Linzer biol. Beitr.	40/1	251-273	10.7.2008
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Seven new species and additional records of Palaearctic *Leptusa*, primarily from Yunnan, China (Coleoptera: Staphylinidae: Aleocharinae)

V. Assing

A b s t r a c t : Seven species of *Leptusa* from western Yunnan province, China, are described and illustrated: *L. (Drepanoleptusa) stimulans* nov.sp., *L. (D.) puetzi* nov.sp., *L. (Yunnaleptusa* nov.subgen.) *cultellata* nov.sp., *L. (Y.) parvibulbata* nov.sp., *L. (Chondrelytropisalia) quinqueimpressa* nov.sp., *L. (C.) proiecta* nov.sp. (all of them from the Gaoligong Shan), and *L. armatissima* nov.sp. (Diancang Shan). *Leptusa discolor* ASSING and *L. titillans* ASSING are moved to the subgenus *Drepanoleptusa* PACE (ex *Heteroleptusa* PACE). *Leptusa schuelkei* PACE is excluded from the subgenus *Chondrelytropisalia* SCHEERPELTZ. Keys to the Chinese representatives of the subgenera *Yunnaleptusa* and *Chondrelytropisalia* are presented; their distributions are mapped. Additional records are reported, among them the first record of the genus from Iran.

K e y w o r d s : Coleoptera, Staphylinidae, Aleocharinae, *Leptusa*, Palaearctic region, China, Yunnan, Iran, taxonomy, new species, new subgenus, new records.

1. Introduction

According to a recent catalogue (ASSING 2002), 46 species and subspecies of the speciose genus *Leptusa* KRAATZ were known from the Chinese mainland and from Taiwan. In the meantime, nine additional species were described, seven of them from mainland China (ASSING 2004b, 2006) and two from Taiwan (PACE 2007), raising the total to 55 species and subspecies. Remarkably, the first species were discovered only as late as 1992 (Taiwan) and 1997 (Chinese mainland).

The present contribution is based primarily on material collected by Michael Schülke, David Wrase (both Berlin), and Andreas Pütz (Eisenhüttenstadt) during a joint excursion to Yunnan in late spring 2007. The highly interesting material yielded as many as 7 new discoveries of *Leptusa* species from China, thus raising the total number of (sub-)species known from China and Taiwan to 62. In addition, some new records of *Leptusa* from the Palaearctic region are reported, among them the first record of *L. armeniaca* PACE from Iran, which at the same time represents the first record of the genus from this country.

2. Material and methods

The material referred to in this study is deposited in the following public institutions and private collections:

MHNG Muséum d'histoire naturelle Genève (G. Cuccodoro) SMNS..... Staatliches Museum für Naturkunde, Stuttgart (W. Schawaller) cAss..... author's private collection cPüt private collection Andreas Pütz, Eisenhüttenstadt cSch...... private collection Michael Schülke, Berlin

The morphological studies were carried out using a Stemi SV 11 microscope (Zeiss Germany) and a Jenalab compound microscope (Carl Zeiss Jena) with a drawing tube. For the photographs a digital camera (Nikon Coolpix 995) was used.

The maps were generated using the online generic mapping tool (GMT) of the Geomar website at www.aquarius.ifm-geomar.de/omc.

Head length was measured from the anterior margin of the clypeus to the posterior margin of the head, elytral length at the suture from the apex of the scutellum to the posterior margin of the elytra.

3. Species descriptions and additional records

Leptusa (Stictopisalia) armeniaca PACE 1989

M a t e r i a l e x a m i n e d : <u>Iran</u>: 28 exs., Azerbeijan, Makidi, Arasbaran Wildlife Refuge, 1650-1800 m, 4.-15.VI.1978, leg. Martens & Pieper (SMNS, cAss).

C o m m e n t : The species was previously known only from Mazra and Kapan in southern Armenia (PACE 1989). The above specimens represent the first record of the species – and the genus – from Iran.

On the species of Drepanoleptusa PACE known from China

The prevailing subgeneric concept of Eastern Palaearctic Leptusa is primarily based on typological principles, mainly relating to the morphology of the median lobe of the aedeagus, and requires revision, so that the current subgeneric assignment of the species known from China can only be considered tentative. The type species of Drepanoleptusa is L. annapurnensis PACE from Nepal. The subgenus previously comprised 22 species distributed in the south of the Eastern Palaearctic from the Himalaya to Japan (ASSING 2002, 2006; SMETANA 2004). Prior to the present paper, seven species had become known from mainland China and two from Taiwan. The descriptions of three species (L. rorata PACE, L. microvolans PACE, L. erlangensis PACE) are based on females only, so that their subgeneric assignment is somewhat doubtful. While studying the subgeneric assignments of the species described below and re-evaluating the affiliations of some previously described species, my attention was drawn to some evident similarities between L. sichuanensis PACE, L. titillans ASSING, L. discolor ASSING, and the two new species described below. These similarities relate to the morphology not only of the median lobe of the aedeagus, but also of the paramere, the male tergite VIII and sternites VII-VIII, and also of other body parts, suggesting that these species form a cluster of

close relatives which should be in the same subgenus. Therefore, *L. titillans* and *L. discolor*, which were previously in *Heteroleptusa* PACE, are here moved to *Drepanoleptusa*.

