT, 1928) (Fig. 41), *E. okurai* (OKANO, 1964) (Fig. 47) and *E. tyrannus* (GUENÉE, 1852) (Fig. 48). Remarkable is its variability, most evident in colour of forewing and shape of juxta, although that is not unique in the genus, e.g. *E. sikhimensis* being even more variable in colour and pattern and *E. okurai* in

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

the shape of juxta (Figs 46-47). In the new species both of these traits are clearly variable on intrapopulational basis and are therefore devoid of systematic value.

Eudocima treadawayi sp. n.

(Figs 12-13, 28, 49, 51)

Type material:
Holotype: ♀, Philippines, Leyte, Milusig, Mahaplag, Mt. Balocaue, 600 m, 23.V.1987, C.G. Treadaway leg., CT.
Paratypes: 1 ♂, Leyte, St. Bernard, Catmon, 450 m, 20.II.1977; 1 ♂, same locality, 325 ft., 20.V.1976; 1 ♀, Leyte, St. Bernard, Hinaban, 3.VI.1974; 1 ♀, Negros, Mt. Canlaon, 10.I.1990; all C.G. Treadaway leg., CT.

Description

Derivatio nominis: The species is named after Colin G. Treadaway (Limbach), the collector of the type series, who greatly contributed to the study of the Philippine Lepidoptera.

Male (Fig. 12): Length of forewing 31-32 mm (n = 2). Habitus and pattern closely corresponding with *Eudocima cocalus* (CRAMER, 1777) (Fig. 14). Background of forewing dark ochreous greenish, with more vivid hue in upper basal field and between postmedial and apex; basal field and area between postmedial and tornus darker than rest of wing; antemedial line straight, dark brown; postmedial dark brown, gently incurved at middle so as to run nearly parallel to distal margin; distal field with indistinct clearing from R5 to tornus; fringe pale brownish, darker in correspondence with veins. Underside as in *E. cocalus*. Hindwing comparable with that of *E. cocalus*, distal black band ending at 1A+2A and fringe less evidently scalloped with white lunules but rather consisting of regular whitish and blackish strokes; underside and abdomen similar to *E. cocalus*, with fringes as on upperside and tip of abdomen dark brown. Posterior abdominal brush on sternum A7 present.

Male genitalia (Figs 49): Armature small. Tegumen and vinculum short; valva subrectangular with distal margin deeply incised at middle; juxta conspicuous, generally in shape of flame, with small teeth along upper margins and crescent-shaped lateral processi apically diverging; uncus very stout and gibbous dorsally, dilated ventrally before apex and terminating into median tooth; scaphium little sclerotised. Aedeagus short, a little flattened distally with irregularly sclerotised distal lobes; vesica with conspicuous balloon-like basal swelling densely covered with thin spines and distal elongate diverticulum, this one swollen and clothed by flat cornuti leaving naked apical area.

Female (Figs 13, 28): Length of forewing 32-36 mm (x = 34; n = 3). Habitus and pattern closely corresponding with *E. cocalus* (CRAMER, 1777) (Fig. 15). Background of forewing dull greenish brown; white maculation restricted to subbasal dot, inside discal cell, beyond discocellular crossvein and in interspace CuA1-1A+2A in basal half of median field; some whitish clearing along postmedial, in interspace M1-M2 close to margin, and in tornal area; antemedial line straight, dark brown, fading below 1A+2A; postmedial and fringe as in male. Underside, hindwing and abdomen as in male, except for less evidently dark-tipped abdomen.

Female genitalia (Fig. 51): Armature small. Ostium bursae wide and sclerotised, circular in cross section, with margin outwardly produced; ductus bursae very short, sclerotised and circular in cross section; bursa short, dilated posteriorly and with elongate sack tapering anteriorly; sternum A8 deeply sclerotised at middle, originating gibbosity along midventral line and fused with sclerotisation surrounding ostium; apophyses anteriores reduced to flat lateral corners of A8; ovipositor short, papillae anales soft and rounded, apophyses posteriores flat, with irregular margins.

Distribution: Philippines (Leyte and Negros).

Discussion: *Eudocima treadawayi* sp. n. represents an interesting Philippine endemism of the *cocalus*-group of *Eudocima*, encompassing *E. hypermnestra* (STOLL, 1780) and *E. cocalus* (CRAMER, 1777). Due to the absence of the discal spots in the hindwings, the new species cannot be confused with *E. hypermnestra* and superficially resembles *E. cocalus* (Figs 14-15), although it shows a totally diverse

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

configuration of the male and female genitalia from this one (Figs 49-52). *Eudocima treadawayi* sp. n. can easily be separated from both species also by the duller colour of the forewing and, in the female sex, by the reduced white maculation and the absence of a gray marginal notch extending from apex of forewing to interspace M2-M3. Nevertheless, the most striking difference with respect to both *E. cocalus* and *E. hypermnestra* is represented by the trend of the postmedial, which is incurved at the middle in correspondence with M3 in *E. treadawayi* and in the superior half at the level of R5 in the other two species.

Interestingly, *E. cocalus* and *E. treadawayi* are sympatric in the Philippines, while *E. hypermnestra* has not till now been recorded from this archipelago.

List of species

During preparation of this study several natural groupings of species have been identified, particularly as relates to the Indoaustralian taxa; nevertheless, as not all species could be studied in detail, noticeably those from Madagascar and some American taxa, the following list will be arranged in alphabetical order.

Besides indication of the original publication for both available and unavailable names, under the heading "Ref." will be found literature references only to works that depict adult specimens, as in such cases it was possible to check that the taxa were correctly identified. Works exclusively dealing with bionomical or agricultural aspects were not reviewed. The species' distribution is recorded with reference to major biogeographical areas.

anguina (SCHAUS, 1911) (*Trissophaes*) Neotropical
(*Annls Mag. nat. Hist.* (8) 7: 190)

Ref.: DRAUDT & GAEDE (1944: pl. 89, row a).

Notes. According to the card index to scientific names of the Natural History Museum (London), the name *Trissophaes anguina* SCHAUS, 1911 would be a synonym of *Phalaena Noctua collusoria* CRAMER, 1777. This possibility was explicitly discussed and excluded by SCHAUS (1911) and is not recognised by POOLE (1989).

apta (WALKER, [1858]) (*Ophideres*) **sp. rev.** South-Nearctic; Neotropical; Southern Atlantic Islands (Figs 16-17, 53-54, 57-58)
(*List Specimens lepid. Insects Colln Br. Mus.* 13: 1221)

Ref.: CRAMER (1777: pl. 174, fig. B; 1779-1780: pl. 267, fig. E; sub *materna*), HOLLAND (1903: pl. 36, fig. 8, as *materna*), DRAUDT & GAEDE (1944: pl. 88, row b, sub *serpentifera* nec pl. 89 row c *apta*), COSTA LIMA ([1950]: 204, fig. 158, as *materna*), BECCARI & GERINI ([1975]: pl. 12, fig. 2, as *Ophideres* sp., fig. 3, as *Athysania* sp.).

Notes. There is much controversy on the status of this taxon with respect to *Eudocima materna* (LINNAEUS, 1767). In fact, a number of American authors (e.g. SMITH, 1893; DYAR, 1902; BARNES & MCDUNNOUGH, 1917; MCDUNNOUGH, 1938; COSTA LIMA, ([1950]), who were apparently unaware of the existance of an available name for the American populations, simply considered *E. materna* as the species occurring in the New World. Others, like GROSSBECK (1917), merely listed *E. apta* WALKER, [1858] (type locality: [Brazil], Santarem) as the American species, while DRUCE (1881-1900) and ANGULO & JANA-SÁENZ (1983) substantiated the concept of *E. apta* as a distinct species. Students that have worked at the Natural History Museum (London) over the years, e.g. HAMPSON (1902), ROBINSON (1975), HOLLOWAY (1977), as well as GAEDE (1939-1940), have always excluded the New World while reporting the range of *E. materna*, thus implicitly considering *E. apta* as a valid species, as it was clearly put forward by FLETCHER (1963). This view was not accepted by FRANCLEMONT & TODD (1983) and POOLE (1989), who listed *E. apta* as a synonym of *E. materna*, an opinion which is currently standing as valid in nomenclature.

As a matter of fact, there are clear diagnostic traits between the American populations (Figs 16-17, 53-54, 57-58) and those from other areas of the World (Figs 18-19, 55-56, 59-60). For instance in the wing pattern, where the black discal spot and the marginal band of the hindwing are noticeably wider in *E. apta* (Figs 16-17). Some American and African specimens were also dissected in order to study their genitalic configuration and the best discriminating characters have been found in the female bursae. That

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

of *E. materna* bears on the cervix a rather flat dorsal sclerotised plate which shows a protuberance on its left (right in Figs 59-60), while the homologous sclerotisation of *E. apta* wraps around from the dorsum to the venter, alongside the right flank of the cervix bursae, and bears a main protuberance at the middle (Figs 57-58). Other main differences reside in the size and shape of the corpus bursae which, independent of the degree of inflation, is distinctly longer in *E. materna* and shows a dilated trochoidal posterior part and tubular anterior fundus, while that of *E. apta* is short and wholly trochoidal. Another small difference occurs in the length and bending of the apical inferior process of the valva, while the arrangement of cornuti on the vesica has so far proven very variable at intraspecific level (Figs 53-56). Nevertheless, as the number of stout cornuti on some diverticula seems to show some constancy, this trait should be thoroughly worked out.

The specimens illustrated by CRAMER (1777, 1779-1780), who recorded *E. materna* from both India ("Kust van Coromandel") and Suriname, show a hindwing pattern well characteristic of *E. apta* and are here attributed to the American species. See also under *Eudocima serpentifera* (WALKER, [1858]) for commenting on the misidentification by DRAUDT & GAEDE (1944).

aurantia (MOORE, 1877) (*Ophideres*) Indoaustralian
(*Proc. zool. Soc. Lond.* 1877: 607)
= *Adris rutilus* MOORE, 1881 (*Trans. zool. Soc. Lond.* 11: 70)

Ref.: MOORE (1881: pl. 13, fig. 4; 1885-1887: pl. 162, fig. 2, as *rutilus*), CHEN (1985: pl. 13, fig. 266, as *rutilus*; 1999: pl. 56, fig. 3), COMMON (1990: pl. 20, fig. 11), YOSHIMOTO (1995: pl. 115, fig. 3).

bathyglypta (A.E. PROUT, 1928) (*Othreis*) Oriental (Figs 8-9, 41)
(*Bull. Hill Mus.* 2: 265)

behouneki sp. n. Oriental (Central-Southern Philippines) (Figs 6-7, 36-39)

boseae (SAALMÜLLER, 1880) (*Ophideres*) African (Malagasy)
(*Ber. Senckenberg. naturf. Ges.* 1879-1880: 278)

Ref.: SAALMÜLLER (1891: pl. 8, fig. 134), GAEDE (1939-1940: pl. 38, row b).

Notes. Superficially this species resembles some American taxa (e.g. *anguina* SCHAUS, 1911, *collusoria* CRAMER, 1777).

cajeta (CRAMER, 1775) (*Phalaena Noctua*) Oriental; Wallacea?
(*Uitl. Kapellen* 1: 48) [the combination occurs in the original description]
= *Ophideres multiscripta* WALKER, [1858] (*List Specimens lepid. Insects Colln Br. Mus.* 13: 1226)
Ophideres muliscripta; CHEN, 1999 (*Fauna Sinica* Noct.: 1090) [misspelling]

Ref.: CRAMER (1775, in 1775-1776: pl. 30, figs A-C), MOORE (1881: pl. 13, figs 2-2a; 1885-1887: pl. 162, figs 1-1a), BARLOW ([1983]: pl. 35, fig. 1), BÄNZIGER (1985: 46, fig. 4 as *srivijayana*, 47, figs 7-8), CHEN (1999: pl. 56, fig. 7).

Notes. Records from Wallacea (e.g. Sulawesi) need to be properly identified after the separation of the similar *Eudocima srivijayana* (BÄNZIGER, 1985).

cocalus (CRAMER, 1777) (*Phalaena Noctua*) Indoaustralian (Figs 14-15, 50, 52)
(*Uitl. Kapellen* 2: 59) [the combination occurs in the original description, being shared with that of *Phalaena Noctua amphix* CRAMER, 1777]
= *Noctua maculata* WEBER, 1801 (*Observ. Ent.*: 111)
= *Ophideres plana* WALKER, [1858] (*List Specimens lepid. Insects Colln Br. Mus.* 13: 1226)
= *Rhytia (Ophideres) crepidolata* T.P. LUCAS, 1894 (*Proc. Linn. Soc. N.S. Wales* (2) 8: 149)
Rhytia cocale; HÜBNER, [1823] (*Verz. bekannter Schmett.*: 264) [unjustified emendation]
Ophideres crocale; PAGENSTECHER, 1896 (*Jb. Nassau. Ver. Naturkde* 49: 165) [misspelling]

Ref.: CRAMER (1777: pl. 134, fig. B), MOORE (1881: pl. 14, figs 5-5a, as *cocale*).

collusoria (CRAMER, 1777) (*Phalaena Noctua*) Neotropical
(*Uitl. Kapellen* 2: 116) [the combination occurs in the original description, being shared with that of *Phalaena Noctua perithea* CRAMER, 1777, and thence not just in the index (p. 148) as stated by POOLE (1989)]
Trissophaes collusaria; HÜBNER, [1823] (*Verz. bekannter Schmett.*: 264) [unjustified emendation]

Ref.: CRAMER (1777: pl. 172, fig. F), DRAUDT & GAEDE (1944: pl. 89, row a).

colubra (SCHAUS, 1911) (*Trissophaes*) Neotropical
(*Annls Mag. nat. Hist.* (8) 7: 189)

Ref.: DRAUDT & GAEDE (1944: pl. 88, row c).

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

discrepans (WALKER, [1858]) (*Ophideres*) Oriental; East-Palaearctic; Wallacea
(*List Specimens lepid. Insects Colln Br. Mus.* 13: 1227)
= *Ophideres archon* R. FELDER, 1874 (in FELDER C., FELDER R. & ROGENHOFER, *Reise Fregatte Novara* Lep.: pl. 113, fig. 3)

Ref.: FELDER (1874: pl. 113, fig. 3 as *archon*), MOORE (1881: pl. 14, fig. 1), BARLOW ([1983]: pl. 36, fig. 1).

Notes. POOLE (1989) ascribes the authorship of *Ophideres archon* to Cajetan FELDER, but the part of the work by FELDER C., FELDER R. & ROGENHOFER (1864-1875) comprising the plate from which the name dates is clearly credited in the relevant frontispiece only to Rudolf FELDER and Alois F. ROGENHOFER; moreover, as in the legend to the plate and in the relevant "Inhalts-Verzeichniss" the name is associated only with FELDER, ROGENHOFER clearly does not stand as author and authorship must therefore be attributed to Rudolf FELDER only.

dividens (WALKER, [1858]) (*Ophideres*) Oriental; Wallacea (Fig. 20)
(*List Specimens lepid. Insects Colln Br. Mus.* 13: 1228)

Ref.: BARLOW ([1983]: pl. 36, fig. 2).

Notes. On account of similarity of wing pattern, HOLLOWAY (in BARLOW, [1983]) delegated this species to *Eudocima* s.str., encompassing *E. salaminia* (CRAMER, 1777) and *E. nigricilia* (A.E. PROUT, 1924). Main differences with respect to these species reside in the pronounced sexual dimorphism, the female being here illustrated (Fig. 20), and the length of the third segment of the labial palpus, which is similar to that of species in other groups.

divitiosa (WALKER, 1869) (*Ophideres*) African
(*Proc. nat. Hist. Soc. Glasgow* (2) 1: 356)
= *Ophideres banakus* PLÖTZ, 1880 (*Ent. Ztg. Stettin* 41: 298)
= *Halastus intricatus* BUTLER, 1892 (*Annls Mag. nat. Hist.* (6) 9: 376)
=*Othreis divitosa*; BECCARI & GERINI, [1975] (*Cat. coll. ent.* Lepid.: 114) [misspelling]

Ref.: GUENÉE (1852: pl. 16, fig. 3, as *princeps*), WALKER (1869: pl. 7, fig. 11), GAEDE (1939-1940: pl. 38, row a), PINHEY (1975a: pl. 54, fig. 1126f, pl. 62, fig. 1126m).

euryzona (HAMPSON, 1926) (*Khadira*) African (Malagasy) (Figs 26-27, 63)
(*New genera species Noctuinae Br. Mus.*: 334)

Ref.: GAEDE (1939-1940: pl. 38, row a).

