# Revision of the immaculate species of the *Anthracus annamensis* group from the East Palaearctic and Oriental Regions (Insecta: Coleoptera: Carabidae: Harpalini)

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#### Summary

The Anthracus annamensis group is introduced and characterized. A revision of the immaculate species of this species group from the Oriental and East Palaearctic Regions is presented. Acupalpus derogatus Walker, 1858 and Acupalpus glabrus Louwerens, 1956 are transferred to the genus Anthracus (comb. nov.). Anthracus derogatus (Walker, 1858), furvus (Andrewes, 1947) and A. glabrus (Louwerens, 1956) are redescribed. Four new species are described: Anthracus wrasei nov. sp. from China (type locality: China: Yunnan: 4 km E Dali old town, shore terrain of Er Hai Lake, 2020 m, 25°42'N /100°11.5'E), A. schuhi nov. sp. and A. indicus nov. sp. from India (type locality: India: Maharashtra: Lonvala, 80 km E Bombay) and A. latus nov. sp. from Thailand, Laos, Vietnam, China and Myanmar (type locality: Thailand: Chiang Mai prov.: Ban San Pakia, 1700 m). New distributional data are provided for Anthracus furvus (Andrewes) (first records for Vietnam and China, Yunnan prov.), and for A. glabrus (Louwerens) (first record for Bali).

#### Zusammenfassung

# Revision der einfarbigen Arten der Anthracus annamensis-Gruppe aus der Ostpaläarktis und der orientalischen Region (Insecta: Coleoptera: Carabidae: Harpalini)

Die Anthracus annamensis-Gruppe wird vorgestellt und charakterisiert. Die durch einfarbige Flügeldecken ausgezeichneten, orientalischen und ostpaläarktischen Arten der Artengruppe werden revidiert. Für Anthracus furvus (Andrewes, 1947), derogatus (Walker, 1858) und glabrus (Louwerens, 1952) werden Redeskriptionen vorgelegt, wobei die beiden letztgenannten Arten in die Gattung Anthracus umgesetzt werden. Vier neue Arten werden beschrieben: A. wrasei nov. sp. (loc. typ.: China: Yunnan: 4 km E Dali old town, shore terrain of Er Hai Lake, 2020 m, 25°42'N /100°11.5'E) aus China, A. schuhi nov. sp. (loc. typ.: Indien: Maharasthra: Lonvala, 80 km E Bombay) und A. indicus nov. sp. (loc. typ.: Indien: Maharasthra: Lonvala, 80 km E Bombay) aus Indien und A. latus nov. sp. (loc. typ.: Thailand: Chiang Mai prov.: Ban San Pakia, 1700 m") aus Thailand, Laos, Vietnam, China und Myanmar. Neue Verbreitungsdaten werden für Anthracus furvus (Andrewes) (Erstnachweise für Vietnam und China, Yunnan prov.) und A. glabrus (Louwerens) (Erstnachweis für Bali) vorgelegt.

**Key words:** *Acupalpus*, redescriptions, new species, first records, India, China, South East Asia

# Introduction

The closely related Stenolophina genera *Acupalpus* Latreille, 1829 and *Anthracus* Motschulsky, 1850 comprise 16 species which were described or recorded from the Oriental region, excluding *Acupalpus ovatulus* Bates, 1889 that actually belongs to the genus *Stenolophus* (Kataev pers. communication) and *A. assamicus* Jedlička, 1964 that represents a species of the subtribe Tachyina of the tribe Bembidiini according to an examination of the holotype.

Six of the Oriental species, *Anthracus annamensis* (Bates, 1889) and *furvus* (Andrewes, 1947), *Acupalpus derogatus* Walker, 1858, *nesophilus* Andrewes, 1936, *haemorrhous* Louwerens, 1952 and *glabrus* Louwerens, 1952, and additionally *Anthracus biplagiatus* (Boheman, 1858) from E China and *furvinus* (Darlington, 1968) from New Guinea belong to a complex of closely related species recently mentioned as the "*Acupalpus annamensis* group" by JAEGER (2010: 147) and here introduced as a peculiar species group of the genus *Anthracus*.

Until now most of the Oriental taxa of this species group were known only from their original descriptions and subsequent records in world and regional catalogues, in collection lists or other faunistic papers (e.g. BATES 1892, ANDREWES 1926, 1928, 1930, 1933, 1947, CSIKI 1932, LANDIN 1954, JEDLIČKA & CHÛJÔ 1964, 1966, LORENZ 1998, 2005, JAEGER & KATAEV 2003, CHAUDARI 2005). Redescriptions or taxonomic notes were provided only for A. derogatus (Walker) by BATES (1886) and ANDREWES (1919). A key, or modern redescriptions characterising and figuring the essentials characters of the male aedoeagi of the formerly described species are missing to date. Moreover, the study of older and recent collections from India and SE Asia revealed that the A. annamensis group comprises various undescribed species externally often very close to formerly described taxa. Thus, a reliable identification of the species was impossible without type comparison, and consequently most former faunistic records remained doubtful.

This first contribution on the taxa of the *Anthracus annamensis* group provides a general diagnosis of the species group, a revision of the immaculate species, containing redescriptions of *A. derogatus* Walker, *A. furvus* Andrewes and *glabrus* Louwerens, as well as descriptions of four new species from China, India and SE Asia, and an identification key. The species with maculate elytra, related to *A. annamensis* (Bates) and *nesophilus* (Andrewes) will be treated in future papers (JAEGER in prep.).

# **Material and Methods**

The material examined is deposited in the following public institutions and private collections:

- BMNH Natural History Museum, London, Great Britain, Chr. Taylor, Cl. Gent and B. Garner
- IZAS Institute of Zoology, Chinese Academy of Sciences, Beijing, China, Dr. Meiying Lin
- MHNG Museum d'Histoire Naturelle, Geneva, Switzerland, Dr. I. Löbl and Dr. G. Cuccudoro
- NHMB Naturhistorisches Museum Basel, Bale, Switzerland, Dr. M. Brancucci
- NHMW Naturhistorisches Museum Wien, Vienna, Austria, Dr. H. Schönmann and Dr. H. Schillhammer
- NHRS Swedish Museum of Natural History, Stockholm, Sweden, Dr. B. Viklund and Dr. J. Ferrer
- NME Naturkundemuseum Erfurt, Germany, Dipl.-Biol. M. Hartmann

- NMP Narodny Muzeum v Praze, Prague, Czech Republic, Dr. J. Hájek
- RMNH Nationaal Naturhistorische Museum "Naturalis", Leiden, The Netherlands, F. van Assen
- ZISP Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia, Dr. B. M. Kataev
- cBUL Coll. P. Bulirsch, Prague, Czech Republic
- cJAE Coll. B. Jaeger, Berlin, Germany
- cKME Coll. R. Kmeco, Litovel, Czech Republic
- cSCHM Coll. J. Schmidt, Admannshagen, Germany
- cWEI Coll. A. Weigel, Wernburg, Germany
- cWRA Coll. D.W. Wrase, Berlin, Germany

Label data of examined type material are cited in full using a "/" to separate different lines of the label in question. If not otherwise stated labels are printed in black on white paper. Collection data of revised nontype material are presented according to the following form: "locality, month. year, collector(s) (number of specimens – deposition)".

Measurements, as defined in JAEGER (2009: 1636), were taken at magnifications of 30 times (body length, elytra and pronotum partly) or 70 times (head and pronotum) using an ocular micrometer attached to a stereomicroscope Nikon SMZ 1500.

The following abbreviations were used in the text and/ or in the legends and in Table 1: **BL** – body length, **HW** – width of the head including eyes, **HWbE** – width of head between inner margins of eyes, **PL** – length of pronotum, **PW** – width of pronotum at its broadest point, **EL** – length of elytra, **EW** – width of elytra, **HT** – Holotype, **PT** – Paratype, **hw** – handwritten.

Microsculpture was examined at magnification of 100 times.

Dissections were made, using standard techniques; genitalia and mouthparts were preserved in Euparal on acetate strips and pinned beneath the specimens from which they had been removed.

Descriptions/redescriptions do not include general characters of the genus and do not repeat features already mentioned in the diagnosis of the species group, except when these characters show distinct modifications or variation between different species.

Photographs of habitus, head and pronotum were taken using a Canon EOS 60d DSLR camera fitted with a Promicron photo adapter attached to a Nikon SMZ 1500 stereomicroscope. Photographs of male and female genitalia, and mouthparts were taken using the above-mentioned equipment attached to a Leica DM LB2 transmitted light microscope. In both cases several single images from different focal planes were taken, which were later combined, using the Combine ZP (©Alan Hadley) and Auto-Montage Essentials (©Synoptics Ltd) software. The head and pronotum of mounted specimens are often distinctly bent downward or aligned to the left or right of centre and therefore not at the same focal plane as the elytra. If so, separate images of each body part were produced, which were subsequently combined with Adobe Photoshop software. Thus, the final images presented here, may often not reflect the original mounting condition.

The distribution maps were generated using the online mapping software SimpleMappr (©David P. Shorthouse).

#### The Anthracus annamensis group

Diagnosis: General appearance Acupalpus-like, with pronotal sides usually roundly or rectilinearly narrowed posteriad, rarely very faintly sinuate, and posterior angles usually widely rounded, or sometimes an indistinct obtuse angle is suggested. Antennomere 2 sparsely pubescent. Ligula with two long ventral setae inserted subapically and two additional shorter setae inserted dorso-laterally just posteriad of ventral ones (Figs 66-70). Mentum and submentum fused, at least laterally, only at middle divided by diffuse edge. Prosternum medially with 4-6 biseriately arranged medium-long setae and just posterior to apical margin with a row of 5-10 medium-long setae. Prosternal process with 1-3 distinct setae (often broken, and then insertion points not or only hardly visible). Abdominal sternites 4-6 in most species with rather dense and long pubescence. Protarsomeres 2-4 of males moderately to markedly dilated and with distinct biseriately arranged adhesive hairs beneath, protarsomere 4 often bilobed. Mesotarsomeres 2-4 of males weakly to moderately dilated, segment 1-4 or 2-4 with biseriately arranged adhesive hairs beneath. Tarsomere 5 of pro-, meso- and metatarsomeres without pairs of ventrally arranged setae.