Leptusa (Drepanoleptusa) discolor Assing 2006

M a t e r i a l e x a m i n e d : <u>China</u>: 1 q, N-Yunnan, Zhongdian Co., 51 km SSE Zhongdian, 27°25.3'N, 99°56.5'E, 2970 m, mixed coniferous forest, 16.-19.VIII.2003, leg. Wrase (cAss).



Figs 1-10: *Leptusa stimulans* nov.sp.: (1) habitus; (2) forebody; (3) antenna; (4) abdominal segments III-VII; (5) male tergite VIII; (6) male sternite VIII; (7-8) median lobe of aedeagus in lateral and in ventral view; (9) paramere; (10) apical lobe of paramere. Scale bars: 1: 1.0 mm; 2-4: 0.5 mm; 5-9: 0.2 mm; 10: 0.1 mm.

C o m m e n t : The original description of this recently described species is based on two type specimens from two localities in northern Yunnan, China (ASSING 2006).

Leptusa (Drepanoleptusa) stimulans nov.sp. (Figs 1-10)

T y p e m a t e r i a l : <u>Holotype &</u>: China: Yunnan [CH07-28A], Nujiang Lisu Aut. Pref., Gaoligong Shan, side valley 19 km NW Liuku, 25°59'02"N, 98°42'23"E, 2730 m, devast. prim. for., litter sifted, 10.VI.2007, M. Schülke / Holotypus & *Leptusa stimulans* sp.n. det. V. Assing 2007 (cAss).

D e s c r i p t i o n : 3.9 mm. Habitus as in Fig. 1. Coloration: head blackish; pronotum castaneous with rufous margins; elytra and abdomen reddish to reddish brown, with abdominal segment VI and anterior half of VII infuscated; legs and antennae reddish.

Head approximately 1.05 times as wide as long; puncturation rather coarse and dense, interstices narrower than diameter of punctures; microsculpture very shallow, barely noticeable. Eyes slightly longer than postocular region in dorsal view (Fig. 2). Antennae (Fig. 3) slender; antennomere X weakly transverse, distinctly less than 1.5 times as wide as long. Maxillary palpi slender, preapical palpomeres more than 3 times as long as wide.

Pronotum 1.28 times as wide as long and 1.28 times as wide as head; maximal width in anterior half; posterior angles marked; puncturation sparser and distinctly finer than that of head; microsculpture more pronounced than that of head (Fig. 2).

Elytra 1.25 times as wide and at suture almost 1.20 times as long as pronotum; humeral angles pronounced; puncturation coarse (much more so than that of pronotum) and somewhat granulose, but not very dense, interstices wider than diameter of punctures (Fig. 2); microsculpture absent. Hind wings apparently fully developed. Legs slender; metatarsomere I longer than II, but shorter than the combined length of II and III.

Abdomen approximately 0.9 times as wide as elytra, segments III-VI subparallel; segments III-VI with pronounced anterior impressions; puncturation rather coarse, dense on tergite III, decreasing in density from tergite III to tergite VI; tergite VII with rather sparse, oblongly granulose puncturation; microreticulation distinct, rather shallow on anterior tergites and pronounced on tergite VII; posterior margin of tergite VII with pronounced palisade fringe (Fig. 4).

 δ : tergite VII with pronounced median keel (Fig. 4); posterior margin of tergite VIII concave and distinctly serrate (Fig. 5); sternite VII unmodified; sternite VIII broadly convex posteriorly (Fig. 6); median lobe of aedeagus slender, ventral process acute both in lateral and in ventral view (Figs 7-8); paramere as in Figs 9-10.

♀: unknown.

E t y m o l o g y : The name - present participle of stimulare (to sting) - refers to the apically acute ventral process of the aedeagus.

C o m p a r a t i v e n o t e s : *Leptusa stimulans* is distinguished from all its congeners especially by the distinctive morphology of the median lobe of the aedeagus. Based on the shape of the aedeagus (median lobe, apical lobe of paramere), the male secondary sexual characters, and external characters, the species is attributed to *Drepanoleptusa* PACE. The only representative of this subgenus previously known from Yunnan is *L. discolor*. From this species, *L. stimulans* is additionally separated by distinctly larger body, darker coloration (*L. discolor*: head brown, pronotum and elytra bright reddish), much longer antennae with less transverse antennomeres IV-X (*L. discolor*:

antennomeres VII-X approximately twice as wide as long), larger eyes, and a much finer puncturation of the pronotum. For illustrations of *L. discolor* and of other *Drepanoleptusa* species known from mainland China (*L. sichuanensis* PACE, *L. rougemonti* PACE, *L. microvolans* PACE, *L. erlangensis* PACE, *L. chengduensis* PACE, *L. wuyica* ASSING, *L. titillans* ASSING) see PACE (1997, 1999, 2001) and ASSING (2002, 2006).

D is tribution and bionomics: The type locality is situated to the northwest of Liuku, western Yunnan province, China. The holotype was sifted from the leaf litter of a degraded primary forest at an altitude of 2730 m.

Leptusa (Drepanoleptusa) puetzi nov.sp. (Figs 63-71)

T y p e m a t e r i a l : <u>Holotype ♂</u>: China: Yunnan [CH07-28], Nujiang Lisu Aut. Pref., Gaoligong Shan, side valley 19 km NW Liuku, 25°59'02"N, 98°42'23"E, 2730 m, devast. prim. forest, litter sifted, 9.VI.2007, leg. A. Pütz / Holotypus ♂ *Leptusa puetzi* sp.n. det. V. Assing 2007 (cAss).