Notes. Except for the occurrence of some sexual dimorphism in the pattern, the overall habitus of this Madagascan endemic is largely reminescent of species of the *Eudocima tyrannus*–group, e.g. by the produced apex of the forewing. Nevertheless, the finding in the Museum für Naturkunde of Berlin of three specimens of this species poorly represented in collections (1•, 2 ••, S. Betseleo, Hildebrandt leg.) allowed to assess that it clearly belongs to the *Eudocima phalonia*-group. In fact, the shape of the valva, the juxta consisting of paired long nastriform processi and the compact vesica with thick lateral covering of needle-like basally-starry cornuti are well characteristic of this group (Figs 61-63).

formosa (GRIVEAUD & VIETTE, [1962]) (*Khadira*) African (Malagasy)
(*Bull. Acad. malgache* (n.s.) 38: 61)

Ref.: GRIVEAUD & VIETTE ([1962]: pl. fig. 8).

Notes. Judging from the original description, this species is probably misplaced in the genus *Eudocima*.

homaena (HÜBNER, [1823]) (*Othreis*) East-Palaearctic; Oriental; Wallacea
(*Verz. bekannter Schmett.*: 264)
= *Phalaena Noctua ancilla* CRAMER, 1777 (*Uitl. Kapellen* 2: 84, 147 [index]) [the combination occurs only in the index] [preoccupied by LINNAEUS, 1767]
= *Phalaena strigata* DONOVAN, [1804] (*Epitome Nat. Hist. Insects India*: [60])
= *Ophideres bilineosa* WALKER, [1858] (*List Specimens lepid. Insects Colln Br. Mus.* 13: 1227)
= *Othreis ancilla formosana* OKANO, 1964 (*Tohoku Konchu Kenkyu* 1: 43)
=*Othreis homaëna*; MOORE, 1881 (*Trans. zool. Soc. Lond.* 11: 67) [misspelling]
=*Othreis homoena*; HAMPSON, 1894 (*Fauna Brit. Ind.* Moths 2: 560) [misspelling]

Ref.: CRAMER (1777: pl. 149, fig. F, as *ancilla*), DONOVAN (1800-[1804]: pl. 54, fig. 2, as *strigata*), MOORE (1881: pl. 13, figs 3-3a, as *ancilla*; 1885-1887: pl. 161, figs 3-3a, as *ancilla*), OKANO (1964: pl. 4, figs 2-3, as *ancilla formosana*), BARLOW ([1983]: pl. 35, figs 3-4), CHEN (1982: pl. 109, fig.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

2596, as *ancilla*; 1999: pl. 56, figs 5-6), SUGI (1982: pl. 213, figs 3-4), HARUTA (1994: pl. 89, fig. 6), WANG (1994: 27).

hypermnestra (STOLL, 1780) (*Phalaena Noctua*) Oriental
(in CRAMER & STOLL, *Uitl. Kapellen* 4: 69) [the combination occurs in the original description]
Othreis hypermnestria; GARDNER, 1947 (*Trans. R. ent. Soc. Lond.* 98: 82) [misspelling]

Ref.: STOLL (1780, in CRAMER & STOLL, 1780-1782: pl. 323, figs A-B), MOORE (1881: pl. 14, figs 4-4a; 1885-1887: pl. 162, figs 3-3a), CHEN (1982: pl. 109, figs 2597; 1999: pl. 56, fig. 9), YOSHIMOTO (1995: pl. 115, figs 4-5).

imperator (BOISDUVAL, 1833) (*Ophideres*) African (Malagasy)
(*Faune ent. Madagascar, Bourbon et Maurice*, Lépid.: 99)

Ref.: BOISDUVAL ([1832], in GUERIN-MENEVILLE (1829-[1844]): pl. 89, fig. 1; 1833a: pl. 14, fig. 3), GAEDE (1939-1940: pl. 38, row b, sub [*Huebnerius*] *dux* nec row b *imperator*).

Notes. This species was described twice in the same year (BOISDUVAL, 1833a, 1833b) and firstly illustrated by BOISDUVAL ([1832]). The dating of the name is commonly credited to BOISDUVAL (1833a) (e.g. POOLE, 1989).

iridescens (T.P. LUCAS, 1894) (*Othreis (Ophideres)*) Australian
(*Proc. Linn. Soc. N.S. Wales* (2) 8: 148)
= *Ophideres pyrocrana* TURNER, 1908 (*Trans. Proc. Royal Soc. S. Austr.* 32: 63)

Ref.: COMMON (1990: pl. 20, fig. 2, female).

jordani (HOLLAND, 1900) (*Ophideres*) Australian
(*Novit. zool.* 7: 570)

Ref.: COMMON (1990: pl. 20, fig. 4).

kinabaluensis (FEIGE, 1976) (*Othreis*) Oriental
(*Ent. Z.* 86: 188)
=*Othreis kinabalensis*; STAUDINGER [manuscript name]

Ref.: FEIGE (1976:189, fig. 1), YOSHIMOTO (1999: 60, fig. 2), HOLLOWAY et al. (2001: 371, fig. 9).

kuehni (PAGENSTECHER, 1886) (*Ophideres*) [as *kühni*, incorrect original spelling] Australian (Papuan) (Fig. 21)
(*Jb. Nassau. Ver. Naturkde* 39: 137)
= *Lagoptera pratti* BETHUNE-BAKER, 1906 (*Novit. zool.* 13: 260)
=*Ophideres kühnii;* PAGENSTECHER, 1886 (*Jb. Nassau. Ver. Naturkde* 39: 194) [misspelling]

Ref.: PAGENSTECHER (1886: pl. 10, fig. 6, as *kühnii*).

Notes. Interestingly, this is the only one among sexually dimorphic species in which the male shows a more contrasted pattern than the female, here illustrated (Fig. 21). In fact, only the male sex bears outstanding white spotting in the discal field, probably entangling disruptive function. This fact was probably overlooked by PAGENSTECHER (1886), who incorrectly considered the specimen illustrated in the original description a female.

materna (LINNAEUS, 1767) (*Phalaena Noctua*) African; South-Palaearctic; Indoaustralian (Figs 18-19, 55-56, 59-60)
(*Syst. Nat.* (Edn 12) 1: 840)
= *Noctua hybrida* FABRICIUS, 1775 (*Syst. Ent.*: 593)
= *Ophideres chalcogramma* WALKER, 1865 (*List Specimens lepid. Insects Colln Br. Mus.* 33: 937)
[*Phalaena Noctua*] *maturna*; DRURY, 1773 (*Ill. nat. Hist.* 2 [Errata and Addenda]: ii [Index]) [misspelling]
Phalaena salaminca; FABRICIUS, 1781 (*Species Insect.* 2: 212) [misspelling based on a misidentification for *Phalaena Noctua salaminia* CRAMER 1777]
[*Phalaena*] *calaminea*; SMITH, 1893 (*Bull. U.S. natn Mus.* 44: 354) [misspelling based on a misidentification for *Phalaena Noctua salaminia* CRAMER 1777]

Ref.: DRURY (1773: pl. 13, fig. 4), WESTWOOD (1837: pl. 13, fig. 4), DUNCAN (1841: pl. 25, fig. 2), MOORE (1881: pl. 14, figs 3-3a; 1885-1887: pl. 161, fig. 2), PINHEY (1975a: pl. 54, fig. 1125f, pl. 62, fig. 1125m), HOLLOWAY (1977: pl. 23, fig. 10), COMMON (1990: pl. 20, fig. 1), WILTSHIRE (1990: 213, fig. 462), HARUTA (1993: pl. 50, fig. 4).

Notes. SMITH (1893) mentions an enigmatic "*calaminea* CRAMER, 1779 (Pap. Exot. 2: 95, pl. 74, fig. A)" as a synonym of *Phalaena Noctua materna* LINNAEUS, 1767 (although he was clearly dealing

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

about the American vicariant *E. apta* WALKER, [1858], see notes under this species) and was followed by several American authors (e.g. DYAR, 1902; HOLLAND, 1903; BARNES & MCDUNNOUGH, 1917; MCDUNNOUGH, 1938). Probably, SMITH's (1893) name is a misspelling based on a misidentification for *Phalaena Noctua salaminia* CRAMER, 1777 drawn from HÜBNER's ([1823]: 264) misspelling ("Maenas Salaminea"). In fact, SMITH's (1893) citation of the work by P. CRAMER is in all aspects incorrect, as plate 74 belongs to CRAMER's (1775-1776) Vol. 1 and there are no *Eudocima* specimens figured. Moreover, in none of the pages numbered "95", nor in other parts of the volumes by P. CRAMER and C. STOLL (CRAMER 1775-1776, 1777, 1779-1780; CRAMER & STOLL 1780-1782; STOLL 1787-1790) this name could be found.

mazzeii sp. n. Oriental (Northern Philippines) (Figs 1-2, 29-31, 34)

memorans (WALKER, [1858]) (*Ophideres*) Neotropical
(*List Specimens lepid. Insects Colln Br. Mus.* 13: 1220)

Ref.: DRAUDT & GAEDE (1944: pl. 89, row b).

mionopastea (HAMPSON, 1926) (*Othreis*) Oriental (Fig. 22)
(*New genera species Noctuinae Br. Mus.*: 335)
Othreis mniopastea; A.E. PROUT, 1928 (*Bull. Hill Mus.* 2: 266) [misspelling]

Notes. This species, showing no sexual dimorphism, seems exceptionally rare; hitherto known from Peninsular Malaysia and Borneo (HAMPSON, 1926; HOLLOWAY, 1976), it can be also recorded for Sumatra, on basis of a male specimen preserved in the Zoologische Staatssamlung of Munich (16 Km NE Sipirok, 1300 m, 21.VIII.1995, Stamer leg.)

muscigera (BUTLER, 1881) (*Purbia*) Australian (Figs 23-24)
(*Annls Mag. nat. Hist.* (5) 10: 230)

Notes. An eastern vicariant of *Eudocima discrepans* (WALKER, [1858]) characterised by a distinctly smaller size and sharing with this species a similar sexual dimorphism.

nigricilia (A.E. PROUT, 1924) (*Eumaenas salaminia* subsp.) Australian (Papuan) (Fig. 25)
(*Bull. Hill Mus.* 1: 449)

Notes. Raised to full species by HOLLOWAY (in BARLOW, [1983]), this new status was overlooked by POOLE (1989) who still dealt with *E. nigricilia* as a subspecies of *Eudocima salaminia* (CRAMER, 1777). The species appears as a sister of *E. salaminia* in New Guinea, where both occur. *E. nigricilia* is easily recognisable from *E. salaminia* by the hindwing pattern. The discal black spot is rounder and the black band extends completely to the distal margin without enclosing any marginal yellow spots (Fig. 25).

okurai (OKANO, 1964) (*Adris*) East-Palaearctic; Oriental (Figs 46-47)
(*Tohoku Konchu Kenkyu* 1: 44)
= *Adris suthepensis* BÄNZIGER & HONEY, 1984 (*Mitt. schweiz. ent. Ges.* 57: 173)

Ref.: OKANO (1964: pl. 4, fig. 4), BÄNZIGER & HONEY (1984: 175, fig. 7, as *suthepensis*), BÄNZIGER (1987: figs 6, 18; 1989: figs 6-7), HARUTA (1993: pl. 50, fig. 2), WANG (1994: 24).

Notes. SUGI (1992) lists *Othreis srivijayana* BÄNZIGER, 1985 as a synonym of *Adris okurai* OKANO, 1964, clearly in error for *Adris suthepensis* BÄNZIGER & HONEY, 1984. It is worth noting that in this species the shape of the juxta is very variable because of unconstancy in the number of apical teeth on the lateral processi, also at intrapopulational level (BÄNZIGER & HONEY, 1984; BÄNZIGER, 1987; ZILLI pers. obs.) (Figs 46-47).

paulii (ROBINSON, 1968) (*Othreis*) Australian (Fiji)
(*Ent. Rec. J. Var.* 80: 251)

Ref.: ROBINSON (1968: pl. 14, fig. [unnumbered]; 1975: fig. 137).

phalonia (LINNAEUS, 1763) (*Phalaena (N[octua])*) **comb. n.**, African; East-Palaearctic; Indoaustralian (Figs 61-62)
(*Centuria Insect. rariorum*: 28)
= [*Phalaena*] *fullonia* CLERCK, [1764] **syn. rev.** (*Icones Insect. rariorum* 2: pl. 48, figs 1-4)
= *Noctua dioscoreae* FABRICIUS, 1775 (*Syst. Ent.*: 593)
= *Phalaena Noctua pomona* CRAMER, 1776 (*Uitl. Kapellen* 1: 122 [1775], 154 [index] [1776]) [the combination occurs only in the index]
= *Ophideres obliterans* WALKER, [1858] (*List Specimens lepid. Insects Colln Br. Mus.* 13: 1229)
Phalaena (Attacus) fullonica; LINNAEUS, 1767 (*Syst. Nat.* [Edn 12] 1: 812) [misspelling]
Ophideres dioscorae; MOORE, 1877 (*Proc. zool. Soc. Lond.* 1877: 607) [misspelling]

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Noctua dioscoriae; HAMPSON, 1894 (*Fauna Brit. Ind.* Moths 2: 560) [misspelling]
Noctua discoreae; SWINHOE, 1900 (*Cat. East. Austral. Lepid. Heteroc.* 2: 174) [misspelling]
[*Noctua*] *dioscorea*; WARREN, 1913 (in SEITZ, *Gross-Schmett. Erde* 3: 361) [misspelling]
Noctua discoriae; ZHU & CHEN, 1963 (*Econ. Ins. fauna China* Noct. 1: 131) [misspelling]
Ophideres fullionica; PINHEY, 1975 (*Moths South. Africa*: 228) [misspelling]
Ophideres janetta; [manuscript name ?]

Ref.: CLERCK ([1764]: pl. 48, figs 1-4), SEBA (1765: pl. 42, figs 13-14, as *Phalaenae huius utraque facies colore & pictura convenit. Alae anticae, ex griseo rufae, duabus fasciolis albis, undulatis distinguuntur: posticae dilute flavae nigras gerunt maculas*), CRAMER (1775, in 1775-1776: pl. 77, fig. C, as *pomona*), DESMAREST ([1857]: pl. 14, fig. 1, as Ophidère empereur [viz. *imperator*, misidentification]), MOORE (1881: pl. 13, figs 1-1a, as *fullonica*), HAMPSON (1894: fig. 317, as *fullonica*), WARREN (1914: pl. 66, row c, as *fullonica*), SUGI (1959: pl. 99, fig. 2, as *fullonica*; 1982: pl. 213, figs 1-2), ZHU & CHEN (1963: pl. 8, fig. 164, as *fullonica*), SHIRÔZU & KUROKO (1966: pl. 50, fig. 3), BOORMAN (1970: 48, fig. 214), OGATA (1971: pl. 113, fig. 2395), LINSENMAIER (1972: 242, fig. 20, as *fullonica*), D'ABRERA (1974: 76, fig. [unnumbered]), LAITHWAITE et al. (1975: col. pl. fig. 392d), PINHEY (1975a: pl. 62, figs 1124a-b; 1975b: pl. 32, figs 232a-b), ROBINSON (1975: fig. 136), BARLOW ([1983]: pl. 35, figs 5-6), CHEN (1982: pl. 110, fig. 2598, as *fullonica*; 1999: pl. 56, fig. 8, as *fullonica*), COMMON (1990: pl. 20, fig. 8), CHEN et al. (1991: pl. 23, fig. 1), HARUTA (1993: pl. 50, fig. 3), WANG (1994: 26), KONONENKO et al. (1998: 431, figs 196a-b).