**Remarks:** Members of the *Anthracus annamensis* group share a number of distinctive characters, such as mentum and submentum fused, prosternum medially with longer, erect setae, and tarsomere 5 without ventrolaterally arranged pairs of setae, with the Asian *Acupal*- pus subgenera Subacupalpus Habu, Pseudanthracus Habu, Palcuapus Habu, Setacupalpus Habu and the genus Anthracus. Though their general appearance resembles typical species of the genus Acupalpus, members of the A. annamensis group are obviously closer related to the genus Anthracus than to the previously mentioned Acupalpus subgenera, because they share another important character, the peculiar chaetotaxy of the ligula, which is quadrisetose in Anthracus and the A. annamensis group instead of being bisetose in Acupalpus and most other Stenolophina, except the genus Parabradycellus Ito. The latter genus has doubtless no closer relations the Acupalpus/Anthracus lineage because it differs in various important features from the mentioned genera and occupies an outstanding position within the subtribe.

Though the modified ligular chaetotaxy has been evolved twice in Stenolophina it constitutes obviously an apomorphic character state, which can be hypothesized to be the autapomorphy for a monophyletic group comprising the genus Anthracus and the A. annamensis group. Taking this hypothesis in to consideration and following SCHAUBERGER (1930), CSIKI (1932) and LORENZ (1998, 2005) who already placed or listed a part of the species in the subgenus, respectively genus Anthracus, the A. annamensis group is here regarded a distinctive species group within the genus Anthracus. A formal taxonomic rank is not proposed here because a phylogenetic analysis of Acupalpus and related genera on a worldwide base is needed to clarify the phylogenetic relations within this genus group and from these results the final taxonomic rank of the involved supraspecific taxa should be determined.

Within the genus *Anthracus* members of the *annamensis* group differ from typical western Palaearctic species by the different general appearance with shorter antennae, less elongate elytra, and pronotal sides without or with only a weak sinuation before the posterior angles, which are usually no more than suggested. From members of the *Anthracus angusticollis* group which comprises five species from Ethiopian, Palaearctic and Oriental regions, they differ additionally by the unmodified median line of the pronotum and the non-serrate lateral margin of the elytra.

**Included Taxa:** The *Anthracus annamensis* group comprises 11 species (including those described here) from the East Palaearctic and the Oriental Regions, *A*.

*furvinus* (Darlington, 1968) from New Guinea and an unknown number of species described from the Ethiopian Region that are still placed in the genus *Acupalpus*.

# Revision of the immaculate species of the A. annamensis group

# Anthracus derogatus (Walker, 1858)

(Figs 1-3, 22-24, 78) *Acupalpus derogatus* Walker, 1858: 204 (type locality: "Ceylon").

Acupalpus derogatus Walker: BATES 1886: 80 [descriptive notes & faunistic record], ANDREWES 1919: 190 [redescription]; ANDREWES 1928: 138 [catalogue Ceylon]. Acupalpus (s.str.) derogatus Walker: CSIKI 1932: 1244 [world catalogue], LORENZ 1998: 337 [world catalogue], LORENZ 2005: 359 [world catalogue]

**Type material:** Holotype: 1 δ (BMNH) labelled [Fig 3] "Type / HT" (circular label with red margin); "Ceylon" (circular label, hw); "Acupalpus / derogatus Walk / A. N. Hist (Type)" (hw); "derogatus" (hw); "Acupalpus / derogatus / stet Wlk / Teste Bates" [hw] and my label "Anthracus /derogatus / (Walker, 1858) / det. B. Jaeger 2012".

Remarks: The holotype is in fair condition. It was originally pinned and later glued on a small paper strip. The right anterior leg, the left antennomeres 3–11 are missing, and the right elytron was somewhat damaged by former pinning. I dissected the aedoeagus and mounted the specimen on a new card.

**Redescription:** General appearance as figured (Fig. 1). Body length 3.1 mm; width 1.2 mm.

Head blackish brown with clypeus, labrum and mandibles (inner margins and apices dark brown) reddish. Pronotum dark reddish brown with lateral margins paler. Elytra blackish brown, leaving first interval, base, lateral margins and the apex (vaguely) paler reddish brown. Legs and palpi, and antennae entirely yellowish to pale reddish brown. Ventral surface dark reddish brown, with pro- and metepisterna somewhat darker, epipleura brown. Upper surface shiny, elytra slightly iridescent.

Head (Figs 1–2) including eyes 0.80 times as wide as pronotum, with eyes only weakly prominent (head 1.46

times as wide as head between eyes). Labrum almost rectilinear at apical margin. Mandibles medium sized, not markedly prolonged, left mandible faintly obtuse at apex. Antennae 2.35 times as long as pronotum and 0.89 times as long as elytra. Microsculpture on labrum and clypeus distinctly isodiametric, on anterior half of head almost obliterated, only traces of isodiametric meshes are visible, on posterior half faintly isodiametric to short transverse.

Pronotum (Figs 1-2) 1.31 times as wide as long, 1.25 times as wide as head, widest in second quarter, lateral seta inserted a little posterior to beginning of second quarter. Apical margin faintly emarginated, with lateral border indistinct and widely interrupted, not prolonged upon lateral quarters. Anterior angles narrowly rounded at tips, not projecting forward. Sides convex in anterior half, markedly narrowed to posterior angles, the latter obtuse. Basal margin almost rectilinear medially, obliquely produced to posterior angles. Lateral furrows evenly narrow in apical two thirds, markedly widened at basal third, where they are fused with the latero-basal impressions. Latero-basal impressions rather small, distinctly delimited from pronotal disc and median part of base, fused with basal and lateral margin. Basal impressions and other surface of pronotum impunctate. Median line fine on disc, disappearing before reaching basal and apical margins. Anterior transverse impression only suggested. Microsculpture on disc with very faintly impressed, shorter to longer transverse meshes, which become more distinct at medial part of base. Laterobasal impressions and lateral furrows with course isodiametric to short transverse meshes.

Elytra (Fig. 1) with sides moderately widened posteriorly, widest just at or just posterior to middle, 1.52 times as long as wide, 2.64 times as long and 1.32 times as wide as pronotum. Elytral striae distinctly impressed and impunctate, scutellar striole rather long. Intervals weakly convex, narrowed and moderately convex at apex. Basal pore at beginning of scutellar striole present, interval 3 in third quarter with one setiferous pore, adjoining stria 2. Microsculpture on scutellum isodiametric, on elytral intervals with indistinct, very lightly impressed transverse lines. Macropterous.

Metepisterna long and narrowed posteriad, at inner margin about 1.5 times longer than wide at basal margin. Prosternum medially with 7 and posterior to apical margin with about 5 longer seta. Setae at prosternal process missing, but probably present and later broken. Abdominal sternites 4–6 with distinct pubescence, in sternites 4 and 5 laterally somewhat reduced. Last visible abdominal sternite of the male holotype very faintly emarginate at apex, at apical margin with two longer setae.

Protarsomeres 1–4 of males markedly dilated and with distinct, biseriately arranged adhesive hairs on ventral surface. Protarsomere 4 moderately bilobed. Mesotarsomeres 2–4 weakly dilated and with adhesive hairs on ventral surface, mesotarsomere 4 somewhat emarginated but not clearly bilobed.

Median lobe of aedoeagus (Figs 22–24) rather small with general appearance and structures of internal sac as figured. The apical portion (in lateral view) is rather distinctly bent ventrally. The apex is somewhat thickened but without any distinct hook. The internal sac (lateral aspect) has one larger and one medium sized tooth in apical half, two medium sized teeth in upper basal half and 3 smaller spines in lower basal half.

**Comparisons:** *A. derogatus* can be separated easily from other immaculate species of the *A. annamensis* group by the combination of following characters: small size, head rather wide between eyes, the latter rather flat, pronotum markedly narrowed posteriorly, and specific size, shape and inner structures of median lobe of aedoeagus.

**Distribution:** *A. derogatus* is so far known only from Sri Lanka (WALKER 1858, BATES 1886: 80). However, because the species is macropterous it is obviously more widely distributed and occurs probably also in southern India.

#### Anthracus furvus (Andrewes, 1947)

(Figs 4-6, 25-35, 66, 71, 76) *Acupalpus furvus* Andrewes, 1947: 8, 17-18, plate 1, fig 5 (type locality: Myanmar: Kambaiti, 7000 ft).

Acupalpus furvus Andrewes: LANDIN 1954: 457 [faunistics].

Anthracus furvus (Andrewes): LORENZ 1998: 339 [world catalogue], 2005: 360 [world catalogue].

Type material: Holotype: 1 ♂ (NHRS) labelled "N.E. BURMA / Kambaiti, 7000 ft. / 12/4 1934 / R. MALAISE" [date hw], "Typus" [red label], "Acupalpus / furvus / Type Andr. / H.E. Andrewes det." [first three lines hw Andrewes], "Acupalpus / (Palcuapus) / furvius [Sic!]/ Andrewes / Det. N. ITO 1994" [first three lines hw Ito], "6384 / E91", "Naturhistoriska / Riksmuseet / Stockholm / Loan no 465/93", "NRM Sthlm / Loan 1105/09" and "Acupalpus / furvus / Andrewes, 1947 / det. B. Jaeger 2011".

Paratypes: 1 & (NHRS) labelled "N.E. BURMA / Kambaiti, 2000 m / 20/3 1934 Malaise", "Paratypus" [red label], "furvus / Andr.", "6385 / E91", "NRM Sthlm / Loan 1106/09" and "Acupalpus / furvus / Andrewes, 1947 / det. B. Jaeger 2011". 1 & (BMNH) labelled "Para- / type" [circular label with yellow margin], "N.E. BURMA / Kambaiti, 7000 ft / 12-15/4 1934 / R. Malaise" [date hw], "Acupalpus / furvus / cotype Andr. / H.E. Andrewes det." [first three lines hw Andrewes]. 1 9 (BMNH) labelled "Para- / type" [circular label with yellow margin], "N.E. BURMA / Kambaiti, 7000 ft / 28/3 1934 / R. Malaise" [date hw], "Acupalpus / furvus / cotype Andr. / H.E. Andrewes det." [first three lines hw Andrewes]. 1 9 (BMNH) labelled "N.E. BURMA / Kambaiti, 7000 ft / 22/3 1934 / R. Malaise" [date hw], "Co- / type" [circular label with green margin], "Acupalpus / furvus / cotype Andr. / H.E. Andrewes det." [first three lines hw Andrewes], "H.E. Andrewes Coll. / B.M. 1945-97". All paratypes from BMNH with my label "Anthracus / furvus / (Andrewes, 1947) / det. B. Jaeger 2012"Remarks: ANDREWES (1947: 17-18) did not designate a type (in sense of a holotype) in the text part of the description. However, according to the legend of the plate 1 the image no 5 is that of the "type" which I accept as the valid holotype designation.

