Notes on *Arisbe (Pathysa) antiphates* (Cramer, 1775) (Lepidoptera, Papilionidae) and its allies

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Abstract: The classification of *Arisbe antiphates* (Cramer, 1775) is reviewed and revised in the light of recent mtDNA sequence data and phenotypic analysis. Two well-separated species are recognized: *Arisbe antiphates* (Cramer, 1775) and *Arisbe itamputi* (Butler, 1885), **stat. rev.** The most likely origin of the syntypes of *Papilio alcibiades* Fabricius, 1787, is determined to be within the area of north-eastern India and northern Thailand, from the dry season. The following synonyms are established: *Papilio pompilius* Fabricius, 1787, **n. syn.,** as a junior synonym of *Papilio alcibiades* Fabricius, 1787; *Papilio antiphates balius* Jordan, 1909, **n. syn.,** and *Graphium antiphates kangeanus* Okano 1993, **n. syn.,** as junior synonyms of *Papilio antiphates javanicus* Eimer, 1889; *Graphium antiphates kurosawai* Igarashi, 1979, **n. syn.,** as a junior synonym of *Papilio antiphates kalaoensis* Rothschild, 1896. *Papilio antiphates linga* Fruhstorfer, 1909, **stat. rev.,** previously treated as a synonym, is recognized as a subspecies of *Arisbe antiphates*. The following new subspecies are described: *Arisbe itamputi* ***tungi*** **ssp. n.** from the southern Malay peninsula; *A. i.* ***toshikazui*** **ssp. n.** from Langkawi Island (Malaysia) and Koh Tarutao (Thailand); *A. i.* ***natunaensis*** **ssp. n.** from the Natuna Islands (Indonesia); *A. i.* ***timothyi*** **ssp. n.** from Siberut Island (Indonesia); *A. i.* ***miae*** **ssp. n.** from Lombok Island (Indonesia); *A. i.* ***nusatenggaraensis*** **ssp. n.** from the Nusa Tenggara archipelago (Indonesia).

Anmerkungen zu *Arisbe (Pathysa) antiphates* (Cramer, 1775) (Lepidoptera, Papilionidae) und seinen Verwandten

Zusammenfassung: Die Klassifizierung von *Arisbe antiphates* (Cramer, 1775) wird im Lichte der jüngsten mtDNA-Sequenzdaten und der phänotypischen Analyse überprüft und überarbeitet. Es werden zwei gut getrennte Arten unterschieden: *Arisbe antiphates* (Cramer, 1775) und *Arisbe itamputi* (Butler, 1885), **stat. rev.** Die wahrscheinlichste Herkunft der Syntypen von *Papilio alcibiades* Fabricius, 1787, wird aus der Trockenzeit im Bereich von Nordostindien/Nordthailand bestimmt. Die folgenden Synonyme werden festgelegt: *Papilio pompilius* Fabricius, 1787, **n. syn.,** als jüngeres Synonym für *Papilio alcibiades* Fabricius, 1787; *Papilio antiphates balius* Jordan, 1909, **n. syn.,** und *Graphium antiphates kangeanus* Okano 1993, **n. syn.,** als jüngere Synonyme von *Papilio antiphates javanicus* Eimer, 1889; *Graphium antiphates kurosawai* Igarashi, 1979, **n. syn.,** als jüngeres Synonym von *Papilio antiphates kalaoensis* Rothschild, 1896. *Papilio antiphates linga* Fruhstorfer, 1909, **stat. rev.,** zuvor als Synonym behandelt, wird als Unterart von *Arisbe antiphates* anerkannt. Die folgenden neuen Unterarten werden beschrieben: *Arisbe itamputi* ***tungi*** **ssp. n.** von der südlichen Malaiischen Halbinsel; *A. i.* ***toshikazui*** **ssp. n.** von der Insel Langkawi (Malaysia) und Koh Tarutao (Thailand); *A. i.* ***natunaensis*** **ssp. n.** von den Natuna-Inseln (Indonesien); *A. i.* ***timothyi*** **ssp. n.** von Siberut (Indonesien); *A. i.* ***miae*** **ssp. n.** von Lombok (Indonesien); *A. i.* ***nusatenggaraensis*** **ssp. n.** von Nusa Tenggara (Indonesien).

Introduction

The members of the *antiphates* group are distinctive white swordtail butterflies that occur throughout much of the Oriental region. Characterized by the storage of large amounts of plant-derived anthoxanthins (Ford 1941, 1944) in broad scales that largely supplant the thinly scaled regions of bilin pigments deposited in the wing tegument that are otherwise frequent in Oriental Leptocircini (Allyn et al. 1989), as well as morphological specializations of the immature stages (where known) and the external genitalia of the adults (Page 1987, Page & Treadaway 2003, 2004), the species are currently placed in the subgenus *Pathysa* Reakirt, 1865, of the genus *Arisbe* Hübner, 1819 ["1816"] (Page & Treadaway 2003, 2004, 2014). The Philippine members of the group, *A. euphrates* (Felder & Felder, 1862), *A. decolor* (Staudinger, 1888) and *A. euphratoides* (Eimer, 1889) have been the subject of systematic study (Page 1987, Page & Treadaway 2003, 2004) but *A. antiphates* (Cramer, 1775) itself has not been reviewed in recent years and there are number of issues that need to be resolved.

Recently published DNA sequences suggest a profound difference between continental and Sundaland populations usually included in *antiphates* (Makita et al. 2003, Wilson et al. 2014). The average differences in the sequenced fragments of the mitochondrial ndh5 and cox1 genes between continental specimens (for example, specimens from China, India, Thailand and Laos) and those from Sundaland (specimens from Malaysia and Indonesia) are significantly greater than the differences typically observed between subspecies in the Papilionidae and well within the range observed for sibling species derived from a recent common ancestor (Makita et al. 2003, Wilson et al. 2014). Therefore, these two clusters should be treated as two distinct species, with the continental races retained under *A. antiphates* (Cramer, 1775) and the races occuring in Sundaland (Malaysia and Indonesia) included under *A. itamputi* (Butler, 1885) stat. rev., which, as will be discussed below, is the oldest available name for this cluster.

The likely origin of the syntype specimens of *Papilio alcibiades* Fabricius, 1787, has been a vexed question: "Tranquebar", the type locality given by Fabricius (1787), is clearly incorrect (Gaonkar 1990). Butler (1885), followed by Rothschild (1896) and many subsequent authors, assigned the name to the Javan population. However, Gaonkar (1990, 1996) found that phenotype of the syntypes of *Papilio alcibiades* Fabr. does not correspond with that of Javan specimens and suggested instead that the two specimens came from south-western

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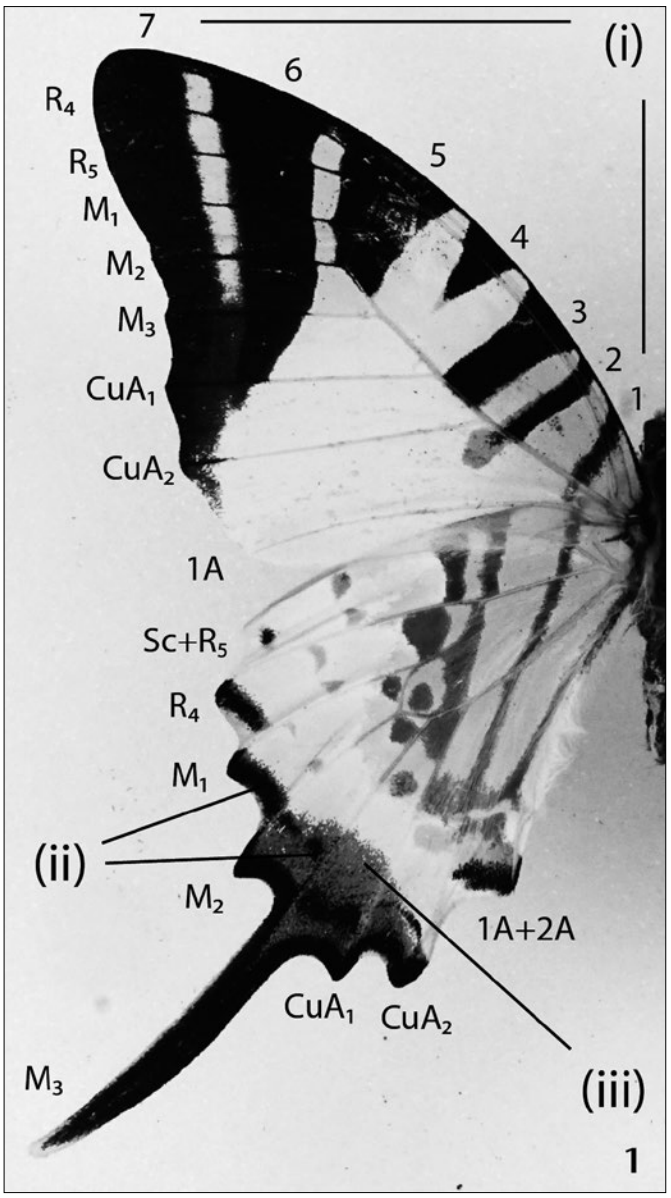

Fig. 1: Wing veins referred to in the text and principal features used for diagnosis of phenotypes: (i) black bands extending from costa, numbered from the base, of which bands 1, 2, 6, and 7 are the most important for diagnosis. (ii) the black marginal and submarginal markings on the hindwing (HW). (iii) the area of grey or black suffusion around the base of the HW tail. The specimen illustrated is the type of *Papilio itamputi* Butler, 1885, NHMUK. — In all illustrations: NHMUK = specimen deposition, picture © and reproduced with permission and thanks to the Trustees of the Natural History Museum, London.

India, as he found that there was a close resemblance in phenotype to specimens from that area. Cotton (2018) disputed this assignment and claimed that the two syntypes were collected somewhere in the south of the Malayan peninsula, possibly near Phuket. As these different assignments place the type locality either in the continental region (*A. antiphates*) or in the Sundaland area (*A. itamputi*) it is important to determine the actual origin of syntype specimens. Although both species are quite variable, there are several features of the wing markings that provide characters that can be used for discrimination (Fig. 1). The most important of these are: (i) the development of the black bands that extend from the costal margin, particularly, counting from the base of the wing, the first (basal), second, sixth (submarginal) and seventh (marginal) bands of the forewing. (ii) the marginal and submarginal black spots of the hindwing. (iii) the grey to black area of scaling around the base of the hindwing tail. After thorough study of specimens collected throughout the Oriental region, it is clear that the syntypes are very similar to dry-season specimens from N. E. India and N. W. Thailand eastwards to Vietnam. North-east India or north-west Thailand thus seem to be the most likely possibilities for the type locality of *Papilio alcibiades* Fabricius, 1787.

All holotypes of new taxa are deposited in the Page Collection, which is part of the entomological collection of the Swiss Federal Polytechnic in Zürich (ETHZ). Many paratypes and most of the other specimens examined are also in the Page Collection (in ETHZ): some, as indicated, are in the collection of the Natural History Museum, London (NHMUK), or in ZMUC, Copenhagen.

