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The status of some taxa of *Aphodiinae* with descriptions of new genus and species (*Coleoptera*: *Scarabaeoidea*)

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STEBNICKA Z. 1994. The status of some taxa of *Aphodiinae* with descriptions of new genus and species (*Coleoptera*: *Scarabaeoidea*). Acta zool. cracov., **37**(1): 71-80.

Abstract. The genus *Dialytes* HAROLD is redefined, *D. granifer* A. SCHMIDT and *D. paramonstrosus* PETROVITZ are synonymized, the Neotropical and Madagascan species are removed and a new generic name for four Asian species is proposed. Subgenus *Paremadus* NAKANE of *Aphodius* ILLIGER and *A. langtangicus* STEBNICKA are synonymized, *A. tarokensis* from Taiwan is described as new, 20 species are combined with *Aphodius* subgenus *Aparammoecius* PETROVITZ.

Key words: *Coleoptera*, *Scarabaeoidea*, *Aphodiinae*, *Dialytes*, *Aphodius* (*Aparammoecius*), taxonomy, new genus, new species.

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INTRODUCTION

The following contribution based primarily on the collections of the Museum d'Histoire naturelle in Geneva is a continuation of a series of papers (STEBNICKA 1988; 1990a; STEBNICKA & GALANTE 1991) dealing with taxonomy and nomenclature of *Aphodiinae*. In the course of determining the affinities of the species placed in various genera and subgenera, I have examined most of the type-specimens of the species included by various authors to the genus *Dialytes* HAROLD and the holotype of *Aphodius* (*Aparammoecius*) *balangensis* PETROVITZ. The resulting changes and comments are presented in the systematic part of this study.

A review of the genus *Dialytes* HAROLD is a following step toward a complete reclassification of the world taxa of *Aphodiinae*. As here recognized, *Dialytes* is primarily an Nearctic genus represented by 4 described species.

Since my 1986 paper on the status of the genus *Caelius* LEWIS a number of new species of *Aphodius* ILLIGER have been added to the *Paremadus*-group (STEBNICKA 1989; 1990b). On the base of the material recently studied it now appears, that the subgeneric name

Paremadus NAKANE is a junior synonym of *Aparammoecius* PETROVITZ. With the new flightless species described herein, at least 20 species form a homogenous group sharing the same general habitat and ranging from Pakistan to Taiwan (see comments and checklist arrangement below).

The acronyms of institutions which loaned material or in which the material is housed are given in parenthesis as follows:

Australian National Insect Collection, Canberra (ANIC); British Museum of Natural History, London (BMNH); H. F. Howden Collection, Ottawa (HC); Institute of Systematics and Evolution of Animals (ISEA); Museum d'Histoire naturelle, Geneva (MHNG); National Museum, Prague (NMP); Naturhistoriska Rijksmuseet, Stockholm (NRS); Zoologische Staatssammlung, Munich (ZSM).

I am greatly indebted to the curators of the mentioned institutions, especially to Prof. Dr H. F. HOWDEN from Ottawa and to Dr I. LÖBL from Geneva for very valuable cooperation.

SYSTEMATICS

Genus *Dialytes* HAROLD, 1869

Dialytes HAROLD, 1869, Col. Hefte 5: 101, et Auct.

Trox FABRICIUS, 1775, Syst. Ent.: 31 (in part)

Aphodius ILLIGER, 1798, Verz. Kaf. Preuss.: 15 (in part)

Type species *Trox striatulus* SAY, 1825.

Distribution: North-eastern United States and Canada.