The holotype has been remounted and dissected by N. Ito and is now in poor condition compared with the image given by Andrewes. It has been "embedded" in glue, the mandibles were broken off, and parts of antennae and tarsi are missing. The aedoeagus was embedded on a separate card, with mounting medium turbid, but so far visible the internal sac was everted.

The paratypes are in perfect or fair condition. Some of them have missing antennomeres, tarsomeres or legs.

**Redescription:** Remark: measurements and indices given below are based on populations from the type locality Kambaiti (near the border to Yunnan) and from Yunnan. General appearance as figured (Fig. 4). Body length 3.4–4.1 mm; width 1.3–1.6 mm.

Dorsal surface mainly dark to blackish brown, leaving clypeus dark reddish, and labrum, mandibles (inner margins and apices blackish), pronotal and elytral lateral margins and first interval of elytra paler reddish brown. Head posterior to eyes sometimes indistinctly reddish brown. Legs and palpi pale or dark yellowish brown, antennae brown to dark brown, with first two, rarely with only first antennomere paler. Ventral surface mainly dark brown, with gula, pro-, meso and metasternum paler, sometimes also posterior half of abdominal sternites somewhat lightened. Upper surface shiny, elytra with faint iridescence.

Head (Figs 4-6) including eyes 0.75-0.83 times as wide as pronotum, with eyes moderately prominent (head 1.45-1.58 times as wide as head between eyes). Labrum almost rectilinear at apical margin. Mandibles medium sized, not distinctly prolonged and curved, left mandible faintly obtuse at apex. Antennae 2.19-2.39 times as long as pronotum and 0.77-0.85 times as long as elytra. Microsculpture on labrum and clypeus distinctly isodiametric to short transverse, on anterior half of head almost obliterated, only traces of isodiametric meshes are visible, on posterior half faintly isodiametric. Pronotum (Figs 4-6) 1.25-1.37 times as wide as long, 1.21-1.33 times as wide as head, widest in second quarter, lateral seta inserted a little posterior to beginning of second quarter. Apical margin almost rectilinear or faintly emarginate, lateral border interrupted, reaching medial third. Anterior angles narrowly rounded at tips, not or only weakly projecting forward. Sides convex in anterior half, rectilinearly narrowed to the widely rounded posterior angles. Basal margin weakly arcuate medially, obliquely produced to posterior angles. Lateral furrows evenly narrow, sometimes weakly widened posteriorly, where they are fused with the latero-basal impressions. Latero-basal impressions rather small, distinctly delimited from pronotal disc and median part of base, fused with basal and lateral margin, or separated from the latter by a small convexity. Basal impressions and other surface of pronotum impunctate. Median line fine on disc, disappearing before reaching basal and apical margins. Anterior transverse impression obliterated or suggested. Microsculpture on disc with faintly impressed, short to long transverse meshes, which become more distinct at medial part of base. Latero-basal impressions and lateral furrows with course isodiametric to short transverse meshes.

Elytra (Fig. 4) with sides moderately widened posteriorly, widest just at or just posterior to middle, 1.55–1.64 times as long as wide, 2.73–2.90 times as long and 1.30–1.41 times as wide as pronotum. Elytral striae distinctly impressed and impunctate, scutellar striole long. Intervals rather flat, narrowed and very weakly convex at apex. Basal pore at beginning of scutellar striole present, interval 3 in third quarter with one setiferous pore, adjoining stria 2. Microsculpture on scutellum isodiametric, on elytral intervals with very lightly impressed transverse lines. Macropterous.

Metepisterna long and narrowed posteriad, at inner margin about 1.5 times longer than wide at basal margin. Prosternum medially with 5–6 and posterior to apical margin with a row of 8 longer setae. Prosternal process with at least 1 distinct seta (very often broken). Abdominal sternites 4–6 with distinct pubescence. Last visible abdominal sternite of males and females very faintly emarginate at apex, with two setae at apical margin in males and four in females.

Protarsomeres 1–4 of males markedly dilated and with distinct, biseriately arranged adhesive hairs on ventral surface. Protarsomere 4 markedly bilobed. Mesotarsomeres 1–4 moderately dilated and with adhesive hairs on ventral surface, mesotarsomere 4 moderately bilobed. In females pro- and mesotarsomeres unmodified.

Median lobe of aedoeagus (Figs 25–35) with general appearance and structures of internal sac as figured. Apex in lateral aspect with a small indistinct hook. Internal sac (lateral aspect) composed of one smaller and one larger apical tooth, two larger subapical tooth, with one of them usually orientated ventrad and the other dorsad, a row of 5–8 dorsally arranged medium sized teeth (the last tooth usually orientated dorsad) and sometimes 1–3 smaller ventrally arranged teeth. More rarely, in specimens from S Vietnam, 12 km N Dalat (Figs 34–35) and single specimens from Yunnan (Fig 33), both subapical teeth are orientated ventrad.

Female genitalia as figured (Fig. 71) without significant specific characters.

**Variation:** Populations from Myanmar, Yunnan and N Vietnam shows a normal individual variation in external features, as well as in shape and inner structures of the median lobe of the aedoeagus. In contrast to those, a small series of somewhat teneral specimens from S Vietnam (N Dalat) differs externally, as well as in inner structures of the aedoeagus. The specimens are larger on average (3.9–4.6 mm), differ in some body proportions (e.g. AL/PL, EL/PL, EL/EW) and in the pronotal shape with sides more rectilinearly narrowed to base and the lateral furrows somewhat widened posteriorly. In this respect the S Vietnam specimens are more similar to *A. wrasei* than to Yunnan populations of *A. furvus*. The inner structures of the aedoeagus of the two males are modified concerning size and orientation of the apical and subapical teeth (Figs 29, 34–35), but the differences are less distinct than those between *A. furvus* and *wrasei*, and additionally there is no discrepancy in shape of the apical hook of the median lobe. Thus, the S Vietnam population is here regarded as a geographical form of *A. furvus*. Additional material from the same area is necessary to determine the final taxonomic position of this population.

**Comparisons:** A. *furvus* is in general appearance very similar to A. wrasei, which were collected together with the former in the Chinese province Yunnan at the western shore of the Er Hai Lake and at Xue Shan. It can be separated easily from this species by the structures of the internal sac without a ventrally arranged row of distinct medium sized teeth, and the different shape of the aedoeagal apex with has only a small hook (Figs 25-35). Externally both species are very similar, but at least the A. furvus populations from Myanmar, Yunnan and N Vietnam can be distinguished from A. wrasei by their smaller size, somewhat shorter elytra and antennae (see ratios EL/PL, EL/EW, AL/PL, AL/EL), the pronotum which is at the average shorter and has the lateral furrows not or less distinctly widened in front of posterior angles, and the head being blackish brown or only indistinctly reddish posterior to eyes instead having distinct reddish spots. In contrast, the A. furvus populations from S Vietnam and those of A. wrasei from Yunnan have no significant external differences, though they differ markedly in the shape of the apex of the median lobe and its inner structures (Figs 29, 34, 35 respectively 36-41). There are only less valuable, minor external differences in the shape of pronotum with sides usually less distinctly narrowed posteriorly. However, according to present knowledge it remains unsure whether both species actually occur sympatrically in S Vietnam.

From *A. latus* nov. sp. which has a similar distribution and occurs sympatrically, at least in S and N Vietnam *A. furvus* can be separated easily by its different general appearance (Figs 4, 19), and the shape of the aedoeagal median lobe and its internal structures (Figs 25–35, 59–65). Other similar species occur allopatrically farther west (*A. schuhi*) or south (*A. glabrus*). They differ from *A. furvus* by various external and aedoeagal features (for details see under these species). **Distribution:** *A. furvus* occurs in S Vietnam and more widely in N Vietnam, W Yunnan and NE Myanmar (Fig. 76). It has been collected at altitudes of 1200–2500 m. In addition to the type material from E Myanmar the following material has been studied.

#### **Examined Material:**

China: Yunnan: Baoshan Pref., Gaoligong Shan, 31 km SE Tengchong, 2200-2250 m, 24°53'11"N, 98°45'22"E, (pasture in sec. forest, under moss/shrubs) [09], VIII. 2009, Wrase (4 - cWRA); Baoshan Pref., Gaoligong Shan, E pass, 36 km SE Tengchong, 2200 m, 24°49'32"N, 98°46'06"E, (farm land, under moss, grass, shrubs, under stones) [13], VIII. 2009, Wrase (2 cWRA); Baoshan Pref., Gaoligong Shan, E pass, 36 km SE Tengchong, 2230 m, 24°49'32"N, 98°46'06"E, (pasture in prim. decid. forest, under stones/wood) [08], VIII. 2009, Wrase (1 - cWRA); Baoshan Pref., mount. range 14 km E Tengchong, 1850 m, 25°00'28"N, 98°38'07"E, (field edge, compost, debris sifted) [16a], VI. 2007, Schülke (1 - cWRA); Baoshan Pref., mount. range 22 km S Tengchong, 1750 m, 24°49'29"N, 98°29'27"E, (loamy banks of fishponds) [18], VI. 2007, Wrase (7 - cWRA); Baoshan Pref., mount. range 22 km S Tengchong, 1750 m, 24°49'29"N, 98°29'27"E, (loamy banks of fishponds) [19A], VIII. 2009, Wrase (1 - cWRA); Dali Bai Nat. Auton. Pref., 1 km W Dali old town, creek valley at foothill of Diancang Shan, 2170m, 25°41.9'N, 100°08.4'E, (loamy banks of fishponds) [18], VIII.-IX. 2003, Wrase (4 - cWRA, ZISP); Dali Bai Nat. Auton. Pref., 4 km E Dali old town, shore terrain of Er Hai Lake, 2020 m, 25°42'N, 100°11.5'E, young willows with knotgrass, under vegetation/in roots [16], VIII.-IX. 2003, Wrase (8 - cWRA, ZISP); Shore of Erhai Hu lake, 1970 m, 25°42.4'N/100°12.1'E, (fields close to shore, under stones) [CH 24], VI. 2007, Ruzicka (1 female with doubtful identification - cWRA); Dali Bai Nat. Auton. Pref., 36 km N Dali, 2158 m, 26°01'20"N/100°08'14"E (ruderal pasture with pines, shrubs, small brooks, und. stones/litter sifted) [04], VIII. 2009, Wrase (1 - cWRA); Dali Bai Nat. Auton. Pref., Măo Jiao Shan, E pass, 2525 m, 58 km NE Dali, 25°56'41"N, 100°40'05"E, (field edge with shrubs, in soil) [26], IX. 2009, Wrase (6 - cWRA); Dali Bai Nat. Auton. Pref., mount. range E Weishan, 12 km NE Weishan, 2630-2660 m, 25°17'02-15"N, 100°22'23-30"E, (slopes with flitration springs, under stones) [54], IX. 2009, Wrase (1 - cWRA); Dali