Notes. MIKKOLA & HONEY (1993) have shown that the name "*Phalaena Phalonia N.*" LINNAEUS, 1763 is a senior synonym of *([Phalaena]) fullonia* CLERCK, [1764], but considered LINNAEUS' name as unused and declared that the case would have to be referred to the International Commission of Zoological Nomenclature (ICZN) in order to maintain precedence of the junior synonym. They stressed also that until the decision by the Commission the current usage had to be followed. Nevertheless, this synonymy had already been explicited and LINNAEUS' name used as valid at least twice since 1899, namely by AURIVILLIUS (1925) and by GAEDE (1939-1940). Therefore, as the provisions of art. 23.9.1. of the Code (ICZN, 1999) for reversal of precedence are not met and the case was not referred to the ICZN till now, a strict application of priority must be followed. Accordingly, *phalonia* LINNAEUS, 1763 is here combined with *Eudocima* BILLBERG, 1820 as the valid name for the species currently known as *Eudocima fullonia* (CLERCK, [1764]). It is worth noticing that the close similarity of spelling between *phalonia* and *fullonia* strongly suggests that the latter name is a misspelling. Accordingly, in the interest of stability of nomenclature it would be preferable not to use as valid a name which could be judged at any time as unavailable.

Eudocima phalonia is a well known species of economic importance recorded from tropical and subtropical areas of Africa, Asia and Oceania (e.g. COCHEREAU, 1977). Further research should be done to establish whether or not two different allopatric taxa are involved whithin this nominal species. In fact, our investigations, albeit preliminary, indicate that West African (e.g. Ghana, Gabon, Guinea, Togo) and Indoaustralian (Malaysia, Solomon Islands) samples can be differentiated by the shape of the lateral processi of the juxta, which is distinctly narrower in the African populations (Figs 61-62). An overall more elongate-lanceolate shape of the forewing of African specimens is also evident

prattorum (A.E. PROUT, 1922) (*Othreis*) Wallacea
(*Bull. Hill Mus.* 1: 239)

Ref.: PROUT (1924: pl. 20, figs 6-7).

Notes. As already put forward by PROUT (1922) herself, this species shows several transitional characters between *Eudocima homaena* (HÜBNER, [1823]) and *E. iridescens* (T.P. LUCAS, 1894).

A note on the card index to scientific names of the Natural History Museum (London) suggests that the name *Noctua lucretia* DALMAN, 1823 might be a senior synonym of *Othreis prattorum* A.E. PROUT, 1922. It should be noticed that features of the pattern stated by DALMAN (1823) are not reconcilable with any species of *Eudocima*, e.g. forewings being white with gray and greenish suffusion, hindwings black with pale yellow median and marginal bands. Last but not least, *lucretia* is credited with a wingspan of less than 3 cm, which is far below the wingspan of any species in the genus. All the existing evidence therefore indicates that there is no relation between *Noctua lucretia* DALMAN, 1823 and *Eudocima*.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

procus (CRAMER, 1777) (*Phalaena Noctua*) Neotropical
(*Uitl. Kapellen* 2: 85, 150 [index]) [the combination occurs only in the index]
= *Ophideres scabellum* GUENÉE, 1852 (in BOISDUVAL & GUENÉE, *Hist. nat. Insectes*, Lépid. 7: 110)
= *Ophideres columbina* GUENÉE, 1852 (in BOISDUVAL & GUENÉE, *Hist. nat. Insectes*, Lépid. 7: 117)
Acacallis procax; HÜBNER, [1823] (*Verz. bekannter Schmett.*: 265) [misspelling]

Ref.: CRAMER (1777: pl. 149, fig. G), DRUCE (1881-1900: pl. 97, fig. 4, as *scabellum*), DRAUDT & GAEDE (1944: pl. 88, row c, as *scabellum* nec row a *procus*), LINSENMAIER (1972: 17, fig. 30, as *scabellum*), PIÑAS RUBIO & MANZANO PESANTEZ (1997: 113, fig. 683).

Notes. See under *Eudocima serpentifera* (WALKER, [1858]).

prolai sp. n. Australian (Papuan) (Figs 10-11, 40, 42-45)

salaminia (CRAMER, 1777) (*Phalaena Noctua*) African (Malagasy); East-Palaearctic; Indoaustralian
(*Uitl. Kapellen* 2: 117, 150 [index]) [the combination occurs only in the index]
Maenas salaminea; HÜBNER, [1823] (*Verz. bekannter Schmett.*: 264) [misspelling]
Noctua salamina; WALKER, [1858] (*List Specimens lepid. Insects Colln Br. Mus.* 13: 1225) [misspelling]
Ophideres atkinsoni; SCOTT, [1890] (*Austral. Lep. transformations* **2**: 6) [unavailable]

Ref.: CLERCK ([1764]: pl. 48, figs 5-6, unnamed), CRAMER (1777: pl. 174, fig. A), MOORE (1881: pl. 14, fig. 2, as *salaminea*; 1885-1887: pl. 161, fig. 1), FORDE & OLLIFF (1890-[1901]: pl. 11, fig. top left, as *atkinsoni* (plate), *salaminia* (legend)), WARREN (1914: pl. 66, row d), GAEDE (1939-1940: pl. 38, row a), VIETTE (1948: fig. 2), SUGI (1959: pl. 99, fig. 5; 1982: pl. 213, fig. 6), ZHU & CHEN (1963: pl. 8, fig. 167), ROBINSON (1975: fig. 127), CHEN (1982: pl. 110, fig. 2601; 1999: pl. 56, fig. 12), COMMON (1990: pl. 20, fig. 3), HARUTA (1993: pl. 50, fig. 5), WANG (1994: 28), KONONENKO et al. (1998: 431, fig. 195).

Notes. The type locality is wrong (Suriname). POOLE (1989) assumes as type locality China.

serpentifera (WALKER, [1858]) (*Ophideres*) Neotropical
(*List Specimens lepid. Insects Colln Br. Mus.* 13: 1218)
= *Ophideres raphael* A. DUGES, 1896 (*La Naturaleza* (2) 2: 456)

Ref.: DUGES (1896: pl. 28, figs 1-6, as *raphael*), DRUCE (1881-1900: pl. 31, fig. 14), (DRAUDT & GAEDE (1944: pl. 88, row a, sub *procus* nec row b *serpentifera*, pl. 89, row c, sub *apta* [aberration?])

Notes. A dramatic mislabelling of figures by DRAUDT & GAEDE (1944) originated several misconceptions in the identification of museum specimens. In the plates they named *serpentifera* as *procus*, *apta* as *serpentifera*, *procus* with the junior synonym *scabellum* and a presumably freak specimen of *serpentifera* as *apta*.

sikhimensis (BUTLER, 1895) (*Adris*) Oriental (Figs 3-5, 32-33, 35)
(*Annls Mag. nat. Hist.* (6) 15: 126)
= *Othreis abathyglypta* A.E. PROUT, 1928 (*Bull. Hill Mus.* 2: 264)
Adris sikkimensis; A.E. PROUT, 1928 (*Bull. Hill Mus.* 2: 265) [misspelling]

Ref.: BÄNZIGER (1985: 48, figs 10-17), HARUTA (1994: pl. 89, fig. 4).

Notes. The species is not listed by POOLE (1989). The synonymy was eventually established by BÄNZIGER (1985), although already envisaged by PROUT (1928) herself, as she was aware of diagnosing *E. abathyglypta* on subtle differences, namely a slightly shorter concavity along the anal margin of the forewing and a much less strongly tufted third segment of the palpus in the male, which could not be further substantiated (e.g. BÄNZIGER, 1985). In a later paper, BÄNZIGER (1989) was apparently thoughtful about the different number of records between the species and its suspected foodplants (Berberidaceae) from the Himalayas to the lesser Sunda islands and, accordingly, suggested well up to six hypotheses to account for such a discrepancy. One of these would have bearing on the taxonomy of the species, as it depicts the scenario of two sibling species with identical genitalic configuration that show parapatric distribution and are adapted to different plants (viz. western "*sikhimensis*" on Lardizabalaceae and/or Berberidaceae, and eastern "*abathyglypta*" on Menispermaceae). Even if parallel situations have been documented in the Lepidoptera, there is no necessary relation between frequency of a species and its foodplant, due to the wide array of ecological and biogeographical factors acting as determinants for both the occurrence and abundance of any species. Moreover, geographic variability of hostplant preference is a well-known phenomenon in the Lepidoptera (e.g. SINGER, 1971; RAUSHER, 1982; FUTUYMA, 1983; SCRIBER, 1983, 2002 and references therein; THOMPSON, 1988a, 1988b; NITEO et al. 1991; ZILLI & RACHELI, 1982), and the fact that the actual foodplants of *E. sikhimensis* have never been assessed leaves any hypothesis in the field of speculation.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

smaragdipicta (WALKER, [1858]) (*Ophideres*) Oriental
(*List Specimens lepid. Insects Colln Br. Mus.* 13: 1229)
= *Ophideres sultana* SNELLEN, 1886 (*Tijdschr. Ent.* 29: 39)
Ref.: SNELLEN (1886: pl. 1, fig. 5), FEIGE (1976: 189, fig. 2), BARLOW ([1983]: pl. 35, fig. 2).
splendida (YOSHIMOTO, 1999) (*Othreis*) Oriental
(*Trans. Lepid. Soc. Jap.* 50: 60)
Ref.: YOSHIMOTO (1999: 60, fig. 1).
srivijayana (BÄNZIGER, 1985) (*Othreis*) Oriental; Wallacea?
(*Heter. sumatr.* 2: 42)
Ref.: BÄNZIGER (1985: 46, fig. 5, as *cajeta*; 47, fig. 9).
Notes. The species is not listed by POOLE (1989). From the original description and illustrations, it looks evident that the legends to figures 4-5 by BÄNZIGER (1985: 46-47) are reversed. See also notes under *E. okurai* and *E. cajeta*.
talboti (A.E. PROUT, 1922) (*Othreis cajeta* subsp.) Wallacea
(*Bull. Hill Mus.* 1: 238)
Ref.: BÄNZIGER (1985: 46, fig. 6).
Notes. Raised to full species by BÄNZIGER (1985), a change of status not recorded by POOLE (1989).
toddi (ZAYAS, 1965) (*Othreis*) Neotropical (Antillean)
(*Poeyana* (A) 5: 1)
Ref.: [ALBAÑIR] (1961), ZAYAS (1965: 6, fig. 1), ALAYO & VALDÉS ARTEAGA (1980: 2, fig. A).
Notes. The species is endemic to Cuba (ZAYAS 1965, ALAYO & VALDÉS ARTEAGA 1980, FONTENLA RIZO & VÁSQUEZ MORENO 1988).
treadawayi sp. n. Oriental (Philippines) (Figs 12-13, 28, 49, 51)
tyrannus (GUENÉE, 1852) (*Ophideres*) East-Palaearctic; Oriental (Fig. 48)
(in BOISDUVAL & GUENÉE, *Hist. nat. Insectes* Lépid. 7: 110)
= *Ophideres tyrannus amurensis* STAUDINGER, 1892 (in ROMANOFF, *Mém. Lépid.* 6: 581)
Ophideres tyranus; ZHU & CHEN, 1963 (*Econ. Ins. fauna China* Noct. 1: 169) [misspelling]
Ref.: MOORE (1881: pl. 13, fig. 5), WARREN (1914: pl. 66, rows c-d), SUGI (1959: pl. 99, fig. 3; 1982: pl. 213, fig. 5), ZHU & CHEN (1963: pl. 8, fig. 168), Shirôzu & KUROKO (1966: pl. 50, fig. 2), OGATA (1971: pl. 113, fig. 2396), BECCARI & GERINI ([1975]: pl. 12, fig. 4), CHEN (1982: pl. 110, fig. 2600; 1999: pl. 56, fig. 4), BÄNZIGER (1987: figs 7, 19), CHEN et al. (1991: pl. 22, fig. 13), HARUTA (1993: pl. 50, fig. 1), WANG (1994: 25), KITCHING & RAWLINS (1998: 368, fig. K), KONONENKO et al. (1998: 431, fig. 197).
Notes. Populations from the northern parts of the species' range (*amurensis* STAUDINGER, 1892), e.g. Northern China, Amur, Korea, Japan, show a distinctly large "comma"-shaped discal spot on the hindwing, while those from the southern districts, e.g. Nepal, Sichuan, Taiwan, tend to show a smaller and "8"-shaped spot, which occasionally approaches the shape characteristic of that of *E. okurai* (OKANO, 1964). Nevertheless, there seems to exist a clear continuous transition between the two forms.

Unrecognised nominal taxa

Phalaena [Noctua] felicia STOLL, 1790

(*[Phalaena] felicia* STOLL, 1790, *Aanhang. Uitl. Kapellen* 2: 58)

POOLE (1989) lists in the genus *Eudocima* also "*Phalaena Noctua felicia* STOLL, 1790", an unrecognised species from Suriname (STOLL, 1790, in 1787-1790: 55 [note]). As based on the original illustration (STOLL, 1790, in 1787-1790: p. 58, pl. 12, fig. 11), size and pattern of this species totally disagree with any member of the genus and it can be therefore concluded that *Phalaena Noctua felicia* STOLL, 1790 does not belong to this group of the Noctuidae.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Ophideres princeps BOISDUVAL, 1832

(*Voyage de Découvertes de l'Astrolabe* Ent. 1: 245)

Original description (BOISDUVAL, 1832): "Alis anticis nebulosis fuscis nigro conspersis virescenti subvariatis; punctis quatuor albis geminatis; posticis luteis macula media reniformi fasciaque marginali nigris fimbriaque albido secta. Ailes supérieures noirâtres, un peu nébuleuses, saupoudrées de noir, et un peu variées de verdâtre, avec quatre points blancs, groupés deux à deux; les inférieures jaunes, avec une tache réniforme et une bordure noire, et la frange entrecoupée de blanchâtre. Elle est de la taille de *Materna*, de CRAMER. Nouvelle-Guinée, environs de Dorey.".

In addition to correctly recognising the misidentification on *Ophideres princeps* BOISDUVAL, 1832 made by GUENÉE (1852), who in reality described and depicted the African species *Ophideres divitiosa* WALKER, 1869, BUTLER (1892) suggested also that BOISDUVAL's (1832) name is a junior subjective synonym of *Phalaena (N) phalonia* LINNAEUS, 1763 (cited as '*O. fullonica*'), as it still stands in nomenclature (POOLE, 1989). However, identification of BOISDUVAL's species is ambiguous, as none of the known species of *Eudocima*, particulary those occurring in the Papuan region (viz. *aurantia, cocalus, iridescens, jordani, kuehni, materna, muscigera, nigricilia, phalonia,* and *salaminia*), including the new one here described (*prolai*), comfortably fits with the original description by BOISDUVAL (1832). For example, the blackish forewings with two pairs of white spots are reminescent of the male of *kuehni* or the female of *cocalus*, and not of *phalonia*, but the hindwings of *kuehni* and *cocalus* are devoid of the black discal spot that BOISDUVAL stated to occur in *princeps*. In the generic diagnosis of *Ophideres* BOISDUVAL, 1832, provided by the author, is reported an additional character which must therefore relate to its type-species, viz. *princeps*, i.e. the last segment of palpus long and distally dilated as a spoon (BOISDUVAL, 1832), but the absence of any indication on the extent of this dilatation does not allow to properly appreciate it.