All images of specimens are reproduced in black-and-white to avoid significant differences in colour cast stemming from the different lighting conditions under which the museum specimens were photographed.

Arisbe (Pathysa) antiphates (Cramer, 1775)

Papilio antiphates Cramer, 1775. — Type locality: S. China.
= *Papilio nebulosus* Butler, 1881. — Type locality: "Darjiling".
= *Pathysa albescens* Chou, Yuan & Wang, 2000. — Type locality: Quanzhou, Fujian.

Subspecies

Arisbe (P.) antiphates antiphates (Cramer, 1775)

Papilio antiphates Cramer, 1775. — Type locality: S. China.

Diagnosis. There appears to be a continuum of variation with lightly marked indiduals prevalent in the low-rainfall season and darker ones more common in the high-rainfall season.

Light individuals (Fig. 3a): FW basal band 1 broad, extending from the costa to the hind margin of the wing; FW band 2 broad, extending into cell CuA_2, terminating about half way between 1A and CuA_2; FW band 6 (submarginal) just crosses CuA_1, connected to FW band 7 (marginal) by black scaling along the veins; FW band 7 (marginal) broad, extending into cell CuA_1; HW marginal spots large but separate, submarginal spots thinly represented in cells R_1, R_5 and M_1; grey suffusion in cells M_2, M_3 and CuA_2 even, extending well past the black submarginal spots.

Dark individuals (Fig. 3b): FW basal band (1) broad, extending from costa to hind margin; FW band 2 broad, extending into cell CuA_2, terminating at CuA_2; FW band 6 (submarginal) fused to FW band 7 (marginal); FW band 7 (marginal) broad, reaching vein 1A; HW marginal spots very large with only the spot in cell R_1 free, submarginal spots strongly represented in cells R_1, R_5 and M_1; grey suffusion in cells M_2, M_3 and CuA_1 even and dark (nearly black), extending well past the black submarginal spots.

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The dividing line between the nominotypical form and ssp. *alcibiades* Fabricius 1787 (see below) appears to run through the northern tip of Vietnam (Ha Giang province) and southern Guangxi, with some intermediate forms found in N. Vietnam and N. Laos (Fig. 2a).

Distribution (Fig. 2a): China (Fujian, Guizhou, Guangdong, Guangxi, Yunnan), Vietnam (Ha Giang province).

Arisbe (P.) antiphates alcibiades (Fabricius, 1787)

(Papilio) alcibiades Fabricius, 1787. — Type locality: "Tranquebar". Two syntype ♂♂ in ZMUC, Copenhagen, photographs examined.

= *(Papilio) pompilius* (Fabricius, 1787) — Type locality: "India". Two syntype ♂♂ in the Hunterian collection, University Glasgow, photographs examined. — **Syn. n.**

Note added in proof: Cotton et al. (2019) have advanced the hypothesis that the syntypes of *Papilio pompilius* Fabricius, 1787 originated from S. E. China, not India. If correct, this makes *Papilio pompilius* Fabricius, 1787 a junior synonym of *Papilio antiphates* Cramer, 1775, not *Papilio alcibiades* Fabricius, 1787, as indicated above. There is no further taxonomic implication.

= *Papilio antiphates continentalis* Eimer, 1889. — Type locality: "auf dem indischen Festlande [...] aus Sikkim, aus Bengalen und von anderen Theilen des ostindischen Festlandes". Current location of type specimen(s) unknown.

Diagnosis. Syntypes of *Papilio alcibiades* Fabricius, 1787: 2 specimens (Figs. 4a, 4b) from "Tranquebar": FW band 1 narrow, extending from the costa only to the posterior discocellular vein; FW band 2 narrow, extending from the costa only to the posterior discocellular vein; FW band 6 narrow, terminating in cell M_3 just short of CuA_1, not or scarcely connected to FW band 7 by black scaling along vein CuA_1 but with fine black lines along CuA_1, M_3 and M_2 in the area between FW bands 6 and 7; FW band 7 broad, extending into cell CuA_2; HW marginal spots small, separate in cells R_1 and R_2, submarginal spots not represented in cells R_1, R_5 and M_1 and only weakly in cells M_2, M_3 and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 thin, not extending past the submarginal spot in cell M_2. The grey scaling is attenuated in cell M_2 such that the submarginal spot stands clear of the suffusion. The inner margin of the grey area forms a more or less straight line, with the shading in cell M_3 not reaching much further towards the discal cell than the submarginal spot in cell M_2.

Syntypes of *Papilio pompilius* Fabricius 1787: 2 specimens from "India": FW basal band (1) broad, extending from the costa to the hind margin of the wing; FW band 2 broad, extending into cell CuA_2; FW band 6 (submarginal) crosses CuA_1, connected to FW band 7 (marginal) by black scaling along the veins. FW band 7 (marginal) broad, extending into cell 1A. HW marginal spots large, separate in cell R_1, submarginal spots scarcely represented in cells R_1, R_5 and M_1 and weakly represented in cells M_2, M_3 and CuA_1. Grey suffusion in cells M_2, M_3 and CuA_1 even, extending well past the black submarginal spots. The inner margin of the grey area is convex, with the shading in cell M_3 reaching further towards the discal cell than the submarginal spot in cell M_2.

Variation in recent specimens. There are two extreme forms, light and dark, associated with dry season and wet season respectively, but with a variety of intermediates.

Light form (see Figs. 4c–4e): 14 specimens seen from N. India, China, Thailand, and Vietnam from January to May in ETHZ (6) and NHMUK (8): FW band 1 narrow, extending from the costa only to the posterior discocellular vein; FW band 2 narrow, extending from the costa only to the posterior discocellular vein; FW band 6 narrow, terminating in cell M3, not connected to FW band 7 except by fine black lines along M3 and M2 in some specimens; HW marginal spots small, separate in cell R_1 and, in most specimens, R_2. HW submarginal spots are not represented in cells R_1, R_5 and M_1. Grey suffusion in cells M_2, M_3 and CuA_1 thin, not extending past the black submarginal spot in cell M_2. The grey scaling is attenuated in cell M_2 such that the black submarginal spot stands clear of the suffusion. The inner margin of the grey area forms a more or less straight line, with the shading in cell M_3 not reaching much further towards the discal cell than the submarginal spot in cell M_2.

Intermediate forms (see Figs. 4f–4g): 56 specimens seen from N. India, China, Myanmar, Thailand, Laos, Cambodia and Vietnam, from April to June in ETHZ and NMHUK. These represent transition from the light form described above to the dark form described below. The palest forms (Fig. 4f) are very similar to the light form, but have FW band 1 extending into cell CuA_2, truncated at 1A and by heavier scaling along M3, connecting FW band 6 and FW band 7. The grey suffusion in cells M_2, M_3 and CuA_2 is thin but reaches the black submarginal spot in cell M_2. This is the prevalent dry season form. Darker individuals (Fig. 4g) appearing as the rainfall increases, show a heavier development of all the black markings and an extension of the grey suffusion in the submarginal region of the HW. Among these specimens are individuals that are very similar to the syntypes of *Papilio pompilius* Fabricius 1787.

Dark form (Fig. 4h): 105 specimens from N. India, China, Myanmar, Thailand, Laos, Cambodia and Vietnam, from May to October in ETHZ and NHMUK. These represent the ultimate development of the black markings. FW basal band 1 broad, extending from costa to hind margin; FW band 2 broad, extending well into cell CuA_2; FW band 6 fused to FW band 7; FW band 7 broad, extending into cell 1A; HW marginal spots very large with only the spot in cell R_1 free, submarginal spots represented in cells R_1, R_5 and M_1. Grey suffusion in cells M_2, M_3 and CuA_1 even and dark, extending well past the black submarginal spots. This is the prevalent wet season form.

The light forms from N. India and Thailand correspond very well to the diagnosis of the syntypes of *Papilio alcibiades* Fabricius 1787. Contary to the observation by Cotton (2018), specimens with both FW bands 1 and 2 truncated at the posterior discocellular vein are quite frequent (about 20% of the dry-season forms studied). These indivdiuals represent the closest observed match

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in phenotype to the two *alcibiades* syntypes and it is very likely that the latter originated somewhere in the continental region, but not in southern India or China. Given the known collecting trips of König, who sent the syntype specimens to Europe from his residence in Travancore (König 1894, Corbet 1941), the type locality should be defined as "northern parts of India or Thailand". The syntypes of *Papilio pompilius* Fabr. also obviously originated somewhere in the same region, albeit later in the season, and thus *Papilio pompilius* Fabr. becomes a junior synonym of *Papilio alcibiades* Fabr.

Distribution (Fig. 2a): N. India, China (S.Yunnan), Myanmar, Thailand, Cambodia, Laos, Vietnam (except northern provinces).

Arisbe (P.) antiphates naira (Moore, 1903)

Papilio antiphates naira Moore, 1903. – Type locality: Travancore. Type ♂ in NHMUK, examined.

Diagnosis. There are several phenotypes to consider:

- A dry season form described by Talbot (1939).
- Intermediate forms that occur in the dry season through to the onset of the wet season (Yates 1930).
- A dark form, represented by the type of *naira* Moore, 1903, that is dominant in the wet season.

Dry season form (Fig. 3e): 5 specimens from Kerala (4) and Tamil Nadu (1) in December and January in ETHZ (3) and NMHUK (2). FW band 1 (basal) attenuated reaching into cell 1A but not reaching the hind margin of the wing; FW band 2 extending into cell CuA_2 but not extensive; FW band 6 (submarginal) is narrow and just reaches vein CuA_1 where it is connected to FW band 7 by black scaling along that vein; FW band 7 broad and extends to cell CuA_2; HW submarginal spots are not represented in cells R_1, R_5 and M_1; grey suffusion in cells M_2, M_3 and CuA_1 thin, not extending past the black submarginal spot in cell M_2 and attenuated in cell M_2 such that the black submarginal spot stands clear of the suffusion; the inner margin of the grey area forms a more or less straight line, with the shading in cell M_3 not reaching much further towards the discal cell than the submarginal spot in cell M_2.

Intermediate forms (Figs. 3f–3h): 23 specimens seen from Karnataka, Kerala and Tamil Nadu in ETHZ and NHMUK. The pale intermediate forms (Figs 3f, g) occur predominantly in December and January: FW band 1 (basal) broad, reaches the hind margin of the wing ; FW band 2 extending into cell CuA_2 but not extensive. FW band 6 (submarginal) broad, reaching vein CuA_1 where it fuses with FW band 7; FW band 7 broad and extends to cell CuA_2. In the palest specimens (Fig. 3f), HW submarginal spots are not represented in cells R_1, R_5 and M_1 and the spots in M_2, M_3 and CuA_1 are very thin; the grey suffusion in cells M_2, M_3 and CuA_1 is absent or very faint. In January and February, darker forms (Figs 3g to 3i) begin to appear in which there is an progressive development of all black markings and the grey suffusion on the HW (Yates 1930).