Bai Nat. Auton. Pref., foothills of Diancang Shan W Dali, 2050 m, 25°42'12"N, 100°08'26"E, (stone and gravel pit) [34], VI. 2007, Schülke (1 - cWRA); Dali Bai Nat. Auton. Pref., NE bank of Er Hai, 27 km N Dali, 1980 m, 25°57'N, 100°09'E (embankment, under plants/ litter) [33], VI. 2007, Wrase (1 - cWRA); Dali Bai Nat. Auton. Pref., Wuliang Shan, 9 km SW Weishan, 2450-2500 m, 25°10'14"N, 100°14'22"E (W. slope, sec. oak/ pine for., pasture, und. stones) [35], VI. 2007, Wrase (1 - cWRA); Dehong Dai Aut. Pref., mount. range 31 km E Luxi, 2280 m, 24°29'31"N, 98°52'58"E, (grassland/pasture, uinder stones/shrubs, in moss/litter) [19], VI. 2007, Wrase (2 - cWRA); Jizu Mts., 2300 m, VII. 1995, Bolm (18 - NHMB, cJAE, cWRA); Lijiang, V.-VI. 2010, Kucera (1 - cWRA); Lincang Pref., Bangma Shan, 20 km NW Lincang, 2210 m, 23°58'25"N, 99°54'36"E, (water reservoir, in/on loamy soil of bank) [37], IX. 2009, Wrase (25 - cWRA, cJAE, NME); Lincang Pref., Bangma Shan, 20 km NW Lincang, 2210 m, 23°58'25"N, 99°54'36"E, (bank of water reservoir, devast. forest, litter & ferns sifted [37], IX. 2009, Schülke (4 - cWRA); Lincang Pref., Xue Shan, 48 km N Lincang, 2070 m, 24°19'03"N, 100°07'13"E, (slope close to small pond, in loamy soil/plant roots) [45], IX. 2009, Wrase (21 cWRA, cJAE); Ailaoshan Mt. Range, W Shuitangzhen Town, 24°07'18" N / 101°27'44" E, 1205-1965 m, V. 2011, Belousov, Kabak, Korolev (1 - ZISP); Jlanchuan Co., Yuhua reservoir, 26.42694°N, 99.96504°E, 2437 m, VII. 2007, Kataev & Liang (2 - ZISP); Kunming, 1900 m, III. 1955, Kryzhanovskij (1 male - ZISP, examined and communicated by B. Kataev).

Vietnam: Sapa (Lao Cai), 22°20'N, 103°50'E, V-VI. 1991, Jendek (2 – NHMW); Lao Cai Province, 250 km from Hanoi, bearing 310, SaPa vill. env., Hoang Lien Son N. Park, ~ 1250 m, VI–VII. 1998, Napolov (1 – ZISP); Lao Chai pr., Sa Pa env., ca. 1650 m, 22°19.52N 103°50.35E, V. 1999, Ahrens (2 – cSCHM); 12 km N Dalat, Lang Bian, 1580–1750 m, 12°03'N, 108°27'E, IV. 1995, Pacholatko & Dembicky (8 – NHMW, cJAE).

# Anthracus wrasei nov. sp. (Figs 7-9, 36-41, 72, 77)

**Type material:** Holotype: 1 ♂ (cWRA) labelled "CHINA (N-Yunnan) Dali Bai / Nat. Aut. Pref., 4 km E Dali / old town, shore terrain / of Er Hai Lake, 2020 m", "25°42'N/100°11.5'E (young / willows with knotgrass, / under vegetation/in roots /, 27.VIII./2.IX. 2003 Wrase [16]", "Acupalpus / ? furvus Andr. / det. *B. Kataev* 2006" [first two lines and year hw], "COLL. WRASE / BERLIN" and "HOLOTYPE & / Anthracus / wrasei spec. nov. / des. B. Jaeger 2012".

Paratypes: 1  $\delta$ , 1  $\circ$  (cWRA, cJAE) with same labels as the holotype, but the male with "Acupalpus / furvus Andr. / det. B. Kataev 2006" and the female with "Acupalpus / (Setacupalpus) /furvus Andr. / det. B. Kataev 2006" [first three lines and year hw]. 1 $\delta$  (cWRA) labelled "CHINA (Yunnan) Lincang Pref. / Xue Shan / 48 km N Lincang 2070 m / 24°19'03"N / 100°07'13"E / (slope close to small pond, / in loamy soil/plant roots) / 12.IX. 2009 D.W.Wrase [45]". All paratypes additionally with my label "PARATYPE  $\delta$  or  $\circ$  / Anthracus / wrasei spec. nov. / des. B. Jaeger 2012"

Remarks: The holotype and the paratypes are in perfect condition without missing body parts, the paratype from Xue Shan is moderately teneral, with somewhat deformed pronotum and right elytron.

**Description:** General appearance as figured (Fig. 7). Body length 4.4-4.5 mm (holotype 4.4 mm); width 1.6-1.7 mm.

Head mainly blackish, posterior to eyes with two dark reddish spots. Clypeus dark reddish, labrum and mandibles (inner margins and apices blackish) paler reddish. Pronotum dark to blackish brown, with lateral margins paler brownish, sometimes also middle part of base and apical margin indistinctly brownish. Elytra almost blackish, leaving the lateral margin and the first interval dark reddish brown. Sometimes posterior to shoulders and at sides more dark brown than blackish. Legs and palpi yellowish brown, antennae dark brown, with first two antennomeres paler. Ventral surface mainly blackish brown, with posterior part of prosternum, metasternum, and sometimes also abdominal sternites somewhat paler. Upper surface shiny, elytra moderately iridescent. Head (Figs 7-9) including eyes 0.78-0.82 times as wide as pronotum, with eyes moderately prominent (head 1.49-1.55 times as wide as head between eyes). Labrum almost rectilinear at apical margin. Mandibles medium sized, not distinctly prolonged and curved, left mandible faintly obtuse at apex, not thickened or truncate. Antennae 2.45-2.52 times as long as pronotum and 0.83-0.86 times as long as elytra. Microsculpture on labrum and clypeus distinct and almost isodiametric, on anterior half of head almost obliterated in males, in females with lightly impressed isodiametric meshes, on posterior half faintly isodiametric in both sexes.

Pronotum (Figs 7-9) 1.29-1.34 times as wide as long, 1.22-1.27 times as wide as head, widest in second quarter, lateral seta inserted at or a little posterior to beginning of second quarter. Apical margin almost rectilinear or slightly emarginate, lateral border interrupted, reaching medial third. Anterior angles narrowly rounded at tips, not or only weakly projecting forward. Sides convex in anterior half, rectilinearly narrowed to posterior angles, which are obtuse but at least suggested, instead of being widely rounded. Basal margin weakly arcuate medially, obliquely produced to posterior angles. Lateral furrows evenly narrow in apical two thirds, becoming distinctly widened at posterior third, where they are fused with the latero-basal impressions. Latero-basal impressions rather small, distinctly delimited from pronotal disc and median part of base, fused with basal and lateral margin. Basal impressions and other surface of pronotum impunctate. Median line fine on disc, disappearing before reaching basal and apical margins. Anterior transverse impression obliterated or suggested. Microsculpture with faintly impressed, short to long transverse meshes on disc, at latero-basal impressions and lateral furrows with course isodiametric meshes.

Elytra (Fig. 7) with sides weakly widened posteriorly, widest just posterior to middle, 1.62–1.65 times as long as wide, 2.89–3.02 times as long and 1.32–1.40 times as wide as pronotum. Elytral striae distinctly impressed and impunctate, scutellar striole long. Intervals rather flat, narrowed and very weakly convex at apex. Basal pore at beginning of scutellar striole present, interval 3 in third quarter with one setiferous pore, adjoining stria 2. Microsculpture on scutellum almost isodiametric, on elytral intervals with indistinct, very lightly impressed transverse lines. Macropterous.

Metepisterna long and narrowed posteriad, at inner margin about 1.6–1.7 times longer than wide at basal margin. Prosternum medially with 5–6, and posterior to apical margin with a row of 8–10 longer setae. Prosternal process with at least 1 distinct seta at middle (additional setae probably broken). Abdominal sternites 4–6 with distinct pubescence. Last visible abdominal sternite of males moderately emarginate and that of females very faintly emarginate at apex, at apical margin with two longer setae in males and four in females. Protarsomeres 1–4 of males markedly dilated and with distinct, biseriately arranged adhesive hairs on ventral surface. Protarsomere 4 markedly bilobed. Mesotarsomeres 1–4 moderately dilated and with adhesive hairs on ventral surface, mesotarsomere 4 moderately bilobed. In females pro- and mesotarsomeres unmodified.

Median lobe of aedoeagus (Figs 36–41) with general appearance and structures of internal sac as figured. Apex in lateral aspect with a rather long and distinct hook. Internal sac (lateral aspect) composed of 2–4 two larger apical tooth, and a row of 8–10 dorsally arranged large to medium sized teeth, and a row of 6–9 large to medium sized ventrally arranged teeth.

Females genitalia as figured (Fig. 72) without significant specific characters.

**Comparisons:** *A. wrasei* is in general appearance most similar to *A. furvus* and they were collected together at the eastern shore of the Er Hai Lake and at Xue Shan in the Chinese province of Yunnan. It can be distinguished easily from this species by the different structures of the internal sac and the apex of the median lobe (Figs 36-41) (for details see under *furvus*). Externally both taxa are very similar but *A. wrasei* differs at least from the Yunnan populations of *A. furvus* by characters given under *A. furvus*. From *A. latus* which probably occurs sympatrically in southern Yunnan, *A. wrasei* differs by the different general appearance and the shape of the pronotum (Figs 7–9, 19–21), and the different shape of the latter (Figs 36–41, 59–65).

Other similar species occur allopatrically farther west (*A. schuhi*) or south (*A. glabrus*). They differ from *A. wrasei* by various external and aedoeagal features (for details see under these species).

**Etymology:** The species is dedicated to my friend and colleague David Wrase, specialist of Harpalini, who collected this and other interesting *Anthracus* specimens during his collecting trips to China.