Several misconceptions further relate to this nominal taxon, such as MOORE's (1881), reporting that *Ophideres princeps* would have been described by BOISDUVAL from Brazil, and HOLLAND's (1920), who realised that *Ophideres princeps* sensu GUENÉE, 1852 was an African species but separately listed also *Ophideres divitiosa* WALKER, 1869, probably failing to recognise the sexual dimorphism in this species. "African" records of *princeps* sensu Guenée, 1852 were also given by WALKER ([1858]).

Ophideres caesar C. FELDER, 1861

(*Sitz. k. Akad. Wiss. Wien* 43: 41)

Original description (FELDER, 1861): "Alis anticis supra saturate ferrugineis, glauco-violascenti variis, vitta lata discali medio subangulata, in ~e lunula etiam postica adjecta virescentibus, subtus fuscescentibus, violaceo suffusis, limbo interno fasciaque discali abbreviata lutescentibus, posticis utrinque pallide luteis, limbo terminali fusco subtus violaceo tincto. Coll. FELDER. – Species venusta, magnitudine *O. Proci* CRAM., signaturis alarum anticarum *O. Ancillae* CRAM. similis.".

Since FELDER's (1861) description, *Ophideres caesar* has remained an unidentified species, at the most routinely recorded from its type locality (Amboina) in faunal catalogues (PAGENSTECHER, 1884, 1888). The type locality and the original description are apparently in accordance with *Othreis prattorum* A.E. PROUT, 1922 (type locality: Ceram, Manusela), which makes it possible that *Ophideres caesar* becames a senior synonym of this name.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Fig. 1: *Eudocima mazzeii* sp. n., ♂-Holotype, Philippines, Luzon, Banaue.

Fig. 2: *Eudocima mazzeii* sp. n., ♀-Paratype, Philippines, Luzon, Banaue.

Fig. 3: *Eudocima sikhimensis* (BUTLER, 1895) ♂, Sumatra, Gunung Malayu.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Fig. 4: *Eudocima sikhimensis* (BUTLER, 1895) ♀, Malaysia, Cameron Highlands.

Fig. 5: *Eudocima sikhimensis* (BUTLER, 1895) ♀, Malaysia, Genting Highlands.

Fig. 6: *Eudocima behouneki* sp. n., ♂-Holotype, Mindanao, Mt. Apo.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Fig. 7: *Eudocima behouneki* sp. n., ♀-Paratype, Mindanao, Mt. Apo.

Fig. 8: *Eudocima bathyglypta* (A.E. PROUT, 1928) ♀, Malaysia, Cameron Highlands.

Fig. 9: *Eudocima bathyglypta* (A.E. PROUT, 1928) ♂, Sumatra, Aek Nauli.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Fig. 10: *Eudocima prolai* sp. n., ♂- Holotype, Irian Jaya, Star Mountains, Abmisibil.

Fig. 11: *Eudocima prolai* sp. n., ♀- Paratype, Papua New Guinea, Fane.

Fig. 12: *Eudocima treadawayi* sp. n., ♂- Paratype, Philippines, Leyte, Hinaban.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Fig. 13: *Eudocima treadawayi* sp. n., ♀-Holotype, Philippines, Leyte, Mt. Balocaue.

Fig. 14: *Eudocima cocalus* (CRAMER, 1777) ♂, Sumatra.

Fig. 15: *Eudocima cocalus* (CRAMER, 1777) ♀, Philippines, Negros, Mt. Canlaon.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

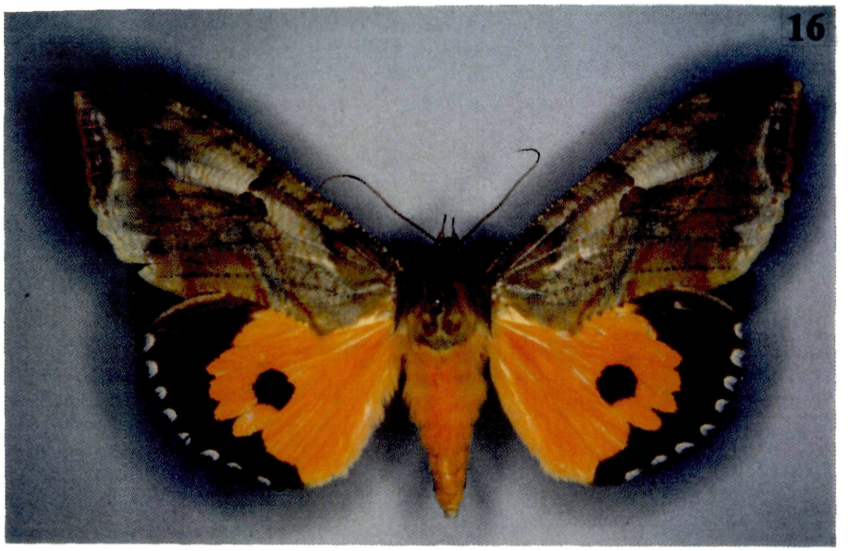


Fig. 16: *Eudocima apta* (WALKER, [1858]) ♂, Venezuela, Rancho Grande.

Fig. 17: *Eudocima apta* (WALKER, [1858]) ♀, Venezuela, La Victoria.

Fig. 18: *Eudocima materna* (LINNAEUS, 1767) ♂, Ghana, Accra.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

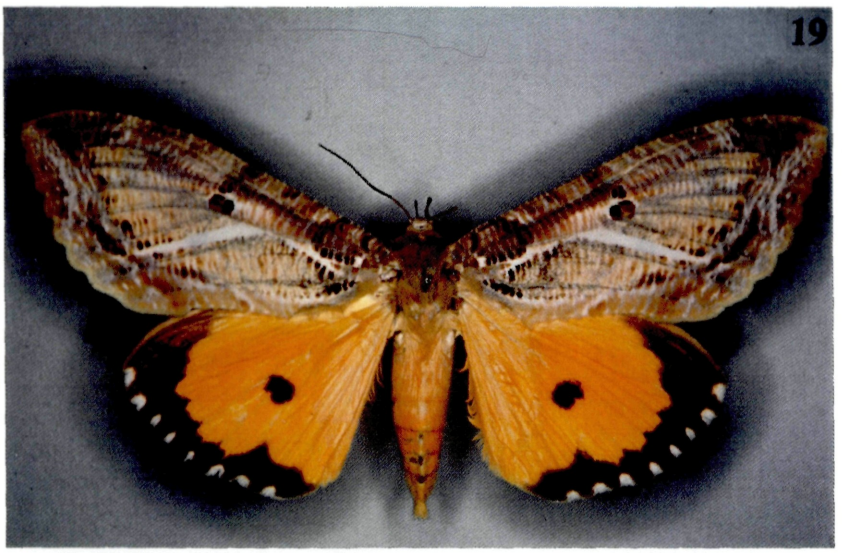


Fig. 19: *Eudocima materna* (LINNAEUS, 1767) ♀, Ghana, Accra.

Fig. 20: *Eudocima dividens* (WALKER, [1858]) ♀, Malaysia, Genting Highlands.

Fig. 21: *Eudocima kuehni* (PAGENSTECHER, 1886) ♀, New Guinea.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Fig. 22: *Eudocima mionopastea* (HAMPSON, 1926) ♀, Malaysia, Cameron Highlands.

Fig. 23: *Eudocima muscigera* (BUTLER, 1881) ♂, Irian Jaya, Arso district, Uskwar.

Fig. 24: *Eudocima muscigera* (BUTLER, 1881) ♀, Irian Jaya, Waris district, Ampas.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Fig. 25: *Eudocima nigricilia* (A.E. PROUT, 1924) ♀, Irian Jaya, Mabilabol.

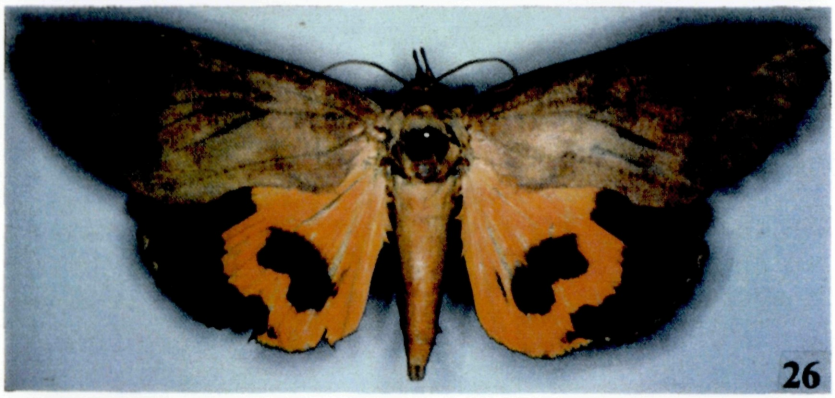


Fig. 26: *Eudocima euryzona* (HAMPSON, 1926) ♂, Madagascar, St. Betseleo.

Fig. 27: *Eudocima euryzona* (HAMPSON, 1926) ♀, Madagascar, St. Betseleo.

Fig. 28: *Eudocima treadawayi* sp. n., ♀-Paratype, Philippines, Negros, Mt. Canlaon.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

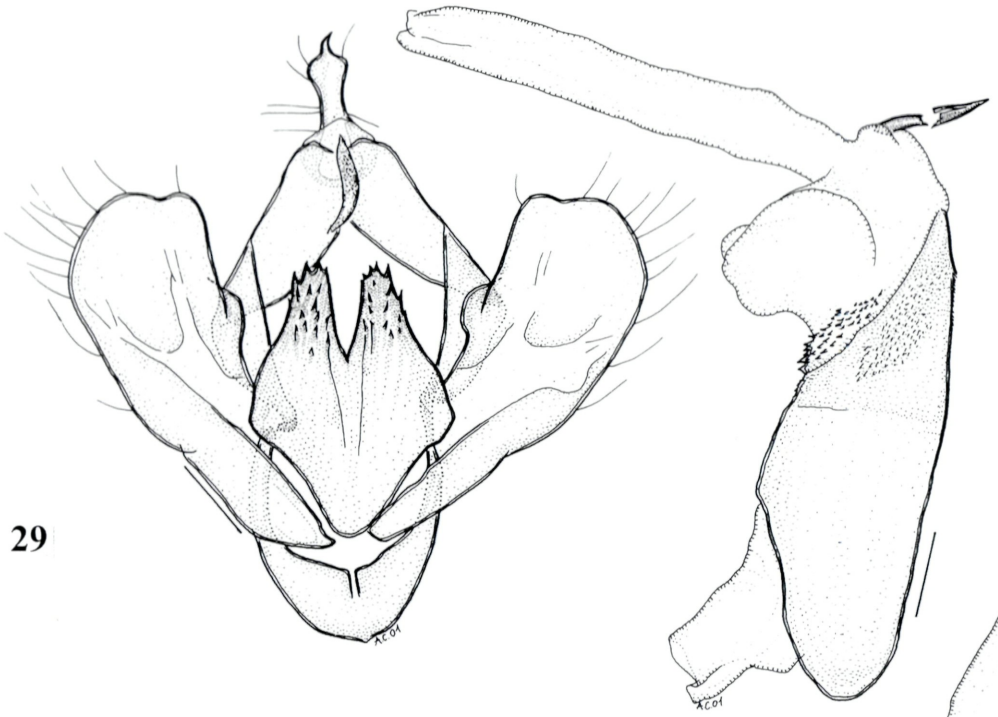
Figs. 29-31 Male genitalia of *Eudocima mazzeii* sp. n., Philippines (scale bar = 1 mm):

Fig. 29 Holotype, Luzon, Banaue.

Fig. 30 Paratype, idem.

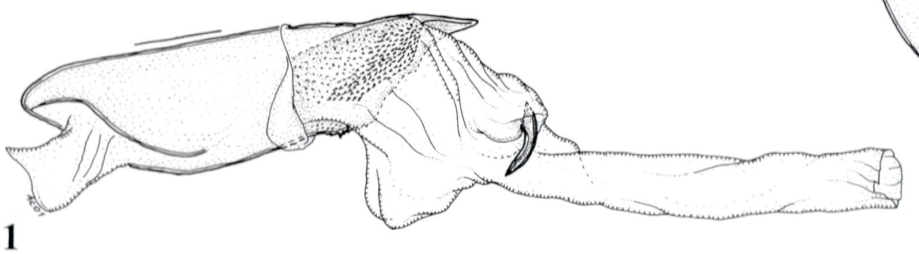
Fig. 31 Paratype (aedeagus only), Luzon, Mt. Amagao.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at



29

30



31

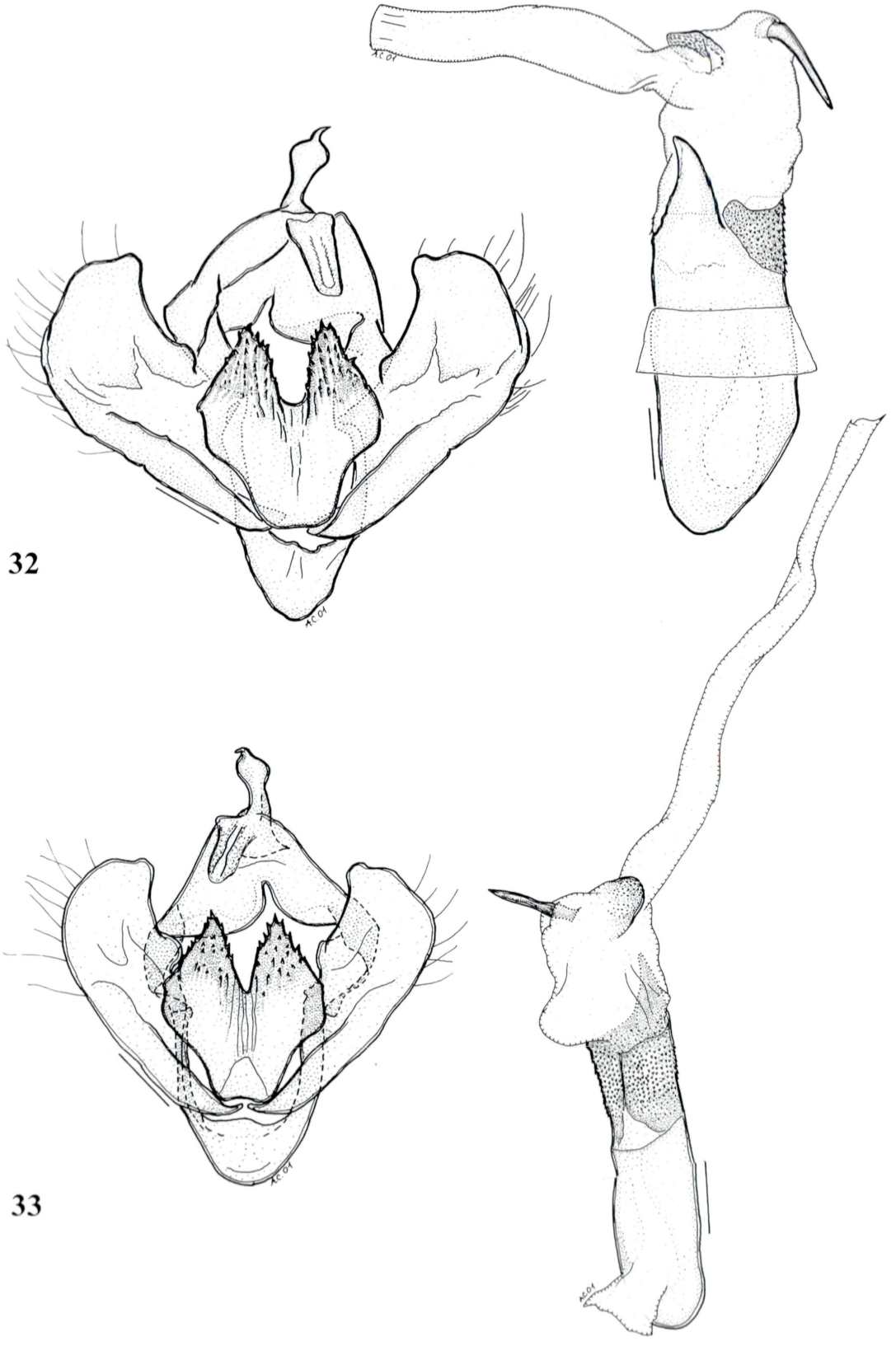
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 32-33 Male genitalia of *Eudocima sikhimensis* (BUTLER, 1895) (scale bar = 1 mm):

Fig. 32 Malaysia, Genting Highlands.