Dark form (Fig. 3j): type of *Papilio antiphates naira* Moore, 1903 (NHMUK) and 31 specimens from Karnataka, Kerala and Tamil Nadu in March through to October in ETHZ and NHMUK. This form represents the ultimate development of the black markings and is the prevalent wet season form. FW basal band 1 broad, extending from costa to hind margin; FW band 2 broad, extending well into cell CuA_2 often reaching vein 1A; FW band 6 (submarginal) very broad and fused to FW band 7 (marginal); FW band 7 (marginal) broad, extending into cell 1A; HW marginal spots very large, fused to the submarginal spots; grey suffusion in cells M_2, M_3 and CuA_1 even and dark, extending well past the black submarginal spots.

The very pale dry-season form is superficially similar to the syntypes of *Papilio alcibiades* and it may be that this resemblance prompted Gaonkar (1990, 1996) to suggest that they come from southern India. However, this determination does not appear to be correct, since all the available specimens differ from the *alcibiades* syntypes in that FW bands 1 and 2 extend past the posterior discocellular vein. Cotton (2018) summarized the variation of the southern Indian population as presenting "two discrete forms" with only "some intermediate specimens". However, this falls short of representing the full extent of variation in this population: the dry season form described by Talbot (1939) was not considered and the specimen figured as a pale form is one of the early intermediate forms. Intermediate forms are indeed numerous and are prevalent from January to March (Yates 1930).

Distribution (Fig. 2a): S. India (Karnataka, Kerala, Tamil Nadu).

Arisbe (P.) antiphates linga (Fruhstorfer, 1909), stat. rev.

Papilio antiphates linga Fruhstorfer, 1909. – Type locality: Hainan. Types: 4 syntype ♂♂, Whitehead leg., coll. H. Fruhstorfer in NHMUK, examined (Fig. 3c).

Diagnosis. There are two principal forms, light and dark associated with dry season and wet season respectively.

The light form (Fig. 3c): 5 males from Hainan: FW basal band 1 narrow, extending from the costa only to the posterior discocellular vein; FW band 2 narrow, extending from the costa only to the posterior discocellular vein; FW band 6 (submarginal) narrow, terminating in cell M3, not connected to FW band 7 (marginal) by black scaling along vein CuA_1 but with fine black lines along M3 and M2; HW marginal spots small, separate in cell R_1 and, in most specimens, R_2; HW submarginal spots are not represented in cells R_1, R_5 and M_1but those in cells M_2, M_3 and CuA_1 are strongly marked; grey suffusion in cells M_2, M_3 and CuA_1 thin, not extending past the black submarginal spot in cell M_2 and attenuated in cell M_2 such that the black submarginal spot stands clear of the suffusion; the inner margin of the grey area forms a more or less straight line, with the shading in cell M_3 not

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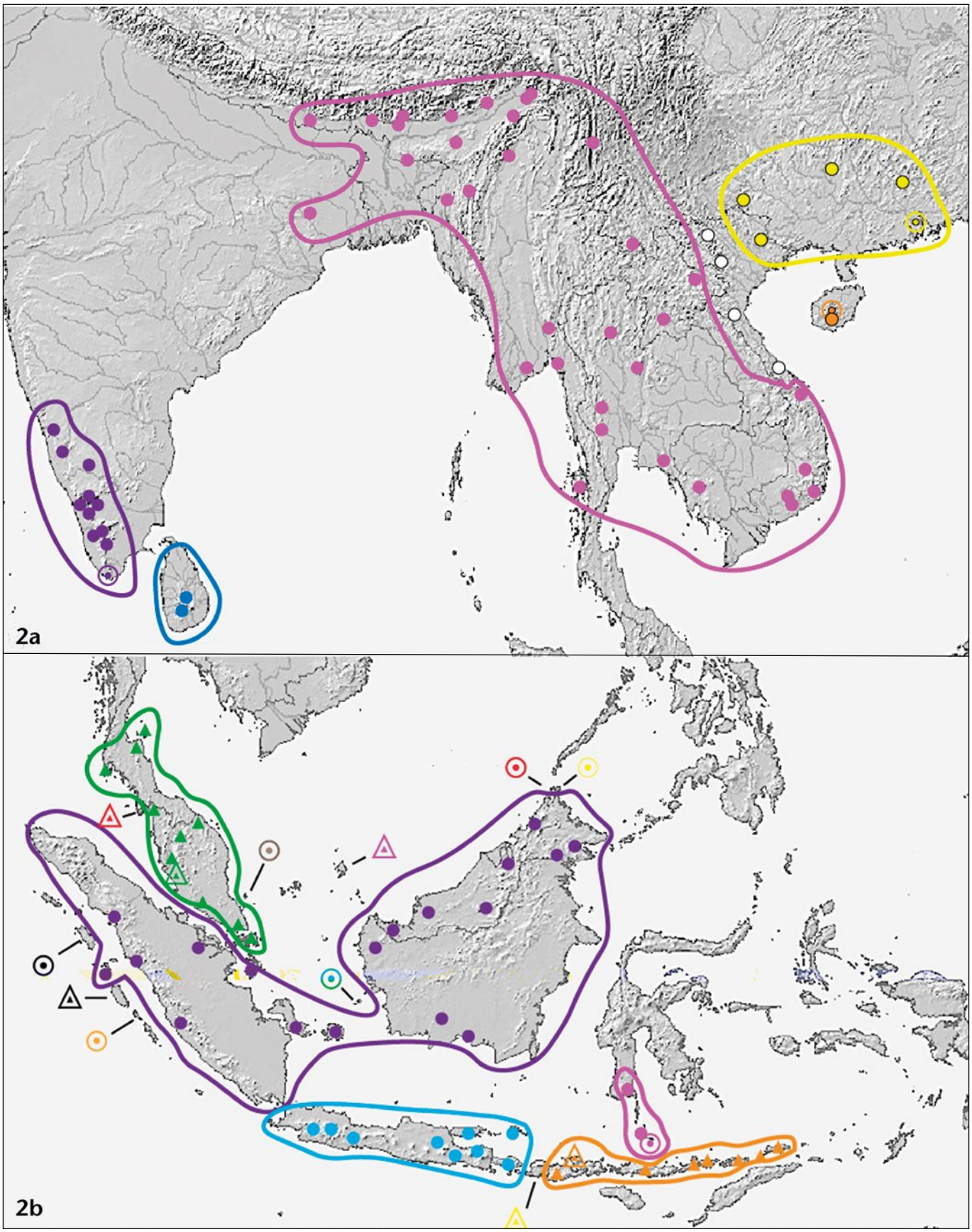

Fig. 2: Distribution of *Arisbe (Pathysa) antiphates* (Cramer, 1775). **Fig. 2a:** Solid circles show the identifiable locations of specimens of the following subspecies: *antiphates* (Cr.), yellow; *alcibiades* (Fabricius, 1787), magenta; locations of intermediate specimens having characters of both of the preceeding subspecies are shown in white; *linga* (Fruhstorfer, 1909), red; *naira* (Moore, 1903), purple; *ceylonicus* (Eimer, 1889), dark blue. — **Fig. 2b:** Distribution of *Arisbe (Pathysa) itamputi* (Butler, 1885). Solid circles show the identifiable locations of specimens of the following subspecies: *itamputi* Btl., purple; *antiphonus* (Fruhstorfer, 1902), black; *rhabdotus* (Jordan, 1927), orange; *pulauensis* (Eliot, 1983), dark blue; *javanicus* (Eimer, 1889), light blue; *karimatanum* dark green; *simpulensis* Abang & Page, 2006, red; *sinambungensis* Abang & Page, 2006, yellow; *kalaoensis* (Rothschild, 1896), magenta. Solid triangles show the locations of specimens of the following new subspecies: *timothyi* ssp. n., black; *tungi* ssp. n., light green; *toshikazui* ssp. n., red; *natunaensis* ssp. n., magenta; *miae* ssp. n., yellow; *nusatenggaraensis* ssp. n., orange. The ringed symbols on both maps indicate type localities.

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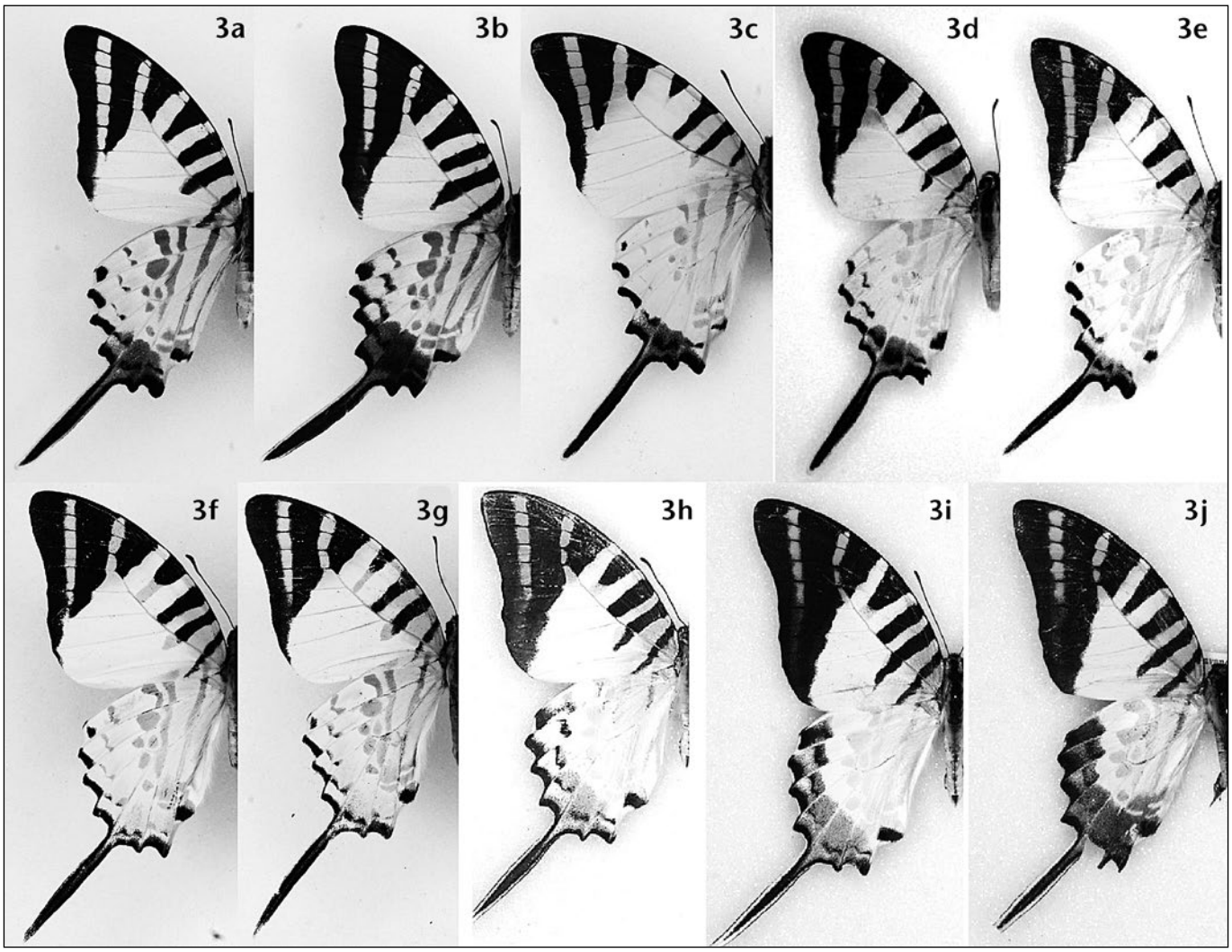