**Distribution:** *A. wrasei* is so far known from two localities in W Yunnan (Fig. 77) where it occurs together with *A. furvus*. Because the species has fully developed hind wings, it is obviously more widely distributed and has probably a similar distribution as the latter species.

#### Anthracus glabrus (Louwerens, 1952)

(Figs 10-12, 42-48, 67, 74, 79) *Acupalpus glabrus* Louwerens, 1952: 213-214 (type locality: Indonesia: E Java: Idjen Plateau, Blawan) *Acupalpus glabrus* Louwerens: LORENZ 1998: 338 [world catalogue], 2005: 3590 [world catalogue].

Remarks: Louwerens did not provide an etymology when naming the species "glabrus" but referred probably to the glabrous dorsal surface, or to the glabrous prosternal process. If so, the correct latin name of the species would be the adjective "glaber" instead of "glabrus". The name given by Louwerens is here regarded as an incorrect latinization, rather than a lapsus calami, and therefore has not been emended. (ICZN Article 32.5.1).

**Type material:** Holotype: 1 δ (RMNH) labelled "H. LUCHT, Java / K. O. Blawan / 900/1500 Mr. / Idjen Plateau / 2.III. / 1941" [last two lines vertical, hw], "Museum Leiden / ex. collection / C. J. Louwerens / rec. 1979", "Typus / Acupalpus / glabrus Louw. / det. C.J. Louwerens" [first three lines hw Louwerens, first line in red ink] and "type" [on red paper].

Paratype: 1 ♀ (RMNH) labelled "H. LUCHT, Java / K. O. Blawan / 900/1500 Mr. / Idjen Plateau / 2.III. / 1941" [last two lines vertical, hw], "Museum Leiden / ex. collection / C. J. Louwerens / rec. 1979", "PARATYPUS" [red paper]; "Acupalpus / glabrus Louw. / det. C. J. Louwerens" [first two lines hw Louwerens] and "Paratype" [red paper].

The holotype and the paratype additionally with my label: "Acupalpus / glabrus / Louwerens, 1952 / det. B. Jaeger 2012".

Remarks: The holotype is in good condition except left metatibia and tarsomeres are missing. The paratype has the antennomeres, left protarsomeres 3–5, and the left metatibia and tarsomeres missing.

The remaining two paratypes mentioned in the description should be deposited in the Zoological Museum Bogor (West Java) according to the introduction of Louwerens' contribution.

**Redescription**: General appearance as figured (Fig. 10). Body length 3.8–4.3 mm (holotype 3.9 mm); width 1.5–1.7 mm.

Colour: Dorsal surface dark brown to blackish brown, leaving clypeus, labrum, mandibles (inner margins and apices blackish), pronotal and elytral lateral margins and first interval of elytra reddish brown. Legs and palpi pale or yellowish brown, antennae dark brown, with first, sometimes also second antennomere paler. Ventral surface mainly brown or reddish brown, with head, proand metepisterna, and sternites laterally darker. Upper surface shiny, elytra with weak iridescence.

Head (Figs 10–12) including eyes 0.76–0.81 times as wide as pronotum, with eyes moderately prominent (head 1.44–1.55 times as wide as head between eyes). Labrum almost rectilinear at apical margin, sometimes faintly emarginated at middle. Mandibles medium sized, not distinctly prolonged and curved, left mandible moderately obtuse at apex. Antennae 2.27–2.44 times as long as pronotum and 0.76–0.81 times as long as elytra. Microsculpture on labrum and clypeus distinctly isodiametric to short transverse, on anterior half of head almost obliterated, only traces of isodiametric meshes are visible, on posterior half first faintly isodiametric, later, in front of pronotal apical margin meshes become transversely stretched.

Pronotum (Figs 10-12) 1.28-1.36 times as wide as long, 1.23-1.31 times as wide as head, widest in second quarter, lateral seta inserted a little posterior to beginning of second quarter. Apical margin almost rectilinear to weakly emarginate, lateral border reaching medial third. Anterior angles narrowly rounded at tips, not or weakly projecting forward. Sides convex in anterior third to half, rectilinearly narrowed to posterior angles, which are obtuse and at least suggested. Basal margin almost straight or very weakly arcuate medially, obliquely produced to posterior angles. Lateral furrows evenly narrow anteriorly, becoming weakly widened and somewhat reflexed posteriorly, where they are fused with the latero-basal impressions. Latero-basal impressions small, distinctly delimited from the pronotal disc and median part of base, fused with basal and lateral margin. Basal impressions and other surface of pronotum impunctate, medial part of base often, and anterior part of pronotum sometimes with some vertical wrinkles. Median line fine on disc, disappearing before reaching basal and apical margins. Anterior transverse impression suggested. Microsculpture on disc with faintly impressed, long-transverse meshes, which become more distinct and short transverse in front of anterior impression and at medial part of base. Laterobasal impressions and lateral furrows with distinct isodiametric meshes.

Elytra (Fig. 10) with sides moderately widened posteriorly, widest just at or just posterior to middle, 1.51–1.62 times as long as wide, 2.93–3.06 times as long and 1.40–1.50 times as wide as pronotum. Elytral striae distinctly impressed and impunctate, scutellar striole long. Intervals rather flat, narrowed and very weakly convex at apex. Basal pore at beginning of scutellar striole present, interval 3 in third quarter with one setiferous pore, adjoining stria 2. Microsculpture on scutellum isodiametric, on elytral intervals with very lightly impressed transverse lines. Macropterous.

Metepisterna long and narrowed posteriad, at inner margin about 1.7 times longer than wide at basal margin. Prosternum medially with 4–5 and posterior to apical margin with a row of 3–4 medium long setae (often broken and then insertion points difficult to observe). Prosternal process with 2–3 distinct setae (often broken). Abdominal sternite 4 with moderate pubescence in medial two thirds, and 5–6 completely with distinct pubescence. Last visible sternite of males and females very weakly emarginate at apex, at apical margin with two longer setae in males and four in females.

Protarsomeres 1–4 of males markedly dilated and with distinct, biseriately arranged adhesive hairs on ventral surface. Protarsomere 4 markedly bilobed. Mesotarsomeres 1–4 moderately dilated with adhesive hairs on ventral surface. Mesotarsomere 4 moderately bilobed. In females pro- and mesotarsomeres unmodified.

Median lobe of aedoeagus (Figs 42-48) with general appearance and structures of internal sac as figured. Apex (lateral aspect) with a short but distinct hook. Internal sac composed of 1 large and 1–2 smaller subapical teeth (sometimes completely reduced, figs 43, 48) and 4–5 smaller teeth arranged in medial portion, and 1–2 somewhat larger teeth in basal portion.

Females genitalia as figured (Fig. 74) without significant specific characters.

**Comparisons:** *A. glabrus* resembles in colour and general appearance *A. furvus, wrasei* and *schuhi*, which are distributed farther north according to present knowledge. From all these species it can be distinguished easily by the different shape of the median lobe of the aedoeagus and the structures of the internal sac (Figs 42–48). Externally it differs from *A. furvus* (excluding S Vietnam specimens) by the pronotum which is more distinctly and more rectilinearly narrowed posteriad and the elytra which are longer and wider compared with the pronotum (see ratios EL/PL, EW/PW in table 1). From S Vietnam populations of *A. furvus* it can be separated by the narrower head (see ratios HW/PW), comparatively shorter and wider elytra and related proportions (see ratio EL/

EW, EW/PW). From *A. wrasei* it can be distinguished by its smaller size, longer antennae (see ratios AL/PL resp. AL/EL), somewhat shorter elytra (see ratio EL/EW) and the pronotum which is more slender relative to the elytra (see ratio EW/PW). From *A. schuhi* it can be separated by the pronotal shape with sides more distinctly narrowed posteriad, the larger, less distinctly produced eyes, and various body proportions as PW/PL, EW/PW, EL/ PL, EL/EW, HW/HWbE (for details see table 1).

**Distribution:** Until now the species was known only from East Java but is here recorded from Bali for the first time (Fig. 79). Because the species has fully developed hind wings it is obviously more widely distributed. In addition to the type material mentioned above the following material has been examined:

# **Examined Material:**

Indonesia: Bali: Bedugul reg., Tamblingan Lakes N.P., alt, 1200m, IX. 2004 (18 – cBUL, cJAE).

#### Anthracus schuhi nov. sp.

(Figs 13-15, 49-54, 69, 78)

**Type material:** Holotype: 1  $\delta$  (NHMW) labelled "INDIA: Maharashtra / Lonvala 13.9.1991 / (80 km E Bombay) / leg. R. SCHUH" and "HOLOTYPE  $\delta$ / Anthracus / schuhi spec. nov. / des. B. Jaeger 2012" [red paper].

Paratypes: 2  $\delta \delta$  (NHMW, cJAE) with same locality label as the holotype and "PARATYPE  $\delta$  / Anthracus / schuhi spec. nov. / des. B. Jaeger 2012" [red paper].

Remarks: The holotype is in good condition except for left antennomeres 9–11 which are missing. The paratypes are in moderate condition and have some antennomeres and/or tarsomeres missing.

**Description:** General appearance as figured (Fig. 13). Body length 4.0–4.1 mm (holotype 4.0 mm); width 1.5 mm. Colour: Head and pronotum dark brown with lateral margins of the latter somewhat paler, elytra blackish brown, with lateral margin and first interval somewhat lighter. Clypeus, labrum and mandibles (inner margins and apices blackish) reddish brown. Legs and palpi yellowish brown, antennae brown, with first two antennomeres somewhat paler. Ventral surface mainly brown to dark brown, with head, pro-, mes- and metepisterna somewhat darker. Upper surface shiny, elytra with weak iridescence. Head (Figs 13–15) including eyes 0.77–0.79 times as wide as pronotum, with eyes distinctly prominent (head 1.61–1.63 times as wide as head between eyes). Labrum almost rectilinear at apical margin. Mandibles not markedly prolonged and curved, left mandible weakly obtuse at apex. Antennae 2.38–2.39 times as long as pronotum and 0.86–0.88 times as long as elytra. Microsculpture on labrum and clypeus distinct and almost isodiametric, on anterior half of head almost obliterated, only traces of isodiametric meshes are visible, on posterior half of head first faintly isodiametric, later (in front of pronotal apical margin) the meshes become transversely stretched.

