

## A review of the genera *Leiopus* Audinet-Serville, 1835 and *Acanthocinus*, Dejean, 1821 (Coleoptera: Cerambycidae, Lamiinae, Acanthocinini) in Asia, with descriptions of six new species of *Leiopus* from China

HENRIK WALLIN<sup>1</sup>, TORSTEIN KVAMME<sup>2</sup> & MEIYING LIN<sup>3</sup>

<sup>1</sup> The Swedish Museum of Natural History, Section of Entomology, P. O. Box 50007, SE-104 05 Stockholm, Sweden  
E-mail: henrik.wallin@saiglobal.com

<sup>2</sup> Norwegian Forest and Landscape Institute, P. O. Box 115, NO-1431 Ås, Norway  
E-mail: torstein.kvamme@skogoglandskap.no

<sup>3</sup> E119, National Zoological Museum of China, Institute of Zoology, Chinese Academy of Sciences, 1# Beichen West Road, Chaoyang, Beijing, 100101 China  
E-mail: linmeiying2004@yahoo.com.cn

### Abstract

The genera *Leiopus* Audinet-Serville, 1835 and *Acanthocinus* Dejean, 1821 are redescribed. New morphological differences at the generic level are described, and the importance of genitalia characters in taxonomy at both species and generic level is emphasized. *Carinopus* **subgen. nov.** in *Leiopus* is described from mainland China and Taiwan. *Acanthobatesianus* **subgen. nov.** in *Acanthocinus* is described from China, the Korean peninsula and Japan. *Leiopus* (*Carinopus*) *campbelli* (Gressitt, 1937) **comb. nov.** is transferred from *Acanthocinus*, and *Acanthocinus* (*Acanthobatesianus*) *guttatus* (Bates, 1873) **comb. nov.** from *Leiopus*. Six new species of *Leiopus* from China are diagnosed, described, and illustrated: *L. nigropunctatus* **sp. nov.**, *L. flavomaculatus* **sp. nov.**, *L. ocellatus* **sp. nov.**, *L. nigrofasciculosus* **sp. nov.**, *L. holzschuhi* **sp. nov.** and *L. multipunctellus* **sp. nov.** Redescriptions of *L. kharazii* Holzschuh, 1974, *L. albivittis albivittis* Kraatz, 1879, *L. stillatus* (Bates, 1884), *L. (Carinopus) shibatai* Hayashi, 1974, *L. (Carinopus) fallaciosus* Holzschuh, 1993, *L. (Carinopus) campbelli* (Gressitt, 1937) **comb. nov.** and *Acanthocinus* (*Acanthobatesianus*) *guttatus* (Bates, 1873) **comb. nov.** are added. A key to the generic and subgeneric levels of *Leiopus* and *Acanthocinus*, and a dichotomous key to all six new species of *Carinopus* **subgen. nov.** (*Leiopus* str.) from China, are provided.

**Key words:** Taxonomy, Cerambycidae, Lamiinae, Acanthocinini, *Leiopus*, *Acanthocinus*, China, Asia

### Introduction

The genus *Leiopus* Audinet-Serville, 1835, previously consisted of 16 species in the Palearctic Region (Löbl & Smetana 2010). The only species, so far, recorded from China were: *L. fallaciosus* Holzschuh, 1993, *L. albivittis* Kraatz, 1879, *L. guttatus* Bates, 1873, *L. stillatus* (Bates, 1884) (Hua 2002; Löbl & Smetana 2010), and *L. shibatai* Hayashi, 1974 (Hayashi 1974, Hua 2002). Two more species were described from Japan: *L. montanus* Hayashi, 1968 and *L. masaoi* Tamura & Tamura, 1992. As a result of the described species and new combinations in the present work, the genus *Leiopus* now contains a total of 22 species from the Palearctic region.

Seventeen species of the genus *Acanthocinus* Dejean, 1821, are known from the Palearctic region (Löbl & Smetana 2010). Eight species are recorded from mainland China (Table 1) and one from the island of Taiwan. *A. aedilis* (Linnaeus, 1758) and *A. griseus* (Fabricius, 1792), have the widest distribution, from Europe to the far east of Russia, China and the Korean peninsula (Löbl & Smetana 2010). Two more species are recorded from Japan (Table 1). In addition, *A. hutacharerae* H. Makihara, 1986, was described from the Oriental Region (cf. Hasegawa 1997), and *A. annamensis* Pic, 1925, is known from Vietnam (Breuning 1963).

Lingafelter & Micheli (2009) state that the tribe Acanthocinini is taxonomically confusing, and that many genera in the New World are in need of revision. This is certainly true for many genera of the tribe Acanthocinini in the entire Holarctic Region. The problems are due to unclear descriptions on the generic level as well as descriptions of many new species. Studies of male genitalia characters are not included in most papers. Therefore, many keys (e.g. Gressitt 1951; Breuning 1978; Bílý & Mehl 1989; Bense 1995; Linsley & Chemsak 1995; Ehnström & Holmér 2007) are partly incomplete in regards to separating species of the genera *Acanthocinus* and *Leiopus* from the Holarctic and Oriental Regions.

In this paper we redescribe the genera *Leiopus* and *Acanthocinus* including genitalia characters, and describe six new *Leiopus* species from China. In addition, some of the previously known *Leiopus* and *Acanthocinus* species from China are redescribed with genital characters. Finally, we evaluate the Asian species in these two genera, introduce new combinations (ICZN 1999), and describe the subgenera *Acanthobatesianus* **subgen. nov.** (genus *Acanthocinus*) and *Carinopus* **subgen. nov.** (genus *Leiopus*).

## Material and methods

### Genitalia characters:

The sclerotized parts of the male genitalia (including the aedeagus, the sclerites inside the internal sac, parameres and tergite VIII) were used to describe the new species. We also examined the sclerotized part of the spermatheca. The method is described in detail in a previous publication by Wallin *et al.* (2009). The spermathecae were embedded in 100% glycerol and photographed using a regular light microscope. These microscopic characters are species-specific and have been used to identify new Palearctic species of *Leiopus* (Sama 1985, 1994; Wallin *et al.* 2009), as well as other Lamiinae (Weigel & Skale 2009; Lin *et al.* 2009).

### List of abbreviations:

CAU	China Agricultural University, Beijing, China
CCCC	Collection of Changchin Chen, Tianjin, China
CCH	Collection of Carolus Holzschuh, Villach, Austria
CHW	Collection of Henrik Wallin, Uppsala, Sweden
CSL	Collection of Stig Lundberg, Luleå, Sweden
CTK	Collection of Torstein Kvamme, Ås, Norway
CUN	Collection of Ulf Nylander, Gävle, Sweden
HBU	Hebei University, Hebei, China
IZAS	National Zoological Museum of China, Institute of Zoology, Chinese Academy of Sciences, Beijing, China
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NHRS	The Swedish Museum of Natural History, Stockholm, Sweden
NMT	National Museum of Natural Science, Taichung City, Taiwan
OMNH	Osaka Museum of Natural History, Japan
SHEM	Shanghai Entomological Museum, Shanghai, China
TARI	Taiwan Agricultural Research Institute, Taichung, Taiwan
USNM	National Museum of Natural History, Smithsonian Institution, Washington D.C., USA

### Examined material:

Forty-nine specimens of the new species of *Carinopus* **subgen. nov.** were examined, and 137 specimens of *Leiopus* spp. and *Acanthocinus* spp. from Asia, North America and Europe were also examined. A few specimens were examined by photos only, where specific statements are given.

*Leiopus albvittis albvittis* Kraatz, 1879

Russia: 1 male, Far East, Primorie, Kavalerova reg. Luzhki village, 1997.06.25, CHW; 1 female, Far East, Promorsky Region, Ussurijsk, 1979.06.14, leg. S. Muzzin, CCH. China: 2 males and 2 females, Heilongjiang (new record), Yabuluoni, 1940.07.12, IZAS; 1 female, Heilongjiang (new record), Dailing, Liangshuigou, 1956.07.18, IZAS; 2 males and 4 females, Liaoning (new record), Gaolingzi, 1941.07.06, IZAS.

*Leiopus albvittis malaisei* Aurivillius, 1928

Russia: **HT** (male), labelled "Kamtschatka" leg. Malaise, Type No. 5958 E94, NHRS.

*Leiopus (Carinopus) campbelli* (Gressitt, 1937) **comb. nov.**

China: **HT** (male), (type no. 52181), Hong Shan, altitude 1000 m, SE Kiangsi (=Jiangxi), Central China, 1936.06.29, leg. J.L. Gressitt, USNM.

*Leiopus fallaciosus* Holzschuh, 1993

China: **HT** (female), CE Fujian, Shaowu env., 1991.07.05–10, leg. C. Holzschuh, CCH; 1 female, CE China, Jiangxi, W. Jinggang Shan, Ciping, 1994.07.02–14, leg. E. Jendek & O. Šauša, CCH; 1 male and 1 female, Fujian, Meihuashan (no dates supplied on labels), IZAS; 1 male and 2 females, Guangdong, Nanling baohuzhan, 2009.05.08, leg. Gao Lei, IZAS.

*Leiopus kharazii* Holzschuh, 1974

Iran: 1 male, Mazandaran, 5 km east of Nowshahr, altitude 100–400 m, 1977.06.04–08, leg. C. Holzschuh, CHW; 1 male, Mazandaran, 5 km east of Nowshahr, altitude 100–400 m, 1977.06.04–08, leg. C. Holzschuh, CHW; 1 female, Mazandaran, 5 km east of Nowshahr, altitude 100–400 m, 1977.06.04–08, leg. C. Holzschuh, CHW.

*Leiopus masaoi* Tamura & Tamura, 1992

Japan: 1 female, Jozankei, Sapporo Prefecture, 1991.07, leg. T. Kvamme, CTK.

*Leiopus montanus* Hayashi, 1968

Japan: 1 male, Mt. Fuji, northern slope, altitude 1750 m, 1975.07.29, leg. Z. Komiya, det. Z.K. Hayashi, CUN; 1 female, Mt. Fuji, northern slope, altitude 1750 m, 1975.07.29, leg. Z. Komiya, det. Z.K. Hayashi, CUN.

*Leiopus shibatai* Hayashi, 1974

Taiwan: 1 male, Taitung, Siangyang, 2007.06.17, leg. Y.L. Lin, TARI; 1 **PT** female, Taiwan, Lishan, Nantou Paef, 1972.07.13, leg. T. Mizunuma, det. M. Hayashi, OMNH (photos examined); 1 female, Taiwan, Nantou county, Zhushanzhen, Shanlinxi, altitude 1600 m, 2008.08.28, IZAS.

*Leiopus stillatus* (Bates, 1884)

Russia (Siberia): 1 male, Ussuri reg. 1990.07, CUN; 1 female, Primorje, Kaměnuška, 1989.07.27, CHW. Japan: 1 male, Marumna, Suma, 1987.07, CUN; 1 male, Yunohana Spa, Fukushima Prefecture, 1972.06.11, leg. T. Shimomura, CCH; 1 female, Mt Hotaka, Grunma Prefecture, 1972.08.06, leg. T. Shimomura, CCH; 1 male, Hinoemata, Fukushima Prefecture, 1982.07.20, leg. A. Nishiiyama, CHW. China: 1 female, Jilin, Weishahe, 1939.07.10, IZAS.

*Acanthocinus aedilis* (Linnaeus, 1758)

Sweden: 1 male, Province of Västerbotten, Lycksele Lappmark, 2009.06.09, CHW; 2 females, Province Uppland, Järlåsa, 1973.05.15, CHW. China: 4 males and 1 female Heilongjiang, Haerbin, 1920s, IZAS; 3 males and 1 female, Heilongjiang, Yichun, 1956.05.08–30, IZAS; 2 males and 3 females, Heilongjiang, Dailing, host: *Pinus sylvestris* var. *mongolica* Litv. 1956.05, IZAS; 23 males and 10 females, Heilongjiang, Dailing, Liangshuigou, 1957.05.14–07.08, IZAS; 2 males, Heilongjiang, Jiamusi, 1970.08.23, IZAS; 1 male, Jilin, Weishahe, 1938.09, IZAS; 6 males, N.E. China, Tschita, 193?, leg. V.J. Tolmachov, IZAS; 2 males and 2 females, Shandong, Tsingtao, 1937.08, leg. V.J. Tolmachov, IZAS.

*Acanthocinus carinulatus* (Gebler, 1833)

China: 1 male, Hebei, Weichang county, Chazilinchang, 1998.08.07, leg. Li Zhe, HBU; 1 male, Hebei, Qinglong county, Linchang, 1998.07.23–26, leg. Ren Qiuzhuang, HBU; 1 female, Hebei, Pingquan county, Guangtoushan, 1998.08.02, leg. Li Zhe, HBU.

*Acanthocinus chinensis* Breuning, 1978

China: **HT** (female), (type no. EC 1802), Prov. Kiangsu, Shanghai, 1932.09.18, MNHN (photos examined).

*Acanthocinus elegans* Ganglbauer, 1884

Iran: 1 female, Mazendaran Prov., env. Sari, Alamdardeh, 2008.04.17, reared from *Carpinus betulus*, CHW.

*Acanthocinus griseus* (Fabricius, 1792)

Sweden: 1 male and 1 female, Marma (Älvkarleby), Province of Uppland, 1998.05.22 (reared from *Pinus sylvestris*), leg. H. Wallin, CHW. China: 1 male and 1 female, Heilongjiang, Dailing, Liangshuigou, 1957.06.15, leg. He Zhong, IZAS; 1 male and 1 female, Liaoning, Gaolingzi, IZAS; 1 male and 1 female, Jilin, Fusong, 1956.05.18, IZAS; 1 male and 1 female, Hebei, Xiling (West Tomb), 1972.08.10, leg. Zhang Baolin, IZAS; 1 female, Beijing, Haidian, Qiwangfen, 1992.07, leg. Hu Sunhuan, IZAS.

*Acanthocinus (Acanthobatesianus) guttatus* (Bates, 1873) **comb. nov.**

Japan: 1 male and 1 female, Kanazawa-bunko, Yokohama, 1969.06.15, leg. K. Akiyama, det. Z. Komyia, CUN; 1 male and 1 female, Rokkoku-Tôge, Kanagawa Prefecture, 1976.06.17, leg. T. Shimomura, CCH.

*Acanthocinus hutacharerae* H. Makihara, 1986

Laos: 1 male and 1 female, NE-Laos, Xieng Khoang prov., Phonsavan env., Phu Padaeng, 19°27'N 103°13'E, altitude 1150 m, ex larva in *Pinus*: 2007.06.02–15, leg. C. Holzschuh, CCH. Thailand: 1 male, NW Thailand, Chiang Mai, Samoeng, 1985.08.26, native collector, CCH; 1 female, N. Thailand, Prov. Mae Hong Son, SE der Paßhöhe zwischen Pai und Soppong, altitude 1250 m, 19°26'17"N 98°19'53"E, 2000.04.22, Lichtanflug, leg. H. & R. Rausch, CCH. This species was described from Thailand (Makihara 1986). Male genitalia description in Hasegawa (1997).