Diagnosis. Head moderate in size, slightly convex, converging anteriorly, clypeal margin obtusely rounded or denticulate on each side of median emargination. Pronotum small to moderate in size, subquadrate, convex, base margined or not, posterior angles truncate and/or excavate, pronotal longitudinal groove present or absent. Scutellum moderate in size, trangular. Elytra convex with moderate humeral denticles, base without marginal line; striae wider than intervals or narrower, intervals flat or carinate. Venter strongly sclerified; mesosternum evenly convex, middle coxae oblique and approximated; metasternum convex, declivous toward mesosternum, lateral triangle feebly marked or absent; abdominal sterna usually fluted along sutures, surface punctate, pygidium with slight transverse carina medially. Legs slender; anterior femora widest with fine perimarginal groove, middle and hind femora narrow, posterior femoral lines absent; anterior tibia with 3-4 teeth (Fig. 1); middle and hind tibiae slender, cylindrical, slightly expanded apically with traces of transverse ridges; apical spurs of posterior tibia thin, located on each side of tarsal articulation or nearly so; basal segment of metatarsus usually long.

Epipharynx. The shape and structures similar to those of the Aphodiini (Figs 2, 4)

Male genitalia. The shape and internal structures similar to those of the *Aphodiini* (Figs 3, 5).

Comments. HAROLD (1869) established the genus *Dialytes* for two Nearctic species *striatulus* (SAY) and *truncatus* (MELSHEIMER). Later, HAROLD (1877) described the

Indonesian species "*monstrosa*", placing it in the genus *Aulonocnemis* KLUG and subsequently (HAROLD 1880) in the genus *Ataenius*. As may be concluded from the above actions, HAROLD considered the Nearctic and Asian species as belonging to the separate genera. Since then, HORN (1875) and BROWN (1929) each described the Nearctic species of *Dialytes*; these are definitively congeneric with *striatulus* and *truncatus*. This group of four species seems to be closely related to some Nearctic species of the genus *Aphodius* ILLIGER and to those of the genus *Dialytellus* BROWN and falls into the *Aphodiini* complex. Because of the confused state of higher taxonomy of the American *Aphodiinae* it would be inadvisable to give any formal tribe before revisions of the other genera involved are completed.

None of the remaining 7 species falls readily into genus *Dialytes* established by HAROLD and none is closely related to the North American species. The existing classification of the world species of the genus is essentially that of A. SCHMIDT (1922). SCHMIDT's reliance on one character (in this case a similar shape of the fore tibia) caused him to include "*monstrosa*" with additional Asian and Australian species to the genus *Dialytes* HAROLD. BALTHASAR (1941; 1964) and PETROVITZ (1963) followed this single genus concept placing the species of different phyletic lineages together. The similarities, such as the shape of anterior tibia are mostly due to homoplasy and occur in various unrelated taxa.

To clarify the above question I redefine the genus *Dialytes* HAROLD on the base of the typical North American species listed below, I synonymize the Australian *Dialytes granifer* A. SCHMIDT with *Ataenius koebelei* BLACKBURN and I consider the Asian species sufficiently distinct to warrant a separate genus here proposed with new name combinations given accordingly. The Neotropical species *impressus* PETROVITZ and Madagascan *umbratus* BALTHASAR are excluded from the genus *Dialytes* as belonging to the other taxonomic units.

Dialytes striatulus (SAY, 1825)

(Figs 1-3)

Trox striatulus SAY, 1825, Journ. Ac. nat. Sci., 5: 192.

Dialytes striatulus: HAROLD, 1869, Col. Hefte 5: 101; HORN, 1887, Trans. Am. Ent. Soc., 14: 66, et Auct.
Type locality: USA, Pennsylvania.

Material examined: USA, Livingston CO., Michigan, E.S. George Reserve (HC, ISEA).