Pronotum (Figs 13-15) 1.22-1.25 times as wide as long, 1.27-1.30 times as wide as head, widest in second quarter, lateral seta inserted a little posterior to beginning of second quarter. Apical margin weakly to moderately emarginate, lateral border reaching medial third. Anterior angles narrowly rounded at tips, weakly projecting forward. Sides convex in anterior third, rectilinearly or roundly narrowed to the widely rounded posterior angles. Basal margin almost straight or very weakly arcuate medially, obliquely produced to posterior angles. Lateral furrows evenly narrow anteriorly, becoming weakly to moderately widened posteriorly, where they are fused with the latero-basal impressions. Latero-basal impressions medium sized, distinctly delimited from the pronotal disc and median part of base, fused with basal and lateral margin. Median line fine on disc, disappearing before reaching basal and apical margins. Anterior transverse impression only suggested. Basal impressions and other surface of pronotum impunctate. Microsculpture on disc with faintly impressed, long-transverse meshes, at basal impressions and in lateral furrows with distinctly impressed isodiametric meshes.

Elytra (Fig. 13) with sides very weakly widened posteriorly, widest about at middle, 1.62–1.63 times as long as wide, 2.63–2.77 times as long and 1.32–1.36 times as wide as pronotum. Elytral striae distinctly impressed and impunctate, scutellar striole long. Intervals rather flat, narrowed and very weakly convex at apex. Basal pore at beginning of scutellar striole present, interval 3 in third quarter with one setiferous pore, adjoining stria 2. Microsculpture on scutellum isodiametric, on elytral intervals with very lightly impressed transverse lines. Macropterous. Metepisterna long and narrowed posteriad, at inner margin about 1.4 times longer than wide at basal margin. Prosternum medially with 5–6 and posterior to apical margin with a row of 6 medium long setae (often broken and then insertion points difficult to observe). Prosternal process with 2–3 distinct setae (broken in the holotype). Abdominal sternite 4–6 with distinct, rather long and dense pubescence. Last visible sternites of males very weakly emarginate at apex, at apical margin with two longer setae in males.

Protarsomeres 1–4 of males markedly dilated and with distinct, biseriately arranged adhesive hairs on ventral surface. Protarsomere 4 markedly bilobed. Mesotarsomeres 1–4 moderately dilated with adhesive hairs on ventral surface. Mesotarsomere 4 moderately bilobed.

Median lobe of aedoeagus (Figs 49–54) with general appearance and structures of internal sac as figured. Apex in lateral aspect without any distinct hook. Apical lamella (dorsal aspect) rather wide and long, at apical margin widely rounded. Internal sac with 3–4 smaller subapical teeth, and a band of closely arranged medium sized teeth in basal half.

**Etymology:** The species is dedicated to Rudolf Schuh, Vienna, specialist of Cucujoidea, who collected this and another new *Anthracus* species in India.

**Comparisons:** *Anthracus schuhi* is in colour and general appearance similar to *A. furvus, wrasei* and *glabrus* which occur farther east or southeast. It differs from these species by the shape of aedoeagal median lobe and its peculiar internal structures (Figs 49–54), the head with rather strongly produced eyes, the shape of the pronotum with sides less distinctly narrowed posteriorly and hind angles widely rounded and various body proportions e.g. HW/HwbE, PW/PL, EW/PW, EL/PL (for details see table 1).

**Distribution:** So far known only from the type locality in West India, Maharashtra province (Fig. 78). Because the species has fully developed hind wings it is probably more widely distributed.

#### Anthracus indicus nov. sp.

(Figs 16-18, 55-58, 68, 73, 78)

**Type material:** Holotype: 1 & (NHMW) labelled "INDIA: Maharashtra / Lonvala 13.9.1991 / (80 km E Bombay) / leg. R. SCHUH" and "HOLOTYPE & / Anthracus / indicus spec. nov. / des. B. Jaeger 2012" [red paper]. Paratypes: 1  $\delta$ , 2  $\Im$  (NHMW, cJAE) with same locality label as the holotype and "PARATYPE  $\delta$  or  $\Im$  / Anthracus / indicus spec. nov. / des. B. Jaeger 2012" [red paper].

Remarks: The holotype is in perfect condition, two of the paratypes have some antennomeres and tarsomeres missing.

**Description:** General appearance as figured (Fig. 16). Body length 3.3–3.4 mm (holotype 3.3 mm); width 1.2–1.3 mm.

Colour: Head and pronotum reddish brown or brown, the former sometimes slightly darker, elytra dark brown (in one PT almost blackish brown), with lateral margin and first interval reddish brown. Clypeus, labrum and mandibles (inner margins and apices blackish) pale reddish brown. Legs, palpi and antennae entirely yellowish brown, sometimes antennomeres 3–11 with a suggested infuscation. Ventral surface brown to reddish brown. Pronotum weakly, elytra markedly iridescent.

Head (Figs 16–18) including eyes 0.75–0.79 times as wide as pronotum, with eyes small and moderately prominent (head 1.51–1.54 times as wide as head between eyes). Labrum almost rectilinear at apical margin. Mandibles not markedly prolonged and curved, left mandible rather sharp at apex. Antennae 2.32–2.42 times as long as pronotum and 0.88–0.93 times as long as elytra. Microsculpture on labrum and apical half of clypeus distinct and almost isodiametric, on anterior half of head almost obliterated, only traces of isodiametric meshes are visible in females, on posterior half first faintly isodiametric, later, in front of pronotal apical margin, the meshes become transversely stretched.

Pronotum (Figs 16–18) 1.21–1.27 times as wide as long, 1.27–1.32 times as wide as head, widest in second quarter, lateral seta inserted a little in front of widest point. Apical margin almost rectilinear to faintly emarginate, in one PT moderately emarginate, lateral border reaching medial third. Anterior angles narrowly rounded at tips, only weakly projecting forward. Sides convex in anterior third, rectilinearly or roundly narrowed to the widely rounded posterior angles. Basal margin almost straight or very weakly arcuate medially, obliquely produced to posterior angles. Lateral furrows evenly narrow anteriorly, moderately to distinctly widened posteriorly, where they are fused with the latero-basal impressions. Latero-basal impressions rather small, distinctly delim-

ited from the pronotal disc and median part of base, and fused with basal and lateral margin. Basal impressions and other surface of pronotum impunctate. Median line fine on disc, disappearing before reaching basal and apical margins. Anterior transverse impression weak or only suggested. Microsculpture on disc with a mixture of very faintly impressed lines and long-transverse meshes, at basal impressions and in lateral furrows with distinctly impressed isodiametric meshes.

Elytra (Fig. 16) with sides weakly widened posteriorly, widest at middle, 1.58–1.59 times as long as wide, 2.61–2.69 times as long and 1.34–1.38 times as wide as pronotum. Elytral striae distinctly impressed and impunctate, scutellar striole long. Intervals rather flat, narrowed and very weakly convex at apex. Basal pore at beginning of scutellar striole present, interval 3 in third quarter with one setiferous pore, adjoining stria 2. Microsculpture on scutellum isodiametric, on elytral intervals with very lightly impressed transverse lines. Macropterous.

Metepisterna long and narrowed posteriad, at inner margin about 1.4 times longer than wide at basal margin. Prosternum medially with 4 and posterior to apical margin with a row of 6 medium long setae (often broken and then insertion points difficult to observe). Prosternal process with at least 1 seta (others probably broken). Abdominal sternite 4 in medial two thirds and 5–6 entirely with distinct, rather long and dense pubescence. Last visible sternite of males very weakly emarginate at apex, at apical margin with two longer setae in males and four setae in females.

Protarsomeres 1–4 of males markedly dilated and with distinct, biseriately arranged adhesive hairs on ventral surface. Protarsomere 4 markedly bilobed. Mesotarsomeres 2–4 moderately dilated with adhesive hairs on ventral surface. Mesotarsomere 4 moderately bilobed. Pro- and mesotarsomeres of females unmodified.

Median lobe of aedoeagus (Figs 55–58) with general appearance and structures of internal sac as figured. Apex in lateral aspect almost straight, without any hook. Apical lamella (dorsal aspect) rather wide and short, at apical margin widely rounded. The internal sac has only one medium sized subapical tooth.

Females genitalia as figured (Fig. 73) without significant specific characters.

**Comparisons:** Acupalpus indicus occurs sympatrically with A. schuhi and differs from this and most other immaculate species of the A. annamensis group by its small size and its pronotal colour, which is markedly paler than that of the elytra, and the more or less unicoloured antennae. From *A. derogatus* which is also rather small in size it can be separated by the different colour and shape of head and pronotum (Figs 1, 17–18). In addition, the median lobe of the aedoeagus (Figs 55–58) has a relatively short and wide apical plateau, which is straight in lateral view and has no capitulum or hook, and the internal sac is rather simple with only one small subapical tooth.

**Etymology:** The name "indicus" refers to the known distribution of the species.

**Distribution:** Known only from the type locality in West India, Maharashtra province (Fig. 78). Because the species has fully developed hind wings it is probably more widely distributed.

# Anthracus latus nov. sp.

(Figs 19-21, 59-65, 70, 75, 77)

**Type material**: Holotype: 1  $\delta$  (NMP) labelled "NW Thailand, 25.iv.- / Chiang Mai prov. -7.v. / BAN SAN PAKIA 1996 / Sv. Bilý leg., 1700m" and "HOLOTYPE  $\delta$  / Anthracus / latus spec. nov. / des. B. Jaeger 2012". Paratypes: <u>Vietnam</u>: 5  $\delta \delta$ , 5  $\Im \Im$  (NHMW, cJAE) labelled "S-VIETNAM: 17.-21.4. / 12km N Dalat 1995 / Lang Bian"; "12°03'N 108°27'E / 1580-1750 m / Pacholatko & Dembicky". 1 $\Im$  (NHMW) labelled "N-Vietnam 25.V.-10.VI. / SAPA (Lao Cai) / 22°20'N 103°50'E / leg. E. Jendek 1991".