*Acanthocinus obliquus* (Le Conte, 1862)

USA: 1 male and 1 female, California, Sacramento, Blodgett Experimental Station, 1986.06, CHW.

*Acanthocinus orientalis* K. Ohbayashi, 1939

Japan: 1 male and 1 female, Jozankei, Sapporo Prefecture, 1991.07, leg. T. Kvamme, CTK.

*Acanthocinus pusillus* Kirby, 1837

Canada: 1 male, Quebec, Blainville, 2009.07.15, CHW.

*Acanthocinus reticulatus* (Razoumowsky, 1789)

Czech Republic: 1 male and 1 female, Moravia, Adamov, 1976.05.10, leg. Ing. Sekera, CHW.

*Acanthocinus sinensis* Pic, 1916

China: 1 male, Yunnan, Yongsheng, host plant: *Pinus yunnanensis*, 1955.04.23, IZAS; 1 female, Yunnan, Xiaozhongdian, altitude 3800 m, 1984.08.01, leg. Wang Shuyong, IZAS; 1 male, Xizang, Chayu, altitude 2300 m, 1973.07.02, IZAS; 1 male, Xizang, Chayu, Xituo, altitude 2200 m, 1973.07.08, leg. Huang Fusheng, IZAS; 1 male, Xizang, Chayu, Shama, altitude 1600 m, light trap, 1973.07.20, leg. Huang Fusheng, IZAS; 1 male, Xizang, Bomi, altitude 2700 m, 1973.06.11, leg. Huang Fusheng, IZAS; 1 male, Xizang, Bomi, altitude 2750 m, 1982.08.26, leg. Han Yinheng, IZAS.

The original descriptions (see Table 1 and reference list), and additional literature (Gressitt 1951; Breuning 1978; Lee 1982; Cherepanov 1991; Ohbayashi, Satô, & Kojima 1992; Hua 2002; Ohbayashi & Niisato 2007; Hua *et al.* 2009) were consulted.

## Taxonomy

Most *Leiopus* spp. from China, including all new species, are moderately-sized, sub-depressed, and the elytra are moderately elongated (about 2 to 3 x longer than wide). The new species are characterised by the presence of 4–5 longitudinal raised costae on the anterior 2/3 of the elytra, and a strong tufted ridge near the base of each elytron. The only species of *Leiopus* occurring outside China with costate elytra (to some extent) is *L. kharazii* (from Azerbaijan and Iran) but this species entirely lacks a tufted ridge near the base of the elytra, and none of the medial costae have tufts of longer pubescence. The sclerites inside the internal sac in all new species are robust, strongly developed, and fork-like in shape, and are contained in a sac with a distinct micro-reticulation (Figs 34–45). *L. stillatus* and *L. albivittis* are recorded from China and adjacent countries, and correspond to the remaining Palearctic species which lack longitudinal raised costae on the elytra. Information below on distribution is based on Löbl & Smetana (2010), unless otherwise stated.

### The genus *Leiopus* Audinet-Serville, 1835

#### Subgenus *Leiopus* Audinet-Serville, 1835

**Redescription:** Antennae in males up to twice as long as body, antennomeres II–V not fimbriate beneath (may have a few sub-erect hairs). The prosternal process mostly relatively narrow, often less than half as wide as mesosternal process. Lateral spines placed near or a little behind the middle (as in *Acanthocinus*). Elytra with appressed pubescence, the lateral elytral margins straight the first ½ and thereafter evenly curved toward outer apical angle, giving the appearance of less elongated elytra. Elytra sub-depressed and often curved from ¾ towards apex (seen from the side). Costae at best weakly developed. Each elytron at the base with a weak swelling. Legs short compared to *Acanthocinus* spp. Hind tarsi stout, with tarsomere I up to 1.4 x as long as tarsomeres II & III combined. Femora slender to slightly swollen. Male genitalia with elongated parameres: well separated along inner margin, base of tegmen narrow and distinctly bent on the middle, anterior margin of tergite VIII evenly curved or weakly notched. The sclerites inside the internal sac very short and vary in shape, but usually form a shaft with or without a distinct head (cf. Sama 1985). Prosternal process usually quite narrow, often less than half as broad as mesosternal process. Entire spermatheca well sclerotized, relatively short (approx. 0.4 to 0.6 mm long, as measured diagonally the longest distance from the base to the tip of the head) and weakly or acutely curved with a distinctly rounded or sharp head, but without any trace of a secondary shaft or “curl” connected to the head. The apex of sternite VII in females mostly straight but sometimes curved or, rarely, notched in the middle. Ovipositor very short, yellow to brown, and protruding only slightly beyond the last visible sternite.

**Type species:** *Leiopus nebulosus* (Linnaeus, 1758), type designation by Thomson (1864).

#### The Asian species of *Leiopus* subgenus *Leiopus*

**Redescriptions:** The following redescriptions mainly include the hitherto undescribed male genitalia and spermatheca.

The details of the nomenclature are summarized in Table 1 and not under each species.

#### *Leiopus kharazii* Holzschuh, 1974

Figs. 1, 2, 41, 48, 57, 71, 85.

The combination of very fine and slender antennae, large eyes and brownish colour is unique to this species. The elytra have a transversal, oblique whitish band on the middle, followed by large spots, which form an oblique band below the middle. There are 4 relatively weak costae on each elytron, with short whitish pubescence and small dark brown spots. A weak swelling between shoulder and scutellum on each elytron sometimes forms a very weak ridge. Elytra densely covered with coarse punctures. Pronotum without tubercles, and covered with relatively fine and dense punctures. The lateral spines located a little below the middle, similar to the European species *L.*

*nebulosus* L. The spines acutely narrowed towards the edges, almost “needle sharp”, and projecting slightly backwards. The presence of longitudinal costae on elytra (although weak), and a swelling near base of elytra, constituting a resemblance with many species from China. The distal sclerites inside the internal sac unique to *L. kharazii*, and the aedeagus, parameres and spermatheca resembling those of *L. syriacus* (Ganglbauer, 1884), instead of the Chinese species of *Carinopus* **subgen. nov.** Two other characters separate *L. kharazii* from *Carinopus* **subgen. nov.**: the first tarsal segment of hind legs much shorter than the remaining segments combined, and the last visible sternite very short. *L. kharazii* represents a species with an extended geographical southern distribution from SE Europe to the Middle East. Examined males: length 8.5–9.0 mm, width 2.5–3.0 mm; female: length 9.0 mm, width 3.0 mm. **Aedeagus:** Approx. 1.5 mm long, relatively slender, narrowed and strongly curved towards apex, dorsal ridge as wide as ventral ridge (Fig. 57). The crescent-shaped sclerites at the proximal end of the basal segment very fine and rounded, and the two median short sclerites inside the internal sac forming a less sclerotized and folded structure and a very short curved sclerite; surrounding intersegmental membrane with very fine, square-shaped micro-reticulation (Fig. 41). **Tegmen:** Approx. 1.8 mm long, parameres slender and flattened dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 71). Apex evenly rounded along entire posterior margin (sharp in *L. syriacus*), with fringes of short, yellowish hairs well concentrated at edge of apex. No micro-reticulation on parameres. Base of tegmen, at lower part of median lobe, extended and weakly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.8 mm long, with fine, yellowish pigmentation, more or less elongated and rounded at the posterior margin (with no trace of a concave or notched posterior margin as in *L. syriacus*), and covered with short, very fine yellowish hairs distally towards the posterior margin (Fig. 85). Surface with weak micro-reticulation medially. **Spermatheca:** Yellow to brown, relatively long, widened at base, and curved almost 90° towards apex (Fig. 48). Apex with an elongated head, similar in shape to *L. syriacus*.

**Remarks:** Known from Iran and Azerbaijan but the species may have a wider distribution. Reared from small branches of *Tilia* sp. in Iran.

### *Leiopus albivittis albivittis* Kraatz, 1879

Figs. 3, 4, 58, 72, 86.

The smallest of the Asian species of *Leiopus* (Figs 3–4). Body length similar to the smallest European species *L. femoratus* Fairmaire, 1859. Integument of entire body black. Colour pattern on pronotum and elytra resemble small specimens of the European species *L. punctulatus* Paykull, 1800. Elytra with short black pubescence interrupted by a grey, horizontally placed V-shaped marking medially and a narrow greyish band near apex (but not reaching apex as in *L. punctulatus*). Elytra smooth and not costate, with a complete lack of tufted tubercles. Anterior part of each elytron between scutellum and humeri with a small raised area or rounded crest with coarser punctures (remaining punctures on elytra fine and sparse). Pronotum only slightly wider than long, without anterior tubercles (pronotum in *L. punctulatus* has distinct tubercles), with weak, whitish or grey pubescence at the base of the very small lateral spines. Last abdominal segment in male rounded or slightly convex. Ovipositor not elongated and with a rounded apex. The small size, black integument, colour patterns on elytra, lack of costae and tufted tubercles on elytra easily separating this species from all other species of *Leiopus* from China. The male genitalia characters similar to the European species *L. punctulatus* (cf. Sama, 1985). Examined male: length 6.0 mm, width 2.0 mm; female: length 6.8 mm, width 2.3 mm. **Aedeagus:** Approx. 1.0 mm long, relatively slender, narrowed and strongly curved towards apex, dorsal ridge as wide as ventral ridge (Fig. 58). The U-shaped sclerites at proximal end of basal segment fine, and the median sclerite inside the internal sac forming a short straight shaft (approx. 0.1 mm long) narrowing at either end; surrounding intersegmental membrane with very fine, rounded micro-reticulation. The median sclerite inside the internal sac shorter and the intersegmental membrane with a much finer micro-reticulation than in the closely related European species *L. punctulatus*. **Tegmen:** Approx. 1.1 mm long, parameres slender and slightly flattened dorso-ventrally at apex, well separated medially along inner margin but curved inwards at apex (Fig. 72). Parameres with a dorsally longitudinal ridge. Apex evenly rounded along entire posterior margin, with fringes of short, yellowish hairs well concentrated at edge of apex. No micro-reticulation on parameres. Base of tegmen extended and strongly curved dorso-ventrally towards the middle. **Tergite VIII:** Approx. 0.5 mm long, dark brown with posterior margin forming a straight line (Fig. 86), covered with short, very fine brownish hairs distally towards the posterior margin. Surface with no micro-reticulation. **Spermatheca:** Brownish, relatively short,

widened at base, and acutely curved (folded 90°) towards apex. Apex with an elongated head. Similar in shape to *L. syriacus* and *L. kharazii* but differing from the closely related *L. punctulatus*, since the spermatheca in the latter species short and almost straight i.e. not evenly curved.

**Remarks:** This species has a wide distribution in the eastern parts of the Palaearctic region from Russia, West Siberia (Ural) to Mongolia, South Korea and Jilin, Liaoning (new record) and Heilongjiang (new record) Provinces of NE China.

### *L. albivittis malaisei* Aurivillius, 1928

This subspecies is only known from Russia (Kamtschatka) and is not included in the present redescriptions.

### *Leiopus stillatus* (Bates, 1884)

Figs. 5, 6, 43, 59, 73, 87.

A large, elongated, greyish species with numerous black spots (Figs 5–6), most similar to the Japanese species *L. montanus* and *L. masaoi*. Integument of body mostly black, with brown antennae and legs. Elytra with 4–5 weakly to relatively strongly developed costae, but no tufted tubercle. Anterior part of elytron (between scutellum and humeri) has a small, weakly raised area or weak crest with black pubescence. Large, black spots on elytra more numerous along costae. Punctuation fine and dense on entire elytra. Elytra with a transversal, oblique to distinctly black band below middle. Pronotum wider than long, with or without anterior and median tubercles, and only weakly supplied with greyish pubescence and more or less glabrous medially. Lateral spines on pronotum placed a little below middle. Sternite VII in male rounded and slightly convex. The posterior margin of the sternite VII in female sharp (rounded in *L. montanus*). Examined males: length 11.0 mm, width 3.0 mm; female: length 8.0 mm, width 2.5 mm. **Aedeagus:** Approx. 2.0 mm long, relatively slender, narrowed and weakly curved towards apex (acutely curved in *L. monatus*), dorsal ridge as wide as ventral ridge, with a longitudinal furrow (Fig. 59). The sclerites at proximal end of basal segment are large, and the median fork-like sclerite inside the internal sac fine; surrounding intersegmental membrane has square-shaped micro-reticulation (Fig. 43). Median fork-like sclerite inside the internal sac more similar to *L. monatus* (Fig. 42) than any other *Leiopus* species. **Tegmen:** Approx. 2.0 mm, parameres robust, and only weakly flattened dorso-ventrally at apex (Fig. 73), well separated medially along inner margin but curved inwards at apex (short and slender in *L. monatus*). Apex evenly rounded along entire posterior margin, with fringes of short, brownish hairs well concentrated at edge of apex with single hairs medially. Entire surface of parameres granulated. Base of tegmen extended and strongly curved dorso-ventrally towards the middle, and acutely curved at base of parameres. **Tergite VIII:** Approx. 1.0 mm long, dark brown with posterior margin rounded, covered with short, very fine brownish hairs distally towards the posterior margin (Fig. 87). Surface with very weak micro-reticulation. **Spermatheca:** Yellowish, relatively short, widened at base, and strongly curved about 45° towards apex. Apex with an elongated head similar in shape to *L. flavomaculatus* **sp. nov.**

**Remarks:** The combination of large size, elongated body, uniform grey pubescence, black-spotted elytra and lack of tufted tubercles on elytra, easily separates this species from all other species of *Leiopus* from China. The male genitalia characters are similar to all other examined species of *Leiopus* but not *Acanthocinus*. This species has a wide distribution in the eastern part of the Palaearctic Region from Far East Russia to the Korean peninsula, Japan and China. In China it has a wide distribution, from Heilongjiang and Jilin Provinces in NE China, Hebei Province in N China to Jiangxi and Zhejiang Provinces in CE China.

### The subgenus *Carinopus* subgen. nov. (genus *Leiopus*)

**Description:** Antennae longer than body, antennomere XI shorter than antennomere X. The width of pronotum (measured between the edge point of each spine) slightly narrower than the maximum width of elytra at base. Pronotum with 3–5 raised tubercles. Lateral spines placed a little behind middle, short and pointing upwards or backwards. Elytra without sub-erect hairs. Humeri not projecting. Elytral apex rounded, with 4–5 longitudinally

raised costae on basal 2/3, often with tufts of short hairs and a strongly pubescent ridge near base of each elytron (between shoulder and scutellum). Metafemora almost extended to base of sternite VII; hind legs much longer than fore legs. Tibia longer than femora; hind tarsi long and slender, tarsomere I 1.5–2 x as long as tarsomere II & III combined and as long as the subsequent four tarsomeres combined (excluding the claw). Last tarsomere (including the claws) strongly elongated, as long as or longer than tarsomere II & III combined. Aedeagus with ventral and dorsal ridges of the same width. The sclerites inside the internal sac robust and strongly developed, fork-like in shape, and enclosed in a sac with very distinct micro-reticulation.