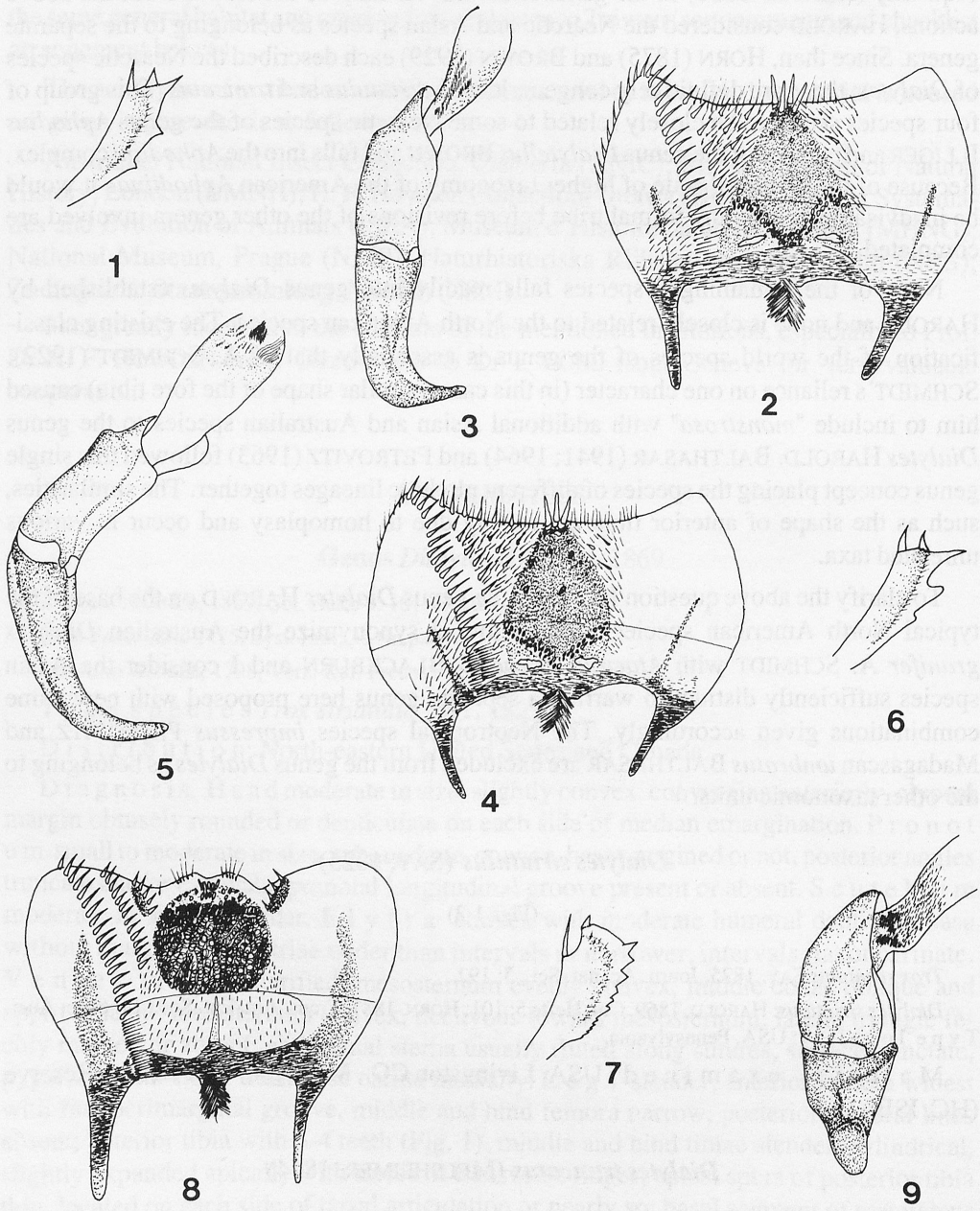
Dialytes truncatus (MELSHEIMER, 1844)

(Figs 4-5)

Aphodius truncatus MELSHEIMER, 1844, Proc. Acad. nat. Sci., 2: 135.

Dialytes truncatus: HAROLD, 1869, Col. Hefte 5: 101; HORN, 1887, Trans. Am. Ent. Soc., 14: 65, et Auct.
Type locality: USA, Pennsylvania.

Material examined: USA, Iowa, Jackson CO., Maquoketa Cave St. Pk; Canada, Quebec, Gatineau Pk, (HC, ISEA).



Figs 1-9. 1-3 – *Dialytes striatulus* (SAY): 1 – anterior tibia; 2 – epipharynx; 3 – aedeagus in lateral view. 4-5 – *Dialytes truncatus* (MELSH.): 4 – epipharynx; 5 – aedeagus in lateral view. 6 – *Ataenius koebelei* BLACKB. – anterior tibia. 7-9 – *Setylaides monstrosus* (HAR.): 7 – anterior tibia; 8 – epipharynx; 9 – aedeagus in lateral view.