Fig. 3: Males of: **Fig. 3a:** *A. a. antiphates* light individual (China, Guangxi, June), ETHZ. **Fig. 3b:** *A. a. antiphates* dark individual (China, Guangxi, August), ETHZ. **Fig. 3c:** *A. a. linga*, light form ("Hainan, WHITEHEAD"), NHMUK. **Fig. 3d:** *A. a. linga*, dark form (China, Hainan, July), ETHZ. **Fig. 3e:** *A. a. naira*, dry season form (India, Kerala, January), ETHZ. **Fig. 3f:** *A. a. naira* pale intermediate form ("Coorg, January, coll. HANNYNGTON"), NHMUK. **Fig. 3g:** *A. a. naira* intermediate form ("S. India. Urti, Coorg., 27. XII. 1928, J. A. YATES"), NHMUK. **Fig. 3h:** *A. a. naira* intermediate form (India, Kerala, February), ETHZ. **Fig. 3i:** dark intermediate form (India, Karnatka, February), ETHZ. **Fig. 3j:** Type of *Papilio antiphates naira* MOORE, 1903, NHMUK.

reaching much further towards the discal cell than the submarginal spot in cell M_2.

Dark form (Fig. 3d), 6 males seen from Dao Lao Shan, Hainan, July-August in ETHZ. FW basal band 1 narrow, extending from the costa to the hind margin of the wing but attenuated after crossing the posterior discocellular vein; FW band 2 broad, extending well into cell CuA_2 often reaching vein 1A; FW band 6 (submarginal) very broad and fused to FW band 7 (marginal); FW band 7 broad, extending into cell 1A; HW marginal spots large but separate in cells $Sc+R_1$ and R_5; HW submarginal spots present in cells R_5, M_1, M_2, M_3 (large) and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 dark, extending past the black submarginal spots, nevertheless attenuated in cell M_2 and along vein M_3.

Papilio antiphates linga FRUHSTORFER, 1909 was treated as a synonym of *Graphium antiphates pompilius* (FABR.) by TSUKADA & NISHIYAMA (1982), BRIDGES (1988) and COTTON (2018). However, the light form differs from light forms of ssp. *alcibiades* in that it has reduced black markings on the FW while having stronger black markings on the HW. The dark form differs from dark forms of ssp. *alcibiades* in the stronger black submarginal markings but lesser extent of the grey scaling: in this respect the dark form of ssp. *linga* is more similar to the nominotypical subspecies. The phenotypes of the forms of ssp. *linga* differ significantly and conistently from the corresponding forms of ssp. *alcibiades* and the Hainan population is therefore treated as a separate subspecies.

Distribution (Fig. 2a): China (Hainan).

Arisbe (Pathysa) itamputi (BUTLER, 1885), stat. rev.

Papilio itamputi BUTLER, 1885. – Type locality: "Lapson", Sumatra. Type ♂ in NMHUK, examined.

Recently published DNA sequences suggest that there is a considerable difference between continental and Sundaland populations usually included the taxon *antiphates* CRAMER, 1775 (MAKITA et al. 2003, WILSON et al. 2014). As shown in Tables 1 and 2, the average differences in the sequenced fragments of the mitochondrial ndh5 (Table 1) and cox1 (Table 2) genes between specimens of *antiphates* and *itamputi* are 4.0% and 4.5%, respectively, which are

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significantly greater than the differences (<1.2%) observed within each species and well within the range observed for sibling species derived from a recent common ancestor. For example, the average differences between *A. bathycles* (Zinken, 1831) and *A. chironides* (Honrath, 1884) are 1.9% and 2.9% for the ndh5 and cox1 genes respectively (Makita et al. 2003, Wilson et al. 2014).

Subspecies

Arisbe (P.) itamputi itamputi (Butler, 1885)

Papilio itamputi Butler, 1885. – Type locality: "Lapson", Sumatra. Type ♂ in NMHUK, examined.

= *Papilio antiphates paetus* Fruhstorfer, 1909. – Type locality: Borneo. 20 syntypes, ♂♂, coll. H. Fruhstorfer, NHMUK, examined.

= *Graphium antiphates jibasumbati* Tung, 1982. – Type locality: Padang, Sumatra Barat. Holotype in the Jiwa Baru Butterfly Collection Club, Sumatra, Indonesia. Not examined.

Diagnosis. Type of *Papilio itamputi* Butler, 1885 (NMHUK) (Fig. 1): FW band 1 truncated at the posterior discocellular vein; FW band 2 crosses the posterior discocellular vein, represented in cell CuA_2 by a small black spot; FW band 6 broad, fused to FW band7; FW band 7 broad, extends to cell CuA_2: HW marginal band spots large, but seperated from one another in cells $Sc+R_1$ and R_5; HW submarginal spots not represented in $Sc+R_1$ R_5 and M_1 but strongly marked in cells M_2, M_3 (large) and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 dark, extending past the black submarginal spots, the inner margin of the area convex bowing towards the discal cell.

Variation. Based on 54 males in ETHZ from Sumatra, Tanahmasa, Bangka, Belitung, Singkep, Lingga and Borneo. There is little seasonal variation in this subspecies but there is considerable individual variation. The majority of specimens agree with the type diagnosis, but lighter individuals occur where the FW band 2 does not cross the posterior discocellular vein and FW band 6 is narrower such that it is not fused, or only weakly joined to, FW band 7 (Fig. 5c). Darker individuals also occur, especially on some of the smaller islands around Sumatra (Tanahmasah, Bangka and Belitung) and on Borneo. In such individuals (Figs. 5d, 6d) FW band 2 crosses the posterior discocellular vein and is well represented in cell CuA_2, FW band 6 is broad, fused to FW band7 and FW band 7 is very broad. In all specimens the HW grey suffusion in cells M_2, M_3 and CuA_1 is dark, extending past the black submarginal spots, with the inner margin of the area convex, bowing towards the discal cell. In many specimens, FW band 1 is represented by a scattering of black scales in cell CuA_1 between the posterior discocellular vein and vein 1A.

Comparison of the syntypes of *Papilio alcibiades* Fabricius, 1787 (Figs. 4 a, 4b) with the type of *Papilio itamputi* Butler, 1885 (Fig. 1) shows that the latter is much more heavily marked and in general there is poor correspondence in phenotypes. The suggestion by Cotton (2018) to include *itamputi* as a synonym of *alcibiades* is, thus, not justified.

Distribution (Fig. 2b): Indonesia (Sumatra, Tanahmasa, Bangka, Belitung, Singkep, Lingga, Kalimantan). Malaysia (Sabah – except Pulau Balambangan and P. Banggi – and Sarawak), Brunei.

Arisbe (P.) itamputi javanicus (Eimer, 1888)

Papilio antiphates javanicus Eimer, 1889. – Type locality: Java. Current location of types unknown.

= *Papilio antiphates balius* Jordan, 1909, **syn. n.** – Type locality: Bali. Syntypes in NHMUK, examined.

= *Graphium antiphates kangeanus* Okano 1993, **syn. n.** – Type locality: Kangean. Holotype in coll. Okano, Mishima, Japan. Not examined.

Diagnosis. Smaller than ssp. *itamputi*. A representative Javan specimen is shown in Fig. 7a: FW band 1 truncated at the posterior discocellular vein; FW band 2 crosses the posterior discocellular vein, represented in cell CuA_2 by a small black spot; FW band 6 not as broad as in ssp. *itamputi*, fused to FW band 7; FW band 7 broad, extends to cell CuA_2: HW marginal band spots large, only seperated from one another in cell $Sc+R_1$; HW submarginal spots not represented in $Sc+R_1$ R_5 and M1 and indistinguishable in cells M_2, M_3 and CuA_1; suffusion in cells M_2, M_3 and CuA_1 black, the inner margin of the area relatively straight.

Variation. Darker individuals (Fig. 7b) occur, in which FW bands 1 and 2 both cross the posterior discocellular vein, although each is only represented by a small area of black scales in the neighbouring cell (Fig. 7b); FW bands 6 and 7 are broader and FW band 7 can reach vein 1A; the HW black marginal and submarginal band is boad. Specimens from Bali (Fig. 7c) and Kangean (Fig. 7d) islands fall within the range of variation of the Javan population and we include them in ssp. *javanicus* (Eimer, 1888).

Papilio antiphates javanicus Eimer, 1889 was treated as a synonym of *Papilio antiphates alcibiades* Fabricius, 1787 by Rothschild (1896) and Bryk (1930). It was treated as a synonym of *Graphium antiphates alcibiades* Fabricius, 1787, by Tsukada & Nishiyama (1982: 408) and Page (1987) and as a synonym of *Graphium (Pathysa) antiphates alcibiades* (Fabricius, 1787) by Bridges (1988). It was treated as a subspecies of *Graphium antiphates* (Cramer, 1775) by Gaonkar (1996) and Cotton (2018).

Distribution (Fig. 2b): Indonesia (Java, Bali, Kangean Isl.).

Arisbe (P.) itamputi kalaoensis (Rothschild, 1896)

Papilio antiphates kalaoensis Rothschild, 1896(: 92). – Type locality: "Kalao Isl., between Sulawesi and FLores". Types: syntypes (3 ♂♂, A. Everett, xii. [18]95) NHMUK, London, examined. Fig. 8a.

= *Graphium antiphates kurosawai* Igarashi, 1979(: 165), **syn. n.** – Type locality: S. Sulawesi. Types not examined.