**Type species:** *Leiopus (Carinopus) holzschuhi* sp. nov.

**Etymology:** The name *Carinopus* is a combination of parts of the word *carinae* and the name *Leiopus*.

### The new species in *Carinopus* subgen. nov.

#### *Leiopus (Carinopus) nigropunctatus* sp. nov.

Figs. 7, 8, 28, 35, 49, 60, 74, 88.

**Type locality:** China, C-Sichuan, Tianquan, Luding.

**Holotype:** Female (body length 11.4 mm, width 3.6 mm), China, C-Sichuan, altitude 3000 m pass, Tianquan, Luding, N 29°51' 44", E 102°16' 48", 2002.06.07, leg. M. Janata, CCH with identity = 1.121.

**Paratypes:** 1 male, China, Guizhou, Fanjingshan, 4500bu, altitude 1775 m, N 27°54.097', E 108°42.228', 2009.06.26, leg. Lin Wenhsin, IZAS, IOZ (E) 1859258. 1 female, Sichuan, Wolong, 2004.08.06–07, leg. Yang Xiujuan, Hua Huiran, HBU. 1 male and 1 female, China, Prov. Sichuan, Tianquan, Labahe, altitude 2060 m, 2007.07.29, leg. Liu, Zhang, Zhou, Bi, SHEMA; 1 female, Sichuan, Baoxing, Fengtongzhai, 2004.08.01–03, leg. Yang Xiujuan, Hua Huiran, HBU. 1 female, Guangxi, Miaoshan, altitude 1200–2100 m, 1979.06.25–26, leg. Du Shaokun, IZAS, IOZ (E) 1859442.

#### Description:

**Female:** Form strongly elongated with elytra about 3 x longer than wide (Fig. 8). Integument black with very coarse punctures. Elytral colour pattern of pubescence and the numerous black spots interrupted by the wide black band. **Head:** Covered mostly with sparse yellowish appressed pubescence, but to some extent also with whitish pubescence towards clypeus. Frons wide and protruding. The distance between the lower lobes of eyes about 5 x the width of one lower eye lobe. **Antenna:** Covered with dense, appressed, black pubescence, interrupted by whitish pubescence at base to ½ on antennomeres I–VI and confined to about 1/3 on antennomeres VII–XI. Ground colour on basal part of all antennomeres brownish and black towards apex. Antennomere III 1.2 x longer than antennomere I. Antennae extending beyond apices by 3.5 antennomeres (only in the female). Antennal scape extending almost to the posterior margin of pronotum. Basal 4 antennomeres with a few short, erect, brown setae ventrally. **Eye:** Lower eye lobe (below scape) slightly shorter than gena below it. **Mouthparts:** Frontoclypeal margin with a fringe of short pubescence and long, suberect hairs (only one, very long, suberect hair present on the HT). Clypeus glabrous except at base. Labrum with appressed yellowish pubescence and 6 long, suberect, brownish setae. **Thorax:** Pronotum 1.1 x wider than long, and slightly wider at the anterior margin than at base. Pronotum with 5 raised dorsal tubercles: 1 elongated oval tubercle at the middle, bordered by 2 anterolateral tubercles and 2 weak posterolateral tubercles. All raised pronotal tubercles more or less glabrous medially. Pronotum covered in appressed pubescence which is mostly brown, but white towards spines and at base. The posterior part of pronotum near the base of lateral spine with a single sub-erect brownish hair. Punctuation much finer than on elytra (each puncture about ½ the size of those on elytra). Lateral spines short and pointing upwards. Pronotum slightly wider at the anterior margin than at base. Scutellum black with a weak longitudinal white band, broadly rounded posterior. Prosternum with intercoxal process narrow, mesosternal process about twice as broad as prosternal process. Mesosternal process between mesocoxae only about half the width of mesocoxa. **Elytra:** Covered with a combination of appressed white and grey pubescence with two irregular white bands, one before and one below middle. The strongly elongated elytra about 3 x longer than wide. Elytra completely lack erect hairs, entirely covered with numerous blackish spots (consisting of small tufts of black hair) and sub-medially with a distinct, blackish, transversal band (interrupted before the suture). The coarse punctures on the elytra evenly distributed towards epipleuron but weaker near apices. The distance between the punctures medially about the



width of one puncture. Elytra costate to 2/3 of elytral length with tufts of black hair on a strongly pubescent ridge near base (between shoulder and scutellum). There are 3 elevated longitudinal costae on each elytron, with the first costa (near suture) being interrupted near basal crest, followed by a sub-depressed area towards base. The area between costae 1 and 2 elevated medially, giving the appearance of a flattened ridge across the transversal black band medially (interrupted near the suture and broken up in separate maculae on the epipleura). Epipleuron covered with a combination of appressed white to greyish and blackish pubescence and scattered black spots, only visible in lateral view. **Legs:** Covered with black and white pubescence with appressed setae; posterior part of femora and middle part of tibia white. Tarsi generally covered at base of each tarsomere with short, appressed, white and black pubescence; apex of tarsomeres darker. Last tarsomere, on all legs, longer than tarsomeres II & III combined. **Abdomen:** Ventrites covered with appressed, white pubescence, becoming denser laterally and along the posterior margins. Sternite VII 1.6 x longer than broad (at base), narrowed and strongly extended at middle, with a distinct glabrous midline at base (Fig. 28). The posterior margin of sternite VII strongly concaved (or notched) and densely covered with numerous fine, yellowish, long hairs, mixed with a few longer, brownish setae. **Spermatheca:** Yellow to brown, relatively short and stout, widened at base, and acutely curved towards apex (Fig. 49). Apex has a weakly elongated head. Body length 9.5–11.4 mm, width 3–3.6 mm.

**Male:** Form (Fig. 7) similar to female but elytra even more elongated (3.5 x longer than wide) than those in the female. Antennae extending beyond apices by 4.5 antennomeres. Pronotum covered with extensive grey pubescence, the black transversal band reduced to a rectangular spot medially on each elytron, and the irregular white bands reduced to the epipleuron in one PT male. **Aedeagus:** 2.0–2.7 mm long and slender, acutely curved and narrowed towards apex, forming a narrowly rounded apex (Fig. 60). The crescent-shaped sclerites at proximal end of basal segment relatively broad, and median fork-like sclerite inside the internal sac strongly developed; surrounding intersegmental membrane with very coarse, rounded or oval-shaped micro-reticulation (Fig. 35). **Tegmen:** 2.2–2.6 mm, weakly flattened dorso-ventrally (lateral margin with a longitudinal ridge), only separated medially along inner margin near base (Fig. 74). Apex evenly rounded along entire posterior margin, with fringes of short, yellowish hairs well concentrated at edge of apex. Parameres in one PT male are shorter, and stouter, than those shown in Fig. 74. Base of tegmen extended and strongly curved dorso-ventrally on middle. Tergite VII broadly rounded, middle slightly concaved, entire surface covered with light brown hairs. Posterior margin of sternite VII deeply notched. **Tergite VIII:** 1.0–1.1 mm long, yellowish with brownish pigmentation concentrated medially and along the posterior margin, broadly rounded and covered with short, yellowish hairs distally towards the posterior margin (Fig. 88). Surface shining with very weak micro-reticulation. Body length 10.5 mm, width 3.3 mm.

**Remarks:** The strongly elongated elytra, and the combination of very coarse punctures on elytra, elytral colour pattern of pubescence and the numerous black spots interrupted by the wide black band on the posterior part, make this species easy to identify. Other distinctive characters include the relatively short antennae (extending beyond apices by 3.5 antennomeres in the female and by 4.5 antennomeres in the male), last tarsomere longer than tarsomeres II & III combined, and the punctuation of pronotum medially which is much finer than the punctuation on the elytra. This species has been collected in Sichuan, Guizhou and Guangxi Provinces of SW China at the altitude of 1200–3000 m (Fig. 99).

**Etymology:** The Latin name refers to the numerous black spots on the elytra.

### *Leiopus (Carinopus) flavomaculatus* sp. nov.

Figs. 9, 10, 29, 36, 50, 61, 75, 89.

**Type locality:** China, Guizhou, Leigong Shan, Leishan-Fangxiang.

**Holotype:** Male (length 7.6 mm, width 2.5 mm) China, Prov. Guizhou SE Kaili, Leishan Co., Leigong Shan, pass Leishan-Fangxiang, N 26°22' 7", E 108°12' 99", altitude 1700 m, 2001.06.14–24, leg. C. Holzschuh, CCH with identity = 1.122.

**Paratypes:** 1 male and 1 female, China, Prov. Guizhou SE Kaili, Leishan Co., Leigong Shan, pass Leishan-Fangxiang, N 26°22' 7", E 108°12' 99", altitude 1700 m, 2001.06.14–24, leg. C. Holzschuh, CCH.

### **Description:**

**Male:** Form subcylindrical, weakly elongated (Fig. 9). Pronotum and elytra with dark brown pubescence, combined with extensive ochraceous maculae. **Head:** Mostly covered with sparse, ochraceous pubescence. Frons

wide and protruding. The distance between the lower lobes of eyes about 5 x width of one lower eye lobe. **Antenna:** Covered with dense, appressed, brown pubescence, interrupted by whitish pubescence at base to 1/3 on antennomeres. Ground colour on basal part of all antennomeres light brownish, and darker towards apex. Antennomere III 1.2 x longer than antennomere I. Antennae much longer than body: extending beyond elytral apices by 5 antennomeres. Antennal scape extending to posterior 1/3 or 1/4 of pronotum. Basal 4 antennomeres with a few short erect brown setae ventrally. **Eye:** Lower eye lobe (below scape) slightly shorter than gena below it. **Mouthparts:** Fontoclypeal margin with a fringe of brownish hairs; clypeus glabrous except at base. Labrum has 8 long, suberect, brownish setae. **Thorax:** Pronotum 1.1 x wider than long, but not wider at the anterior margin than at base. Pronotum with 3 weakly raised dorsal tubercles: 1 elongated oval tubercle at middle, surrounded by 2 anterolateral tubercles. All raised pronotal tubercles more or less glabrous medially (with the dark brown integument exposed). Pronotum covered with appressed brownish pubescence, interrupted with a longitudinal ochraceous band on each side towards the base of the lateral spines. The posterior part of pronotum near the base of lateral spine bearing a few sub-erect brownish hairs. Punctuation finer than on elytra. Lateral spines short and point upwards. Scutellum dark brown, with a weak longitudinal ochraceous band; broadly rounded posterior. Prosternum with intercoxal process narrow, mesosternal process about twice as broad as prosternal process. Mesosternal process between mesocoxae less than half the width of mesocoxa. **Elytra:** Covered with a combination of appressed brown and irregular ochraceous pubescence scattered on the entire surface, forming more prominent maculae medially, laterally (on epipleuron) and near apex (especially in the female). Elytra costate to slightly more than 2/3 of elytral length, not extending to apical margin. The inner costa with tufts of black hair on a short, strongly pubescent ridge near base (between shoulder and scutellum). Each elytron bearing 3 elevated longitudinal costae with the first costa (near suture) being interrupted near basal crest followed by a sub-depressed area towards base. The area between costae 1 and 2 elevated medially. The suture and costae covered with brown pubescence interrupted with small ochraceous spots, resulting in a speckled pattern along each costa. The coarse punctures on the elytra concentrated medially up to 2/3 towards apex, and remaining surface covered with finer, widely scattered punctures. Epipleuron covered with a combination of appressed brownish and irregular ochraceous pubescence. **Legs:** Covered with brown to black and white pubescence with appressed setae; middle part of tibia lighter brown with white pubescence, femora dark brown. Tarsi uniformly coated on each tarsomere with short, appressed, brown pubescence. Last tarsomere only as long as tarsomeres II & III combined. **Abdomen:** Ventrites covered with appressed, ochraceous to brown pubescence, becoming denser laterally and along the posterior margins. Tergite VII with posterior margin broadly rounded and entire surface with brown hairs. Posterior margin of sternite VII slightly concave. **Aedeagus:** 1.2 mm, relatively stout, narrowed and acutely curved towards apex, forming a broadly rounded apex (Fig. 61). Lateral margin of aedeagus, near apex, with a distinct convexity (forming a "tooth"). The crescent-shaped sclerites at proximal end of basal segment fine, and median fork-like sclerite inside the internal sac relatively strongly developed; surrounding intersegmental membrane with coarse, square-shaped micro-reticulation (Fig. 36). **Tegmen:** 1.2 mm, acutely curved and flattened dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 75). Apex evenly rounded along entire posterior margin, with fringes of relatively short, yellowish hairs well concentrated at edge of apex. No micro-reticulation on parameres. Base of tegmen extended and slightly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.5 mm long, yellowish to brown with dark brown pigmentation concentrated medially and along the posterior margin, broadly rounded and covered with short, brownish hairs distally towards the posterior margin (Fig. 89). Surface shining medially, with no distinct micro-reticulation. Body length 7.6 mm, width 2.5 mm.

*Female:* Form similar to male, but elytra broader than in the male (Fig. 10). Antennae much longer than body: extending beyond elytral apices by 4.5 antennomeres. Antennal scape extending beyond posterior margin of pronotum. Sternite VII 1.5 x longer than broad (at base), narrowed and strongly extended in the middle, with a weak glabrous midline at base (Fig. 29). The posterior margin of sternite VII strongly concaved (or notched) and densely covered with numerous fine, yellowish, long hairs mixed with a few longer, brownish setae. **Spermatheca:** Yellow to brown, relatively long, widened at base, and acutely curved towards apex (Fig. 50). Apex with a strongly elongated head. Body length 11.5 mm, width 4.1 mm.

**Remarks:** The dark brown pubescence on pronotum and elytra, combined with extensive ochraceous spots and maculae, is unique to this species (Figs. 9, 10).

The aedeagus has a distinct convexity on each lateral side, which forms a tooth near the posterior margin. This character easily separates the males of this species from all other Palaearctic *Leiopus* species. In addition, the very

long antennae, with antennal scape extending beyond posterior margin of pronotum, are a unique feature of females of this species. The spermatheca is large and elongated. The female of this species mostly resembles the female of *L. fallaciosus*, but is recognised by the extensive ochraceous maculae on pronotum and elytra, much coarser punctures on elytra, the slightly longer scape, and shorter and wider ovipositor. The elytra is more elongated with parallel sides towards apex than in *L. fallaciosus*, and the spermatheca in *L. fallaciosus* is not elongated and has a much smaller head. This species has been collected in Guizhou Province of SW China at an altitude of 1700 m (Fig. 99).