Dialytes ulkei HORN, 1875

Dialytes ulkei HORN, 1875, Trans. Am. ent. Soc., 5: 141; l.c. 14: 66, et Auct. Type locality: USA, Maryland.

Material examined: USA, Maryland, Aberdeen (HC).

Dialytes criddlei BROWN, 1929

Dialytes criddlei BROWN, 1929, Can. Ent., 61: 210, et Auct. Type locality: Canada, Manitoba.

Material examined: USA, New Hampshire, Eaton (ISEA).

Removals. The species removed from the genus Dialytes are as follows:

1/ *Ataenius koebelei* BLACKBURN, 1904, Proc. R. Soc. Victoria, 17: 159, 162. Type locality: Australia (ANIC, BMNH).

= *Dialytes granifer* A. SCHMIDT, 1909, Soc. ent. 24: 66. Type locality: Australia. New synonymy – (ANIC, BMNH, NRS).

The shape of anterior tibia as in Fig. 6. The species is closely related to one of the homogenous group of the Australian *Ataenius* HAR.

2/ *Dialytes impressus* PETROVITZ, 1963, Ent. Arb. Mus. Frey, 14: 643-644. Type locality: Brasil, Mato Grosso (ZSM). Genus (?)*Phalangochaeta* MARTINEZ.

3/ *Dialytes umbratus* BALTHASAR, 1941, Ent. Blatter, 37: 89. Type locality according to BALTHASAR, 1941: "Kanada, S.Baie, Antogil" (NMP). *Aulonocneminae.*

There is a confusion concerning the type locality given in the original description. The Antongil Bay (Fr. Baie d'Antongil), inlet of Indian Ocean adjacent to Masoala Peninsula is located on NE coast of Madagascar.

The remaining, Asian species referred to *Dialytes* by BALTHASAR (1964) are here considered to represent a new genus proposed below.

Genus *Setylaides* nov.

= *Dialytes* HAROLD, 1869 (in part)

Type species *Aulonocnemis monstrosa* HAROLD, 1877, by present designation.

Diagnosis. Head very large, strongly convex medially and steeply declivous in front toward clypeal median groove; clypeal margin widely rounded each side of median emargination. Pronotum large, strongly convex in median anterior half with deep transverse fovea laterally, pronotal longitudinal furrow lacking; posterior angles truncate and more or less emarginate, base margined or not. Scutellum minute, narrowly triangular. Elytra convex, base margined, humeral denticles large, striae narrow, punctate; surface usually subopaque, covered with coating. Venter strongly sclerified; mesosternum feebly convex with variously shaped depression at middle; middle coxae subparallel and separated with slight carina between; metasternum convex, median furrow and irregular lateral triangle deep; abdominal sterna fluted along sutures, pygidium strongly transversely carinate, rugose. Legs short; anterior femora very wide, about two times as wide as middle and hind femora; middle and hind femora with strong femoral line; anterior tibia with row of small teeth (Fig. 7); middle and hind tibiae slightly flattened

laterally and slightly expanded apically with strong longitudinal line at inner side; apical spurs of posterior tibia located close together below tarsal insertion; tarsi shorter than tibiae, segments relatively short, slightly triangular.

Epipharynx. The shape and structures similar to those of the *Eupariini* (Fig. 8).

Male genitalia. The shape and internal structures similar to those of the *Eupariini* (Fig. 9).

Affinities. The closest relatives of *Setylaides* appear to be the genera *Cnematoplatys* A. SCHMIDT and *Saprosites* REDTENBACHER by vitue of similar shape of the head and pronotum, of the ventral sclerites and legs. On the other hand, a general appearance of the members of *Setylaides* and similarities in the shape of the ventral sclerites are shared with *Aulonocneminae* sensu lato.