China: 1 & (NME) labelled "CHINA: S-YUNNAN / (Xishuangbanna) / 37 km NW Jinghong / vic. Guo Men Shan" and " N22°14.43 E100°36.12 / 1100m, 06.IV.2009 MF/leg. L.Meng rice fallow". 1 & (cWEIG) labelled "CHINA: S-YUNNAN / (Xishuangbanna) / 20 km NW Jinghong / vic. Man Dian (NNNR)" and " N22°07.80 E100°40.05 / 730m, 06.IV.2009 BF / leg. L.Meng forest". 1 9 (IZAS) labelled "CHINA: S-YUNNAN / (Xishuangbanna) / 37 km NW Jinghong / vic. Guo Men Shan" and " N22°14.48 E100°36.22 / 1080m, 06.IV.2009 EKL / leg. L.Meng prim. forest". Laos: 1 & (NMP) labelled "LAOS, Hua Phan prov., 2001 / 20°15'N 104°02'E, 26.iv.-11.v. / Ban Saluei, Phu Phan Mt. env. / Jan Bezděk leg., 1500-2000 m". data as the holotype. 2 d d, 2 ♀♀ (NMP, cJAE) labelled "NW Thailand, Chieng Dao, / Ban San Pakia, 5.-

10. v. / 2004, 1200m, Sv. Bilý leg.". 2 & &, 1 \$\varphi\$ (cKME, cWRA) labelled "THAI-N, 1-15.v.1998, / Chiang Mai prov., / 19°19'N 98°50'E, / SAN PAKIA, 1400m, / Vit Kubáň leg.", 1 & additionally with "COLL. WRASE / BERLIN" [green label]. 2 ♀♀ (cKME, cJAE) "N. THAILAND 19°19'N / Chiang Mai prov. 98°50'E / San Pakia, 1400m / 1.-15.5.1998 / Michael Bednařik leg." and 1 additionally with "Collectio / Rudolf KMECO". 6 ざ ざ, 1 ♀, (NMP, cJAE) labelled "NW THAILAND, 1200m / Mae Hong Son pr. / BAN SI LANG, 20.-22.v. / Sv. Bilý leg. 1996". 2 9 9 (NHMB) "NW THAILAND 9.-16.5. 1991 / MAE HONG SON / BAN HUAI PO labelled "THAILAND: Chiang Mai / Doi Angkhang 10km W / Fang 1450m 22.IV.87 / P. Schwendinger". 4 ざ (cKME, cWRA, cJAE) "N. THAILAND / 50 km NW of Chiang Rai / Mae Salong env. / 1.5.2003 O. Šafránek leg.", 3 of them additionally with "Collectio / Rudolf KMECO / Czech Republic" and 1 with "COLL. WRASE / BERLIN" [green label].

Myanmar: 1 & (cWRA) labelled "MYANMAR (Chin State) / Chin Hills / Avocado Plantage / 21°23'34.7''N/093°52'29.4''E / 30.VI.-01.VII.2008 M. Langer', "COLL. WRASE / BERLIN" [with black frame], "Acupalpus / spec. / D.W. Wrase det. '11" [first two lines hw]; "COLL. WRASE / BERLIN" [green label].

All Paratypes additionally with my label "PARATYPE  $\delta$  or  $\varphi$  / Anthracus / latus spec. nov. / des. B. Jaeger 2012".

Remark: The holotype is in perfect condition, except right antennomere 11 is missing. Some of the paratypes have missing antennomeres or tarsomeres.

**Description:** General appearance as figured (Fig. 19). Body length 3.5–4.4 mm (holotype 4.1 mm); width 1.4–1.7 mm.

Dorsal surface mainly dark to blackish brown, with pronotum often somewhat paler, and clypeus, labrum, mandibles (inner margins and apices blackish), lateral margins of pronotum and elytra, and first interval of the latter paler reddish brown. Legs, palpi and first two antennomeres yellowish brown, remaining antennomeres darkened. Ventral surface brown, with mouthparts, epipleura, pro-, meso- and metasternum, and abdominal sternites medially pale brown. Upper surface shiny, elytra slightly iridescent. Head (Figs 19–21) including eyes 0.70–0.76 times as wide as pronotum, with eyes moderately prominent (head 1.50–1.59 times as wide as head between eyes). Labrum with apical margin rectilinear or slightly emarginate at middle. Mandibles not markedly prolonged and curved, left mandible weakly obtuse at apex. Antennae rather short only 2.02–2.26 times as long as pronotum and 0.72–0.79 times as long as elytra. Microsculpture on labrum and clypeus distinct and almost isodiametric, on anterior half of head almost obliterated, only traces of isodiametric meshes are visible in females, on posterior half of head first isodiametric, later (in front of pronotal apical margin) the meshes become transversely stretched.

Pronotum (Figs 19-21) rather broad, 1.35-1.40 times as wide as long, 1.32-1.43 times as wide as head, widest in second quarter, lateral seta inserted a little posterior to beginning of second quarter. Apical margin almost straight or faintly emarginate, lateral border distinctly prolonged to middle, leaving the medial third or quarter unbordered. Anterior angles narrowly rounded at tips, quite clearly projecting forward. Sides convex in anterior third, rectilinearly or roundly narrowed to the widely rounded posterior angles. Basal margin almost straight or very weakly convex medially, and weakly produced to posterior angles. Lateral furrows evenly narrow anteriorly, becoming moderately widened posteriorly, where they are fused with the latero-basal impressions. Laterobasal impressions medium sized, clearly delimited from the pronotal disc and median part of base, fused with basal and lateral margin. Basal impressions and other surface of pronotum impunctate, the former sometimes with some irregular wrinkles or rugosities. Median line fine on disc, disappearing before reaching basal and apical margins. Anterior transverse impression weak to obsolete. Microsculpture on disc with faintly impressed, long-transverse meshes, at basal impressions and in lateral furrows with distinctly impressed short transverse to irregularly isodiametric meshes.

Elytra (Fig. 19) with sides weakly widened posteriorly, widest at middle, 1.51–1.62 times as long as wide, 2.77–2.96 times as long and 1.29–1.36 times as wide as pronotum. Elytral striae distinctly impressed and impunctate, scutellar striole long. Intervals rather flat, narrowed and weakly convex at apex. Basal pore at beginning of scutellar striole present, interval 3 in third quarter with one setiferous pore, adjoining stria 2. Microsculpture on scutellum isodiametric, on elytral intervals with lightly impressed transverse lines or indistinct meshes. Macropterous.

Metepisterna long and narrowed posteriad, at inner margin about 1.5–1.6 times longer than wide at basal margin. Prosternum medially with 4–6 and posterior to apical margin with a row of 8 medium long setae (often broken and then insertion points difficult to observe). Prosternal process with at least 1 seta (very often broken). In contrast to other immaculate species treated above abdominal sternite 4 glabrous, or only with few single hairs in medial part, 5 with weak and scattered, 6 with moderately dense pubescence (hairs shorter and less densely arranged than in *furvus* and other species). Last visible sternite of males weakly emarginate at apex, at apical margin with two longer setae in males and four setae in females.

Protarsomeres 1–4 of males moderately dilated and with distinct, biseriately arranged adhesive hairs on ventral surface. Protarsomere 4 weakly bilobed. Mesotarsomeres 2–4 moderately dilated with adhesive hairs on ventral surface. Mesotarsomere 4 not or only very weakly bilobed.

Median lobe of aedoeagus (Figs 59–65) with external shape and structures of internal sac as figured. Apex in lateral aspect with distinct capitulum. Internal sac with one large tooth in apical half, and with an accumulation of some medium sized and various smaller teeth medially. Females genitalia as figured (Fig. 75) without significant specific characters.

**Etymology:** The Latin adjective *latus*, meaning broad, refers to the broad body of the species.

**Comparisons:** Acupalpus latus differs at first glance from all other immaculate species by its robust, rather broad body. It can be distinguished particularly by its rather wide pronotum (PW/PL > 1.34), rather short antennae (AL/PL < 1.27), the lateral border of the pronotal apical margin which is distinctly prolonged towards the mid line, the reduced pubescence of abdominal sternite 4 with only a few single hairs or glabrous, instead of being moderately to distinctly pubescent as in other species, and the completely different apex of aedoeagal median lobe and its characteristic inner structures.

**Distribution:** The species occurs from S Vietnam across N Vietnam, northern Laos, southern Yunnan, northern Thailand to west Myanmar (Fig. 77). It has been collected in mountainous areas at altitudes of 730–2000 m.

# Key to immaculate species of A. annamensis group from the East Palaearctic and Oriental Regions

- Smaller species, 3.1–3.4 mm, with general appearance, shape of head and pronotum as figured (Figs. 1–2, 16–18). Antennae with antennomeres 3–11 not markedly darkened. Median lobe (Figs 22–24, 55–58)
- Larger species, mostly 3.5-4.6 mm, when smaller then general appearance and median lobe different (Figs 4-15, 19-21, 25-54, 59-65). Antennae with antennomeres 3-11 markedly darkened
- 2 Head and pronotum blackish brown, pronotum markedly narrowed posteriad (Fig. 1), head with eyes 1.46 times as wide as head between eyes, elytra shorter (EL/EW < 1.53), pronotum broader (PW/PL > 1.30). Median lobe and internal structures as figured (Figs 22–24). 3.1 mm. So far known only from Sri Lanka

# A. derogatus (Walker, 1858)

- Head and pronotum reddish to reddish brown, pronotum less markedly narrowed posteriad (Figs 16–18), head with eyes 1.51–1.54 times as wide as head between eyes, elytra longer (El/EW > 1.57), pronotum narrower (PW/PL < 1.28). Median lobe and internal structures different (Figs 55–58). 3.3–3.4 mm. So far known only from the type locality in western India</li>
  *A. indicus* nov. sp.
- 3 General appearance with pronotum and elytra rather broad (Figs 19–21), fourth abdominal sternite glabrous or with few single hairs only. Median lobe and internal structures as figured (Figs 59–65). 3.5–4.4 mm. Widely distributed (Fig. 77) from S Vietnam in the southeast to western Myanmar in the west. A. latus nov. sp.
- General appearance with pronotum and elytra more slender (Figs 4–15), fourth abdominal sternite with distinct pubescence. Median lobe and internal structures different (Figs 25–54).
- Known from Indonesian Isles Java and Bali. General appearance and shape of pronotum as figured (Figs 10–12) Elytra rather long and broad relative to pronotum (EW/PW > 1.39, EL/PL >2.93). Median lobe and internal structures as figured (Figs 42–48). 3.8–4.2 mm.
  *A. glabrus* (Louwerens, 1952)
- Species from India or continental SE Asia. General appearance and shape of pronotum different (Figs 4–9, 13–15). Elytra usually shorter and more slender relative to pronotum (EW/PW < 1.42, EL/PL < 2.95). Median lobe and internal structures different (Figs 25–41, 49–54).</li>
- 5 Species from western India. Head with eyes more distinctly prominent (HW/HWbE > 1.60) and pronotum rather long (PW/PL < 1.26) and less distinctly narrowed to posterior angles (Figs 13–15). Median lobe and internal structures as figured (Figs 49–54). 4.0-4.1 mm.</li>
  A. schuhi nov. sp.
- Species with distribution farther east. Head with eyes less prominent (HW/HWbE < 1.59) and pronotum shorter and broader (PW/PL > 1.24) and more distinctly narrowed to posterior angles (Figs 4–9). Median lobe and internal structures as figured (Figs 25-41)
- 6 Species larger, 4.3-4.5 mm. Head with two distinct dark reddish spots behind eyes. Pronotum (Figs 7-9) with sides rectilinearly narrowed to base and lateral furrows more distinctly widened posteriorly. Antennae markedly longer relative to pronotum (AL/PL > 2.44). Apex of aedoeagal median lobe (Figs 36-38, 41) with a rather long distinct hook. Internal structures in addition to a distinct dorsal row of teeth also with a ventrally arranged row of medium sized teeth. Known from two localities in the Chinese province Yunnan.
- Species smaller, 3.3–4.1 mm. Head usually entirely blackish brown or more rarely indistinctly dark reddish behind eyes. Pronotum (Figs 4–6) less distinctly narrowed to base and lateral furrows not or less distinctly widened posteriorly. Antennae shorter relative to pronotum (AL/PL < 2.40). Apex of aedoeagal median lobe (Figs 30–35) with a short indistinct hook. Internal sac in addition to the dorsal teeth row only with 1–3 ventrally arranged teeth. Known from E Myanmar, Yunnan, N Vietnam and S Vietnam. Members of the latter population are markedly larger (3.9–4.6 mm) and represent a distinct geographical form, which cannot be separated from the preceding species by the aforementioned external characters, but differs clearly by the shape of median lobe and structures of the internal sac (Figs 29, 34, 35).</li>