**Etymology:** The Latin name refers to the ochraceous or yellowish maculae on the elytra.

***Leiopus (Carinopus) ocellatus* sp. nov.**

Figs. 11, 12, 30, 37, 51, 62, 76, 90.

**Type locality:** China, Shaanxi, Qinling Shan, Xunyangba.

**Holotype:** Male (length 7.6 mm, width 2.6 mm), C-China, Shaanxi, Qinling Shan, 6 km E of Xunyangba, altitude 1000–1300 m, 2000.05.23–06.13, leg. C. Holzschuh, CCH with identity = 1.123.

**Paratypes:** 3 females, C-China, Shaanxi, Qinling Shan, 6 km E of Xunyangba, altitude 1000–1300 m, 2000.05.23–06.13, leg. C. Holzschuh, CCH; 1 female, Shaanxi, Ningshan, Huoditang, altitude 1580 m, 1998.08.22, IZAS, IOZ (E)1858417; 1 female, Shaanxi, Ningshan, Huodigou, altitude 1580–2000 m, 1998.08.18, leg. Yuan Decheng, IZAS, IOZ (E)1858418. 1 male, Shaanxi, Shiquan, 1960.06.03, IZAS, IOZ (E) 1859440.

**Description:**

**Male:** Form subcylindrical, weakly elongated (Fig. 11). Integument brown with appressed white, ochraceous and brown pubescence which gives an overall apparent greyish colour.

**Head:** Covered mostly with relatively dense yellowish to brownish pubescence. Frons wide and protruding, most of the integument dark brown. The distance between the lower lobes of eyes about 4.5 x the width of one lower eye lobe. **Antenna:** Covered with dense, appressed, light brown pubescence, interrupted by whitish pubescence at base to 1/3 on antennomeres. Ground colour on basal part of all antennomeres light brownish, and darker towards apex. Antennomere III 1.3 x longer than antennomere I. Antennae extending beyond apices by 4.5 antennomeres in the female and by 5.5 antennomeres in males. Antennal scape extending beyond posterior margin of pronotum in both sexes. Basal 4 antennomeres with a few short, erect, brown setae ventrally. **Eye:** Lower eye lobe (below scape) about the same length as gena below it. **Mouthparts:** Frontoclypeal margin with a fringe of yellowish hairs; clypeus glabrous except at base. Labrum with a fringe of yellowish hairs and 8–10 long brownish setae. **Thorax:** Pronotum slightly wider than long, but not wider at the anterior margin than at base. Pronotum with 3 weakly raised dorsal tubercles: 1 elongated oval tubercle at middle (with light brown appressed pubescence), surrounded by 2 anterolateral tubercles with sub-erect dark brown to black hairs. All raised pronotal tubercles more or less glabrous medially (with the dark brown integument exposed). Pronotum covered with appressed white, ochraceous and brownish pubescence, giving the impression of a greyish colour. The posterior part of pronotum near the base of lateral spine bearing a few sub-erect brownish hairs. Punctuation fine medially but overall similar to the punctuation on elytra. Lateral spines short, pointing upwards. Scutellum covered with sparse yellowish to brown pubescence with much of the dark brown integument exposed. Prosternum with intercoxal process narrow, mesosternal process about twice as broad as prosternal process. Mesosternal process between mesocoxae less than half the width of mesocoxa. **Elytra:** Covered with a combination of appressed whitish to brown and irregular ochraceous pubescence, scattered on the entire brownish integument giving the impression of an overall greyish colour. Elytra with a transversal oblique whitish band on the middle, and one rounded black spot immediately below the white band on each elytron (not extending onto epipleura). Elytra costate to slightly more than 2/3 of elytral length. The inner costa with distinct tufts of black hairs on a strongly pubescent, short ridge near the base (between shoulder and scutellum). Each elytron with 3 elevated longitudinal costae, with the first costa (near suture) being interrupted near basal crest followed by a sub-depressed area towards base. The area between costae 1 and 2 elevated medially. The suture and costae with white and brown pubescence, interrupted with a few dispersed small, black, tufted tubercles. The punctures on the elytra more or less evenly distributed on the entire elytra. Epipleuron covered with a combination of appressed brownish and irregular white pubescence. **Legs:**

Covered with brown to black and white pubescence with appressed setae; middle part of tibia lighter brown with white pubescence, femora dark brown. Tarsi uniformly coated on each tarsomere with short, appressed, brown pubescence. Last tarsomere only as long as tarsomeres II & III combined. **Abdomen:** Ventrites covered with appressed, ochraceous to brown to yellowish pubescence, becoming denser along the posterior margins. Tergite VII with posterior margin weakly rounded, entire surface covered with whitish hairs. Posterior margin of sternite VII broadly rounded. **Aedeagus:** Approx. 1.4 mm long, relatively slender, narrowed and weakly curved towards apex, forming a smoothly rounded apex (Fig. 62). The crescent-shaped sclerites at proximal end of basal segment fine, and median fork-like sclerite inside the internal sac strongly developed; surrounding intersegmental membrane with coarse, square-shaped micro-reticulation (Fig. 37). **Tegmen:** Approx. 1.5 mm, parameres slender and slightly flattened dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 76). Apex evenly rounded along entire posterior margin, with fringes of relatively short, yellowish hairs well concentrated at edge of apex. No micro-reticulation on parameres. Base of tegmen extended and slightly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.5 mm long, yellowish with brownish pigmentation concentrated along the posterior margin, rounded and covered with short, very fine yellowish or brownish hairs distally towards the slightly concave posterior margin (Fig. 90). Surface shining medially, with no distinct micro-reticulation. Body length 7.6 mm, width 2.6 mm.

**Female:** Form similar to male but elytra broader than in the male (Fig. 12). Sternite VII 1.1 x broader than long, narrowed and extended at middle, with a weak glabrous midline at base (Fig. 30). The posterior margin of sternite VII weakly concave, and densely covered with numerous fine, yellowish, long hairs, mixed with a few longer, brownish setae. The apex of tergite VII convex. **Spermatheca:** Yellow to brown, relatively long, widened at base, and weakly curved towards apex (Fig. 51). Apex with a small head. Body length 7.7–10.9 mm, width 2.8–3.9 mm.

**Remarks:** This is a characteristic species readily identified by the colour pattern of the elytra in both sexes, with an overall apparent greyish colour (Figs 11, 12). The pattern is composed of appressed white, ochraceous and brown pubescence on a brown integument, interrupted by a transversal oblique whitish band at the middle of elytra. One rounded black spot is situated immediately below the white band on each elytron. Two more rounded black spots are situated medially on pronotum. The short ridge near base of each elytron (between shoulder and scutellum) has distinct black tufts of hair. Likewise, the 2 inner elytral costae have sparse tubercles with tufts of black hair. The punctuation of both pronotum and elytra is relatively fine and evenly distributed. The ovipositor is short and stout, apex of tergite VII convex. This species is similar to *L. holzschuhi*, but can be recognised by the smaller size, much more sparse punctures on elytra (easiest seen medially between costa 2 near suture and costa 3). The narrow and weakly developed lateral spines on pronotum are often straight or weakly curved upwards. The rounded black spots below middle on elytra and the absence of a black spot on epipleuron (below humeri), makes this species easily distinguished. Tergite VIII is shining and has no micro-reticulation. In *L. holzschuhi*, tergite VIII has dense micro-reticulation. The male genitalia and spermatheca are distinctly different between these two species, and the ovipositor is much shorter than in *L. holzschuhi*. This species has been collected in Shaanxi Province of NW China at an altitude of 1000–2000 m (Fig. 99).

**Etymology:** The Latin name refers to the rounded black spot below the middle of each elytron, giving the appearance of two small “eyes”.

### *Leiopus (Carinopus) nigrofasciculosus* sp. nov.

Figs. 13, 14, 31, 38, 52, 63, 77, 91.

**Type locality:** China, S Shaanxi, Xi'an-Ningshan, Qinling Shan.

**Holotype:** Male (body length 8.2 mm, width 2.7 mm), S. Shaanxi, Xi'an-Ningshan, Qinling Shan pass, 50 km S Xi'an, altitude 2000 m, 33°08' N, 108°08' E, 2000.06.11, leg. J. Turna, CCH with identity = 1.124.

**Paratype:** 1 female, SW Anhui, Yuexi Co., Miaodaoshan mountains, altitude 600–1300 m, 30°48–50'N 116°05'E, 1995.07.18–20, leg. L & R. Businsky, CCH. 1 female, Anhui, Huangshan, 1977.07.19, leg. Huang Ju, CAU.

### **Description:**

**Male:** Form subcylindrical, weakly elongated (Fig. 13). Integument brownish with appressed white, ochraceous and brown pubescence. **Head:** Covered mostly with scattered yellowish to brownish pubescence. Frons

wide and protruding and most of the integument dark brown. The distance between the lower part of eye lobes about 4.3 x the width of one lower eye lobe. **Antenna:** Covered with dense, appressed, dark brown pubescence, interrupted by whitish pubescence at base to 1/3 on antennomeres. Ground colour on basal part of all antennomeres light brown, and darker towards apex. Antennomere III 1.1 x longer than antennomere I. Antennae extending beyond apices by 5.5 antennomeres. Antennal scape only extends to posterior 1/3 or 1/4 of pronotum. Basal 4 antennomeres with a few short, erect, brown setae ventrally. **Eye:** Lower eye lobe (below scape) about the same length as gena below it. **Mouthparts:** Frontoclypeal margin with a fringe of yellowish hairs; clypeus glabrous except at base. Labrum with a fringe of yellowish hairs and 8–10 long brownish setae. **Thorax:** Pronotum slightly wider than long, but not wider at the anterior margin than at base. Pronotum with 3 weakly raised dorsal tubercles: 1 elongated oval tubercle at middle (with light brown appressed pubescence), surrounded by 2 anterolateral tubercles with sub-erect dark brown to black hairs. All raised pronotal tubercles more or less glabrous medially (with the dark brown integument exposed). The posterior part of pronotum near the base of lateral spine with a few sub-erect brownish hairs. Punctuation finer medially but overall similar to the punctuation on elytra. Lateral spines short, pointing upwards. Scutellum covered with sparse yellowish to brown pubescence with much of the dark brown integument exposed. Prosternum with intercoxal process narrow, mesosternal process about twice as broad as prosternal process. Mesosternal process between mesocoxae less than half the width of mesocoxa. **Elytra:** Covered with a combination of appressed whitish to brown and irregular ochraceous pubescence, scattered on the entire brownish integument. Elytra with a transversal whitish band on the middle, with an oblique, black, transversal band both above (laterally) and immediately below (distinct medially) the white band on each elytron (each extending onto epipleura). Elytra costate to slightly more than 2/3 of elytral length. The inner costa has distinct tufts of black hair on a strongly pubescent, short ridge near base (between shoulder and scutellum). Each elytron with 3 elevated longitudinal costae with the first costa (near suture) being interrupted near basal crest followed by a sub-depressed area towards base. The area between costae 1 and 2 elevated medially. The suture and costae with white and brown pubescence, interrupted with numerous small, black, tufted tubercles. Punctuation on elytra very dense medially (the distance between punctures not more than the width of one puncture) with the surface shining due to very short, fine and appressed pubescence that exposes the integument. Epipleuron covered with a combination of appressed brownish and irregular white pubescence. Elytral apex straight with both sutural and apical angle acutely produced. **Legs:** Covered with brown to black and white pubescence with appressed setae; middle part of tibia lighter brown with white pubescence, femora dark brown. Tarsi uniformly coated on each tarsomere with short, appressed, brown pubescence. Last tarsomere only as long as tarsomeres II & III combined. **Abdomen:** Ventrites covered with appressed, ochraceous to brown to yellowish pubescence, becoming denser along the posterior margins. Tergite VII with posterior margin broadly rounded, entire surface sparsely covered with very fine brownish hairs, exposing the shining integument. Posterior margin of sternite VII slightly concave. **Aedeagus:** Approx. 1.4 mm long, relatively slender, acutely narrowed towards a pointing and rounded apex (Fig. 63). The crescent-shaped sclerites at proximal end of basal segment fine, and median fork-like sclerite inside the internal sac strongly developed; surrounding intersegmental membrane with relatively coarse square-shaped micro-reticulation (Fig. 38). **Tegmen:** Approx. 1.5 mm, parameres long, almost straight, slender and rounded dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 77). Apex evenly round along entire posterior margin, with fringes of relatively short, brownish hair well concentrated at edge of apex. No micro-reticulation on parameres. Base of tegmen extended and slightly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.5 mm long, yellowish with brownish pigmentation concentrated medially and along the posterior margin, narrowed towards apex and covered with short, brownish hairs towards the posterior margin (Fig. 91). Shining surface medially, with weak micro-reticulation.

*Female:* Form and colour pattern on elytra similar to male, although elytra slightly broader than in the male (Fig. 14). Antennae much longer than body, extending beyond apices by 4.5 antennomeres. The transversal black band slightly below the middle very broad and distinct in the female. Sternite VII 1.1 x broader than long, narrowed and extended at middle, with a weak glabrous midline at base (Fig. 31). The posterior margin of sternite VII weakly concave and densely covered with numerous fine, yellowish, long hairs, mixed with a few longer and brownish setae. **Spermatheca:** Yellow to brown, relatively long, widened at base, and weakly curved towards apex (Fig. 52). Apex with a small head. Body length 8.9–9.3 mm, width 3.1–3.3 mm.

**Remarks:** This species can be identified by its relatively small and slender body, with punctuation on elytra very dense medially (the distance between punctures not more than the width of one puncture), and shining elytral

surface due to very short, fine and appressed pubescence (Figs 13, 14). The punctuation on the small pronotum is much finer and sparsely distributed than on elytra. The black transversal band, a little behind middle on elytra, is broad and distinct in the female and oblique in the male, and is due to short, black pubescence on the exposed black integument. The male of this species is very similar to that of *L. campbelli* but differs by the black transversal maculae, oblique band on elytra, black scutellum and denser punctuation on elytra. The entire integument of *L. campbelli* is light brown. The male genitalia, including the shape of the sclerites inside the internal sac, differ between the two species. This species was collected in Anhui and Shaanxi Provinces of China at an altitude of 600–2000 m (Fig. 99).

**Etymology:** The Latin name refers to the transversal band a little behind middle on the elytra, distinct in the female and oblique in the male.

***Leiopus (Carinopus) holzschuhi* sp. nov.**

Figs. 15, 16, 32, 39, 53, 64, 78, 92.