Fig. 33 Sumatra, Dolok Merangir.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at



32

33

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 34-35 Female genitalia of *Eudocima* Hübner (scale bar = 1 mm):

Fig. 34 *E. mazzeii* sp. n., Paratype, Philippines, Mindoro, Mt. Halcon.

Fig. 35 *Eudocima sikhimensis* (BUTLER, 1895), Malaysia, Cameron Highlands.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

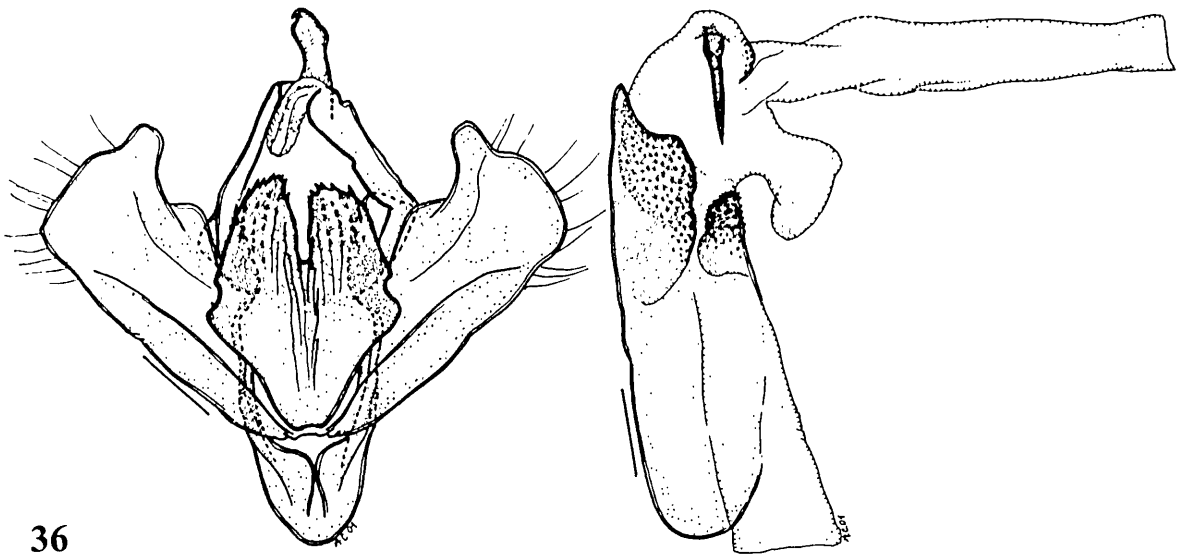
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 36-37 Male genitalia of *Eudocima behouneki* sp. n., Philippines (scale bar = 1 mm):

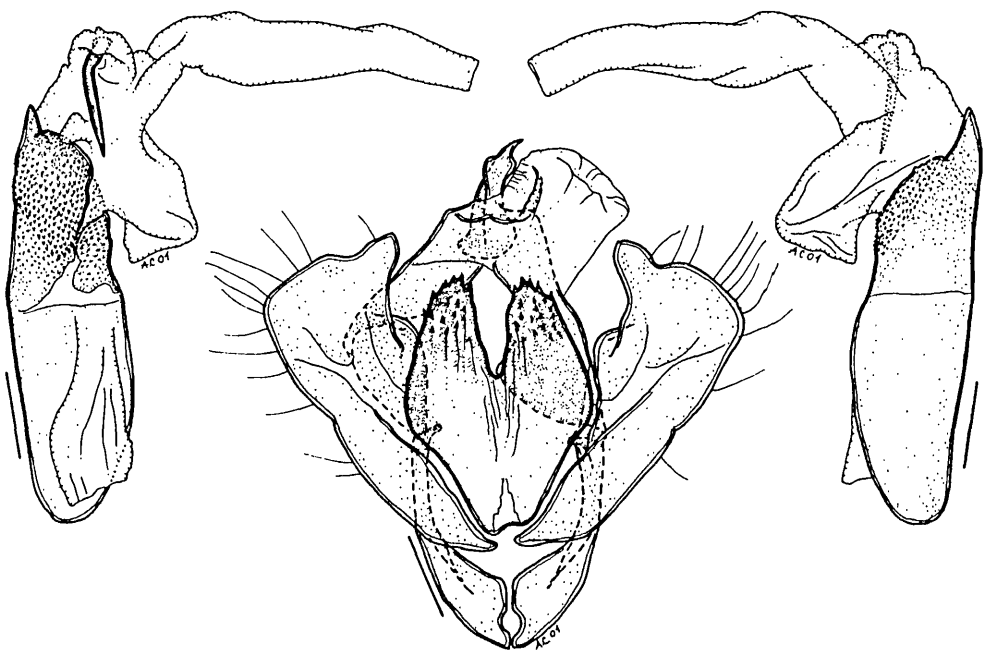
Fig. 36 Holotype, Mindanao, Mt. Apo.

Fig. 37 Paratype, idem.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at



36



37

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 38-40 Female genitalia of *Eudocima* Hübner (scale bar = 1 mm):

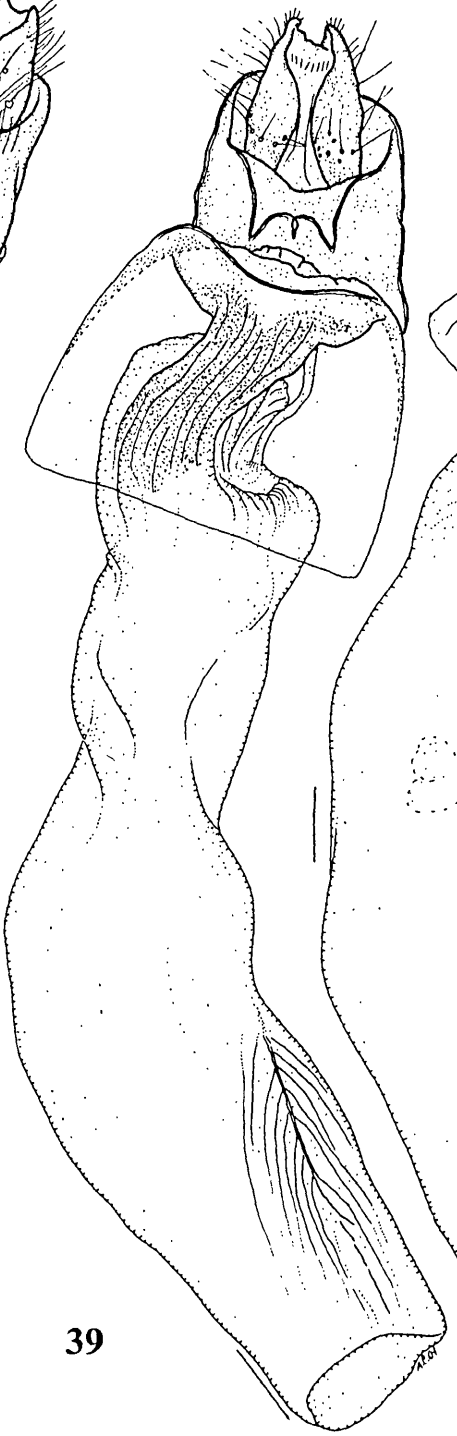
Fig. 38 *E. behouneki* sp. n., Paratype, Philippines, Panay, Mt. Banag.

Fig. 39 idem, Paratype (sternum A7 removed), Mindanao, Mt. Apo.

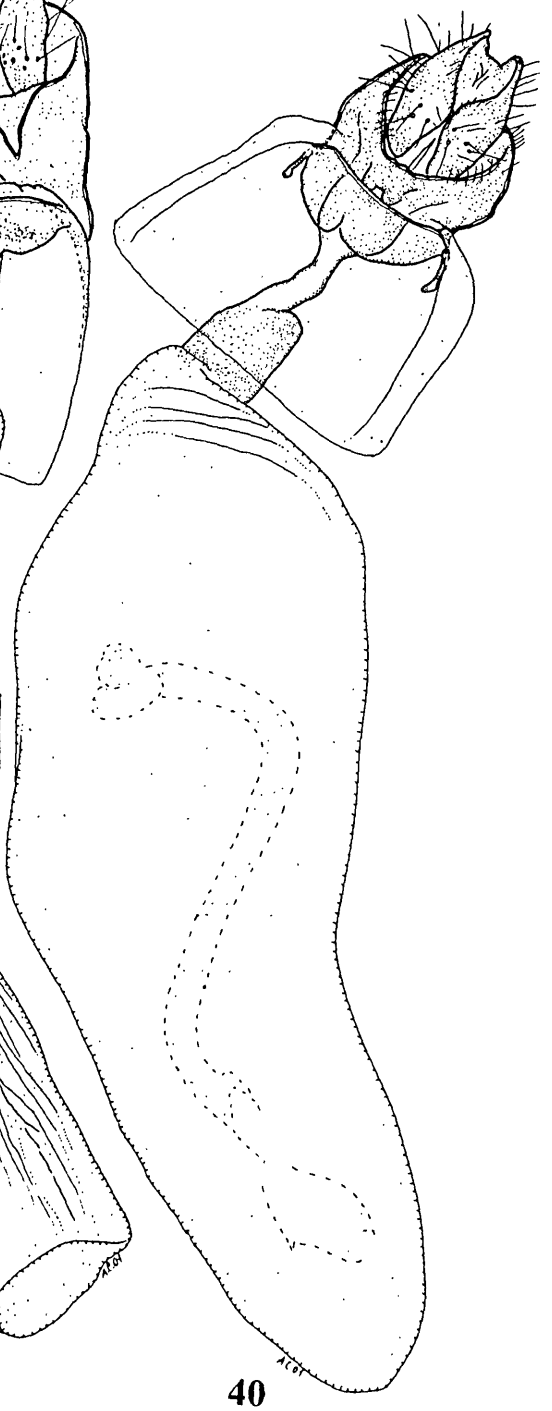
Fig. 40 *E. prolai* sp. n., Paratype, Papua New Guinea, Fane.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

38



39



40

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 41-45 Male genitalia of *Eudocima* Hübner (scale bar = 1 mm):

Fig. 41 *E. bathyglypta* (A.E. PROUT, 1928), Sumatra, Aek Nauli.

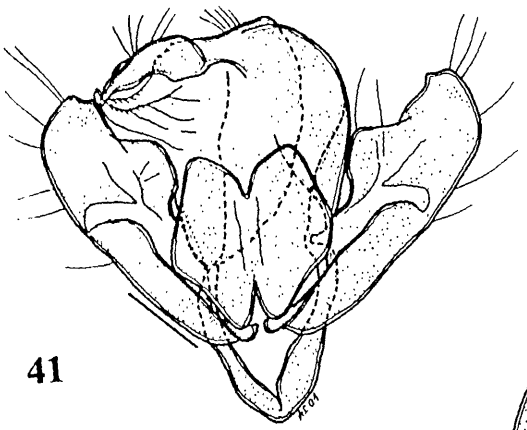
Fig. 42 *E. prolai* sp. n., Holotype, Irian Jaya, Abmisibil.

Fig. 43 idem, Paratype (juxta only), Irian Jaya, Keerom Rivier.

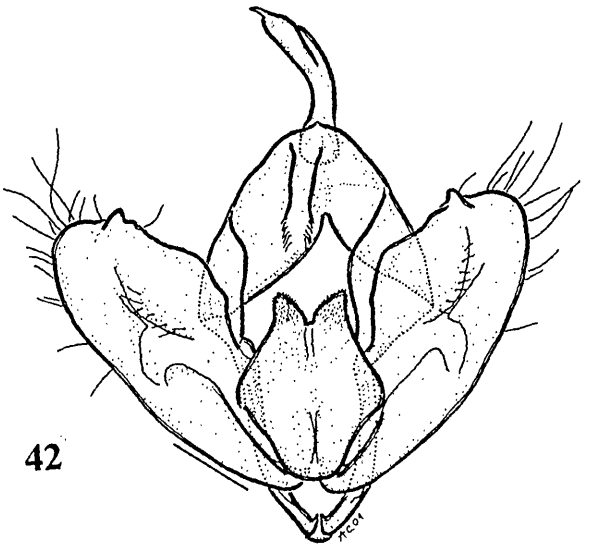
Fig. 44 idem, Paratype, Papua New Guinea, Fane.

Fig. 45 idem, Paratype (juxta only), idem.

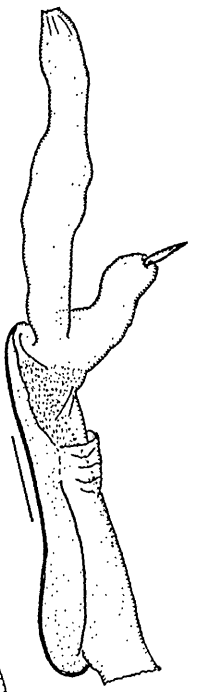
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

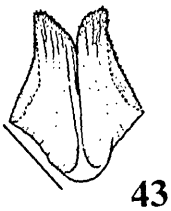


41

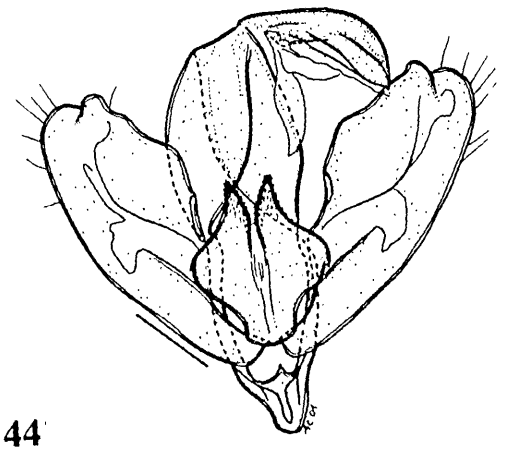


42

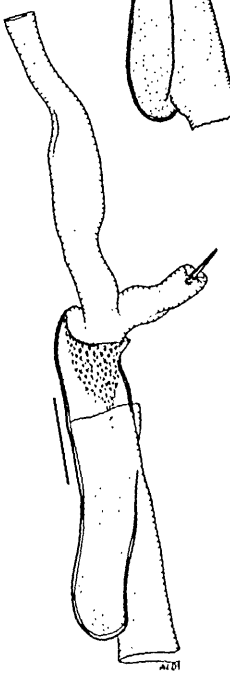




43



44



45

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 46-47 Male genitalia of *Eudocima okurai* (OKANO, 1964), Malaysia (scale bar = 1 mm):

Fig. 46 Cameron Highlands (aedeagus omitted).