Etymology. The generic name is a combination of the reverse of the name *Dialytes* and it is masculine in gender.

Setylaides monstrosus (HAROLD, 1877), comb. nov.

(Figs 7-9)

Aulonocnemis monstrosa HAROLD, 1877, Ann. Mus. Genova, 10: 92. Type locality: Borneo, Sarawak.

Ataenius monstrosus HAROLD, 1880, Not. Leyden Mus., 2: 198.

Dialytes javanus A. SCHMIDT, 1907, D. ent. Zeit.: 569. Type locality: Java. (syn.)

Dialytes monstrosus: A. SCHMIDT, 1910, Gen. Ins., 110: 114; 1922, Das Tierreich, 45: 464; BALTHASAR, 1964, Verl. Tsch. Akad. Wiss., 3: 521.

Dialytes paramonstrosus PETROVITZ, 1973, Ent. Arb. Mus. Frey, 24: 304-306. Type locality: Borneo, Sarawak. **New synonymy**.

Material examined: Specimens of *monstrosus* compared with type: Borneo, Sarawak (ZSM); Sumatra, Mt Leuser N.P., 300-500 m, Ketambe (ISEA, MHNG); Holotype of *javanus* labelled 'Java, Preanger, 4-6000 ft', (NRS); Holotype and paratypes of *paramonstrosus* labelled 'Kapit. Sarawak, Malaysia, v 66 (ZSM, MHNG).

Setylaides foveatus (A. SCHMIDT, 1909), comb. nov.

Dialytes foveatus A. SCHMIDT, 1909, Soc. ent., 24: 61; 1922, Das Tierreich, 45: 464; BALTHASAR, 1964, Verl. Tsch. Akad. Wiss., 3: 521. Typelocality: Japan.

Material examined: Holotype, labelled 'Typus', 'Japan' (NRS).

Setylaides punctatus (A. SCHMIDT, 1911), comb. nov.

Dialytes punctatus A. SCHMIDT, 1911, Soc. ent., 26: 15; 1922, Das Tierreich, 45: 463; BALTHASAR, 1964, Verl. Tsch. Akad. Wiss., 3: 521-522. Type locality: Andaman Isl.

Material examined: Holotype labelled 'Typus', 'Andamans (Roepstorff)' (NRS).

Setylaides canescens (BALTHASAR, 1933), comb. nov.

Dialytes canescens BALTHASAR, 1933, Cas. Csl. Spol. ent., 30: 45; 1964, Verl. Tsch. Akad. Wiss., 3: 522. Type locality: Tonkin.

M a t e r i a l e x a m i n e d : Holotype, labelled 'Typus, Hoa Binh (Tonkin)', seen in 1986 (NMP).

Aphodius subgenus *Aparammoecius* PETROVITZ, 1958

Aphodius (*Aparammoecius*) PETROVITZ, 1958, Ent. Arb. Mus. Frey, 9: 138-139.

Aphodius (*Pseudacrossus*): BALTHASAR, 1964, Verl. Tsch. Akad. Wiss., 3: 300, 303. New synonymy (in part).

Aphodius (*Paremadus*) NAKANE, 1967, Ent. Rev. Japan, 19: 4; STEBNICKA, 1986, Acta zool. cracov., 29(14): 342. **New synonymy**.

Caelius LEWIS, 1895, Ann. Mag. nat. Hist., 16: 381, et Auct.(see STEBNICKA, 1986a).

T y p e s p e c i e s *Aphodius isaburoi* NAKANE, 1956.

K n o w n d i s t r i b u t i o n: Western, Central and Eastern Himalayas, China, Japan, Taiwan.