D e s c r i p t i o n : 3.2 mm. Habitus as in Fig. 63. Coloration: head dark brown with anterior part paler; pronotum dark brown with paler margins; elytra reddish brown; abdomen dark brown, with posterior margins of segments somewhat paler; legs and antennae yellowish brown.

Head approximately as wide as long; puncturation dense and shallow, interstices distinctly narrower than diameter of punctures and with distinct microsculpture. Eyes approximately as long as postocular region in dorsal view (Fig. 64). Antennae (Fig. 66) distinctly increase apically; antennomere IV approximately as long as wide; V-X of increasing width and increasingly transverse; X strongly transverse, approximately twice as wide as long. Maxillary palpi with preapical palpomeres approximately 2.5 times as long as wide.

Pronotum 1.21 times as wide as long and 1.25 times as wide as head; maximal width in anterior half; posterior angles marked; lateral margins in posterior half weakly concave in dorsal view; puncturation very dense and ill-defined; microsculpture shallow (Fig. 64).

Elytra approximately as long as pronotum; humeral angles pronounced; posterior margins strongly sinuate near posterior angles; puncturation coarse (much more so than that of pronotum), dense, and somewhat granulose (Fig. 64); microsculpture indistinct. Hind wings apparently fully developed. Legs slender; metatarsomere I approximately as long as the combined length of II and III.

Abdomen with segments III-VI subparallel; segments III-V with pronounced anterior impressions, segment VI with shallow impression; anterior impressions of segments III-VI with conspicuously coarse and dense puncturation; remainder of tergal surfaces of segments III-VI with rather fine and moderately sparse puncturation; puncturation of tergite VII slightly granulose; tergites III-V without, tergites VI-VII with very shallow microsculpture; posterior margin of tergite VII with palisade fringe (Fig. 65).

 δ : tergites VII and VIII with pronounced median keel (Figs 65, 67); posterior margin of tergite VIII weakly concave in the middle (Fig. 67); sternite VII unmodified; sternite VIII broadly convex posteriorly (Fig. 68); median lobe of aedeagus slender (Figs 69-70); apical lobe of paramere as in Fig. 71.

♀: unknown.

E t y m o l o g y : The species is dedicated to Andreas Pütz, specialist of Byrrhidae, who collected the holotype.

C o m p a r a t i v e n o t e s : *Leptusa puetzi* is distinguished from all its congeners especially by the distinctive morphology of the median lobe of the aedeagus. The species is attributed to *Drepanoleptusa* PACE especially based on the morphology of the median lobe of the aedeagus, which is rather similar to that of *L. sichuanensis* and *L. stimulans*. From the latter, which was collected in the same locality, the species is additionally distinguished by smaller size, paler coloration, different morphology of the antennae, completely different puncturation of the whole body, the completely different shape and chaetotaxy of the apical lobe of the paramere, and the different male secondary sexual characters. For illustrations of other *Drepanoleptusa* species known from China see PACE (1997, 1999, 2001) and ASSING (2002, 2006).

D is tribution and bionomics: The type locality is identical to that of L. *stimulans* (see above). The holotype was sifted from the leaf litter of a degraded primary forest at an altitude of 2730 m.

Yunnaleptusa nov.subgen.

Type species, here designated: Leptusa curvata ASSING 2006

D e s c r i p t i o n : Small species (ca. 1.8-2.5 mm). Head, pronotum, and abdomen with fine puncturation. Antennae of moderate length and with distinctly transverse preapical antennomeres. Pronotum distinctly transverse and much wider than head; posterior angles weakly marked. Elytra at suture of similar length as pronotum or only slightly shorter; humeral angles marked. Tarsi relatively short; metatarsomere I only slightly longer than II. Abdomen not distinctly parallel, widest at segment V; tergites III-V with moderately deep anterior impressions, tergite VI without such impression; tergites VII-VIII without distinct sexual dimorphism.

 δ : posterior margin of sternite VIII moderately projecting posteriad in the middle; median lobe of aedeagus strongly arched in lateral view; crista proximalis reduced; crista apicalis long and narrow; internal sac with relatively short straight flagellum, with weakly sclerotised apical structures, and without sclerotised basal structures; apical lobe of paramere relatively short, of conical shape, and with two long and two short setae.

 φ : sternite VIII with convex posterior margin; spermatheca with short duct; spermathecal capsule with long cuticular intrusion (see figure 67 in ASSING 2006).

E t y m o l o g y : The name is composed of Yunna (from Yunnan) and the generic name; the gender is feminine.

R e m a r k s : Since the *Leptusa* fauna of the Eastern Palaearctic region is rather poorly known, a description of subgenera at this stage seems generally problematic. For this reason, several species described in earlier papers (ASSING 2002, 2004a, 2004b, 2006) which could not attributed to any of the existing subgenera were regarded as species of doubtful subgeneric assignment. An exception is here made for *L. curvata* ASSING, *L. recta* ASSING, and the two new species described below. They share numerous similarities, especially a synapomorphically derived morphology of the aedeagus, so that they are doubtlessly monophyletic. At the same time, they differ from other Eastern Palaearctic taxa so significantly that it seems justifiable to assign them to a distinct subgenus.