Diagnosis. Syntypes. Smaller than ssp. *itamputi*. FW band 1 truncated at the posterior discocellular vein; FW band

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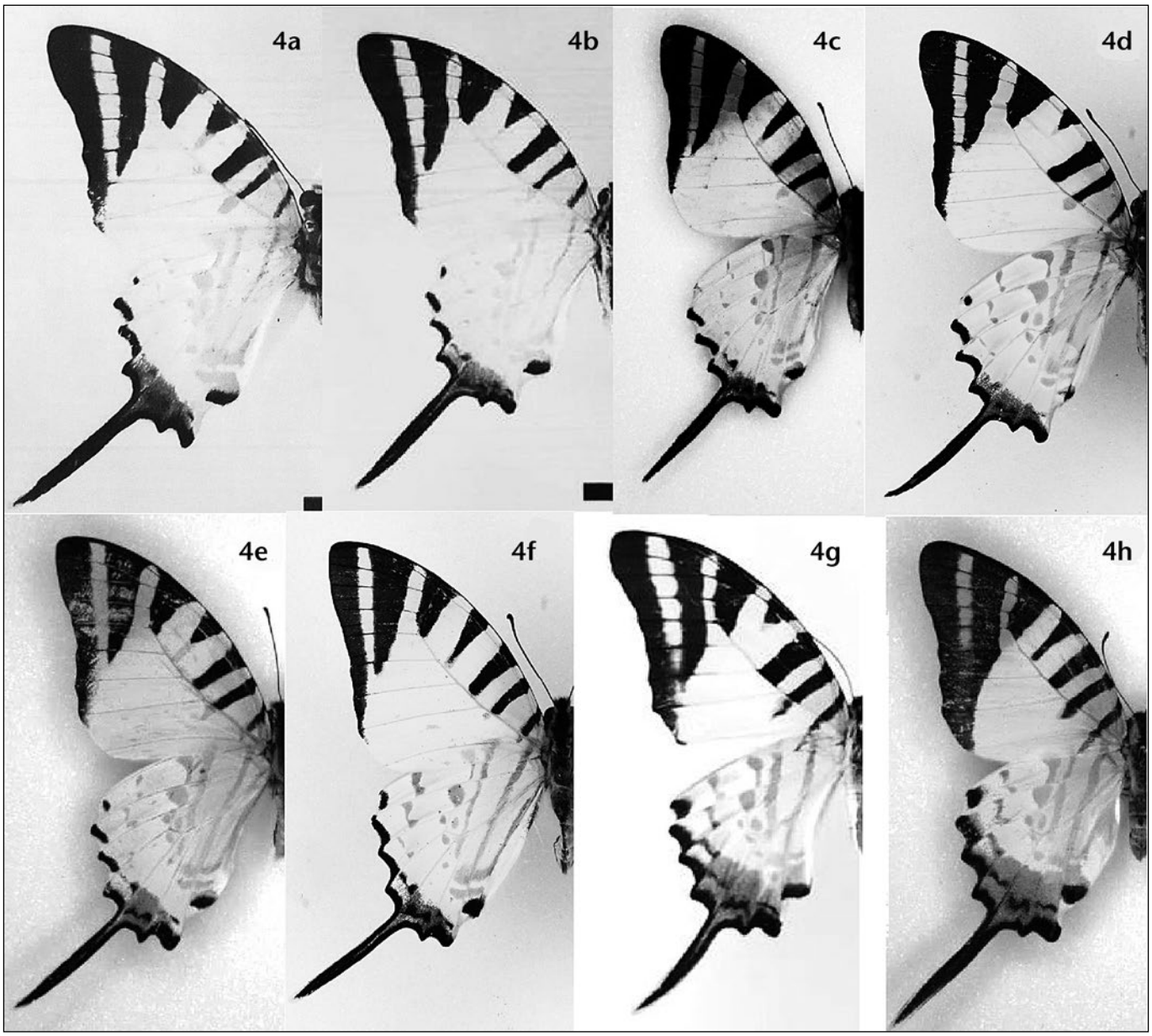

Fig. 4a, 4b: *Papilio alcibiades* syntypes ("Travancore"), © ZMUC. **Fig. 4c:** *A. a alcibiades* light form ("Dighol, Assam, (Mr. Brunt)"), NHMUK. **Fig. 4d:** *A. a alcibiades* light form ("Khasia Hills, Assam, Rev. W. Hamilton, 1893"), NHMUK. **Fig. 4e:** *A. a alcibiades* light form (Thailand, near Bangkok, January), ETHZ. **Fig. 4f:** *A. a alcibiades* light form ("W. Siam, Pang Yao, 20 mi. W of Raheng, February 1920, 2100 ft., Maj. C. A. Stockley"), NHMUK. **Fig. 4g:** *A. a alcibiades* intermediate individual (Thailand, Phrae, May), ETHZ. **Fig. 4h:** *A. a. alcibiades* dark form (Thailand, Chiang Mai, June), ETHZ.

2 does not cross the posterior discocellular vein; FW band 6 narrow, not fused to FW band 7 but weakly connected to it by black scaling along veins CuA_1 and M_3 and a variable amount of black suffusion in cell CuA_1; FW band 7 narrow, extends to vein CuA_2: HW marginal band spots small, not present in cell $Sc+R_1$; HW submarginal spots not represented in $Sc+R_1$ R_5 and M_1 and weak in cells M_2 (trace only), M_3 and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 weak, attenuated in cell M_2.

In addition to the syntypes, there are two specimens from "Djampea" (Tanahjampea), also collected by Everett, in the NHMUK collection that conform closely to the diagnosis of the syntypes. Further, recent specimens from south Sulawesi (Fig. 8b) fall within the variation of the syntypes and we include them in ssp. *kalaoensis* (Rothschild, 1896).

Distribution (Fig. 2b): Indonesia (Kalao, Tanahjampea, South Sulawesi). One might expect to find it on Saleyer as well.

Arisbe (P.) itamputi tungi ssp. n.

Holotype (Fig. 5e) ♂: Sengei Batu Tegeh, Taiping, Perak, Malaysia, 3. iv. 1976, ETHZ.

Paratypes (in total 36 ♂♂, 1 ♀): **Thailand:** 3 ♂♂, Ranong, 4. v. 2010. 1 ♂, Ko Samui, 6. vi. 2001. 1 ♂, Nakhon si Thammarat. 1 ♂, Phuket 10. v. 2010. 5 ♂♂, Phuket 12. v. 2010. 3 ♂♂, Trang, 10. vi. 1999. – **W. Malaysia:** 2 ♂♂, Sengei Batu Tegeh, Taiping, Perak, 3. iv. 1976. 2 ♂♂, Sengei Batu Tegeh, Taiping, Perak, 5. iv. 1976. 1 ♂, Sengei Batu Tegeh, Taiping, Perak, 20. iv. 1976. 1 ♂, Ipoh, Perak, 1976. 1 ♂, Ipoh, Perak, 1987. 6 ♂♂, Jelebu, Negri Sembilan, iii. 2010. 1 ♂, Tapah Hills, Perak, 2012. 2 ♂♂, Jerantut, Pahang. 4 ♂♂, Taman Negara Rompin, Johor. 1 ♀, Jelebu, Negri Sembilan, iii. 2010. – **Singapore:** 1 ♂, Singapore. – **Indonesia:** Bintan, 1 ♂.

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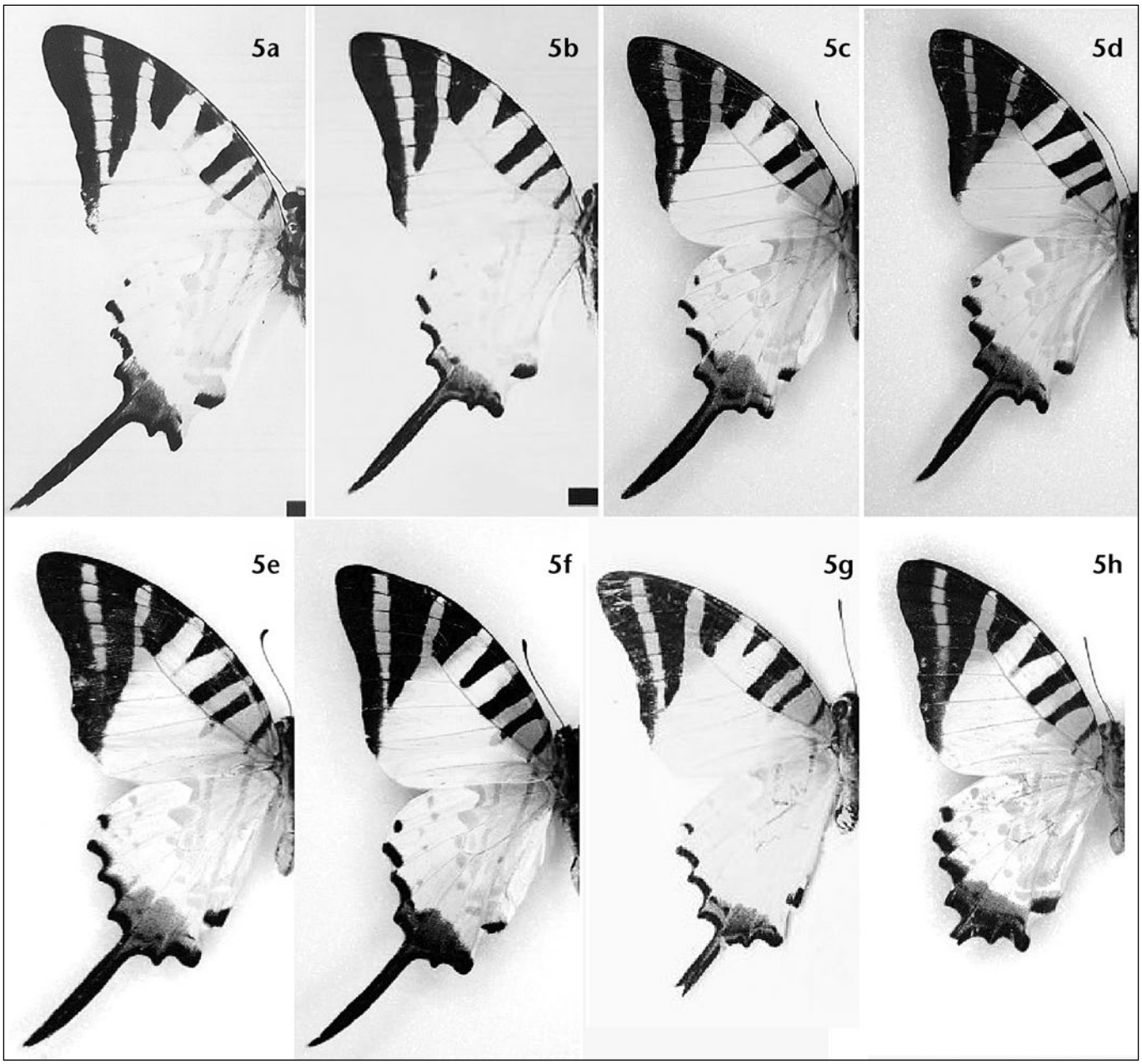

Fig. 5a, 5b: *Papilio alcibiades* syntypes "Travancore", © ZMUC. — Males of: **Fig. 5c:** *A. i. itamputi* light individual (Indonesia, Sumatra, Harau, January), ETHZ. **Fig. 5d:** *A. i. itamputi* dark individual (Indonesia, Tanahmasa, June), ETHZ. **Fig. 5e:** *A. i.* ***tungi*** **ssp. n.** holotype (Taiping, Perak, Malaysia), ETHZ. **(f)** *A. i. tungi* ssp. n. paratype (Taiping, Perak, Malaysia), ETHZ. **Fig. 5g:** *A. i. tungi* ssp. n. paratype. An exceptional pale specimen (Kedah, Malaysia), ETHZ. **Fig. 5h:** *A. i.* ***toshikazui*** **ssp. n.** holotype (Langkawi Island, Kedah, Malaysia), ETHZ.