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species	n	BL	HW/HWbE	AL/PL	AL/EL	HW/PW
A. derogatus (よ)	1	3.1	1.46	2.35	0.89	0.80
A. furvus (るる)	10	3.7-4.1 (3.9)	1.48-1.58 (1.54)	2.19-2.36 (2.28)	0.78-0.85 (0.82)	0.75-0.80 (0.77)
A. furvus $(99)$	10	3.4-4.1 (3.8)	1.45-1.55 (1.51)	2.19-2.39 (2.26)	0.77-0.83 (0.79)	0.76-0.83 (0.79)
A.furvus (Dalat) (	2	3.9-4.1 (4.0)	1.51-1.52 (1.51)	2.57-2.58 (2.58)	0.88-0.91 (0.89)	0.81-0.81 (0.81)
A. furvus (Dalat) $(99)$	6	4.1-4.6 (4.3)	1.49-1.54 (1.51)	2.38-2.62 (2.49)	0.80-0.88 (0.84)	0.81-0.83 (0.82)
A.wrasei (よよ)	3	4.3-4.4 (4.3)	1.49-1.55 (1.53)	2.45-2.52 (2.48)	0.84-0.86 (0.85)	0.78-0.82 (0.80)
A. wrasei (♀♀)	1	4.5	1.51	2.51	0.83	0.80
A. glabrus (	10	3.8-4.3 (4.0)	1.49-1.54 (1.51)	2.27-2.44 (2.36)	0.77-0.81 (0.80)	0.76-0.81 (0.79)
A. glabrus (♀♀)	10	3.9-4.2 (4.1)	1.44-1.55 (1.47)	2.27-2.35 (2.31)	0.76-0.78 (0.77)	0.78-0.81 (0.80)
A. schuhi (ささ)	3	4.0-4.1 (4.0)	1.61-1.63 (1.62)	2.38-2.39(2,38)	0.86-0.88 (0.87)	0.77-0.79 (0.78)
A. indicus ( o	2	3.3	1.52-1.53 (1.52)	2.39-2.42 (2.40)	0.91-0.93 (0.92)	0.75-0.77 (0.76)
A. indicus $(99)$	2	3.3-3.4 (3.4)	1.51-1.54 (1.52)	2.32	0.88	0.78-0.79 (0.78)
A. latus (	10	3.5-4.4 (4.0)	1.50-1.58 (1.53)	2.08-2.26 (2.18)	0.72-0.79 (0.77)	0.72-0.76 (0.73)
A. latus (♀♀)	10	3.8-4.4 (4.2)	1.50-1.59 (1.53)	2.02-2.16 (2.07)	0.72-0.74 (0.73)	0.70-0.75 (0.73)
		PW/HW	PW/PL	EW/PW	EL/PL	EL/EW
A. derogatus (よ)	1	1.25	1.31	1.32	2.64	1.52
A. furvus ( ð ð )	10	1.25-1.33 (1.30)	1.27-1.33 (1.30)	1.30-1.38 (1.34)	2.73-2.86 (2.80)	1.57-1.64 (1.61)
A. furvus $(99)$	10	1.21-1.31 (1.27)	1.25-1.37 (1.30)	1.35-1.41 (1.37)	2.78-2.90 (2.84)	1.55-1.61 (1.59)
A. furvus (Dalat) (	2	1.24-1.24 (1.24)	1.30-1.32 (1.31)	1.36-1.39 (1.38)	2.85-2.94 (2.90)	1.60-1.61 (1.61)
A. furvus (Dalat) (99)	6	1.20-1.23 (1.22)	1.27-1.33 (1.30)	1.35-1.41 (1.39)	2.93-3.02 (2.96)	1.62-1.65 (1.63)
A. wrasei ( o  o )	3	1.22-1.27 (1.24)	1.29-1.34 (1.31)	1.32-1.39 (1.37)	2.89-2.94 (2.92)	1.62-1.65 (1.63)
A. wrasei (♀♀)	1	1.26	1.32	1.40	3.02	1.64
A. glabrus ( o	10	1.23-1.31 (1.27)	1.28-1.33 (1.31)	1.40-1.47 (1.42)	2.93-3.00 (2.96)	1.54-1.62 (1.58)
A. glabrus (♀♀)	10	1.24-1.28 (1.26)	1.26-1.36 (1.33)	1.41-1.50 (1.46)	2.95-3.06 (3.01)	1.51-1.58 (1.56)
А. schuhi (ささ)	3	1.27-1.30 (1.28)	1.22-1.25 (1.24)	1.32-1.36 (1.34)	2.63-2.77 (2.71)	1.62-1.63 (1.63)
A. indicus ( ð  ð )	2	1.30-1.32 (1.31)	1.22-1.23 (1.23)	1.34-1.34 (1.34)	2.61-2.61 (2.61)	1.59-1.59 (1.59)
A. indicus $(99)$	2	1.27-1.28 (1.27)	1.21-1.27 (1.24)	1.34-1.38 (1.36)	2.64-2.69 (2.67)	1.58-1.59 (1.59)
A. latus (	10	1.32-1.40 (1.36)	1.36-1.40 (1.38)	1.29-1.34 (1.31)	2.77-2.96 (2.84)	1.54-1.62 (1.56)
A. latus $(99)$	10	1.33-1.43 (1.37)	1.35-1.40 (1.38)	1.30-1.36 (1.33)	2.77-2.92 (2.83)	1.51-1.58 (1.55)

Table 1. Variation of ratios among specimens of the A. annamensis group



Figs. 1-3. Anthracus derogatus (Walker). Habitus, head, pronotum and orignal labels. (1-3) Holotype.



Figs. 4-6. Anthracus furvus (Andrewes). Habitus, head and pronotum. (4) China, Yunnan, Xue Shan; (5) Paratype; (6) Vietnam, Sa Pa



Figs. 7-9. Anthracus wrasei nov. sp. Habitus, head and pronotum. (7-8) Paratypes, China, Yunnan, Er Hai Lake; (9) Holotype.



Figs. 10-12. Anthracus glabrus (Louwerens). Habitus, head and pronotum. (10, 12) Bali, Tamblingan Lakes; (11) Holotype.



Figs. 13-15. Anthracus schuhi nov. sp. Habitus, head and pronotum. (13) Holotype; (14-15) Paratypes.



Figs. 16-18. Anthracus indicus nov. sp. Habitus, head and pronotum. (16) Holotype; (17-18) Paratypes.



Figs. 19-21. Anthracus latus nov. sp. Habitus, head and pronotum. (19) Holotype; (20) Paratype, S Vietnam, 12 km N Dalat; (21) Paratype, Thailand, Ban San Pakia.



Figs. 22–29. Median lobe of aedoeagus, lateral and dorsal aspect. (22–24) Anthracus derogatus (Walker), Holotype; (25–29) A. furvus (Andrewes) (25, 28 Yunnan, Xue Shan; 26 Yunnan, Er Hai Lake; 27 Yunnan, Jizu Mts; 29 S Vietnam, 12 km N Dalat).



Figs. 30-35. Anthracus furvus (Andrewes). Median lobe of aedocagus lateral and dorsal aspect. (30) N Vietnam, Sapa; (31) Paratype, Myanmar, Kambaiti; (32) Yunnan, Bangma Shan; (33) Yunnan, W Dali; (34-35) S Vietnam, 12 km N Dalat. 299



Figs. 36-41. Anthracus wrasei nov. sp. Median lobe of aedoeagus, lateral and dorsal aspect. (36, 39) Holotype; (37, 40, 41) Paratype, Yunnan, Er Hai Lake; (38) Paratype, Yunnan, Kue Shan.





Figs. 49-54. Anthracus schulti nov. sp. Median lobe of aedoeagus, lateral and dorsal aspect. (50, 52) Holotype; (49, 51, 53, 54) Paratypes.



Figs. 55-58. Anthracus indicus nov. sp. Median lobe of aedoeagus, lateral and dorsal aspect. (55-56) Holotype; (57-58) Paratype.



Figs. 59–65. Anthracus latus nov. sp. Median lobe of aedoeagus, lateral and dorsal aspect. (59) Paratype, Yunnan, Guo Men Shan; (60) Holotype; (61) Paratype, Thailand, Doi Angkhang; (62–64) Paratypes, S Vietnam, 12 km N Dalat; (65) Paratype, Thailand, Mae Salong.







Figs. 71-75. Hemisternite and gonocoxa. (71) Anthracus furvus (Andrewes); (72) A. wrasei nov. sp.; (73) A. indicus nov. sp.; (74) A. glabrus (Louwerens); (75) A. latus nov. sp.



Figs. 76-77. Distribution. (76) Anthracus furvus (Andrewes); (77) A. wrasei nov. sp. (triangles) and A. latus nov. sp. (circles).



Figs. 78-79. Distribution. (78) Anthracus indicus nov. sp. (black star); A. schuhi nov. sp. (white circle); A. derogatus (Walker) (black square); (79) A. glabrus (Louwerens).

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