D is tribution and bionomics: The known distribution of the subgenus is confined to Yunnan province, China. The species are apparently inhabitants of the forest floor, as is suggested by the fact that they were sifted from the litter of various types of forest (coniferous, deciduous, and mixed forest). The altitudes range from 2730 to 3550 m.

Key to species:

- 2 Elytra at suture distinctly (ca. 0.7 ×) shorter than pronotum. Small species, body length approximately 1.8 mm. ♂: median lobe of aedeagus with basal part of ventral process curved in lateral view and with smaller proximal bulbus (Fig. 24). Northwestern Yunnan province: Gaoligong Shan (Map 1)......*L. parvibulbata* nov.sp.

- ♂: median lobe of aedeagus with basal part of ventral process straight in lateral view, subapically distinctly angled (see figure 73 in ASSING 2006)...... *L. recta* ASSING



Map 1: Distributions of the species of the subgenus *Yunnaleptusa* in China: *L. curvata* ASSING (filled circles), *L. recta* ASSING (open circle), *L. parvibulbata* nov.sp. (filled square), and *L. cultellata* nov.sp. (open square).

Leptusa (Yunnaleptusa) cultellata nov.sp. (Figs 11-20, Map 1)

T y p e m a t e r i a l : <u>Holotype &</u>: China: Yunnan [CH07-28], Nujiang Lisu Aut. Pref., Gaoligong Shan, side valley 19 km NW Liuku, 25°59'02"N, 98°42'23"E, 2730 m, devast. prim. for., litter sifted, 9.VI.2007, M. Schülke / Holotypus & *Leptusa cultellata* sp.n. det. V. Assing 2007 (cAss).

D e s c r i p t i o n : 2.2 mm. Habitus as in Fig. 11. Coloration: head reddish brown; pronotum reddish; elytra brown, with the humeral angles and the posterior margins reddish; abdomen reddish, with segment VI and the anterior half of segment VII blackish; legs and antennomeres I-III and XI pale reddish; antennomeres IV-X dark brown.

Head approximately 1.15 times as wide as long; puncturation sparse and extremely fine, barely noticeable even at higher magnification; microsculpture indistinct. Eyes weakly projecting from lateral contours of head, approximately as long as postocular region in dorsal view (Fig. 12). Antennae (Fig. 13) distinctly incrassate apically; antennomere IV approximately as long as wide; V-X of increasing width and increasingly transverse; X more than twice as wide as long.

Pronotum strongly transverse, approximately 1.35 times as wide as long and 1.30 times as wide as head; maximal width appoximately in the middle; posterior angles rounded, weakly marked; puncturation moderately dense and fine, but distinct (much more so than that of head); microsculpture extremely shallow, barely noticeable (Fig. 12).

Elytra slightly (approximately $1.05 \times$) wider than and at suture almost as long as pronotum; humeral angles marked; puncturation moderately dense, weakly granulose, and fine; microsculpture extremely shallow, almost obsolete (Fig. 12). Hind wings apparently reduced. Metatarsomere I only slightly longer than II.

Abdomen approximately as wide as elytra, maximal width at segment V; segments III-V with moderately deep anterior impressions; segment VI without anterior impression; puncturation very fine and rather sparse; microsculpture shallow, more distinct on posterior than on anterior tergites; posterior margin of tergite VII with narrow rudiment of a palisade fringe (Fig. 14).

 δ : tergite VII unmodified; tergite VIII very shallowly concave in the middle (Fig. 15); sternite VIII moderately projecting posteriad in the middle (Fig. 16); median lobe of aedeagus of distinctive morphology, strongly curved in lateral view; apex of ventral process apically distinctly compressed, forming a sharp edge (Figs 17-18); paramere as in Figs 19-20.

♀: unknown.

E t y m o l o g y : The name (Latin, adjective: shaped like a small knife) refers to the shape of the apex of the ventral process of the aedeagus.

C o m p a r a t i v e n o t e s : See description of the subgenus and the key to species above.

D is tribution and bionomics: The species is known only from one locality to the northwest of Liuku, western Yunnan province, China (Map 1). The holo-type was sifted from the leaf litter of a degraded primary forest at an altitude of 2730 m.



Figs 11-20: *Leptusa cultellata* nov.sp.: (11) habitus; (12) forebody; (13) antenna; (14) abdominal segments III-VII; (15) male tergite VIII; (16) male sternite VIII; (17-18) median lobe of aedeagus in lateral and in ventral view; (19) paramere; (20) apical lobe of paramere. Scale bars: 11: 0.5 mm; 12-16: 0.2 mm; 17-19: 0.1 mm; 20: 0.05 mm.

Leptusa (Yunnaleptusa) parvibulbata nov.sp. (Figs 21-24, 72, Map 1)

T y p e m a t e r i a l : <u>Holotype &</u>: China: Yunnan [CH07-22], Nujiang Lisu Aut. Pref., Gaoligong Shan, valley 21 km W Gongshan, 27°47'03"N, 98°27'39"E, 3320 m, moss, alder, bamboo, Rhodod., sifted, 6.VI.2007, leg. A. Pütz / Holotypus & *Leptusa parvibulbata* sp.n. det. V. Assing 2008 (cAss).