Etymology: Named after V. W. Y. Tung, who reported on the difference between the Sumatran and Malaysian populations of these butterflies.

Diagnosis

FW band 1 attenuated at the posterior discocellular vein only representedby a small area of scattered black scales in cell CuA_2; FW band 2 crosses the posterior discocellular vein, represented in cell CuA_2 by a small black spot; FW band 6 broad, fused to FW band7; FW band 7 broad, extends to cell CuA_2: HW marginal band spots large, only seperate in cell $Sc+R_1$, the inner margin of the spots in $Sc+R_1$ R_5 and M_1 with slight grey suffusion; HW submarginal spots not represented in $Sc+R_1$ R_5 and M_1 and weakly marked in cell M_2 and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 extending past the black submarginal spots, the inner margin of the area convex bowing towards the discal cell and envaginated along veins M_2, M_3 and CuA_1.

The majority of specimens are similar to the holotype with modest variation in the extent of the black markings: FW band 1 may not be represented in cell CuA_2 or may reach vein 1A; FW band 2 may not be represented in cell CuA_2 or may have a siginifcant extension to the middle of this cell; FW bands 6 and 7 may be fused or separated by a narrow gap (Fig. 5f) and the HW grey suffusion, can be darker (Fig. 5f). I have seen only only very lightly marked individual (Fig. 5g), in which the extent of the black markings and HW grey suffusion are decreased, with both FW band 1 and FW band 2 truncated at the posterior discocelluale vein.

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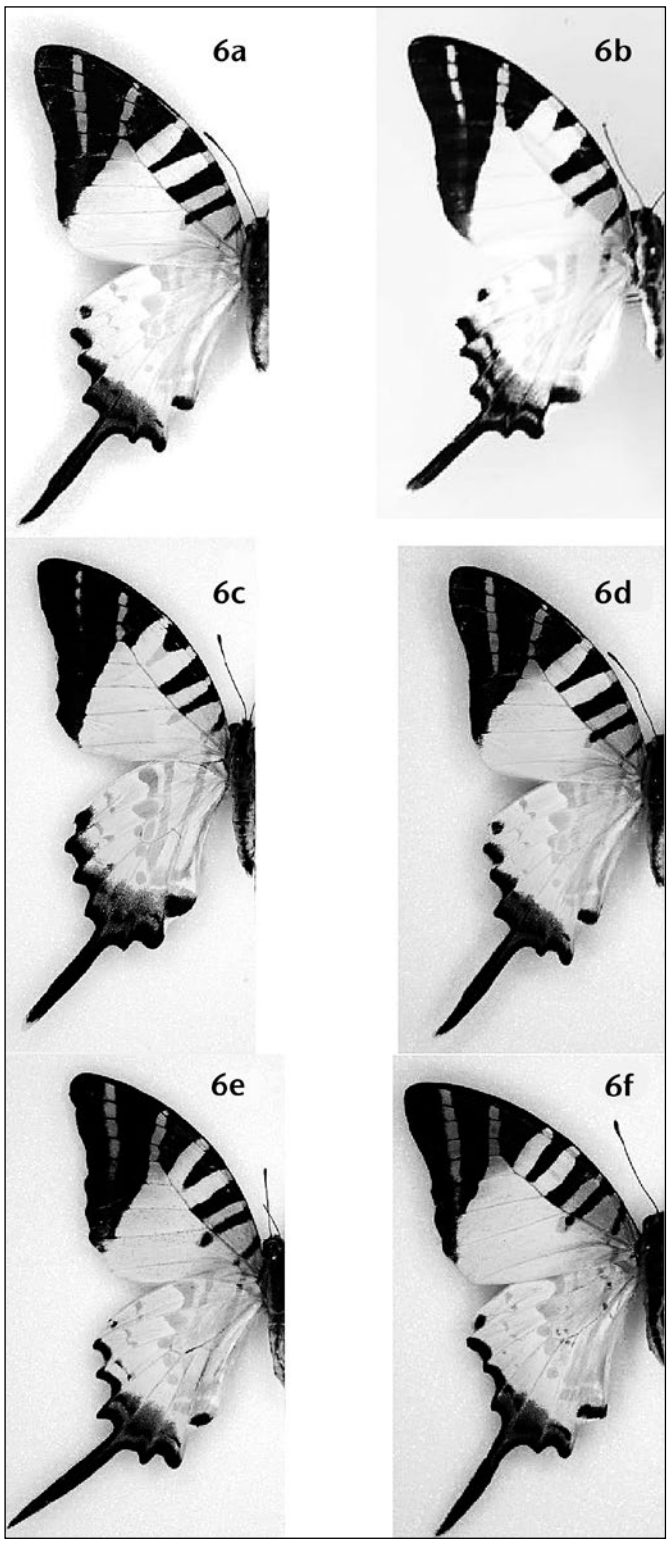

Fig. 6: Males of: **Fig. 6a:** *A. i. itamputi* typical individual (Indonesia, Tanahmasa, June), ETHZ. **Fig. 6b:** *A. i. rhabdotus* typical individual (Indonesia, Sipora Island), ETHZ. **Fig. 6c:** *A. i.* ***timothyi*** **ssp. n.** holotype (Siberut Island, Indonesia), ETHZ. **Fig. 6d:** *A. i. itamputi* (Sabah, Malaysia), ETHZ. **Fig. 6e:** *A. i.* ***natunaensis*** **ssp. n.** holotype (Natua Island, Indonesia), ETHZ. **Fig. 6f:** *A. i. natunaensis* ssp. n. paratype (Natuna Island, Indonesia), ETHZ.

Tung (1982) noted the difference between the phenotypes of the Sumatran and peninsular poulations of *A. itamputi* but unfortunately he decided to describe the Sumatran population as the new subspecies. The principal differences are in the extent of black markings, with ssp. *tungi* ssp. n. being generally lighter than ssp. *itamputi.* There is poor correspondence between the holotype of ssp. *tungi* ssp. n. and the syntypes of *Papilio alcibiades* Fabricius, 1787, and it is clear that these latter two specimens do not fall within the normal range of variation of specimens from the Malayan peninsula. The very lightly marked individual (Fig. 5g) approaches the phenotype of the syntypes of *Papilio alcibiades* Fabricius, 1787 but, nevertheless, retains significant differences in the characteristic markings: FW band 6 is broader at the costa, such that the separation of FW bands 6 and 7 is less than in the *alcibiades* syntypes; FW band 7 is shorter, only just extending beyond vein CuA_2; the HW marginal spots are larger and connected between cells R_5 and M_1; the grey suffusion in cells M_2, M_3 and CuA_1 is more extensive with a characteristic convex inner margin that is envaginated at the veins that transect it.

Distribution (Fig. 2b): Thailand (Phuket, Trang); West Malaysia; Singapore; Indonesia (Bintan I.)

Arisbe (P.) itamputi ***toshikazui*** **ssp. n.**

Holotype (Fig. 5h): ♂. Langkawi Island, ETHZ.

Paratypes (in total 2 ♂♂): 1 ♂, Koh Tarutao. 1 ♂, Langkawi. ETHZ.

Etymology: Named after Toshikazu Yamazaki, who collected the holotype specimen.

Diagnosis

FW band 1 extends beyond the posterior discocellular vein, reaching vein 1A; FW band 2 does not extend beyond the posterior discocellular vein; FW band 6 broad, fused to FW band 7; FW band 7 broad, extends to cell CuA_2: HW marginal band spots large, only separate in cell $Sc+R_1$; HW submarginal spots not represented in cells $Sc+R_1$, R_5 and M_1, weak in cell M_2, but large in cell M_3 where it is fused to the marginal spot; grey suffusion in cells M_2, M_3 and CuA_1 dark, extending well past the submarginal spots.

Both paratype specimens have extended black markings like the holotype, in particular FW bands 6 and 7 are broad and fused in both specimens. There are some differences in other markings: in the specimen from Koh Tarutao FW band 1 is like the holotype but FW band 2 extends well beyond the posterior discocellular band; in the specimen from Langkawi, FW band 1 is attenuated and does not extend beyond the posterior discocellular band but FW band 2 does extend beyond the posterior discocellular band; both paratypes have broad HW marginal bands, the specimen from Koh Tarutao these are particularly broad and fuse with the submarginal spots in M_2, M_3 and CuA_1; in this specimen there are traces of the HW submarginal spots in cells R_5 and M_1.

Distribution: Thailand (Koh Tarutao), Malaysia (Langkawi island, Kedah).

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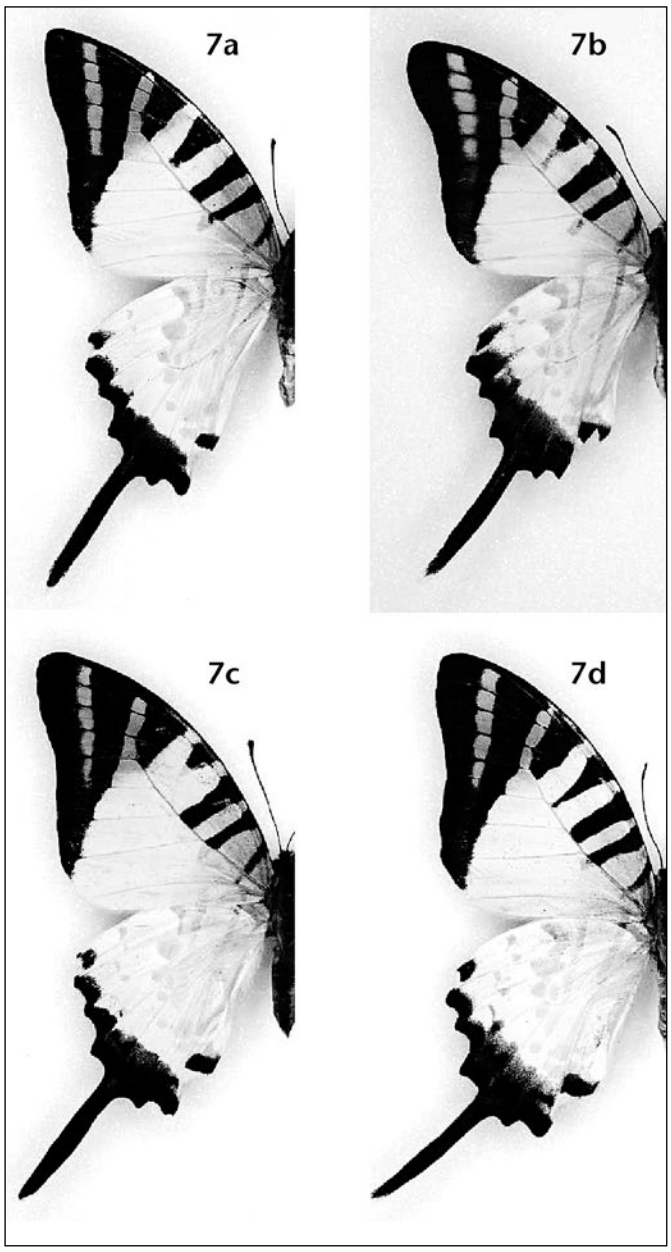

Fig. 7: Males of: **Fig. 7a:** *A. i. javanicus* light form (Indonesia, Java), ETHZ. **Fig. 7b:** *A. i. javanicus* dark form (Indonesia, Java), ETHZ. **Fig. 7c:** *A. i. javanicus* (Indonesia, Bali), ETHZ (= *baliensis* **syn. n.**). **Fig. 7d:** *A. i. javanicus* (Indonesia, Kangean Island), ETHZ (= *kangeanus* **syn. n.**).