C o m m e n t s. The monotypic subgenus *Aparammoecius* was established by PETROVITZ (1958) for *Aphodius balangensis* from China ('W Sichuan, Sankiangkou, Balang, Wassuland, 9 viii 1934, leg. Friedrich; MHNG, ZSM), and no other species have been included since. BALTHASAR (1964) synonymized *Aparammoecius* with *Pseudacrossus* REITTER and referred *balangensis* to that subgenus. In 1967 NAKANE proposed a new subgeneric name *Paremadus* for a number of Japanese species. The following year, PETROVITZ (1968) increased a taxonomic gap between closely related species, placing his "*nepalensis*" in the genus *Caelius* LEWIS (for more detailed nomenclatorial history see STEBNICKA, 1986a). As a matter of fact, both PETROVITZ' species are similar in general appearance and share the character states similar to those of the remaining species of the group listed below. Most species are local endemics, patchily distributed and restricted to the mountain ranges, occurring usually over 2000 m above sea level (STEBNICKA, 1986b).

Checklist arrangement of the species is as follows:

Aphodius (*Aparammoecius*) *balangensis* PETROVITZ, 1958; China

A. (*A.*) *pallidiligonis* WATERHOUSE, 1875, comb. nov.; Japan

A. (*A.*) *isaburoi* NAKANE, 1956, comb. nov.; Japan

A. (*A.*) *mizo* NAKANE, 1967, comb. nov.; Japan

A. (*A.*) *masumotoi* NAKANE, 1967, comb. nov.; Japan

A. (*A.*) *zojilae* (STEBNICKA, 1981), comb. nov.; India

A. (*A.*) *mahriensis* (STEBNICKA, 1983), comb. nov.; India

A. (*A.*) *bagmatiensis* (STEBNICKA, 1983), comb. nov; Nepal

= *A. langtangicus* (STEBNICKA, 1983). **New synonymy**.

A. (*A.*) *yangricus* (STEBNICKA, 1983), comb. nov.; Nepal

A. (*A.*) *yenpingensis* STEBNICKA, 1986, comb. nov.; China

= *Caelius chinensis* BALTHASAR, 1945

A. (*A.*) *nomurai* STEBNICKA, 1986, comb. nov.; China

= *Caelius sulcatus* BALTHASAR, 1952

A. (*A.*) *yaralensis* STEBNICKA, 1986, comb. nov.; Nepal

= *Caelius nepalensis* PETROVITZ, 1968

A. (*A.*) *annapurnae* STEBNICKA, 1986, comb. nov.; Nepal

A. (*A.*) *phulcokiensis* STEBNICKA, 1986, comb. nov.; Nepal

A. (*A.*) *schawalleri* STEBNICKA, 1989, comb. nov.; India

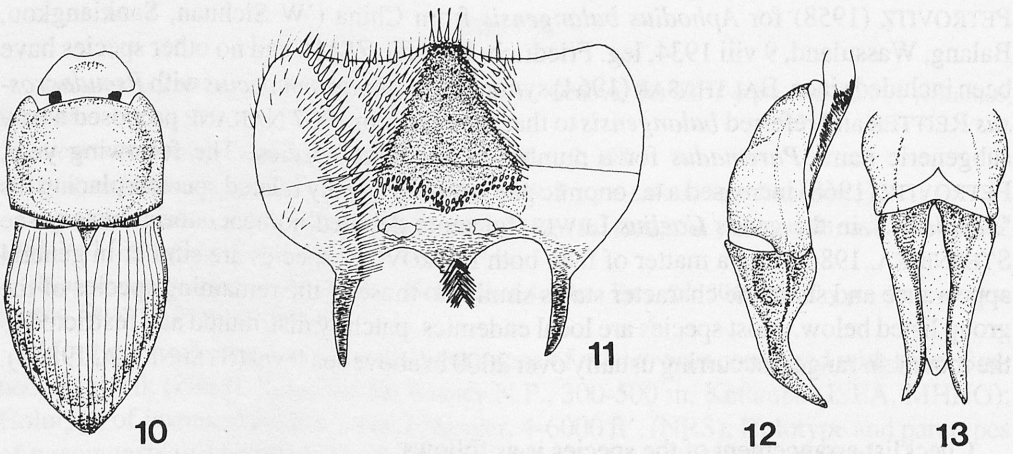
A. (*A.*) *mudukensis* STEBNICKA, 1989, comb. nov.; Pakistan

A. (*A.*) *ivani* STEBNICKA, 1989, comb. nov.; Pakistan

A. (*A.*) *sabhae* STEBNICKA, 1990, comb. nov.; Nepal

A. (*A.*) *kanglae* STEBNICKA, 1990, comb. nov.; Nepal

A. (*A.*) *tarokensis* sp. nov.; Taiwan.



Figs 10-13. *Aphodius* (*Aparammoecius*) *tarokensis* sp. nov.: 10 – habitus; 11 – epipharynx; 12 – aedeagus in lateral view; 13 – aedeagus in dorsal view.