D e s c r i p t i o n : 1.8 mm. Habitus as in Fig. 21. Coloration: head dark brown; pronotum and elytra paler brown; abdomen blackish brown, with the anterior and the posterior segments (III, IV, VIII) indistinctly paler; legs and antennae dark yellowish.

Head approximately 1.10 times as wide as long; puncturation moderately dense and fine; microsculpture shallow, interstices with some shine. Eyes small and weakly projecting from lateral contours of head, composed of about 25 ommatidia, little more than half as long as postocular region in dorsal view. Antennae gradually incrassate apically; antennomere IV approximately as long as wide; V-X of increasing width and increasingly transverse; X more than twice as wide as long.

Pronotum strongly transverse, approximately 1.35 times as wide as long and 1.25 times as wide as head; maximal width slightly before the middle; posterior angles rounded, weakly marked; puncturation dense and fine; microsculpture shallow, but distinct.



Figs 21-24: *Leptusa parvibulbata* nov.sp.: (21) habitus; (22) male tergite VIII; (23) male sternite VIII; (24) median lobe of aedeagus in lateral view. Scale bars: 21: 0.5 mm; 22-23: 0.2 mm; 24: 0.1 mm.

Elytra slightly narrower than and at suture approximately 0.7 times as long as pronotum; humeral angles marked; puncturation dense, but less so than that of pronotum, much more pronounced than that of head and pronotum; interstices without evident microsculpture. Hind wings apparently reduced. Metatarsomere I only slightly longer than II.

Abdomen approximately 1.15 times as wide as elytra, maximal width at segments V-VI; segments III-V with rather shallow anterior impressions; segment VI without anterior impression; puncturation very fine and moderately dense; microsculpture shallow; posterior margin of tergite VII with narrow rudiment of a palisade fringe.

 δ : tergite VII unmodified; tergite VIII very shallowly concave in the middle (Fig. 22); sternite VIII with distinctly convex posterior margin (Fig. 23); median lobe of aedeagus shaped as in Fig. 24; apical lobe of paramere similar to that of other species of the subgenus.

♀: unknown.

E t y m o l o g y : The name (Latin, adjective) refers to the relatively small proximal capsule of the median lobe of the aedeagus.

C o m p a r a t i v e n o t e s : See description of the subgenus and the key to species above.

D is tribution and bionomics: The species is known only from one locality to the west of Gongshan, western Yunnan province, China (Map 1). The holo-type was sifted from moss and the litter of alder, bamboo, and *Rhododendron* at an altitude of 3320 m (Fig. 72).

Leptusa (Chondrelytropisalia) puella PACE 1989

M a t e r i a l e x a m i n e d : <u>Nepal</u>: 2 ざ ざ, Rasuwa district, Gosainkund Lakes, 4200-4300 m, 20.IV.1985, leg. Smetana (MHNG, cAss).

C o m m e n t : The specimens are of distinctly darker coloration than indicated in the original description, but the morphology of the aedeagus is in agreement with the illustrations provided by PACE (1989).

On the species of Chondrelytropisalia SCHEERPELTZ known from China

Only two species of the subgenus *Chondrelytropisalia* were previously known from China: L. schuelkei PACE 1999 (Shaanxi) and L. tectusoides ASSING 2002 (W-Sichuan). PACE (1999) apparently attributed the former to this subgenus based on the similar internal structures of the aedeagus. However, an examination of type material of L. schuelkei and a comparison with other species of Chondrelytropisalia, also from the Himalaya, revealed that L. schuelkei differs so significantly and in so many characters that it is most unlikely to belong to this subgenus. These differences especially include the finer puncturation of the head, antennae with more transverse antennomeres V-X, the more transverse and distinctly less convex (cross-section) pronotum, the completely different puncturation of the pronotum, the much shallower and less defined puncturation of the elytra, the shape of the abdomen (broader, not subparallel, but widened in the middle), the much shallower and finely punctate anterior impressions of tergites III-V, the absence of anterior impressions on tergites VI-VII, the presence of median keels on the male abdominal tergites VII-VIII, the different chaetotaxy of the male sternite VII, as well as the different shape and chaetotaxy of the apical lobe of the paramere. Therefore, in order to maintain the monophyly of Chondrelytropisalia, L. schuelkei is here excluded from the subgenus and considered a species incertae sedis.





Map 2: Distributions of the species of the subgenus *Chondrelytropisalia* and *L. schuelkei* PACE in China: *L. schuelkei* (open square), *L. tectusoides* ASSING (filled square), *L. quinqueimpressa* nov.sp. (filled circles), and *L. proiecta* nov.sp. (open and filled circles).

Including the new species described below, the subgenus now comprises 15 species and subspecies, which are distributed in the Himalaya, including adjacent mountain ranges, and western China (Map 2). The Chinese representatives are distinguished as follows:

Leptusa (Chondrelytropisalia) quinqueimpressa nov.sp. (Figs 25-37, Map 2)

T y p e m a t e r i a l : <u>Holotype &</u>: China: Yunnan [CH07-27], Nujiang Lisu Aut. Pref., Gaoligong Shan, creek valley 20 km NW Liuku, 25°58'49"N, 98°41'48"E, 3000 m, bamboo, shrubs, litter sifted, 9.VI.2007, M. Schülke / Holotypus & *Leptusa quinqueimpressa* sp.n. det. V. Assing 2007 (cAss). <u>Paratypes</u>: 2 exs.: same data as holotype (cSch, cAss); 2 exs.: China: Yunnan [CH07-26], Nujiang Lisu Aut. Pref., Gaoligong Shan, pass 21 km NW Liuku, 3150 m, 25°58'22"N, 98°41'00"E, bamboo with shrubs, litter sifted, 9.VI.2007, M. Schülke (cSch).