Arisbe (P.) itamputi ***natunaensis*** **ssp. n.**

Holotype (Fig. 8d) ♂**:** Natuna Islands, Riau Islands province, Indonesia, IV. 2009, ETHZ.

Paratypes: 2 ♂♂, Natuna Islands, IV. 2009, ETHZ. – One specimen agrees well with the holotype, the second (Fig. 5f) is somewhat lighter: although still broad, FW band 1 does not cross the posterior discocellular vein and FW band 6 is narrower; HW submarginal spots only represented in cells M_3, CuA_1, CuA_2: the area of grey suffusion is less extensive than in the holotype, although still divided by paler areas along the veins.

Etymology: Named after the type locality.

Diagnosis

FW band 1 relatively broad (about twice the width typical of ssp. *itamputi*) extending beyond the posterior discocellular vein, reaching vein 1A; FW band 2 extends beyond the posterior discocellular vein; FW band 6 broad, fused to FW band 7; FW band 7 broad, extends to cell CuA_2: HW marginal band spots narrower and more sharply defined than in ssp. *itamputi*, only separate in cell $Sc+R_1$; HW submarginal spots represented in cells M_1, M_2, M_3, CuA_1, CuA_2; grey suffusion in cells M_2, M_3 and CuA_1 dark, extending well past the submarginal spots but divided by lighter lines along veins M_3 and CuA_1.

Distribution: Indonesia (Natuna islands).

Arisbe (P.) itamputi ***timothyi*** **ssp. n.**

Holotype (Fig. 8d) ♂**:** Siberut Island, Mentawei Island Regency, Indonesia, VI. 2005, ETHZ.

Paratypes: 2 ♂♂. Siberut Island, Mentawei Island Regency, Indonesia, VI. 2007. – Both specimens agree well with the holotype.

Etymology: Named after the grandson of the author, Timothy Gartmann.

Diagnosis

FW band 1 relatively broad (about twice the width typical of ssp. *itamputi*) at the costa but tapering to a point just short of the posterior discocellular vein; FW band 2 terminates at the posterior discocellular vein; FW band 6 broad, fused to FW band 7 for most of its length; FW band 7 broad, extends to cell CuA_2: HW marginal band spots broader than in ssp. *itamputi* forming a continuous band, with noticeable suffusion spreading from the inner margin; HW submarginal spots represented in cells M_1, M_2, M_3, and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 dark, extending well past the submarginal spots.

Distribution: Indonesia (Siberut)

Arisbe (P.) itamputi ***miae*** **ssp. n.**

Holotype (Fig. 8d) ♂**:** Lombok Island, West Nusa Tenggara Province, Indonesia, IV. 2004, ETHZ.

Paratypes: 4 ♂♂, Lombok Island, West Nusa Tenggara Province, Indonesia, IV. 2006, ETHZ. – All specimens conform to the diagnosis of the holotype.

Etymology: Named after Mia Gartmann, granddaughter of the author.

Diagnosis

FW band 1 does not extend beyond the posterior discocellular vein; FW band 2 does not extend beyond the posterior discocellular vein; FW band 6 broad, fused to FW band 7; FW band 7 broad, extends to cell 1A: HW marginal band spots large forming a continuous marginal band; HW submarginal spots not represented in cells $Sc+R_1$, R_5 and M_1, fused with the marginal spots in cells M_2, M_3 and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 limited to a narrow band inside the broad black band formed by the fused marginal and submarginal spots.

Distribution: Indonesia (Lombok).

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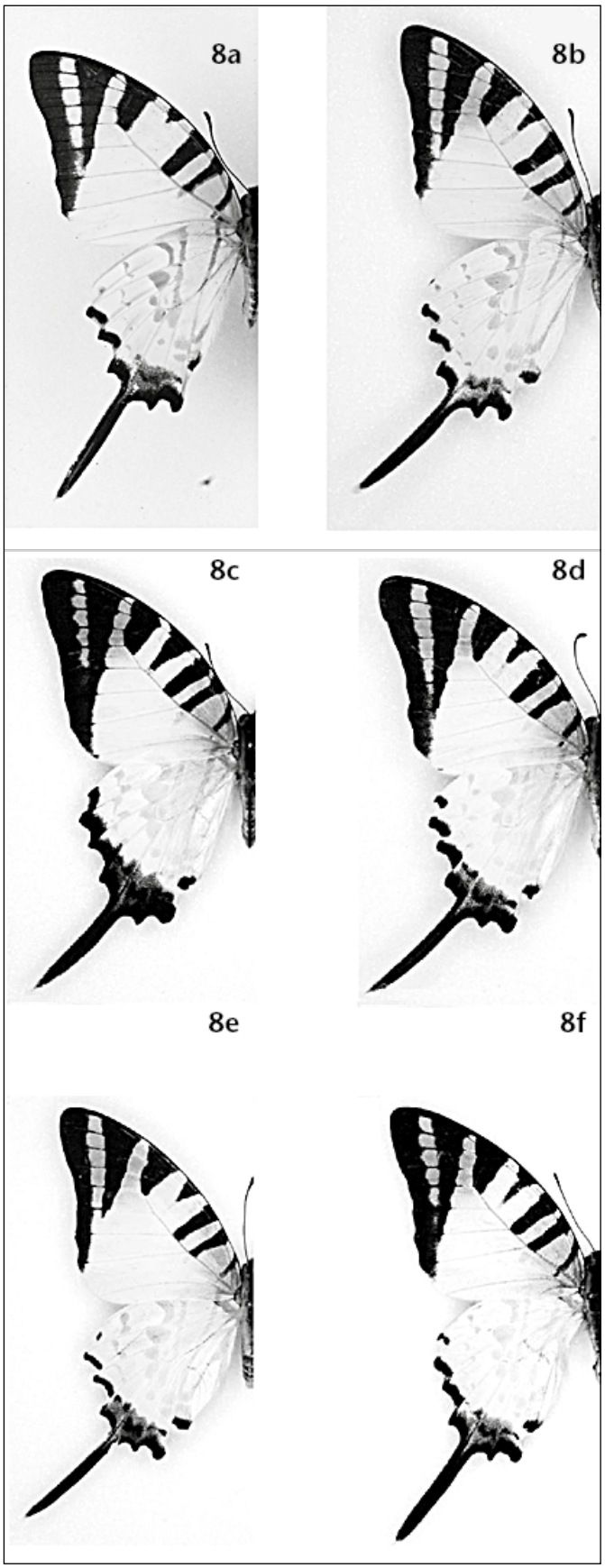

Fig. 8: Males of: **Fig. 8a:** *A. i. kalaoensis* syntype ("Kalao, Dec. [18]95, A. Everett"), NHMUK. **Fig. 8b:** *A. i. kalaoensis* (South Sulawesi, Indonesia), ETHZ (= *kurosawai* Igarashi, 1979, **syn. n.**). **Fig. 8c:** *A. i.* ***miae*** **ssp. n.** holotype (Lombok Island, Indonesia), ETHZ. **Fig. 8d:** *A. i.* ***nusatenggaraensis*** **ssp. n.** holotype (Sumbawa Island, Indonesia), ETHZ. **Fig. 8e:** *A. i. nusatenggeraensis* ssp. n. paratype, dry-season form (Flores Island, Indonesia), ETHZ. **Fig. 8f:** *A. i. nusatenggaerensis* ssp. n. paratype, wet-season form (Pantar Island, Indonesia), ETHZ.

Arisbe (P.) itamputi ***nusatenggaraensis*** **ssp. n.**

Holotype (Fig. 8d) ♂: Sumbawa Island, West Nusa Tenggara Province, Indonesia, iii. 2006, ETHZ.

Paratypes (in total 23 ♂♂, 1 ♀): **Indonesia, West Nusa Tenggara, Sumbawa Isl.:** 6 ♂♂, iii. 2006. ETHZ. 1 ♂, "Tambora, iv.–v. [18]96, Doherty", NHMUK. 2 ♂♂, "Sumbawa (Staud.)", NHMUK. 1 ♂, "Sumbawa, Doherty ix. [18]91". NHMUK. 2 ♂♂, "Sumbawa, Doherty ix. [18]91, ex Coll. H. W. Elwes 1920", NHMUK. 2 ♂♂, "Bima, ii. [18]96, Doherty", NHMUK. – **Indonesia, East N.T., Flores Isl.:** 2 ♂♂, ix. 2006, ETHZ. 2 ♂♂, "S. Flores, NH [18]96, Dry s., Everett", NHMUK. – **Indonesia, East N.T., Pantar Isl.:** 3 ♂♂, i. 2006, ETHZ. – **Indonesia, East N.T., Alor Isl.:** 1 ♂, i. 2008, ETHZ. 1 ♂, xii. 2008, ETHZ. 1 ♀, "Alor", NHMUK – this specimen had been identified as the "neoallotype" [no valid category of the ICZN 1999] of ssp. *kalaoensis*.

Etymology: Named after Nusa Tenggara, the Indonesian name for the archipelago throughout most of which this subspecies is distributed.

Diagnosis

FW band 1 crosses the posterior discocellular vein, extending to vein 1A; FW band 2 does not extend beyond the posterior discocellular vein; FW band 6 broad tapering to fuse with FW band 7; FW band 7 narrow, extends to cell CuA_1: HW marginal band spots large but separated along each vein; HW submarginal spots not represented in cells $Sc+R_1$, R_5 and M_1, prominent in cells M_2, M_3 and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 dark, relatively narrow band reaching to just beyound the submarginal spots.

Variation: Males specimens from the rainy season (November through to April) conform to the holotype, except that in some (Fig. 8f) the spots of the HW marginal band are joined at veins M_1 and M_2. The male specimens from the dry season (May-October) are generally lighter (Fig. 8e): FW band 1 tapers towards and does not cross the posterior discocellular vein; FW band 2 does not extend beyond the posterior discocellular vein; FW band 6 narrow, tapering towards vein M3 only joined to FW band 7 by fine lines of black scaling along the veins; HWmarginal spots narrow, separated from one another; HW submarginal spots not represented in cells $Sc+R_1$, R_5 and M_1, prominent in cells M_2, M_3 and CuA_1; grey suffusion in cells M_2, M_3 and CuA_1 similar to the wet season specimens. The lighter dry season forms approach the males of ssp. *kalaoensis* but can be readily separated by the stronger representation of the submarginal black spots and grey suffusion in cells M_2, M_3 and CuA_1 on the HW.

The female specimen from Alor is slightly larger than the males and has broader FW. The black markings are less extensive than those of the dry season males. Unfortunately no females of ssp. *kalaoensis* were available for comparison.