**Type locality:** China, Shaanxi, Qinling Shan, 12 km SW of Xunyangba.

**Holotype:** Male (body length 9.7 mm, width 3.4 mm), China, Shaanxi, Qinling Shan, 12 km SW of Xunyangba, altitude 1900–2250 m, 2000.05.14–18, leg. C. Holzschuh, CCH with identity = 1.125.

**Paratypes:** 5 males and 4 females, China, Shaanxi, Qinling Shan, 6 km E of Xunyangba, altitude 1000–1300 m, 2000.05.23–06.13, leg. C. Holzschuh, CCH; 2 females, China, Sichuan, 70 km E of Chengkou, altitude 2000 m, 1995.07.03–07, leg. A. Shamaev, CCH; 1 male, Chongqing, Chengkou county, Wangxiang, 2008, CCCC; 1 female, W-Henan, 20 km SE Luanchuan, 33°7'N 111°8'E, 2001.07.01, leg. J. Turna, CCH; 1 female, Henan, Baiyunshan, altitude 1500 m, 2001.07.24, leg. Ge Siqin, IZAS, IOZ (E)1859441; 1 female, Guizhou, Fanjingshan, altitude 1850 m, 2008.07.02, light trap, leg. Yang Xiaodong, CCCC.

**Description:**

**Male:** Form subcylindrical, a broad and robust species (Fig. 15). Integument dark brown with fine punctures, more or less evenly distributed on the elytra. The overall colour apparently brownish to greyish, composed of appressed white, ochraceous and brown pubescence on a brown integument, interrupted with a transversal oblique whitish band on the middle (more distinct longitudinally along the 3 costae). A narrow and oblique black band (composed of 2 irregular black spots; 1 small lateral spot on epipleuron and 1 larger spot medially) present immediately below the white band on each elytron. **Head:** Covered mostly with very dense yellowish to brownish pubescence. Frons very wide and protruding, and the integument mostly dark brown. The distance between lower lobes of eyes about 4.7 x the width of one lower eye lobe. **Antenna:** Covered with dense, appressed, light brown pubescence, interrupted by whitish pubescence at base to 2/3 on antennomeres. Ground colour on basal part of all antennomeres light brownish, and darker towards apex. Antennomere III 1.3 x longer than antennomere I. Antennae much longer than body, extending beyond apices by 5 antennomeres. Antennal scape short, only extending to about 2/3 of pronotum in both sexes. Basal 4 antennomeres with a few short, erect, brown setae ventrally. **Eye:** Lower eye lobe (below scape) about the same length as gena below it. **Mouthparts:** Frontoclypeal margin with a fringe of yellowish hairs; clypeus glabrous except at base. Labrum with a fringe of yellowish hairs and 6–8 long, brownish setae. **Thorax:** Pronotum slightly wider than long, and slightly wider at the anterior margin than at base. Pronotum with 3 raised dorsal tubercles: 1 elongated oval tubercle at middle (with brownish, appressed pubescence), surrounded by 2 anterolateral tubercles with sub-erect, dark brown to black hairs. All 3 tubercles very weak in one examined male. Pronotum covered in appressed brownish pubescence. The posterior part of pronotum near the base of lateral spine with one sub-erect brownish hair. Punctures on pronotum similar in size to those on elytra, but more sparse medially. Lateral spines long to very long, wide and curved backwards. Scutellum covered with sparse yellowish to brown pubescence, with much of the dark brown integument exposed. Prosternum with intercoxal process narrow, mesosternal process about 1.5 x as broad as prosternal process. Mesosternal process between mesocoxae less than half the width of mesocoxa. **Elytra:** Covered with a combination of appressed whitish to brown and irregular ochraceous pubescence scattered on the entire brownish integument, giving the impression of a relatively greyish colour overall. Elytra with or without a transversal oblique whitish band on the middle (but always with distinct white spots longitudinally along the costae), and a

narrow and oblique black band, which consists of 2 large, irregular black spots medially, 1 small lateral spot on epipleuron and 1 medial larger spot, immediately below the white band on each elytron. The median black spots on the elytra are very weak in one examined male. Distinct black tufts of hair on the short ridge near base (between shoulder and scutellum), and one elongated black spot on epipleuron below humeri. Elytra costate to almost elytral length (but not entirely to the apical margin). The inner costa with distinct tufts of black hairs on a strongly pubescent, short ridge near the base (between shoulder and scutellum). Each elytron bearing 3 elevated longitudinal costae medially with the first costa (near suture) being interrupted near basal crest followed by a sub-depressed area towards base. The area between costae 1 and 2 slightly elevated sub-medially. The suture, costae and the area between costae with white and brown pubescence, interrupted with a few dispersed small, black, tufted tubercles. The dense and relatively fine punctures on the elytra more or less evenly distributed on the entire elytra, though sparser close to apex. Epipleuron covered with a combination of appressed brownish and irregular white pubescence. **Legs:** Covered with brown to black and white pubescence with appressed setae; middle part of tibia lighter brown with whitish pubescence, femora reddish-brown to dark brown. Tarsi uniformly coated on each tarsomere with short, appressed, brown pubescence. Last tarsomere only as long as tarsomeres II & III combined. **Abdomen:** Ventrites covered with appressed ochraceous to brown to yellowish pubescence, becoming denser along the posterior margins. Tergite VII with posterior margin broadly rounded, middle slightly concaved, with a mixture of short white and light brown hairs. Posterior margin of sternite VII slightly concave. **Aedeagus:** Approx. 1.7 mm long, relatively slender, narrowed and evenly curved towards apex, forming a smoothly rounded apex (Fig. 64). The crescent-shaped sclerites at proximal end of basal segment fine, and median fork-like sclerite inside the internal sac strongly developed; surrounding intersegmental membrane with coarse, square-shaped micro-reticulation (Fig. 39). **Tegmen:** Approx. 2.0 mm, parameres slender and slightly flattened dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 78). Apex evenly rounded along entire posterior margin, with fringes of relatively short, yellowish hairs at edge of apex, and also medially on each paramere. No micro-reticulation on parameres. Base of tegmen extended and weakly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.8 mm long, yellowish with brownish pigmentation concentrated along the posterior margin, rounded and covered with short, very fine yellowish or brownish hairs distally towards the slightly convex posterior margin (Fig. 92). Surface dull; entirely covered with dense micro-reticulation. The shape of tergite VIII varying from almost rounded in most examined specimens to elongated in one male. Body length 9.5–11.0 mm, width 3.4–4.0 mm.

**Female:** Form similar to male, although elytra broader than in the male (Fig. 16). Antennae much longer than body, extending beyond apices by 4 antennomeres. Ventrite V 3.7 x longer than broad, narrowed and extended at the middle, with a weak glabrous midline at base (Fig. 32). The posterior margin of sternite VII straight and densely covered with numerous fine, yellowish, long hairs mixed with a few longer and brownish setae. **Spermatheca:** Yellow to brown, relatively long, widened at base, and weakly curved towards apex (Fig. 53). Apex with an elongated head. Body length 9.9–11.0 mm, width 3.4–4.0 mm.

**Remarks:** The large size and broad elytra, combined with the distinct colour pattern of elytra in both sexes, make the species characteristic (Figs. 15, 16). Distinct black tufts of hair on a short ridge near the base of each elytron (between shoulder and scutellum) and one elongated black spot on epipleuron below humeri, are unique to this species and readily identify it. Punctuation of the entire elytra is relatively coarse and very dense. Female sternite VII is long, wide at base, and curved towards apex (Fig. 32). This robust species is most similar to *L. ocellatus*, but is recognised by the very dense and coarse punctures on elytra (easiest seen medially between costa 1 near suture and costa 3), the broad and large lateral spines on pronotum (curved backwards), the broad black spots below middle on elytra and the black spot on epipleuron below humeri. Tergite VIII is covered with very dense micro-reticulation in *L. holzschuhi* (shining in *L. ocellatus*). The male genitalia and spermatheca are distinctly different between these two species, and the ovipositor in *L. holzschuhi* is much longer than in *L. ocellatus*. This species has been collected from Shaanxi and Henan Provinces in NW China, and Sichuan and Guizhou Provinces in SW China at an altitude of 1000–2000 m (Fig. 99). Specimens were collected by beating dead branches of *Juglans* sp.

**Etymology:** This species is named in honour of Carolus Holzschuh who kindly offered his collected specimens of *Leiopus* spp. from China to be included in this work.

***Leiopus (Carinopus) multipunctellus* sp. nov.**

Figs. 17, 18, 33, 40, 54, 65, 79, 93.

**Type locality:** SW China, Yunnan, Lushui, Yaojiaping.

**Holotype:** Male (length 8.0 mm; width 2.8 mm), SW China, Yunnan, Lushui, Yaojiaping, altitude 2500 m, 1981.06.05, leg. Wang Shuyong, IZAS, identity = IOZ(E)1858413.

**Paratypes:** 5 males and 6 females, Yunnan, Lushui, Yaojiaping, altitude 2500 m, 1981.06.01–06, leg. Zhang Xuezhong, Liao Subai, Wang Shuyong, IZAS, IOZ(E)1859414, 1859416, 1859468–476. 1 male, SW China, Sichuan, Wolong, altitude 2500 m, 1983.08.08, leg. Zhang Xuezhong, IZAS, IOZ(E)1859415.

**Description:**

**Male:** Form subcylindrical, weakly elongated (Fig. 17). Integument dark brown. Elytra with sparse, but very distinct punctuation and each puncture well exposed and shining.

**Head:** Covered mostly with fine and dense yellowish to brownish pubescence. Frons wide and protruding, integument dark brown. The distance between the lower lobes of eyes about 4 x the width of one lower eye lobe.

**Antenna:** Covered with dense, appressed, light brown pubescence, interrupted by whitish pubescence from base to ½-way on scape and antennomere II, and to 1/3 on remaining antennomeres. Ground colour on basal part of all antennomeres light brownish, and darker towards apex. Antennomere III 1.3 x longer than antennomere I. Antennae extending beyond apices by 5 antennomeres. Antennal scape long, extending almost to posterior margin of pronotum. Antennomeres I and II with a few short, erect, brown setae ventrally (at least near apex of scape).

**Eye:** Lower eye lobe (below scape) about the same length as gena below it. **Mouthparts:** Frontoclypeal margin with a fringe of dense yellowish hairs; clypeus glabrous except at base. Labrum almost entirely covered with dense pubescence and 6–8 long brownish setae.

**Thorax:** Pronotum slightly wider than long, but about the same width at anterior margin than at base. Pronotum with 3 raised dorsal tubercles: 1 elongated oval tubercle between 2 anterolateral tubercles (elongated longitudinally in 2 of the males). All raised tubercles on pronotum more or less glabrous (with weak, brownish, appressed pubescence). Pronotum covered in appressed, light brownish pubescence, becoming denser on each side (towards the lateral spines). The posterior part of pronotum near the base of lateral spine with a sub-erect, brownish hair. Punctuation slightly weaker than on elytra and sparser medially. Lateral spines relatively long and slightly curved backwards. Scutellum covered with dense yellowish to brown pubescence. Prosternum with intercoxal process narrow, mesosternal process about twice as broad as prosternal process. Mesosternal process between mesocoxae less than half the width of mesocoxa.

**Elytra:** Covered with a combination of appressed whitish to light brown or ochraceous pubescence. Elytra with a transversal oblique whitish band on the middle (from suture and across costae 2–5 and epipleuron). In one male, the white transversal band more distinct below the black spot on the posterior part of elytra. All 5 costae with 10 (or more) small tubercles with black tufts of hair, interrupted with white spots longitudinally along the costae. The area between costae 2–3 weakly raised medially, with a small, square-shaped black spot below middle. The area between costae 4–5 weakly raised, with a small lateral spot on the anterior part (2 of the males also had a black spot below the middle of elytra). Elytra costate to almost elytral length (not entirely extending to apical margin). The inner costa with distinct tufts of black hair on a strongly pubescent, short ridge near base (between shoulder and scutellum). Each elytron bearing 5 elevated, longitudinal costae with the first costa (near suture) being interrupted near the basal crest followed by a small sub-depressed area towards base. The suture, costae and the area between costae with white and brown pubescence interrupted with a few dispersed small, black, tufted tubercles. The sparse and relatively coarse punctures on the elytra more or less evenly distributed on the entire elytra. Epipleuron covered with a combination of appressed brownish and irregular white pubescence, and black tufted spots. Entire epipleuron evenly covered with coarse, shining punctures. **Legs:** Covered with brown and white pubescence with appressed setae; middle part of tibia with a narrow white band and white pubescence also at apex, femora with fine white pubescence on a dark brown integument which clearly exposed. Tarsi uniformly coated on each tarsomere with short, appressed, white and brown pubescence. Last tarsomere only as long as tarsomeres II & III combined. **Abdomen:** Ventrites covered with appressed ochraceous to brown to yellowish pubescence, becoming denser along the posterior margins. Tergite VII with posterior margin concaved, or notched, in the middle, with short yellowish hairs. Posterior margin of sternite VII slightly concave. **Aedeagus:** Approx. 1.7 mm long, relatively slender, narrowed and evenly curved towards apex, dorsal ridge much wider than the ventral ridge towards apex.



(Fig. 65). The crescent-shaped sclerites at proximal end of basal segment very fine, and median fork-like sclerite inside the internal sac weakly developed (apart from the well-sclerotized shaft); surrounding intersegmental membrane with coarse, square-shaped micro-reticulation (Fig. 40). **Tegmen:** Approx. 2.0 mm, parameres slender and slightly flattened dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 79). Apex evenly rounded along entire posterior margin, with fringes of short, yellowish hairs well concentrated at edge of apex. No micro-reticulation on parameres, but there are numerous brown spots. Base of tegmen extended and weakly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.8 mm long, yellowish with brownish pigmentation concentrated along the posterior margin, more or less rounded and covered with short, very fine yellowish hairs distally towards the posterior margin (Fig. 93). Surface shining; not covered with any micro-reticulation. Body length 7.4–9.0 mm, width 2.5–3.0 mm.

**Female:** Form similar to male but elytra broader than in the male (Fig. 18). Antennae extend beyond apices by 4 antennomeres. The posterior margin of sternite VII more or less straight, and densely covered with long, brownish hairs. Sternite VII long and narrow (3.2 x longer than broad), and extended at middle, with a relatively weak glabrous midline at base (Fig. 33). The posterior margin of sternite VII straight and densely covered with numerous fine, yellowish, long hairs, mixed with a few long, brownish setae. **Spermatheca:** Yellow, short straight shaft with an almost round apex (Fig. 54). Body length 9.0–10.8 mm, width 3.0–3.6 mm.