D e s c r i p t i o n : 2.0-2.6 mm. Habitus as in Fig. 25. Coloration: body, including appendages, bright reddish, with abdominal segment VI and anterior half of segment VII blackish.

Head approximately as wide as long; puncturation coarse and dense, interstices narrower than diameter of punctures; microsculpture extremely shallow, barely noticeable. Eyes small, composed of approximately 20 ommatidia, weakly projecting from lateral contours of head, distinctly shorter than postocular region in dorsal view (Fig. 26). Antennae relatively long and slender (Fig. 27); antennomere IV approximately as long as wide; V indistinctly transverse; VI-X of increasing width and increasingly transverse; X slightly less than twice as wide as long. Maxillary palpus with penultimate palpomere little more than twice as long as wide.

Pronotum strongly convex in cross-section, weakly transverse, 1.12-1.20 times as wide as long and 1.15-1.20 times as wide as head; maximal width in anterior half; posterior angles marked; lateral margins in posterior half weakly concave in dorsal view; puncturation somewhat denser, less coarse, less deep, and less defined than that of head; microsculpture very shallow (Fig. 26).

Elytra approximately as wide and at suture 0.8 times as long as pronotum; humeral angles obsolete; puncturation very coarse, well-defined, and dense; microsculpture absent (Fig. 26). Hind wings reduced. Metatarsomere I almost as long as combined length of II and III.

Abdomen approximately 1.15 times as wide as elytra; segments IV-VI subparallel; maximal width at segment VI; tergites III-VII anteriorly with distinct impressions, that of tergite VII slightly shallower than those of tergites III-VI; anterior impressions with very coarse and dense puncturation; puncturation of remainder of tergal regions fine and moderately dense; microsculpture shallow, but distinct; posterior margin of tergite VII with narrow rudiment of a palisade fringe (Fig. 28); tergite VII without evident sexual dimorphism.

 δ : sternite VII posteriorly truncate, at posterior margin with 6 and in median area with 4 additional conspicuously long black setae; tergite VIII as in Fig. 29; posterior margin of sternite VIII broadly convex (Fig. 30); median lobe of aedeagus of highly distinctive morphology, ventral process almost covered by semitransparent and apically incised additional plate in ventral view (Figs 34-35); apical lobe of paramere apically abruptly narrowed (Figs 36-37).

 φ : setae of sternite VII much shorter; tergite VIII as in Fig. 31; posterior margin of sternite VIII weakly convex (Fig. 32); spermatheca with relatively long coiled duct (Fig. 33).

E t y m o l o g y : The name (Latin, adjective: with five impressions) refers to the presence of anterior impressions on the abdominal tergites III-VII.

C o m p a r a t i v e n o t e s : The new species is readily distinguished from all its congeners by the distinctive morphology of the aedeagus. For characters separating it from other consubgeners known from China see the key above.

D is tribution and bionomics: The species is known from two localities to the northwest of Liuku, western Yunnan province, China (Map 2). The types were collected by sifting the litter of bamboo and shrubs at altitudes of 3000-3150 m.



Figs 25-33: Leptusa quinqueimpressa nov.sp.: (25) habitus; (26) forebody; (27) antenna; (28) abdominal segments III-VII; (29) male tergite VIII; (30) male sternite VIII; (31) female tergite VIII; (32) female sternite VIII; (33) spermatheca. Scale bars: 25: 0.5 mm; 26-32: 0.2 mm; 33: 0.1 mm.





Figs 34-37: *Leptusa quinqueimpressa* nov.sp.: (34-35) median lobe of aedeagus in lateral and in ventral view; (36) paramere; (37) apical lobe of paramere. Scale bars: 0.1 mm.

Leptusa (Chondrelytropisalia) proiecta nov.sp. (Figs 38-48, 73, Map 2)

T y p e m a t e r i a l : <u>Holotype &</u>: China: Yunnan [CH07-21], Nujiang Lisu Aut. Pref., Gaoligong Shan, pass 22 km W Gongshan, N-slope, 3350-3400 m, 27°46'27"N, 98°26'50"E, fern, moss, litter sifted, 6.VI.2007, M. Schülke / Holotypus & *Leptusa proiecta* sp.n. det. V. Assing 2008 (cAss). <u>Paratypes</u>: 1 q: same data as holotype, but leg. A. Pütz (cPüt); 1 q: China: Yunnan [CH07-26], Nujiang Lisu Aut. Pref., Gaoligong Shan, pass 21 km NW Liuku, 3150 m, 25°58'22"N, 98°41'00"E, bamboo with shrubs, litter sifted, 9.VI.2007, M. Schülke (cSch).

D e s c r i p t i o n : 2.3-2.7 mm. Habitus as in Fig. 38. Coloration: body dark brown to blackish; legs rufous; antennae dark brown, with the basal 4 antennomeres reddish.