Distribution: Indonesia (Sumbawa, Flores, Pantar, Alor).

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Table 1: Differences in the nucleotide sequences of the mitochondrial ndh5 gene. The differences observed in pairwise comparisons between each sample is given as a percentage of the sequence lengths being compared. Genbank accession numbers are indicated below the locality in the Location column.

Species		*antiphates*	*itamputi*		*androcles*	*chironides*		*bathycles*
	Location/ Access. no.	**Laos**	**Malaysia**	**Borneo**	**Sulawesi**	**Myanmar**	**China**	**Malaysia**
antiphates	Laos AB059494	0	4.0	4.0	7.5	9.6	9.6	9.5
itamputi	Malaysia AB059495		0	0.25	8.2	9.5	9.5	9.6
	Borneo AB059496			0	8.2	9.6	9.6	9.7
androcles	Sulawesi LT999976				0	9.7	9.7	9.7
chironides	Myanmar AB059502					0	0	1.9
	China KP159289						0	1.9
bathycles	Malaysia AB059503							0

Table 2: Differences in the nucleotide sequences of the mitochondrial cox1 gene. The differences observed in pairwise comparisons between each sample is given as a percentage of the sequence lengths being compared. Genbank accession numbers are indicated below the locality in the Location column. — *Labelled as "*Graphium doson*" in the NCBI database.

Species		*antiphates*				*itamputi*		*androcles*	*chironides*		*bathycles*	
	Location/ Access. no.	**India**	**China**	**India**	**Mizoram**	**Malaysia**	**Malaysia**	**Sulawesi**	**China**	**China**	**Malaysia**	**Malaysia**
antiphates	India KJ195289	0	0.5	1.1	0.8	4.9	4.7	6.7	8.7	8.7	8.5	8.7
	China HM565276*		0	0.3	0.5	4.1	4.4	6.1	8.0	8.1	7.9	8.0
	India KJ195281			0	0.5	4.5	4.3	6.4	8.4	8.6	8.2	8.4
	Mizoram KC810962				0	4.7	4.8	6.7	8.7	8.9	8.5	8.7
itamputi	Malaysia KC970103					0	0.2	7.6	9.9	10	8.6	8.8
	Malaysia KC970106						0	8.3	10	10	9.0	8.8
androcles	Sulawesi LT999976							0	7.6	7.7	8.8	9.0
chironides	China HM246463								0	0.2	2.9	3.0
	China KP159289									0	2.7	2.9
bathycles	Malaysia KC970110										0	0.2
	Malaysia KC970111											0

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Checklist of the *antiphates*-group

1. *Arisbe (Pathysa) antiphates* (Cramer, 1775)

= *Papilio nebulosus* Butler, 1881. — Type locality: Darjiling.
= *Pathysa albescens* Chou, Yuan & Wang, 2000. — Type locality: Quanzhou, Fujian.

ssp. *antiphates* (Cramer, 1775)

Type locality: S. China. — Distribution: China (Fujian, Guangdong, Guangxi), Vietnam (Ha Giang Province).

ssp. *alcibiades* (Fabricius, 1787)

Type locality: «Tranquebar», loc. err. Probably from northern parts of India or Thailand. Distribution: N.E. India, Bangladesh, China (S. Yunnan), Myanmar, Thailand, Cambodia, Laos, Vietnam (except northern provinces).
= *pompilius* (Fabricius, 1787). — Type locality: "India". [See also "Note added in print" above.]
= *continentalis* (Eimer, 1889). — Type locality: "auf dem indischen Festlande [...] aus Sikkim, aus Bengalen und von anderen Theilen des ostindischen Festlandes".

ssp. *ceylonicus* (Eimer, 1889)

Type locality: Ceylon. — Distribution: Sri Lanka.

ssp. *naira* (Moore, 1903)

Type locality: Travancore. — Distribution: S. India (Katanaka, Kerala, Tamil Nadu).

ssp. *linga* (Fruhstorfer, 1909), stat. rev.

Type locality and distribution: China (Hainan).

2. *Arisbe (Pathysa) itamputi* (Butler, 1885), stat. rev.

ssp. *itamputi* (Butler, 1885)

Type locality: "Lapsong", Sumatra. — Distribution: Indonesia (Sumatra, Tanahmasa, Bangka, Belitung, Singkep, Lingga, Borneo).
= *paetus* (Fruhstorfer, 1909). — Type locality: Borneo. Distribution: Malaysia (Sabah, Sarawak), Brunei, Indonesia (Kalimantan).
= *jibasumbati* (Tung, 1982). — Type locality: Padang, Sumatra Barat.

ssp. *javanicus* (Eimer, 1888)

Type locality: Java. — Distribution: Indonesia (Java, Bali, Kangean I.).
= *balius* (Jordan, 1909), syn. n. — Type locality: Bali.
= *kangeanus* (Okano, 1993) syn. n. — Type locality: Kangean.

ssp. *kalaoensis* (Rothschild, 1896)

Type locality: Kalao island. — Distribution: Indonesia (P. Kalao, P. Tanahjampea, S. Sulawesi).
= *kurosawai* Igarashi, 1979, syn. n. — Type locality: S. Sulawesi.

ssp. *antiphonus* (Fruhstorfer, 1902)

Type locality and distribution: Indonesia (P. Nias).

ssp. *rhabdotus* (Jordan, 1937)

Type locality and distribution: Indonesia (P. Sipora).

ssp. *pulauensis* (Eliot, 1983)

Type locality and distribution: Malaysia (P. Tioman).
= *insularis* (Eliot, 1978) (homonym).
= *tiomanus* (Moonen 1984). — Replacement name proposed for *insularis* Eliot, 1978) (synonym).

ssp. *karimatanum* (Hanafusa, 1990)

Type locality and distribution: Indonesia (P. Karimata).

ssp. *simpulensis* Abang & Page, 2006

Type locality and distribution: Malaysia (Sabah: P. Balambangan).

ssp. *sinambungensis* Abang & Page, 2006

Type locality and distribution: Malaysia (Sabah: P. Banggi)

ssp. *tungi* ssp. n.

Type locality: Malaysia (Perak). — Distribution: Thailand, West Malaysia, Singapore, Indonesia (P. Bintan).

ssp. *toshikazui* ssp. n.

Type locality: Malaysia (P. Langkawi). — Distribution: Thailand (Koh Taruao), Malaysia (P. Langkawi).

ssp. *natunaensis* ssp. n.

Type locality and distribution: Indonesia (Natuna islands).

ssp. *timothyi* ssp. n.

Type locality and distribution: Indonesia (P. Siberut).

ssp. *miae* ssp. n.

Type locality and distribution: Indonesia (P. Lombok).

ssp. *nusatenggaraensis* ssp. n.

Type locality: Sumbawa. — Distribution: Indonesia (P. Sumbawa, P. Flores, P. Pantar, P. Alor).

3. *Arisbe (Pathysa) epaminondas* (Oberthür, 1879)

Type locality and distribution: India (Andaman Islands).

4. *Arisbe (Pathysa) androcles* (Boisduval, 1836)

ssp. *androcles* (Boisduval, 1836)

Type locality: Celebes. — Distribution: Indonesia (Sulawesi, P. Buton, P. Muna).

ssp. *cleomenes* (Fruhstorfer, 1911)

Type locality: Sula Mangoli. — Distribution: Indonesia (Kep. Sula: Sanana I.).

ssp. *pelengensis* (Detani, 1983)

Type locality and distribution: Indonesia (Kep. Banggai: Peleng I.).

5. *Arisbe (Pathysa) decolor* (Staudinger, 1888)

ssp. *decolor* (Staudinger, 1888)

Type locality: Palawan. — Distribution: E. Malaysia (N. Borneo)?, Philippines (Balabac, Calamian, Palawan).

ssp. *tigris* (Semper, 1892)

Type locality: S. E. Mindanao. — Distribution: Philippines (Dinagat, Mindanao).

ssp. *atratus* (Tsukada & Nishiyama, 1980)

Type locality and distribution: Philippines (Mindoro).

ssp. *neozebraica* (Page, 1987)

Type locality: Luzon. — Distribution: Philippines (Bohol, Leyte, Luzon, Marinduque, Masbate, Negros, Panaon, Panay, Polillo, Samar, Siquijor, Ticao).

ssp. *sibuyana* (Page, 1987)

Type locality and distribution: Philippines (Sibuyan).

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ssp. *rebeccae* Page & Treadaway, 2003

Type locality and distribution: Philippines (Camiguin de Luzon).

ssp. *jamesi* Page & Treadaway, 2003

Type locality: Sanga Sanga. — Distribution: Philippines (Sibutu, Sanga Sanga).

6. *Arisbe (Pathysa) euphrates* (Felder & Felder, 1862)

ssp. *euphrates* (Felder & Felder, 1862)

Type locality: Luzon. — Distribution: Philippines (Busuanga, Cuyo, Homonhon, Leyte, Luzon, Marinduque, Mindanao, Mindoro, Samar).

ssp. *domaranus* (Fruhstorfer, 1903)

Type locality: Dumaran. — Distribution: Philippines (Calamian, Palawan, Dumaran, Balabac).

ssp. *boholensis* (Page, 1987)

Type locality and distribution: Philippines (Bohol).

ssp. *buhisanus* (Page, 1987)

Type locality and distribution: Philippines (Cebu).

ssp. *itim* Page & Treadaway, 2011

Type locality and distribution: Philippines (Lubang).

7. *Arisbe (Pathysa) euphratoides* (Eimer, 1889)

Type locality: "auf Borneo und auf den Philippinen". — Distribution: Philippines (Mindanao). Recent confirmed records only from Davao Province, S.E. Mindanao: Mt. Hamiguitan at 900–1400 m (Mohagan & Treadaway 2010) and from "Mt Magsad, 1500–1725 m" [= probably Mt. Agtuganon, 1660 m, or Mt. Pasian, 1432 m] (Schroeder & Treadaway 2012).

8. *Arisbe (Pathysa) ornatus* (Rothschild, 1895)

Type locality: Halmahera. — Distribution: Indonesia (Halmahera, Bachan), S. Sulawesi.

= *elegantia* (Tsukada & Nishiyama, 1980). — Type locality: S. Sulawesi.

Acknowledgements

This article is dedicated to the memory of my good friend and colleague, Colin "Trig" Treadaway, who sadly passed away before the manuscript could be completed. I thank the Trustees and Staff of the Natural History Museum, London, for access to the collections and I am particularly grateful to Dr. Blancas Huertas for her support during my visits.

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Received: 22. v. 2019

© Entomologischer Verein Apollo e. V., Frankfurt am Main, Juni 2020 ISSN 0723-9912

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: Nachrichten des Entomologischen Vereins Apollo

Jahr/Year: 2019

Band/Volume: 40

Autor(en)/Author(s): Page Malcolm G. P.

Artikel/Article: Notes on Arisbe (Pathysa) antiphates (Cramer, 1775) (Lepidoptera, Papilionidae) and its allies 187-202