**Remarks:** The sparse, but very distinct, punctuation on entire elytra (the distance between each puncture is much greater than the width of one puncture), where the rim of each puncture is well exposed and shining (i.e. not covered by any pubescence) is unique to this species and readily identifies it (Figs. 17, 18). Other features include the characteristic colour pattern of elytra in both sexes with the overall apparent brownish to greyish colour, interrupted with a transversal oblique whitish band on the middle, and 1–2 small, narrow, rectangular, black spots immediately below the white band on each elytron, are also unique to this species. Female has relatively long and narrow abdominal segment VII (apex on dorsal ridge rounded). This species is most similar to *L. ocellatus* and *L. holzschuhi*, but is recognised by the exposed and shining punctures on entire elytra, and the small, rectangular black spots below middle on elytra. The male genitalia and spermatheca are unique to *L. multipunctellus*, especially the aedeagus with the dorsal ridge which is much wider than the ventral ridge towards apex.

This species was collected in Yunnan and Sichuan Provinces, SW China at an altitude of 2500 m (Fig. 99).

**Etymology:** The Latin name refers to the numerous and exposed punctures that cover the entire elytra.

### Redescriptions of species of *Leiopus* subgenus *Carinopus* subgen. nov.

The following redescriptions mainly include the hitherto undescribed male genitalia and spermathecae. For details on the nomenclature, see Table 1.

#### *Leiopus (Carinopus) shibatai* Hayashi, 1974

Figs. 19, 20, 44, 67, 81, 95.

Readily identified by relatively fine, sparse punctuation on elytra, with distance between each puncture greater than width of one puncture (Figs 19, 20). The numerous small tufted tubercles with black hairs longitudinally along each costa, giving the entire elytra a distinctly spotted appearance. Elytra with a uniform yellowish colour on a dark brown integument giving a more or less green lustre, interrupted with a transversal oblique black band (or square-shaped spots) below middle but not covering the area between costae 1 and 2. The posterior margin of tergite VII in the male notched in the middle, with short, yellowish hairs. Similar to *L. ocellatus*, *L. holzschuhi* and *L. multipunctellus* but different in having sparse and weak punctures on elytra, short and blunt lateral spines on pronotum, distinctly spotted costae, and lack of whitish pubescence on elytra. Male genitalia distinctly different from the other 3 species mentioned earlier. Crescent-shaped sclerites at proximal end of basal segment very fine, the fork-like median sclerite well developed and similar to the median sclerite of *L. campbelli*.

Examined male: length 9.1 mm, width 3.1 mm. HT male: length 9.5 mm, width 3.5 mm according to Hayashi (1974). **Aedeagus:** Approx. 1.5 mm long, relatively slender, narrowed and weakly curved towards apex, dorsal ridge not wider than the ventral ridge towards apex (Fig. 67). Crescent-shaped sclerites at proximal end of basal

segment very fine, and median fork-like sclerite inside the internal sac well developed (the sclerotized shaft weakly twisted); surrounding intersegmental membrane with coarse, square-shaped micro-reticulation (Fig. 44). **Tegmen:** Approx. 1.8 mm, parameres slender and slightly flattened dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 81). Apex evenly rounded along entire posterior margin, with fringes made up of relatively long, yellowish hairs on the edge of apex on the last 1/3 of the parameres. Very weak micro-reticulation towards apex. Base of tegmen extended and strongly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.65 mm long, yellowish with brownish pigmentation on entire surface. Anterior part with short, fine, yellowish hairs distally towards the posterior margin (Fig. 95). Entire surface with weak, but clearly visible, micro-reticulation.

**Remarks:** This species is endemic to the island of Taiwan (Fig. 99).

***Leiopus (Carinopus) fallaciosus* Holzschuh, 1993: 49**

Figs. 21, 22, 34, 45, 55, 66, 80, 94.

Readily identified by very fine and sparse punctuation on elytra (distance between each puncture much greater than the width of one puncture), the large tufted tubercles with black hair longitudinally along each costa (and a few between each costa), as well as an oblique black transversal band below middle (Figs. 21, 22). Each elytron with a light spot in middle immediately below the short raised anterior costa punctures near base (between the 2 raised costae) more distinct and coarser, and costae weak on remaining parts of elytra. Tubercles on pronotum relatively weak. Pubescence on elytra consisting of a mixture of overall brownish hairs with black hairs forming irregular spots (more concentrated on the 2 anterior and raised costae) and a transversal band below middle. Lateral spines of pronotum weak and pointed slightly upwards (and backwards). Sternite VII of the female very long and narrow (3.8 x longer than broad), narrowed and extended at middle, with a very weak glabrous midline at base. The posterior margin of the sternite VII in the female slightly concaved and densely covered with numerous fine, yellowish, long hairs mixed with a few long, brownish setae (Fig. 34). This species is most similar to *L. holzschuhi* and *L. shibatai*, but is recognised by sparse and very weak punctures on elytra, weak tubercles on pronotum, very weak costae medially on elytra, and large black spots both on costae and between costae on elytra.

Examined females: length 9.0–9.9 mm, width 3.0–3.2 mm. Males: length 8.7–9.3 mm, width 3.0–3.1 mm.

**Spermatheca:** Yellow to brown, relatively long, widened at base, and weakly curved towards apex (Fig. 55). Apex with an elongated head. Similar in shape to *L. holzschuhi*. **Aedeagus:** Approx. 1.2 mm long and relatively slender, curved towards apex, forming a narrowly rounded apex (Fig. 66). Crescent-shaped sclerites at proximal end of basal segment fine, and median fork-like sclerite inside the internal sac strongly developed; surrounding intersegmental membrane with very fine, rounded micro-reticulation (Fig. 45). **Tegmen:** Approx. 1.6 mm (including tegmen), short and flattened dorso-ventrally on the middle (with a longitudinal ridge laterally), only separated medially along inner margin near base (Fig. 80). Apex evenly rounded along entire posterior margin, with fringes of short, yellowish hairs well concentrated at edge of apex. Base of tegmen extended and weakly curved dorso-ventrally on middle. **Tergite VIII:** Approx. 0.6 mm long, yellowish with brownish pigmentation concentrated medially and along the posterior margin, broadly rounded and covered with short, yellowish hairs distally towards the posterior margin (Fig. 94). Surface shining with weak micro-reticulation.

**Remarks:** Previously only known from the HT female. New data show that this species has a wider distribution with records from Fujian and Jiangxi Provinces of China (Fig. 99).

***Leiopus (Carinopus) campbelli* (Gressitt, 1937) comb. nov.**

Figs. 23, 46, 68, 82, 96.

Distinguished from all other examined species of *Leiopus* from China by its small body size, colour patterns on pronotum and elytra, weak costae on elytra, lack of tufted tubercles on elytra (Fig. 23). Colour brownish with an oblique whitish transversal band on middle of elytra, interrupted by a narrow dark brown band below middle, and a few scattered brownish spots on elytra. Elytra smooth laterally but with 2 relatively weak costae medially, and a glabrous ridge near the base of elytra on each side of scutellum. Pronotum with a short and blunt spine on middle of each side, very weak anterolateral tubercles, and medially with fine and sparse punctures and light brown hairs

forming 2 longitudinal bands laterally. Tarsomere I on hind legs as long as the remaining segments combined. Last abdominal segments slightly concaved, or notched, on the posterior margin. Separated from most species of *Acanthocinus* by antennomeres III–V not fimbriate beneath (there might be a few suberect hairs), short legs and short ovipositor in female. Colour pattern on pronotum and elytra somewhat similar to that in dark specimens of the European species *L. nebulosus* L. Legs short and antennae up to 1.5 x longer than body. Elytra covered with fine, sparse punctures. Male genitalia characters similar to *Leiopus* and not *Acanthocinus*. This species has therefore been transferred from *Acanthocinus* to *Leiopus*.

Examined **HT** (male): length 6.6 mm, width 2.5 mm. **Aedeagus**: Approx. 1.3 mm long, relatively slender, narrowed and acutely curved towards apex, dorsal ridge as wide as ventral ridge (Fig. 68). Crescent-shaped sclerites at proximal end of basal segment very slender, and fork-like median sclerite inside internal sac fine; surrounding intersegmental membrane with fine, square-shaped micro-reticulation (Fig. 46). Median sclerite inside the internal sac most similar to that of *L. shibatai*. **Tegmen**: Approx. 1.4 mm, parameres slender and flattened dorso-ventrally, well separated medially along inner margin and towards apex (Fig. 82). Apex evenly rounded along entire posterior margin, with fringes of short, yellowish hair well concentrated at edge of apex. No micro-reticulation on parameres. Base of tegmen extended and strongly curved dorso-ventrally towards the middle. **Tergite VIII**: Approx. 0.5 mm long, yellowish with fine pigmentation, and covered with short, very fine yellowish hairs distally towards the posterior margin (Fig. 96). Surface has no micro-reticulation.

**Remarks**: Only 2 specimens have been found (male HT and female PT). This species was collected in Hong Shan, Jiangxi Province of China, altitude 1000 m, 1936.06.25–29 (Fig. 99).

### Redescription of the genus *Acanthocinus* Dejean, 1821

Figs. 26, 27, 56, 70, 84, 98.

Elytra with appressed pubescence, pronotum with acutely spined tubercles at sides, femora slender to slightly swollen, with lateral spines placed near or a little behind middle (as in *Leiopus*). Elytral lateral margin straight toward outer apical angle (giving an appearance of elytra being strongly elongated in most species), antennae 3–4 x longer than body in males, and ovipositor very long. The following exceptions occur: in *A. aedilis* the elytra are only about 1.8 x longer than wide and antennae 4–5 x longer than body in males, and in *A. reticulatus* the antennae in males are only 2 x longer than body. Pronotum often with 4 anterior, tufted tubercles (tubercles yellow in *A. aedilis* and *A. griseus*).

Elytra often flattened almost towards apices, and mostly strongly costate, legs long and slender, antennae 2–5 x longer than body (shorter in females). Last visible abdominal sternite in males deeply notched (or at least concave). Ovipositor strongly elongated (protruding far beyond the last visible abdominal sternite: at least extended twice the length of the last visible sternite). Antennomeres III–V mostly densely fimbriate beneath, pronotum with 2–4 distinct, tufted anterior tubercles. Hind tarsi relatively short or long and slender (first segment from as long as to almost twice as long as segments II and III combined). Parameres very short: not separated along inner margin, tegmen forming a straight line, i.e. not bent in middle. Anterior margin of tergite VIII deeply notched in middle. Aedeagus very long and narrow, with the apical part weakly sclerotized. Sclerites inside the internal sac usually forming a very long (>10 mm), fine, weakly sclerotized (thus more or less transparent laterally) and straight thread, with an exception: sclerites in *A. reticulatus* very short, resembling those in *A. guttatus*. Prosternal process (usually relatively wide) about half as broad as mesosternal process. Anterior margin of sternite VII in females deeply notched in the middle. Spermatheca not, or only weakly, sclerotized, very small (approx. 0.2 to 0.4 mm long as measured diagonally the longest distance from the base to the tip of the head) and acutely curved (sometimes forming a spiral). Spermatheca with an elongated head, and sometimes with a long, secondary shaft, resembling a “proboscis” connected to the head (as found in *A. aedilis* and *A. griseus*).

**Type species**: *Acanthocinus aedilis* (Linnaeus, 1758), type designation by Audinet-Serville (1835).

### Description of *Acanthocinus* subgenus *Acanthobatesianus* subgen. nov.

Elytra smooth with at most very weak costae, legs long and slender, antennae 2–5 x longer than body (shorter in females), femora slender to slightly swollen, ovipositor very short, antennomeres III–V not fimbriate beneath. Pronotum with only 2 anterior, glabrous tubercles. Prosternal process about half as broad as mesosternal process.

Hind tarsi long and slender (the first segment about 1.5 x longer than segments II and III combined). Male genitalia with very short parameres, not separated along inner margin, tegmen forming a straight line, i.e. not bent in middle, anterior margin of tergite VIII strongly elongated with a pointed (sharp) apex. Sclerites inside internal sac very short and fork-like in shape (but well sclerotized). Last visible abdominal sternite in males deeply notched. Ovipositor and last visible abdominal sternite short in females. Spermatheca very small, with a very short secondary shaft or “proboscis” connected to the head.

**Type species:** *Acanthocinus* (*Acanthobatesianus*) *guttatus* (Bates, 1873)

**Etymology:** The name *Acanthobatesianus* is a combination of parts of the names *Acanthocinus* and the auctor Bates.

***Acanthocinus* (*Acanthobatesianus*) *guttatus* (Bates, 1873) comb. nov.**

Figs. 24, 25, 47, 69, 83, 97.

A small and slender species (Figs 24, 25) resembling *A. griseus* (Figs 26, 27). Legs and antennae (antennae 2–3 x longer than body) very long, and male genitalia similar to those in *Acanthocinus* but not *Leiopus*. However, the species differs from *Acanthocinus* in line with the diagnosis given above, and thus we transferred it from *Leiopus* to the new subgenus *Acanthobatesianus*.

Pronotum with 3 weak and glabrous tubercles (2 anterior and 1 median), more pronounced in females. Antennal scape only slightly shorter than antennomere II. Elytra covered with relatively fine, dense punctures. Colour brownish with an oblique whitish transversal band on middle of elytra, interrupted by a narrow dark brown band below middle and a few scattered brownish spots on elytra. Elytra with 2 very weak costae medially, and a glabrous raised ridge near the base of elytra on each side of scutellum. Pronotum with a short and acutely narrowed spine on each side in middle. First tarsal segment on hind legs as long as the remaining segments combined (in *A. griseus* slightly longer than the remaining segments combined). Separated from *A. griseus* by antennomeres III–V not fimbriate beneath (at most with a few sub-erect long hairs, as in *A. reticulatus*), a lack of distinct whitish transversal band on the middle of elytra, lack of 4 tufted, yellowish tubercles on near anterior margin on pronotum, shorter first tarsal segment on hind legs, and the posterior margin of sternite VII in males convex and rounded (deeply notched in *A. griseus*). Sternite VII in female *A. guttatus* slightly shorter than in *A. griseus*. Ovipositor in *A. guttatus* short and yellow to brown and that in *A. griseus* black and very long, often extending far beyond the last abdominal segments.