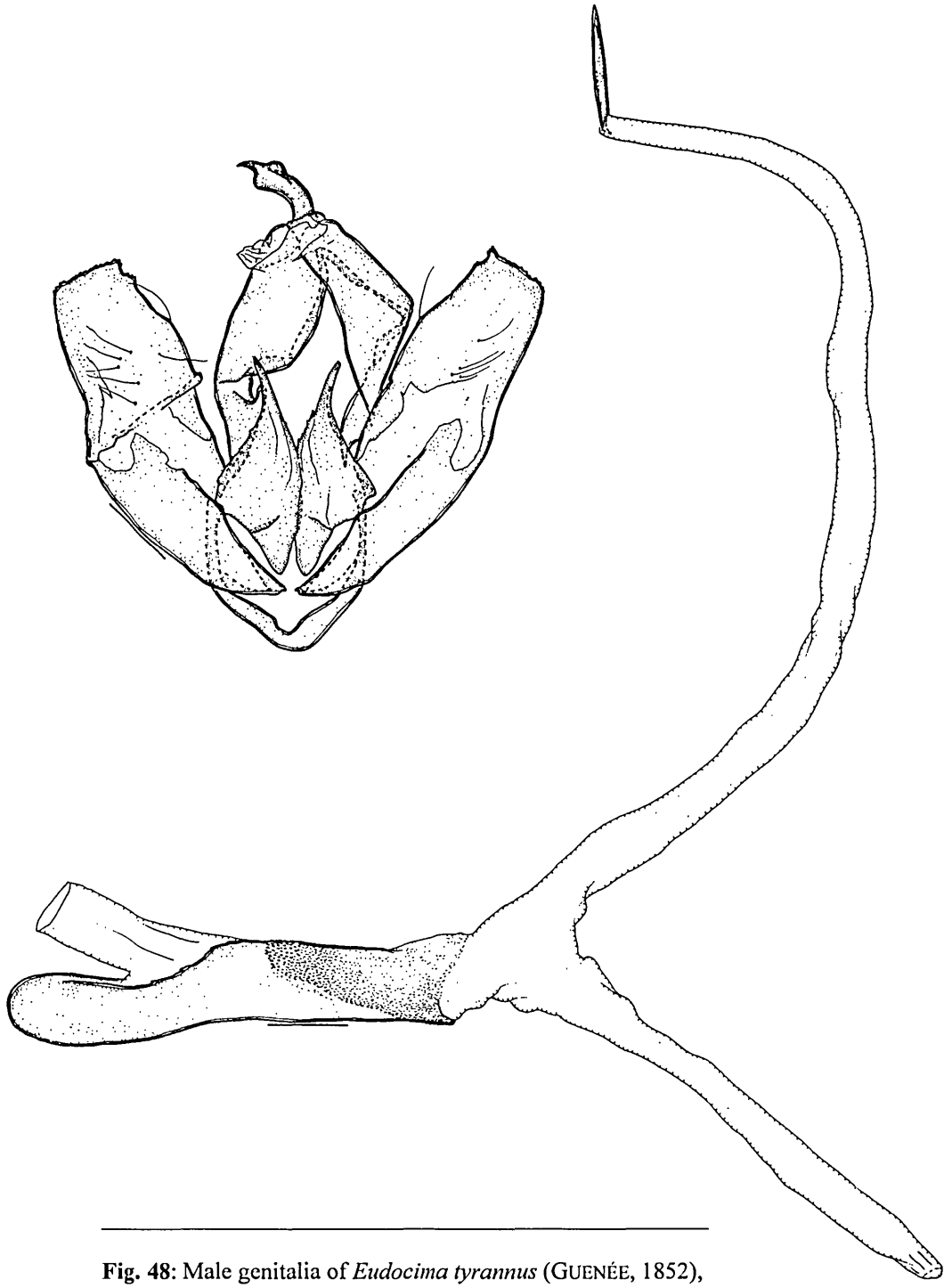
Fig. 47 Genting Highlands (juxta and aedeagus).

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

46

47

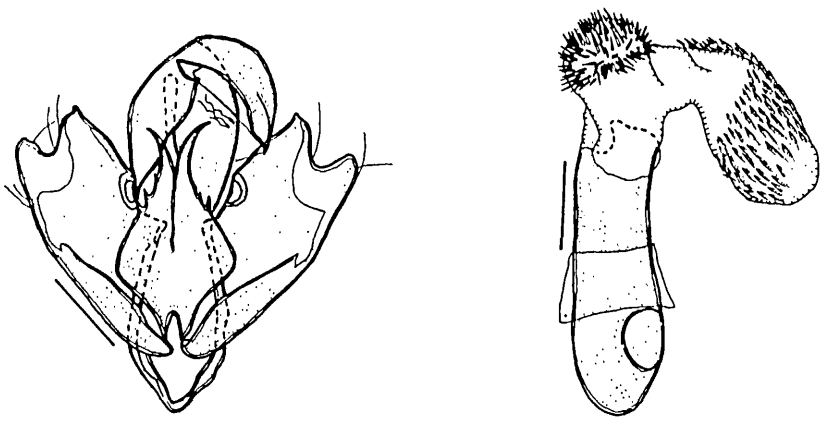
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at



48

Fig. 48: Male genitalia of *Eudocima tyrannus* (GUENÉE, 1852), China, Sichuan, 30 Km E of Wolong (scale bar = 1 mm).

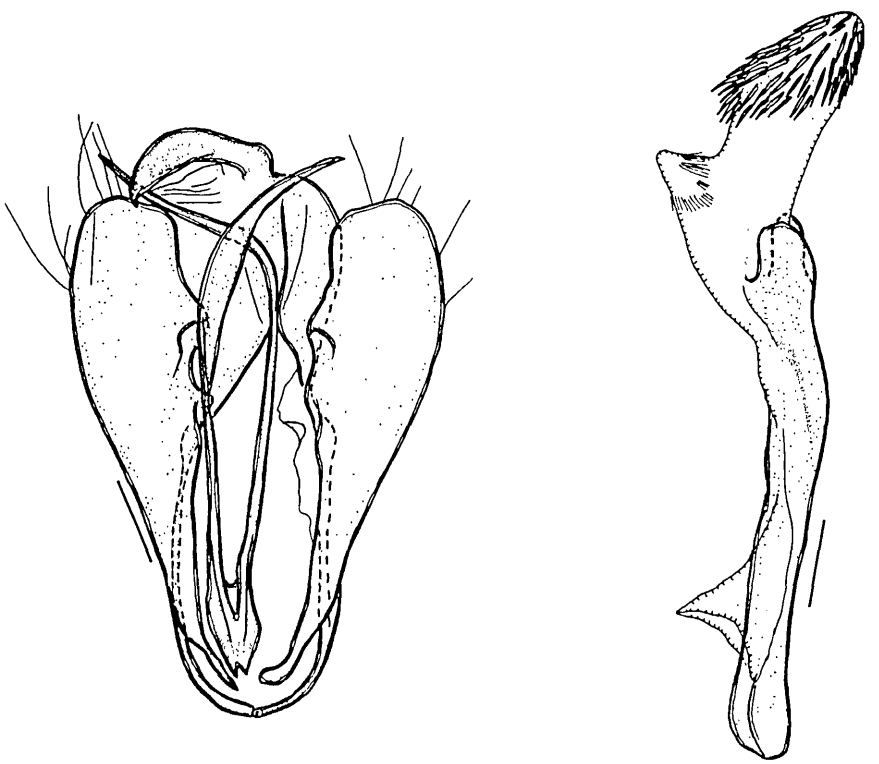
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at



49

Figs. 49-50 Male genitalia of *Eudocima* Hübner (scale bar = 1 mm):

Fig. 49 *E. treadawayi* sp. n., Paratype, Philippines, Leyte, St. Bernard, Catmon.



50

Fig. 50 *E. cocalus* (CRAMER, 1777), Java, Meru-Betiri, 25 Km S of Kalibaru.

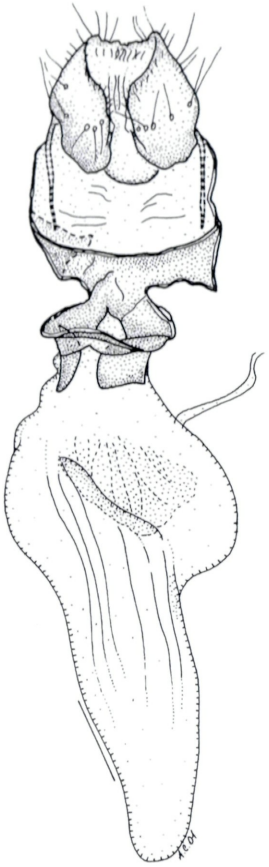
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 51-52 Female genitalia of *Eudocima* Hübner, Philippines (scale bar = 1 mm):

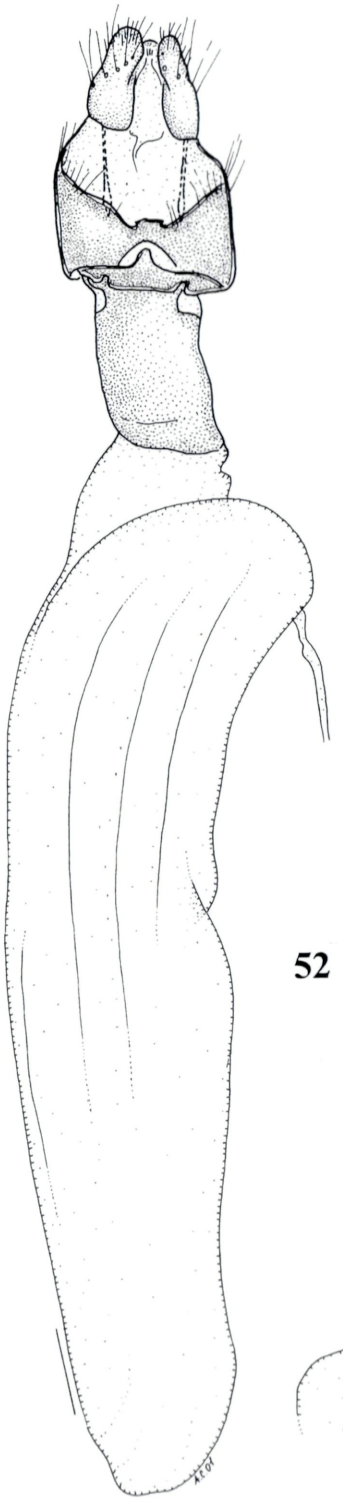
Fig. 51 *E. treadawayi* sp. n., Holotype, Leyte, Mt. Balocaue.

Fig. 52 *E. cocalus* (CRAMER, 1777), Sulu Archipelago, Sanga.

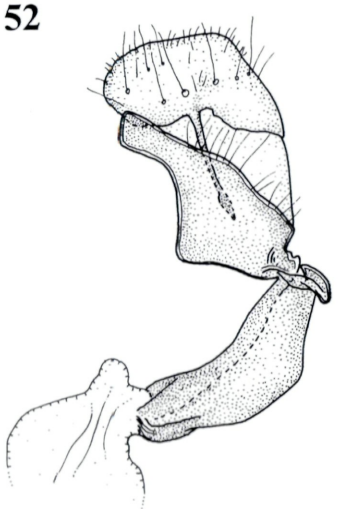
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at



51



52



©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 53-56 Male genitalia of *Eudocima* Hübner (aedeagi) (scale bar = 1 mm):

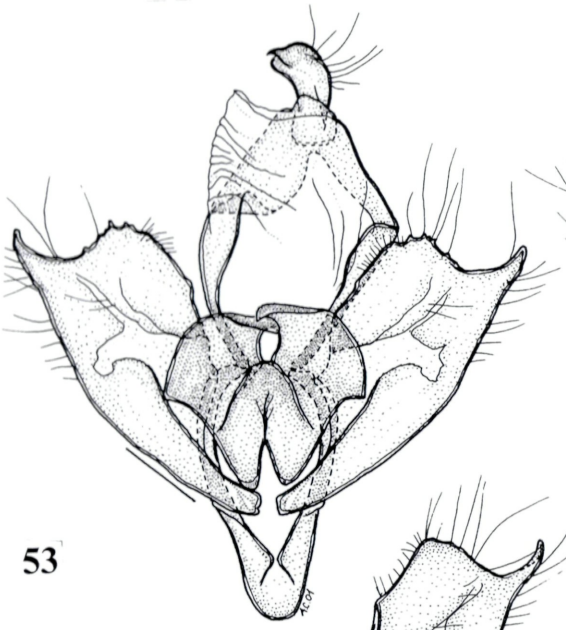
Fig. 53 *E. apta* (WALKER, [1858]), Brasil, Obidos.

Fig. 54 idem (right valva only), Venezuela, Rancho Grande.

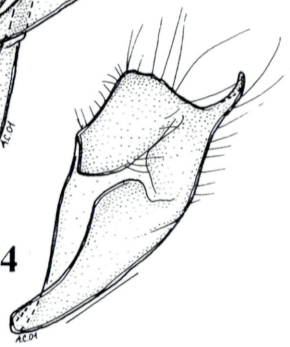
Fig. 55 *E. materna* (LINNAEUS, 1767), Togo, Kloto.

Fig. 56 idem (right valva only), Cameroon, Douala.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

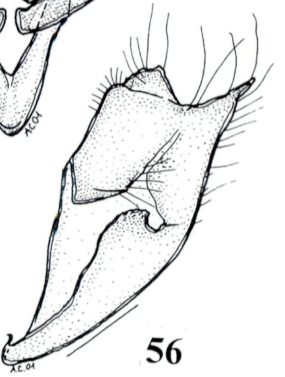


53

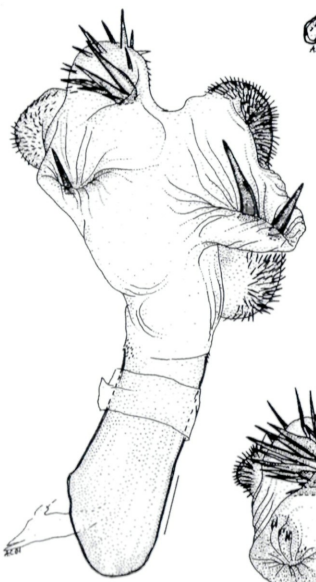


54

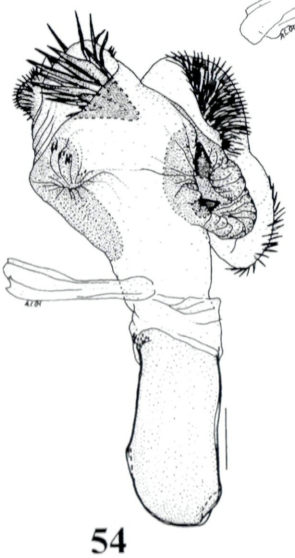
55



56

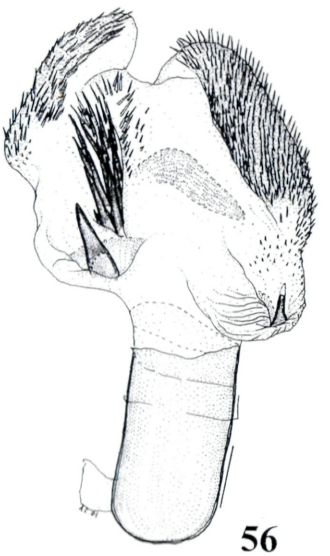


53



54

55



56

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 57-60 Bursae copulatrices and cervical plates of *Eudocima* Hübner (scale bar = 1 mm):

Fig. 57 *E. apta* (WALKER, [1858]), Brasil, Obidos.

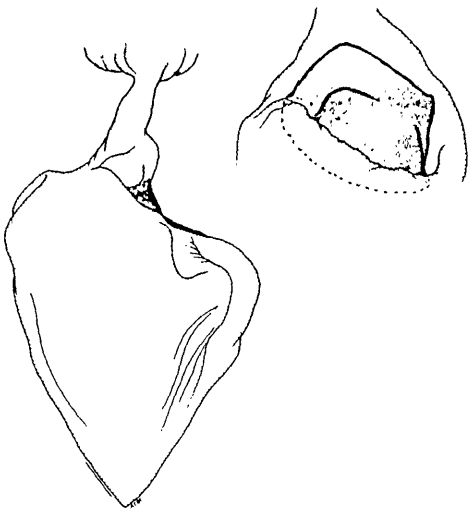
Fig. 58 idem, Venezuela, La Victoria.

Fig. 59 *E. materna* (LINNAEUS, 1767), Cameroon, Figuil.