Head approximately as wide as long; puncturation coarse and dense, interstices distinctly narrower than diameter of punctures; microsculpture obsolete. Eyes moderately small, approximately as long as postocular region in dorsal view (Fig. 39). Antennae relatively slender (Fig. 40); antennomeres IV-V weakly oblong; VI approximately as wide as long; VII-X of increasing width and increasingly transverse; X approximately 1.5 times as wide as long. Maxillary palpus with penultimate palpomere almost three times as long as wide.

Pronotum strongly convex in cross-section, weakly transverse, 1.12-1.20 times as wide as long and approximately 1.20 times as wide as head; maximal width in anterior half; posterior angles marked; lateral margins in posterior half weakly concave in dorsal view; puncturation less coarse, less deep, and less defined than that of head, especially in median area of disc; microsculpture obsolete (Fig. 39).



Figs 38-48: *Leptusa proiecta* nov.sp.: (**38**) habitus; (**39**) forebody; (**40**) antenna; (**41**) abdominal segments III-VII; (**42**) male tergite VIII; (**43**) male sternite VIII; (**44**) median lobe of aedeagus in lateral view; (**45**) apex of median lobe in ventral view; (**46**) apical lobe of paramere; (**47**) female sternite VIII; (**48**) spermatheca. Scale bars: 38-39, 41: 0.5 mm; 40, 42-43, 47: 0.2 mm; 44-46, 48: 0.1 mm.



Figs 49-59: *Leptusa armatissima* nov.sp.: (49) habitus; (50) forebody; (51) antenna; (52) abdominal segments III-VII; (53) male tergite VIII; (54) male sternite VIII; (55) female tergite VIII; (56) female sternite VIII; (57) apical lobe of paramere; (58) paramere; (59) spermatheca. Scale bars: 49-50, 52: 0.5 mm; 51, 53-56, 58: 0.2 mm; 57, 59: 0.1 mm.

Elytra approximately as wide and at suture 0.8 times as long as pronotum; humeral angles present; puncturation very coarse, well-defined, and dense; microsculpture absent (Fig. 39). Hind wings reduced. Metatarsomere I shorter than the combined length of II and III.

Abdomen (Fig. 41) approximately 1.10 times as wide as elytra; segments IV-VI subpar-

allel; maximal width at segments V-VI; tergites III-VII anteriorly with distinct impressions, that of tergite VII slightly shallower than those of tergites III-VI; anterior impressions with very coarse and dense puncturation; puncturation of remainder of tergal regions fine and moderately sparse; microsculpture obsolete; posterior margin of tergite VII with narrow rudiment of a palisade fringe; tergites VII-VIII without evident sexual dimorphism (Fig. 42).

 δ : sternite VII posteriorly truncate, at posterior margin with 6 conspicuously long black setae; posterior margin of sternite VIII produced in the middle (Fig. 43); median lobe of aedeagus as in Figs 44-45; apical lobe of paramere as in Fig. 46.

 φ : posterior margin of sternite VII with fine long setae, without additional pairs of conspicuously long black setae; posterior margin of sternite VIII weakly convex, in the middle indistinctly angled (Fig. 47); spermatheca as in Fig. 48.

E t y m o l o g y : The name (Latin, adjective: projecting) refers to the shape of the male sternite VIII, one of the characters separating this species from L. *quinqueimpressa*.

C o m p a r a t i v e n o t e s: The new species is readily distinguished from all its congeners by the distinctive morphology of the aedeagus. For characters separating it from other consubgeners known from China see the key above.

D is tribution and bionomics: The species is known from two localities in the Gaoligong Shan, western Yunnan province, China (Map 2). The types were collected by sifting moss and the litter of fern, bamboo, and shrubs at altitudes of 3150-3400 m (Fig. 73). On one occasion, the species was collected together with L. *quinqueimpressa*.

Leptusa armatissima nov.sp. (Figs 49-62)

T y p e m a t e r i a l : <u>Holotype</u> δ : China: Yunnan [CH07-08], Dali Bai Auton. Pref., Diancang Shan 43 km NW Dali, 3078 m, 25°59'35"N, 99°52'06"E, W pass, Rhodod., oaks [sic], bamboo, sifted, 29.V.2007, M. Schülke / Holotypus δ *Leptusa armatissima* sp.n. det. V. Assing 2007 (cAss). <u>Paratypes</u>: 5 exs.: same data as holotype (cSch, cAss); 2 exs., same data, but leg. A. Pütz (cPüt, cAss).

D e s c r i p t i o n : 2.1-2.7 mm. Habitus as in Fig. 49. Coloration: head dark brown; pronotum and elytra reddish; abdomen blackish brown, with segments III-IV slightly paler brown and apex (posterior 1/4 of segment VII and following segments) reddish brown; legs and antennal bases reddish; antennae apically more or less infuscated, reddish brown to darker brown.

Head approximately 1.05 times as wide as long; puncturation sparse and extremely fine, barely noticeable; microsculpture distinct, but shallow. Eyes of moderate size, slightly longer than postocular region in dorsal view (Fig. 50). Antennae moderately slender (Fig. 51); antennomere IV approximately as long as wide; V indistinctly transverse; VI-X of increasing width and increasingly transverse; X slightly less than twice as wide as long. Maxillary palpus with penultimate palpomere approximately 2.5 times as long as wide.