Examined male length 7.5 mm, width 2.5 mm; female length 8.5 mm, width 3.0 mm. **Aedeagus:** Similar to that of *A. griseus* (Fig. 70); approx. 1.5 mm long, very slender, narrowed and weakly curved towards apex, dorsal ridge as wide as ventral ridge and very flat at apex (Fig. 69); apical part weakly sclerotized. The crescent-shaped sclerites at proximal end of basal segment sharply square-shaped, and the double fork-like (apical part extended and distal part forming a shorter, curved fork-like part) median sclerite inside the internal sac slightly elongated; surrounding intersegmental membrane with fine, square-shaped micro-reticulation (Fig. 47). Very short sclerites inside the internal sac similar to those of the European species *A. reticulatus* but in the latter only distal part of sclerites with a curved and fork-like part. **Tegmen:** Approx. 2.0 mm, parameres slender and flattened dorso-ventrally, and not separated medially (Fig. 83). Apex evenly rounded along entire posterior margin, with fringes of short, yellowish hair well concentrated at edge of apex. No micro-reticulation on parameres. Base of tegmen extended and weakly curved dorso-ventrally towards the middle. Median lobe (mainly tegmen) long and evenly curved below the parameres, strongly narrowed towards the base of tegmen, with no twisted part on the middle of tegmen. Parameres almost identical to all other examined species of *Acanthocinus*. **Tergite VIII:** Approx. 0.8 mm long, dark brown and covered with short, very fine yellowish hairs distally towards the elongated (pointing) posterior margin (Fig. 97). Entire surface with distinct square-shaped micro-reticulation. Tergite VIII without deep notch or concavity found in all other examined species of *Acanthocinus*. **Spermatheca:** Approx. 0.2 mm long, weakly sclerotized straight shaft and transparent (soft) head with a very short secondary shaft connected to the head. The presence of a very long secondary shaft was found in *A. aedilis* (Fig. 56) and *A. griseus*.

**Remarks:** This species is known from Japan, South Korea, and Jiangxi Province of China.

## Key to the genera *Acanthocinus* and *Leiopus*, including new subgenus designations:

- 1 Elytra flattened towards apex (lateral view), with straight lateral margin towards outer apical angle (giving the appearance of a strongly elongated elytra), or antennae at least 3–4 x longer than body in males, ovipositor very long .....2
- Elytra sub-depressed and curved from  $\frac{3}{4}$  towards apex (in lateral view), lateral margin straight to about halfway and thereafter weakly curved toward outer apical angle (giving the appearance of a less elongated elytra), antennae in males up to twice as long as body, ovipositor short .....3
- 2 Elytra distinctly costate in most species. Ovipositor and last visible abdominal sternite strongly elongated in female. Antennomeres III–V densely fimbriate beneath in most species. Pronotum with 2–4 distinct, tufted anterior tubercles. Parameres mostly with a narrow apex (Fig. 84). Sclerites inside the internal sac usually forming a very long (>10 mm), fine, weakly sclerotized, straight thread. Anterior margin of tergite VIII deeply notched (Fig. 98). ..... *Acanthocinus*
- Elytra weakly costate. Ovipositor and last visible abdominal sternite very short in female. Antennomeres III–V not fimbriate beneath. Pronotum with 0–2 anterior tubercles. Parameres with a rounded apex (Fig. 83). Sclerites inside the internal sac double fork-like (apical part extended and distal part forming a shorter, curved fork-like part). Anterior margin of tergite VIII strongly elongated with a pointing (sharp) apex (Fig. 97) ..... *Acanthobatesianus* **subgen. nov.** (genus *Acanthocinus*)
- 3 Elytra with weakly developed costae (Fig. 1), each elytron with a weak swelling at the base. The sclerites inside the internal sac are very short and usually form a straight shaft with or without a rounded head. The membrane of the internal sac has mostly very weak micro-reticulation ..... *Leiopus*
- Elytra with 4–5 clearly raised longitudinal costae (Fig. 16), each elytron with a strongly pubescent ridge at the base. The sclerites inside the internal sac in males are robust and fork-like in shape apically (Fig. 35). The membrane of the internal sac has very distinct micro-reticulation ..... *Carinopus* **subgen. nov.** (genus *Leiopus*)

## Key to species of the *Carinopus* subgen. nov. (*Leiopus*)

- 1 Elytra strongly elongated (about 3 x longer than wide), covered with very coarse punctures and numerous black spots (Fig. 8). Punctures on elytra much larger than those on pronotum. .... *L. nigropunctatus* **sp. nov.**
- Elytra not strongly elongated (up to 2.5 x longer than wide) and punctures on elytra fine or coarse, but only slightly larger than those on pronotum .....2
- 2 (1) Carinae on elytra weak, with no trace of tufts of hair or tufted tubercles. Small species (body length approx. 7 mm), brownish colour with dark brown spots and irregular band below middle, lateral spines on pronotum blunt (Fig. 23) ..... *L. campbelli* (Gressitt, 1937) **comb. nov.**
- Carinae on elytra strong, with tufts of hair or tufted tubercles .....3
- 3 Punctures on elytra not exposed (partly covered with elytral pubescence) ..... 4
- Punctures on elytra entirely exposed and shining (Figs 17, 18) ..... *L. multipunctellus* **sp. nov.**
- 4 (3) Elytral punctures very fine and sparse (distance between each puncture much greater than width of one puncture), costae weak but with large tufted tubercles bearing black hairs (Figs 21, 22) ..... *L. fallaciosus* Holzschuh, 1993
- Elytral punctures fine or coarse but distance between each puncture not greater than width of one puncture .....5
- 5 Elytra dark brown with extensive ochraceous spots and maculae (Figs 9, 10). Males with a distinct convexity (forming a tooth) near posterior margin of aedeagus (Fig. 61). Females with a very long, strongly curved spermatheca (Fig. 50) ..... *L. flavomaculatus* **sp. nov.**
- Elytra without any distinct ochraceous spots and maculae. Aedeagus without any trace of convexity (or tooth) near posterior margin, short spermatheca ..... 6
- 6 (5) Elytra greyish or silvery grey with 2 large, distinct black spots immediately below median white band. Pronotum with 2 rounded black spots, slightly above middle (Figs 11, 12). .... *L. ocellatus* **sp. nov.**
- Elytral colour different. Elytra with an irregular to solid transversal dark brown or black band below middle. Pronotum with

- 2–4 dark spots, sometimes longitudinally elongated ..... 7
- 7 (6) Smaller and more slender species. Punctures on elytra very dense medially (distance between punctures not more than width of one puncture) with shining surface due to very short, fine and appressed pubescence. Lateral spines on pronotum small (Figs 13, 14) ..... *L. nigrofasciculosus* **sp. nov.**
- Larger and more robust species. Punctures on elytra weak medially (distance between punctures much greater than width of one puncture), dull surface medially, with pubescence sub-depressed and dense. Lateral spines on pronotum large ..... 8
- 8 (7) Elytral colour brownish to greyish, composed of appressed white, ochraceous and brown pubescence on a brown integument, interrupted with a transversal oblique whitish band on middle, lateral spines on pronotum very large (often curved backwards), a broad black spot or band below middle on elytra and a black spot on epipleuron below humeri (Figs 15, 16) ..... *L. holzschuhi* **sp. nov.**
- Elytral colour uniformly yellowish to green (without any transversal whitish band on middle), head small, frons narrow, lateral spines on pronotum broad but relatively short, elytral costae with numerous small tufted tubercles giving a distinct, spotted appearance (Figs 19, 20) ..... *L. shibatai* Hayashi, 1974

**TABLE 1.** Summary of *Acanthocinus* and *Leiopus* from Asia.

The nomenclatural details and history are based on Löbl & Smetana (2010), Wallin, Nylander & Kvamme (2009), Makihara (1986), Breuning (1963), Pic (1925), in addition to the present paper. Species marked with \* are known from China.

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**The genus *Acanthocinus* Dejean, 1821: 106**

**Subgenus *Acanthocinus* Dejean, 1821**

- \* *Acanthocinus (Acanthocinus) aedilis* (Linnaeus, 1758: 392) (*Cerambyx*) (Widely distributed in Asia and Europe)  
     = *dongbeiensis* Z. Wang, 2003: 258, 395 \*\*  
     = *marmoratus* (Villers, 1789: 239) (*Cerambyx*)  
     = *montana* (Audinet-Serville, 1835: 33) (*Ædilis*)  
     = *obliteratus* Pic, 1917: 9
- Acanthocinus (Acanthocinus) annamensis* Pic, 1925: 139 (Vietnam)
- \* *Acanthocinus (Acanthocinus) carinulatus* (Gebler, 1833: 302) (*Cerambyx*) (Widely distributed in Asia and Europe)  
     = *alpinus* (Redtenbacher, 1849: 494) (*Astynomus*)  
     = *sibiricus* (Motschulsky, 1860: 149) (*Astynomus*)
- \* *Acanthocinus (Acanthocinus) chinensis* Breuning, 1978: 57 (Endemic to China)
- Acanthocinus (Acanthocinus) elegans* Ganglbauer, 1884: 534 (Azerbaijan, Iran)
- \* *Acanthocinus (Acanthocinus) griseus* (Fabricius, 1792: 261) (*Cerambyx*) (Widely distributed in Asia and Europe)  
     = *nebulosus* Sulzer, 1761 (*nec* Linné, 1758: 11) (*Cerambyx*) (misapplied)  
     = *novaki* Tippmann, 1952: 153  
     = *obscurus* Pic, 1891a: 32
- \* *Acanthocinus (Acanthocinus) gundaiensis* Kano, 1933: 285 (Endemic to the island of Taiwan)
- Acanthocinus (Acanthocinus) hutacharerae* Makihara, 1986: 31 (Laos, Thailand)
- Acanthocinus (Acanthocinus) orientalis* K. Ohbayashi, 1939: 116 (Japan, Russia: Far East)
- Acanthocinus (Acanthocinus) sachalinensis* Matsushita, 1933a: 391 (Japan, Mongolia, Russia: Far East, East Siberia)
- \* *Acanthocinus (Acanthocinus) sinensis* Pic, 1916: 14 (Endemic to China)
- \* *Acanthocinus (Acanthocinus) subsolana* Z. Wang, 2003: 262, 395 (China, Northeast Territory) \*\*\*
- \* *Acanthocinus (Acanthocinus) tethys* Z. Wang, 2003: 262, 396 (Endemic to China) \*\*\*
- Acanthocinus (Acanthocinus) validus* Matsushita, 1936: 148 (North Korea)

**Subgenus *Acanthobatesianus* subgen. nov.**

- \* *Acanthocinus (Acanthobatesianus) guttatus* (Bates, 1873: 384) **comb. nov.** (from *Leiopus*) (China, Japan, South Korea)

## The genus *Leiopus* Audinet-Serville, 1835

### Subgenus *Leiopus* Audinet-Serville, 1835

\* *Leiopus (Leiopus) albivittis albivittis* Kraatz, 1879: 112 (*Liopus*) (Russia: East & West Siberia, Far East of Russia, China, Mongolia, South Korea)

= *ganglbaueri* Csiki, 1901: 116

*Leiopus (Leiopus) albivittis malaisei* Aurivillius, 1928: 42 (Russian Far East)

*Leiopus (Leiopus) andreae* Sama, 1994: 43 (Endemic to Cyprus)

*Leiopus (Leiopus) femoratus* Fairmaire, 1859: 62 (Iran, Turkey)

= *caspius* Ganglbauer, 1884: 531 (*Liopus*)

= *constellatus* Mulsant & Rey, 1863: 159

= *pachymerus* Ganglbauer, 1884: 532 (*Liopus*)

*Leiopus (Leiopus) kharazii* Holzschuh, 1974: 98 (Azerbaijan, Iran)

*Leiopus (Leiopus) masaoi* Tamura & Tamura, 1992: 195 (Endemic to Japan)

*Leiopus (Leiopus) montanus* Hayashi, 1968: 25 (Endemic to Japan)

= *montanoides* (Breuning, 1978): 58 (*Acanthocinus*)

*Leiopus (Leiopus) nebulosus caucasicus* (Ganglbauer, 1887: 25) (*Liopus*) (Turkey)

*Leiopus (Leiopus) nebulosus nebulosus* (Linnaeus, 1758: 391) (*Cerambyx*) (Kazakhstan)

= *bifasciatus* Goeze, 1777: 464 (*Cerambyx*)

= *dissimilis* Pic, 1889: 5

= *fasciatus* Villers, 1789: 239 (*Cerambyx*)

= *insulanus* Sláma, 1985: 19

= *monilis* Geoffroy, 1785: 75 (*Cerambyx*)

= *siculus* Pic, 1924: 22

= *taeniatus* Gmelin, 1790: 1863 (*Cerambyx*)

= *unifasciatus* Pic, 1891b: 23

\* *Leiopus (Leiopus) stillatus* (Bates, 1884: 254) (*Acanthocinus*) (China, Japan, South & North Korea, Russia: Far East)

= *japonicus* Pic, 1901: 342

*Leiopus (Leiopus) syriacus* Ganglbauer, 1884: 532 (*Liopus*) (Cyprus, Israel, Lebanon, Syria, Turkey)

= *major* Pic, 1891b: 23 (*Liopus*)

### Subgenus *Carinopus* subgen. nov.

\* *Leiopus (Carinopus) campbelli* (Gressitt, 1837: 613) **comb. nov.** (from *Acanthocinus*) (Endemic to China)

\* *Leiopus (Carinopus) fallaciosus* Holzschuh, 1993: 49 (Endemic to China)

\* *Leiopus (Carinopus) flavomaculatus* Wallin, Kvamme & Lin **sp. nov.** (Endemic to China)

\* *Leiopus (Carinopus) holzschuhi* Wallin, Kvamme & Lin **sp. nov.** (Endemic to China)

\* *Leiopus (Carinopus) multipunctellus* Wallin, Kvamme & Lin **sp. nov.** (Endemic to China)

\* *Leiopus (Carinopus) nigrofasciculosus* Wallin, Kvamme & Lin **sp. nov.** (Endemic to China)

\* *Leiopus (Carinopus) nigropunctatus* Wallin, Kvamme & Lin **sp. nov.** (Endemic to China)

\* *Leiopus (Carinopus) ocellatus* Wallin, Kvamme & Lin **sp. nov.** (Endemic to China)

\* *Leiopus (Carinopus) shibatai* Hayashi, 1974: 58 (*Leiops*) (Endemic to the island of Taiwan)

\*\*) *dongbeinesis* [sic] Z. Wang, 2003: 395 (misspelling).

\*\*\*) According to Z. Wang (2003), both *A. subsolana* and *A. tehys* resemble *A. griseus*. Unfortunately, all the photos of these species in the original descriptions are of females only. This, combined with very brief descriptions, makes further examination needed. We were not able to study the type specimens.

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**FIGURES 1–12.** Habitus. 1, *Leiopus kharazii* Holzschuh, 1974, male, 9.0 mm; 2, *Leiopus kharazii* Holzschuh, 1974, female, 9.0 mm; 3, *Leiopus albivittis* Kraatz, 1879, male, 6.0 mm; 4, *Leiopus albivittis* Kraatz, 1879, female, 6.8 mm; 5, *Leiopus stillatus* (Bates, 1884), male, 11.0 mm; 6, *Leiopus stillatus* (Bates, 1884), female, 8.0 mm; 7, *Leiopus (Carinopus) nigropunctatus* **sp. nov.**, paratype, male, 10.5 mm; 8, *Leiopus (Carinopus) nigropunctatus* **sp. nov.**, holotype, female, 11.4 mm; 9, *Leiopus (Carinopus) flavomaculatus* **sp. nov.**, holotype, male, 7.6 mm; 10, *Leiopus (Carinopus) flavomaculatus* **sp. nov.**, paratype, female, 11.5 mm; 11, *Leiopus (Carinopus) ocellatus* **sp. nov.**, holotype, male, 7.6 mm; 12, *Leiopus (Carinopus) ocellatus* **sp. nov.**, paratype, female, 10.9 mm.