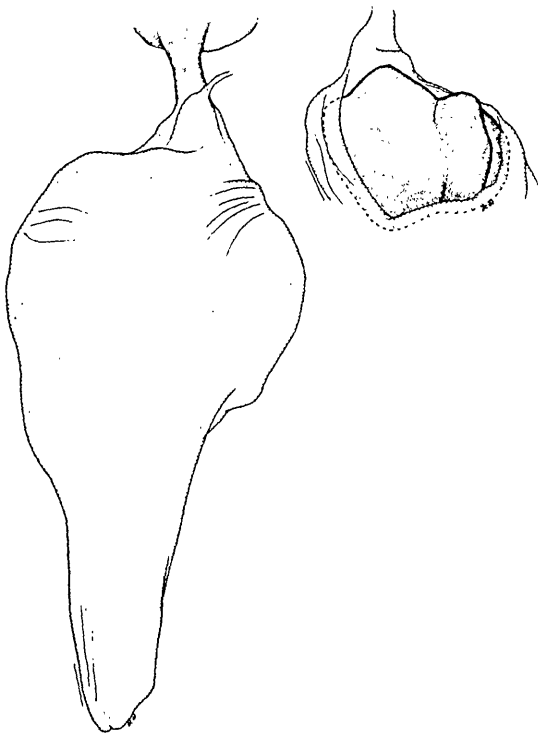
Fig. 60 idem, Ghana, Accra.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

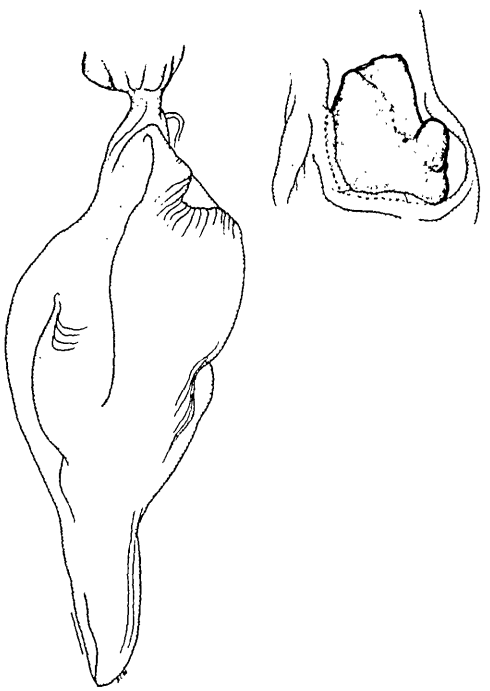
57



58



59



60

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Figs. 61-63 Male genitalia of *Eudocima* Hübner (scale bar = 1 mm):

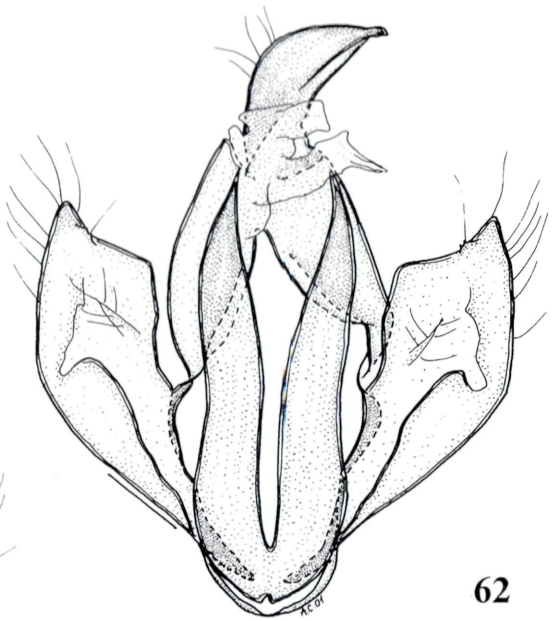
Fig. 61 *E. phalonia* (LINNAEUS, 1773), Ghana, Accra (aedeagus omitted).

Fig. 62 idem, Malaysia, Genting Highlands (aedeagus omitted).

Fig. 63 *E. euryzona* (HAMPSON, 1926), Madagascar, St. Betseleo.

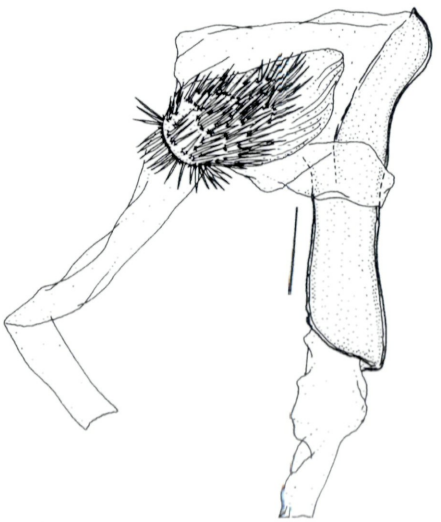
©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

61



62

63



©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

Acknowledgements

This work was substantially supported by a EU-Large Scale Facilities grant and by a grant of the Van Groenendael-Krijger Stichting (Amsterdam) for the study of Lepidoptera in the Van Groenendael collection. Facilities provided by the Zoological Museum of Amsterdam enabled the first author to do the needed studies. A grateful thank you thence goes to the whole staff of this Institution and, particularly, Sandrine Ulenberg, in charge of the Lepidoptera collection, the technicians Jan Fossen and Rob de Vos, and the librarian Godard Tweehuysen, for their invaluable help and assistance. Fundamental was also the collaboration of Martin Honey (Natural History Museum, London), who supplied important original information, and Gottfried Behounek (Grafing bei München), Piero Provera (Lugano) and Colin G. Treadaway (Limbach) for their providing study material of major relevance. Hubert Thöny (St. Leopoldina, Brasil), Shen-Horn Yen (Taipei) and Stefano Zoia (Milan) were most helpful in the tracing of some rare literature. Last but not least, the authors are deeply indebted to Dyoke Van Assum (Amsterdam) for general assistance, Axel Hausmann (Zoologische Staatssammlung, Munich), Ole Karsholt (Zoologisk Museum, Copenhagen) and Wolfram Mey (Museum für Naturkunde, Berlin) for access to the collections, Ivo Capretti (Rome) for part of the photographs, and Alessandra Cecca (Rome) for original artwork.

Literature

ALAYO, P.D. & VALDES ARTEAGA, E. 1980: Notas sobre Lepidópteros de Cuba III. Novedades de la familia Noctuidae.- Poeyana 198: 1-4.

ALBAÑIR, G.T. 1961: *Othreis toddi*, ZAYAS (in litt.).- [Navidad 1961-62. Stamp by value of centavos 10], Correos de Cuba.

ANGULO, A.O. & JANA-SÁENZ, J. 1983: Catalogo critico, ilustrado y claves de Catocalinae y Ophiderinae para Chile (Lepidoptera: Noctuidae).- Gayana, Zoologia 45: 1-26.

AURIVILLIUS, C. 1925: Ergebnisse der zweiten deutschen Zentral-Afrika-Expedition 1910-1911, unter Führung Adolf Friedrichs, Herzogs zu Mecklenburg, 1. Zoologie, 18. Lepidoptera, 4.- Klinkhardt & Biermann, Leipzig, 1243-1359 pp., 49-50 pls.

BÄNZIGER, H. 1985: Description of *Othreis srivijayana* n. sp. and notes on related fruit-piercing moths of the Indomalayan Region (Lep., Noctuidae).- Heterocera sumatrana 2: 41-48.

BÄNZIGER, H. 1987: Biological and taxonomic studies on immature and adult fruit-piercing moths in Nepal, with reference to Thailand.- The natural History Bulletin of the Siam Society 35 (1/2): 1-17.

BÄNZIGER, H. 1989: Lardizabalaceae: new plant family for Thailand 'predicted' by rare moth on Doi Suthep.- The natural History Bulletin of the Siam Society 37 (2): 187-208.

BÄNZIGER, H. & HONEY, M.R. 1984: Description of *Adris suthepensis* n. sp., a suspected fruit-piercing moth (Lepidoptera: Noctuidae) from N. Thailand and contiguous mountain regions.- Mitteilungen der schweizerischen entomologischen Gesellschaft 57: 173-177.

BARLOW, H.S. [1983]: An introduction to the moths of South-East Asia.- The Malayan Nature Society, Kuala Lumpur, ix + 305 pp.

BARNES, W.M. & MCDUNNOUGH, J. 1917: Check list of the Lepidoptera of Boreal America.- Herald Press, Decatur, viii + 392 pp.

BECCARI, F. & GERINI, F. [1975]: Catalogo della collezione entomologica, 1. Lepidoptera.- Istituto agronomico per l'Oltremare, Firenze, 123 pp., 44 pls.

BOISDUVAL, [J.P.A.D., de] 1832: Voyage de découvertes de l'Astrolabe exécuté par ordre du Roi, pendant les années 1826-1827 1828 1829, sous le commandement de M. J. Dumont d'Urville. Faune entomologique de l'Océan Pacifique, première partie. Lépidoptères.- Tastu, Paris, 267 pp.

BOISDUVAL, [J.P.A.D., de] 1833a: Faune entomologique de Madagascar, Bourbon et Maurice. Lépidoptères.- Roret, Paris, 122 pp., 16 pls.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

BOISDUVAL, [J.P.A.D., de] 1833b: Lépidoptères de Madagascar.- Nouvelles annales du Museum d'Histoire naturelle 2 : 149-270, pl. 7.

BOORMAN, J. 1970: West African butterflies and moths.- Longman, London, 79 pp.

BUTLER, A.G. 1892: On the *Ophideres princeps* of GUENÉE and its utter dissimilarity in structure and pattern from the *Ophideres princeps* of BOISDUVAL.- Annals and Magazine of Natural History (6) 9: 375-376.

CHEN, Y. 1985: Economic insect fauna of China. Lepidoptera: Noctuidae (4).- Science Press, Beijing, xiv + 167 pp., 15 pls.

CHEN, Y. 1982: Iconographia heterocerorum sinicorum, 3.- Science Press, Beijing, ii + (237-390) + 24 pp., 76-118 pls.

CHEN, Y. 1999: Fauna sinica, Insecta 16. Lepidoptera Noctuidae.- Science Press, Beijing, lxxiii + 1596 pp., 68 pls.

CHEN, Y., WANG, B. & LIN, D. 1991: The noctuids [sic] fauna of Xizang.- Henan Scientific and Technical Publishing House, 25 + 409 pp., 26 pls.

CLERCK, C.A. [1764]: Icones Insectorum rariorum cum nominibus eorum trivialibus, locisque e C. LINNAEI Arch. R. et Eqv. Aur. Syst. Nat. allegatis. Sectio secunda.- (Publisher not stated), Holmiae, [3] + [3] (Register) pp., pls 17-62.

COCHEREAU, P. 1977: Biologie et écologie des populations en Nouvelle-Calédonie d'un papillon piquer de fruits: *Othreis fullonia* Clerck (Lepidoptera; Noctuidae, Catocalinae).- ORSTOM, Paris, 322 pp.

COSTA LIMA, A., da 1950: Insetos do Brasil, 6. Lepidópteros, 2.- Escola nacional de Agronomia, Rio de Janeiro, 420 pp.

CRAMER, P. 1775-1776: Uitlandsche Kapellen Voorkomende in de drie Waereld-Deelen Asia, Africa en America, 1.- S.J. Baalde & Barthelemy Wild, Amsterdam & Utrecht, 156 pp., pls. 1-96.

CRAMER, P. 1777: Uitlandsche Kapellen Voorkomende in de drie Waereld-Deelen Asia, Africa en America, 2.- S.J. Baalde & Barthelemy Wild, Amsterdam & Utrecht, 152 pp., pls. 97-192.

CRAMER, P. 1779-1780: Uitlandsche Kapellen Voorkomende in de drie Waereld-Deelen Asia, Africa en America, 3.- S.J. Baalde & Barthelemy Wild, Amsterdam & Utrecht, 176 pp., pls 193-288.

CRAMER, P. & STOLL, C. 1780-1782: Uitlandsche Kapellen Voorkomende in de drie Waereld-Deelen Asia, Africa en America, 4.- S.J. Baalde & Barthelemy Wild, Amsterdam & Utrecht, 252 + 29 pp., pls. 289-400.

D'ABRERA, B. 1974: Moths of Australia.- Lansdowne, Melbourne, 85 pp.

DALMAN, J.W. 1823: Analecta entomologica.- Typis Lindhianis, Holmiae, vii + 104 + [4] pp., 4 pls.

DESMAREST, E. [1857]: Papillons nocturnes. [in] CHENU [J.C.] (Ed.): Encyclopédie d'Histoire Naturelle: [iv] + 310 + [2] pp., 40 pls. Paris, Maresq et C.

DONOVAN, A. 1800-[1804]: An epitome of the natural history of the Insects of India, and the islands in the Indian seas: comprising upwards of two hundred and fifty figures and descriptions of the most singular and beautiful species, selected chiefly from those recently discovered, and which have not appeared in the works of any preceding author.- Published by the author c/o T. Bensley, [2] (Advertisement) + [68] + [2] (Indices) + [1] (Errata) pp., 58 pls.

DRAUDT, M. & GAEDE, M. 1944: Unterfamilie: Noctuinae. [in] SEITZ A. (Ed.): Die Gross-Schmetterlinge der Erde 7: 471-508, pls 73-83, 85-86, 88-91, 93-94, 96. A. Kernen, Stuttgart.

DRUCE, H. 1881-1900: Lepidoptera-Heterocera. [in] GODMAN, F.D., & SALVIN, O. (Eds): Biologia Centrali-Americana: i-xxi, 1-490, 1-622, pls 1-101. Taylor & Francis, London.

DRURY, D. 1773: Illustrations of Natural History, wherein are exhibited upwards of two hundred and twenty figures of Exotic Insects, 2.- Published by the author c/o B. White, vii + 90 + 2 (Index, Errata et Addenda) pp., 50 pls.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

DUGÈS, A. 1896: Una mariposa nueva (*Ophideres raphael*, A. DUG.).- La Naturaleza (2) 2 (1891-1896): 456-459, pl. 28.

DUNCAN, J. 1841: The Naturalist's library, Entomology 7. The Natural History of Exotic Moths.- W.H. Lizars, Edinburgh, 229 pp., 30 pls.

DYAR, H.G. 1902: A list of North American Lepidoptera and key to the literature to this order of insects.- Bulletin of the United States national Museum 52: i-xix, 1-723.

EDWARDS, E.D. 1996: Noctuidae. [in] NIELSEN, E.S. et al. (Eds): Checklist of the Lepidoptera of Australia: 291-333. CSIRO, Canberra.

FABRICIUS, J.C. 1781: Species insectorum exhibentes eorum differentias specificas, synonyma auctorum, loca natalia, metamorphosin adjectis observationibus, descriptionibus, 2.- Ernest Bohn, Hamburgi et Kilonii, 494 pp.

FEIGE, R. 1976: Eine übersehene Noctuide aus Malaysia: *Othreis kinabaluensis* n. sp. (Lep.).- Entomologische Zeitschrift 86 (16): 188-190.

FELDER, C. 1861: Lepidopterorum Amboinensium a Dre. L. Doleschall annis 1856-58 collectorum species novae diagnosibus collustratae a Dre. C. Felder. II. Heterocera.- Sitzungsberichten der köningliche Akademie der Wissenschaften zu Wien 43: 26-44.

FELDER, R., in FELDER R. & ROGENHOFER A.F. 1874: Heft IV. Atlas der Heterocera Sphingida-Noctuida. [in] FELDER C., FELDER R. & ROGENHOFER A.F., 1864-1875: Reise der österreichischen Fregatte Novara um die Erde in den Jahren 1857, 1858, 1859 unter der Befehlen des Commodore B. Von Wüllerstorf-Urbair. Zoologischer Theil, 2 (2). Lepidoptera. Atlas.: pls 75-120.- Kaiserlich-köninglich Hof- und Staatsdruckerei, Wien.