Aphodius (*Aparammoecius*) *tarokensis* sp. nov.

(Figs 10-13)

H o l o t y p e, ♂: Taiwan, Hualien Hsien, Taroko National Park, Ridge SE Nanhushi Hut, 2700 m, 11 v 1990, leg. A. Smetana (MHNG).

P a r a t y p e s : 9 ♂♂ and ♀♀. 3, same data as holotype; 1, Taroko N.P., Duodyatunshan, 2650 m, 8-13 i 1990; 1, Nantou Hsien, Houhuanshan, Kuenyang, 3050 m, 29 iv 1990; 4, Nantou Hsien, Yushan N.P., Mun-Li Cliff, 2700 m, 18 v 1990, ex debris, leg. A. SMETANA (MHNG, ISEA).

D e s c r i p t i o n. Length 3.2-3.6 mm, greatest width 1.5-1.7 mm. B o d y (Fig. 10) ovoid, strongly convex, shining; colour black, clypeal margin, suture and apex of elytra and legs dark reddish brown, antennal club yellowish brown. H e a d trapezoid, slightly gibbose medially, clypeal margin narrowly reflexed and obtusely rounded on each side of moderate median emargination, sides nearly straight to obtuse, protruding gena; anterior of head more or less alutaceous and shallowly rugose, frontal suture feebly marked by line, vertex shining with minute to fine punctures separated by about their diameter. P r o n o t u m transverse, significantly wider than elytra and convex on disc, slightly deplanate near posterior angles; sides finely margined and slightly arcuate toward right-angled posterior angles, basal marginal line fine, medially finer or broken; surface finely punctate, the punctures on disc irregularly spaced, separated by about two times their diameter become more concentrated toward the sides. S c u t e l l u m as wide as long, triangular, convex medially. E l y t r a short, one and one-half times as long as pronotum, strongly convex; base finely margined, humeri not strongly but sharply denticulate, humeral tubers absent, flight wings absent; elytral striae impressed with large punctures distinctly crenating inner margins of intervals, the punctures in lateral striae are deeper and larger; intervals slightly convex on disc, strongly convex apically, surface with minute, scattered punctures. V e n t e r alutaceous; mesosternum convex, roughly punctate; middle coxae slightly separated with fine carina between; metasternum short, circular, surface coarsely punctate, laterally scabrous; abdominal sterna shagreened, shortly piliferous. L e g s moderate in length; anterior femora coarsely punctate in anterior half, middle and hind femora narrower than anterior ones with finer punctures bearing short, erect setae; lateral teeth of fore tibia sharply pointed, apical spur acute, slightly curved inwardly in both sexes; middle and hind tibiae slender, feebly expanded apically with weak, incomplete transverse ridges; apical setae of posterior tibia unequal in length, longest at inner edge, apical spurs short and thin, equal in length; tarsus shorter than tibia, basal segment of metatarsus two times as long as tibial spurs.

E p i p h a r y n x as in Fig. 11.

♂. The body more robust than in female, head larger, pronotum wider; basal segment of metatarsus equal in length to following three tarsal segments combined; genitalia as in Figs 12-13.

♀. Basal segment of metatarsus longer than following three tarsal segments combined.

R e m a r k s. This peculiar species has more advanced reduction of the metathorax and of the length of elytra than any other flightless species known in the group. It seems to be most close to *A. kanglae* STEBNICKA (1990b) from the eastern Nepal-Himalaya by having a similar structure of the body.

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