Pronotum moderately convex in cross-section, strongly transverse, approximately 1.35 times as wide as long and 1.35 times as wide as head; maximal width in anterior half; posterior angles moderately marked; puncturation fine, slightly denser and more distinct than that of head; microsculpture distinct, more pronounced than that of head (Fig. 50).



Figs 60-62: *Leptusa armatissima* nov.sp.: median lobe of aedeagus is lateral and in ventral view. Scale bar: 0.1 mm.

Elytra approximately 1.1 times as wide and at suture as long as pronotum, or slightly longer; humeral angles distinct; puncturation coarse and very dense, but not very deep; microsculpture very shallow, barely noticeable (Fig. 50). Hind wings fully developed. Metatarsomere I of similar length as II.

Abdomen approximately 0.95 times as wide as elytra, widest at segments V/VI; tergites III-V with, tergites VI-VII without anterior impressions; puncturation of anterior impressions of tergites III-V rather coarse and dense, on remainder of tergites III-VI fine and moderately dense, on tergite VII sparse; microsculpture distinct everywhere; posterior margin of tergite VII with pronounced palisade fringe (Fig. 52); tergites VII-VIII without evident sexual dimorphism (Figs 53, 55).

 δ : sternite VII unmodified; posterior margin of sternite VIII obtusely pointed (Fig. 54); median lobe of aedeagus stout, internal sac heavily armed with strongly sclerotised structures (Figs 60-62); paramere as in Figs 57-58.

 φ : posterior margin of sternite VIII strongly convex (Fig. 56); spermathecal capsule with long and slender cuticular intrusion (Fig. 59).

E t y m o l o g y : The name (Latin, adjective, superlative of armata) refers to the numerous and large sclerotised structures in the internal sac of the aedeagus.



Figs 63-71: *Leptusa puetzi* nov.sp.: (63) habitus; (64) forebody; (65) abdominal segments III-VII; (66) antenna; (67) male tergite VIII; (68) male sternite VIII; (69) median lobe of aedeagus in lateral view; (70) apical part of median lobe in ventral view; (71) apical lobe of paramere. Scale bars: 63:L 1.0 mm; 64-65: 0.5 mm; 66-68: 0.2 mm; 69-71: 0.1 mm.



Fig. 72: Type locality of Leptusa parvibulbata nov.sp. (photo by M. Schülke).



Fig. 73: Type locality of Leptusa proiecta nov.sp. (photo by M. Schülke).

C o m p a r a t i v e n o t e s a n d s u b g e n e r i c a f f i l i a t i o n s : From all other *Leptusa* species known from the Eastern Palaearctic region, *L. armatissima* is readily separated by the distinctive morphology of the aedeagus, as well as by the shape of the spermatheca. Since neither the sexual nor the external characters suggest closer a relationship to any of the described subgenera present in the Eastern Palaearctic region, a subgeneric assignment is here refrained from. The external shape of the aedeagus somewhat resembles that of species of *Aphaireleptusa*, but the internal structures, the shape of the paramere, the male secondary sexual characters (especially sternite VII), and the external morphology (body shape, puncturation, etc.) are completely different.

D is tribution and bionomics: The type locality is situated some 40 km to the northwest of Dali, northwestern Yunnan province, China. The type specimens were sifted from the litter of *Rhododendron*, oak, and bamboo at an altitude of about 3080 m.

Acknowledgements

I am most grateful to Michael Schülke, David Wrase, and Andreas Pütz for making their interesting material available to me. In particular, I would like to thank Michael Schülke for the generous gift of five of the holotypes of the new species described in this paper and for providing the habitat photos, as well as to Andreas Pütz for the gift of the holotypes of *L. puetzi* and *L. parvibulbata*. Benedikt Feldmann (Münster) proof-read the manuscript.

Zusammenfassung

Sieben Leptusa-Arten werden aus dem westlichen Teil der chinesischen Provinz Yunnan beschrieben und abgebildet: L. (Drepanoleptusa) stimulans nov.sp., L. (D.) puetzi nov.sp., L. (Yunnaleptusa nov.subgen.) cultellata nov.sp., L. (Y.) parvibulbata nov.sp., L. (Chondrelytropisalia) quinqueimpressa nov.sp., L. (C.) proiecta nov.sp. (alle aus dem Gaoligong Shan) und L. armatissima nov.sp. (Diancang Shan). Leptusa discolor ASSING und L. titillans ASSING werden in die Untergattung Drepanoleptusa PACE gestellt (ex Heteroleptusa PACE). Leptusa schuelkei PACE wird aus dem Subgenus Chondrelytropisalia ausgeschlossen. Für die chinesischen Vertreter der Untergattungen Yunnaleptusa and Chondrelytropisalia werden Schlüssel erstellt; ihre derzeit bekannte Verbreitung wird anhand von Karten illustriert. Weitere Nachweise werden gemeldet, darunter ein Erstnachweis der Gattung aus dem Iran.

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Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Linzer biologische Beiträge

Jahr/Year: 2008

Band/Volume: 0040_1

Autor(en)/Author(s): Assing Volker

Artikel/Article: <u>Seven new species and additional records of Palaearctic Leptusa</u>, primarily from Yunnan, China (Coleoptera: Staphylinidae: Aleocharinae) 251-273