FLETCHER, D.S. 1963: Macrolepidoptera collected by the Gough island scientific survey 1955-56. Proceedings of the royal entomological Society of London (B) 32: 17-19.

FONTENLA RIZO, J. & VÁSQUEZ MORENO, L. 1988: Nueva localidad y algunos datos sobre *Othreis toddi* ZAYAS (Lepidoptera: Noctuidae).- Miscelanea zoologica (La Habana) 40: 2-3.

FORDE, H. & OLLIFF, A.S. 1890-[1901]: Australian Lepidoptera and their transformations, by the late Alexander Walker Scott; with illustrations drawn from the life by his daughters Harriet Morgan and Helena Forde, 2.- Australian Museum, Sidney, 36 pp., 10-21 pls.

FRANCLEMONT, J.G. & TODD, E.L. 1983: Noctuidae (partim). [in] HODGES R.W. et al. (Eds): Check list of the Lepidoptera of America north of Mexico: 120-159. E.W. Classey Ltd & The Wedge Entomological Research Foundation, London.

FUTUYMA, D.J. 1983: Evolutionary interactions among herbivorous insects and plants. [in] FUTUYMA D.J. & SLATKIN M. (eds): Coevolution: 207-231. Sinauer, Sunderland.

GAEDE, M. 1939-1940: Unterfamilie: Noctuinae. [in] SEITZ A. (ed.): Die Gross-Schmetterlinge der Erde 15: 263-358, pls 31-41. A. Kernen, Stuttgart.

GRIVEAUD, P. & VIETTE, P. [1962]: Nouvelles espèces malgaches de noctuelles quadrifides (Lépidoptères).- Bulletin de l'Académie malgache, n.s. 38: 53-62, 1 pl.

GROSSBECK, J.A. 1917: Insects of Florida, 4. Lepidoptera.- Bulletin of the American Musum of natural History 37: 1-147.

GUENEE, A. 1852: Noctuélites 3. [in] BOISDUVAL, [J.P.A.D., de] & GUENEE, A: Histoire naturelle des Insectes, Species général des Lépidoptères 7. Roret, Paris, 442 pp., 24 pls.

GUERIN-MENEVILLE, F.E. 1829-[1844]: Iconographie du règne animal de G. Cuvier, ou représentation d'après nature de l'une des espèces les plus remarquables et souvent non encore figurées de chaque genre d'animaux; pourant servire d'atlas à tous les traités de zoologie, 7.- J.B. Baillière, Paris, 576 pp., 104 pls.

HAMPSON, G.F. 1894: The fauna of British India, including Ceylon and Burma. Moths, 2.- Taylor & Francis, London, xxii + 609 pp.

HAMPSON, G.F. 1902: The moths of South Africa, 2.- Annals of the South African Museum 2 (10): 255-446.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

HAMPSON, G.F. 1926: Descriptions of new genera and species of Lepidoptera Phalaenae of the subfamily Noctuinae (Noctuidae) in the collection of the British Museum (Natural History).- Trustees of the British Museum, London, 641 pp.

HARUTA, T. 1993: Noctuidae: Catocalinae and Ophiderinae 1. [in] HARUTA T. (Ed.): Moths of Nepal 2: 57-73, pls 45-52 (Tinea 13, Suppl. 3). The Japan Heterocerists' Society, Tokyo.

HARUTA, T. 1994: Noctuidae: Catocalinae & Ophiderinae. [in] HARUTA T. (Ed.): Moths of Nepal 3: 140-153, pls 87-91 (Tinea 14, Suppl. 1). The Japan Heterocerists' Society, Tokyo.

HOLLAND, W.J. 1903: The moth book.- Doubleday, Page & Co., Garden City, xxiv + 479 pp., 48 pls.

HOLLAND, W.J. 1920: Lepidoptera of the Congo, being a systematic list of the butterflies and moths collected by the American museum of natural history Congo expedition, together with descriptions of some hitherto undescribed species.- Bulletin of the American Museum of natural History 43: 109-369, pls 6-14.

HOLLOWAY, J.D. 1976: Moths of Borneo with special reference to Mount Kinabalu.- The Malayan Nature Society, Kuala Lumpur, viii + 264 pp.

HOLLOWAY, J.D. 1977: The Lepidoptera of Norfolk Island, their biogeography and ecology.- Series entomologica 13. Dr. W. Junk bv, The Hague, vi + 291 pp.

HOLLOWAY, J.D., KIBBY, G. & PEGGIE, D. 2001: The families of Malesian moths and butterflies.- E.J. Brill, Leiden, xi + 455 pp.

HÜBNER, J. [1823]: Verzeichniss bekannter Schmetterlinge.- Published by the author, Augsburg, 431 + 72 (Anzeiger) pp.

ICZN 1999: International code of zoological nomenclature. 4th edn.- The International Trust for Zoological Nomenclature, London, xxix + 306 pp.

KITCHING, I.J. & RAWLINS, J.E. 1999: The Noctuoidea. [in] KRISTENSEN N.P. (Ed.): Handbuch der Zoologie 4.35: Lepidoptera, Moths and Butterflies 1: 355-401. Walter de Gruyter, Berlin.

KONONENKO, V.S., AHN, S.B. & RONKAY, L. 1998: Illustrated catalogue of Noctuidae in Korea (Lepidoptera).- Korea research institute of bioscience and biotechnology & Center for insect systematics, Chunchon, 507 pp.

LAITHWAITE, E., WATSON, A. & WHALLEY, P.E.S. 1975: The dictionary of butterflies and moths in colour.- Michael Joseph, London, xlvi + 296 pp.

LINSENMAIER, W. 1972: Insects of the World.- McGraw-Hill Book Company, New York, 392 pp.

MCDUNNOUGH, J. 1938: Check list of the Lepidoptera of Canada and the United States of America, 1. Macrolepidoptera.- Memoirs of the Southern California Academy of Sciences 1: 1-272.

MIKKOLA, K. & HONEY, M.R. 1993: The Noctuoidea (Lepidoptera) described by LINNAEUS.- Zoological Journal of the Linnean Society 108: 103-169.

MOORE, F. 1881: On the genera and species of the lepidopterous subfamily Ophiderinae inhabiting the Indian region.- Transactions of the zoological society of London 11 (3): 63-76, pls 12-14.

MOORE, F. 1885-1887: The Lepidoptera of Ceylon, 3.- L. Reeve & Co., London, 578 + xv pp., pls 144-215.

NITEO, J.K., AYRES, M.P., LEDERHOUSE R.C. & SCRIBER, J.M. 1991: Larval adaptation to lauraceous hosts: geographic divergence in the spicebush swallowtail butterfly.- Ecology 72: 1428-1435.

OGATA, M. 1971: Noctuidae. [in] ESAKI T. et al.: Icones heterocerorum japonicorum in coloribus naturalibus 2 (2nd edn): 55-198, pls 83-119. Hoikusha, Osaka.

OKANO, M. 1964: New or little known moths from Formosa (5).- Tohoku Konchu Kenkyu (Morioka) 1 (2): 41-44, pl. 4.

PAGENSTECHER, A. 1884: Beiträge zur Lepidopteren-Fauna von Amboina.- Jahrbücher des nassauischen Vereins für Naturkunde 37: 150-326, pls 6-7.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

PAGENSTECHER, A. 1886: Beiträge zur Lepidopteren-Fauna des malayischen Archipels, 3. Heteroceren der Aru-Inseln, Kei-Inseln und von Südwest-Neu-Guinea.- Jahrbücher des nassauischen Vereins für Naturkunde 39: 104-193, pl. 10.

PAGENSTECHER, A. 1888: Beiträge zur Lepidopterenfauna des malayischen Archipels, 5. Verzeichniss der Schmetterlinge von Amboina nebst Beschreibung neuer Arten.- Jahrbücher des nassauischen Vereins für Naturkunde 41: 85-217.

PINHEY, E.C.G. 1975a: Moths of southern Africa.- Tafelberg, Cape Town, 273 pp., 63 pls.

PINHEY, E. [C.G.] 1975b: Some well known African moths.- Longman Rhodesia, Salisbury, 116 pp., 32 pls.

POOLE, R.W. 1989: Noctuidae. [in] HEPPNER J.B. (Ed.): Lepidopterorum catalogus (n.s.) 118: 1314 pp. E.J. Brill-Flora & Fauna Publ., Leiden, New York.

PIÑAS RUBIO, F. & MANZANO PESÁNTEZ, I. 1997: Mariposas del Ecuador, 1. Géneros.- Pontificia Universidad Católica del Ecuador, Quito, 115 pp.

PROUT, A.E. 1922: On some apparently new species and forms of Noctuidae [part].- The Bulletin of the Hill Museum 1 (2): 193-251.

PROUT, A.E. 1924: On some apparently new species and forms of Noctuidae [part].- The Bulletin of the Hill Museum 1 (3): pls 18-21.

PROUT, A.E. 1928: Descriptions of some Indo-Australian Noctuidae [part].- The Bulletin of the Hill Museum 2 (3): 256-269.

RAUSHER, M.D. 1982: Population differentiation in *Euphydryas editha* butterflies: larval adaptation to different hosts.- Evolution 36: 581-590.

ROBINSON, G.S. 1968: Some new species of Lepidoptera from the Fiji islands.- The Entomologist's record and Journal of Variation 80: 249-255, pl. 14.

ROBINSON, G.S. 1975: Macrolepidoptera of Fiji and Rotuma: a taxonomic and biogeographic study.- E.W. Classey, Faringdon, vii + 362 + 73 pp.

SAALMÜLLER, M. 1891: Lepidopteren von Madagascar, 2.- in Commission bei Moritz Diesterweg, Frankfurt a. M., (249-531) pp., [1] + (7-14) pls.

SCHAUS, W. 1911: New species of Heterocera from Costa Rica, 5.- Annals and Magazine of Natural History (8) 7: 173-193.

SCRIBER, J. M. 1983: Evolution of feeding specialization, physiological efficiency, and host races in selected Papilionidae and Saturniidae. [in] DENNO R.F. & MCCLURE M.S. (eds): Variable plants and herbivores in natural and managed systems: 373-412. Academic Press, New York.

SCRIBER, J. M. 2002: Latitudinal and local geographic mosaics in host plant preferences as shaped by thermal units and voltinism in *Papilio* spp. (Lepidoptera).- European Journal of Entomology 99: 225-239.

SEBA, A. 1765: Locupletissimi rerum naturalium thesauri accurata descriptio, et iconibus artificiosissimis expressio, per universam physices historiam. Naaukeurige beschryving van het schatryke kabinet der voornaamste seldzaamheden der natuur, 4.- Apud H.C. Arksteum, et H. Merkum, et Petrum Schouten, Amstelaedami, 42 + 226 pp., 108 pls.

SHIRÔZU, T. & KUROKO, H. 1966: Common butterflies and moths of Japan in color.- Hoikusha, Osaka, xii + 188 pp., 64 pls.

SINGER, M.C. 1971: Evolution of food-plant preference in the butterfly *Euphydryas editha*.- Evolution 25: 383-389.

SMITH, J.B. 1893: Catalogue of the lepidopterous superfamily Noctuidae found in Boreal America.- Bulletin of the United States national Museum 44: 1-424.

SNELLEN, P.C.T. 1886: Beschrijvingen van nieuwe Oost-Indische Lepidopteren Heterocera.- Tijdschrift voor Entomologie 29: 33-50, pls 1-2.

©Naturhistorisches Museum Wien, download unter www.biologiezentrum.at

STOLL, C. 1787-1790: Aanhangsel van het Werk, de Uitlandsche Kapellen Voorkomende in de drie Waereld-Deelen Asia, Africa en America.- N.T. Gravius, Amsterdam, 184 pp., 42 pls.

SUGI, S. 1959: Noctuidae. [in] INOUE H. et al.: Iconographia insectorum japonicorum colore naturali edita 1: 105-159, 64-106 pls. Hokuryukan, Tokyo.

SUGI, S. 1982: Noctuidae. [in] INOUE H. et al.: Moths of Japan 1: 669-913; 2: 80-107, 138-146, 344, 405, pls 164-223, 355-392. Kodansha & Co., Tokyo.

SUGI, S. 1992: Catocalinae. [in] HEPPNER J.B. & INOUE H. (Eds): Lepidoptera of Taiwan 1.2. Checklist: 175-183. Association for Tropical Lepidoptera & Scientific Publishers, Gainesville.

THOMPSON, J.N. 1988a: Variation in preference and specificity in monophagous and oligophagous swallowtail butterflies.- Evolution 42: 118-128.

THOMPSON, J.N. 1988b: Evolutionary genetics of oviposition preference in swallowtail butterflies.- Evolution 42: 1223-1234.

VIETTE, P. 1948: Les Ophideres du Pacifique (Lépid. Noctuidae).- Revue française d'Entomologie 15 (4): 209-220.

WALKER, F. [1858]. List of the specimens of lepidopterous insects in the collection of the British Museum, 13.- Trustees of the British Museum, London, (983-1236) pp.

WALKER, F. 1869: Characters of seventy-six undescribed species of heterocerous Lepidoptera from Congo, West Africa. [in] CHAPMAN T.A.C. (Ed.): On some lepidopterous insects from Congo.- Proceedings of the natural History Society of Glasgow (2) 1: 325-378, 3 pls.

WANG, H.Y. 1994: Guide book to insects in Taiwan, 8. Noctuidae.- 477 pp.

WARREN, W. 1914: Die eulenartigen Nachtfalter. Tafeln.- [in] SEITZ A. (Ed.): Die Gross-Schmetterlinge der Erde 3: pls 1-75. A. Kernen, Stuttgart.

WILTSHIRE, E.P. 1990: An illustrated, annotated catalogue of the macro-Heterocera of Saudi Arabia.- Fauna of Saudi Arabia 11: 91-250.

WESTWOOD, J.O. 1837: Illustrations of exotic entomology, containing upwards of six hundred and fifty figures and descriptions of foreign insects, interspersed with remarks and reflections on their nature and properties by Dru DRURY, 2.- H.G. Bohn, London, vi + 100 pp., 50 pls.

YOSHIMOTO, H. 1995: Noctuidae. [in] HARUTA T. (Ed.): Moths of Nepal 4: 49-88, pls 109-116 (Tinea 14, Suppl. 2). The Japan Heterocerists' Society, Tokyo.

YOSHIMOTO, H. 1999: A new species of the genus *Othreis* HÜBNER (Noctuidae, Ophiderinae) from Myanmar.- Transactions of the lepidopterological society of Japan 50 (1): 60-62.

ZAYAS, F., de 1965: Dos nuevas especies de insectos cubanos de los ordenes Lepidoptera (Noctuidae) y Orthoptera (Tettigoniidae).- Poeyana, (A) 5: 1-8.

ZHU, H., & CHEN, Y. 1963: Economic insect fauna of China. Lepidoptera: Noctuidae (1).- Science Press, Beijing, xiv + 172 pp., 10 pls.

ZILLI, A., & RACHELI, T. 1992: Gregariousness, apterism, matrivory, and the natural history of a moth (Lepidoptera, Heterogynidae).- Animal & Human Biology 2: 7-40.

Authors' addresses

Dr. Alberto Zilli, Museum of Zoology, Via U. Aldrovandi 18, I-00197 Rome, Italy.– e-mail: a.zilli@comune.roma.it

Willem Hogenes, Zoölogisch Museum, Plantage Middenlaan 64, NL-1018 DH Amsterdam, The Netherlands.– e-mail: hogenes@science.uva.nl

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Quadrifina

Jahr/Year: 2002

Band/Volume: 5

Autor(en)/Author(s): Zilli Alberto, Hogenes Willem

Artikel/Article: An annotated list of the friut-piercing- moth genus Eudocima BIELBERG, 1820 genu POOLS) with descriptions of four new species (Lepidoptera: Noctuidae: Catocalinae). 153-207