**FIGURES 13–24.** 13, *Leiopus (Carinopus) nigrofasciculosus* **sp. nov.**, holotype, male, 8.2 mm; 14, *Leiopus (Carinopus) nigrofasciculosus* **sp. nov.**, paratype, female, 9.3 mm; 15, *Leiopus (Carinopus) holzschuhi* **sp. nov.**, holotype, male, 11.0 mm; 16, *Leiopus (Carinopus) holzschuhi* **sp. nov.**, paratype, female, 11.0 mm; 17, *Leiopus (Carinopus) multipunctellus* **sp. nov.**, holotype, male, 8.0 mm; 18, *Leiopus (Carinopus) multipunctellus* **sp. nov.**, paratype, female, 10.8 mm; 19, *Leiopus (Carinopus) shibatai* Hayashi, 1974, male, 9.1 mm; 20, *Leiopus (Carinopus) shibatai* Hayashi, 1974, paratype, female, 9.5 mm; 21, *Leiopus (Carinopus) fallaciosus* Holzschuh, 1993, male, 9.3 mm; 22, *Leiopus (Carinopus) fallaciosus* Holzschuh, 1993, holotype, female, 9.9 mm; 23, *Leiopus (Carinopus) campbelli* (Gressitt, 1937), **comb. nov.**, holotype, male, 6.6 mm; 24, *Acanthocinus (Acanthobatesianus) guttatus* (Bates, 1873), **comb. nov.**, male, 7.5 mm



**FIGURES 25–27.** 25, *Acanthocinus* (*Acanthobatesianus*) *guttatus* (Bates, 1873), **comb. nov.**, female, 8.5 mm; 26, *Acanthocinus* *griseus* (Fabricius, 1792), male, 10.0 mm; 27, *Acanthocinus* *griseus* (Fabricius, 1792), female, 11.0 mm.



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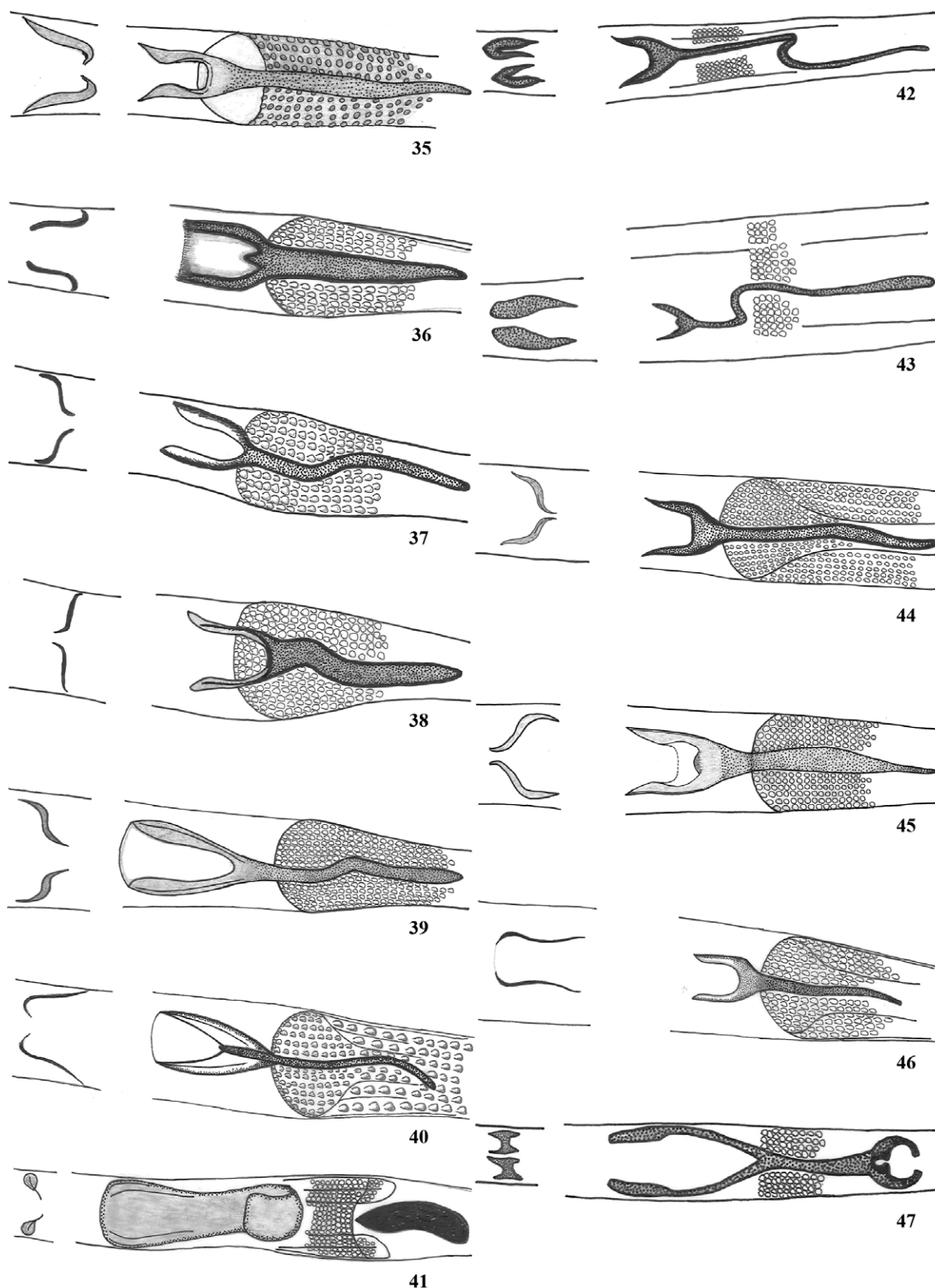
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**FIGURES 28–34.** Female abdominal ventrite V & part of ovipositor. 28, *Leiopus (Carinopus) nigropunctatus* **sp. nov.**; 29, *Leiopus (Carinopus) flavomaculatus* **sp. nov.**; 30, *Leiopus (Carinopus) ocellatus* **sp. nov.**; 31, *Leiopus (Carinopus) nigrofasciculosus* **sp. nov.**; 32, *Leiopus (Carinopus) holzschuhi* **sp. nov.**; 33, *Leiopus (Carinopus) multipunctellus* **sp. nov.**; 34, *Leiopus (Carinopus) fallaciosus*.





**FIGURES 35–47.** Drawings of the crescent-shaped sclerites at proximal end of basal segment (left), and the elongated, median sclerite inside the internal sac (right) in males. The median sclerite is partly enclosed in an intersegmental membrane with dense micro-reticulation. Scale bar is 0.5 mm. 35, *Leius* (*Carinopus*) *nigropunctatus* **sp. nov.**, paratype; 36, *Leius* (*Carinopus*) *flavomaculatus* **sp. nov.**, holotype; 37, *Leius* (*Carinopus*) *ocellatus* **sp. nov.**, holotype; 38, *Leius* (*Carinopus*) *nigrofasciculosus* **sp. nov.**, holotype; 39, *Leius* (*Carinopus*) *holzschuhi* **sp. nov.**, holotype; 40, *Leius* (*Carinopus*) *multipunctellus* **sp. nov.**, holotype; 41, *Leius* *kharazii*; 42, *Leius* *montanus* Hayashi, 1968; 43, *Leius* *stillatus*; 44, *Leius* *shibatai*; 45, *Leius* *fallaciosus*; 46, *Leius* *campbelli* **nov. comb.**; 47, *Acanthocinus* (*Acanthobatesianus*) *guttatus* **nov. comb.**



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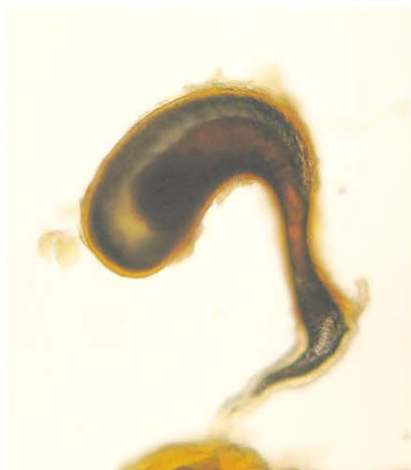
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**FIGURES 48–56.** Spermathecae. 48, *Leiopus kharazii*; 49, *Leiopus (Carinopus) nigropunctatus* **sp. nov.**; 50, *Leiopus (Carinopus) flavomaculatus* **sp. nov.**; 51, *Leiopus (Carinopus) ocellatus* **sp. nov.**; 52, *Leiopus (Carinopus) nigrofasciculosus* **sp. nov.**; 53, *Leiopus (Carinopus) holzschuhi* **sp. nov.**; 54, *Leiopus (Carinopus) multipunctellus* **sp. nov.**; 55, *Leiopus (Carinopus) fallaciosus*; 56, *Acanthocinus aedilis*.





**FIGURES 57–70.** Aedeagi. 57, *Leiopus kharazii*; 58, *Leiopus albivittis*; 59, *Leiopus stillatus*; 60, *Leiopus (Carinopus) nigropunctatus* **sp. nov.**; 61, *Leiopus (Carinopus) flavomaculatus* **sp. nov.**; 62, *Leiopus (Carinopus) ocellatus* **sp. nov.**; 63, *Leiopus (Carinopus) nigrofasciculosus* **sp. nov.**; 64, *Leiopus (Carinopus) holzschuhi* **sp. nov.**; 65, *Leiopus (Carinopus) multipunctellus* **sp. nov.**; 66, *Leiopus (Carinopus) fallaciosus*; 67, *Leiopus (Carinopus) shibatai*; 68, *Leiopus (Carinopus) campbelli* **nov. comb.**; 69, *Acanthocinus (Acanthobatesianus) guttatus* **nov. comb.**; 70, *Acanthocinus griseus*.

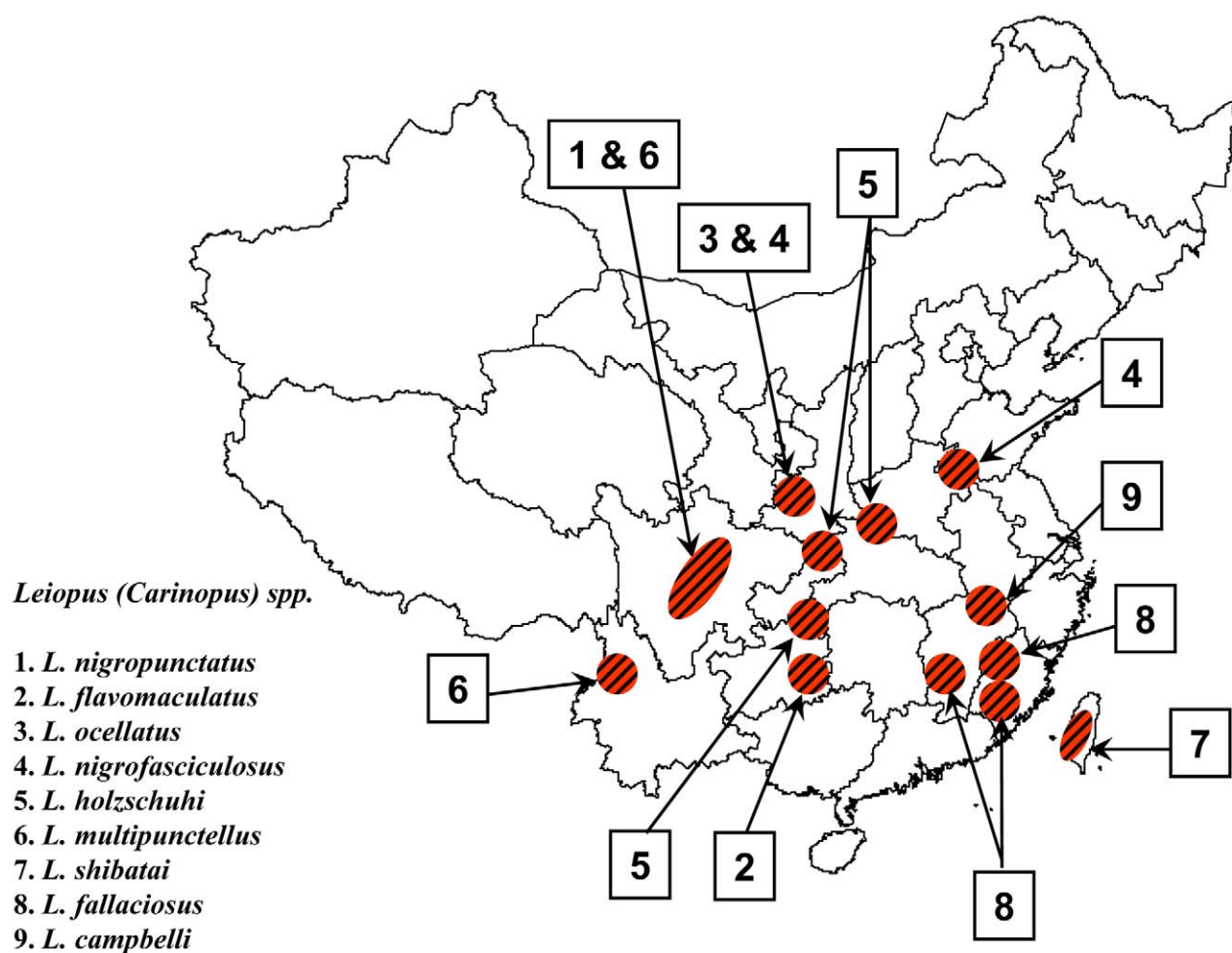


**FIGURES 71–84.** Parameres with median lobes. 71, *Leiopus kharazii*; 72, *Leiopus albivittis*; 73, *Leiopus stillatus*; 74, *Leiopus (Carinopus) nigropunctatus* **sp. nov.**; 75, *Leiopus (Carinopus) flavomaculatus* **sp. nov.**; 76, *Leiopus (Carinopus) ocellatus* **sp. nov.**; 77, *Leiopus (Carinopus) nigrofasciculosus* **sp. nov.**; 78, *Leiopus (Carinopus) holzschuhi* **sp. nov.**; 79, *Leiopus (Carinopus) multipunctellus* **sp. nov.**; 80, *Leiopus (Carinopus) fallaciosus*; 81, *Leiopus (Carinopus) shibatai*; 82, *Leiopus (Carinopus) campbelli* **nov. comb.**; 83, *Acanthocinus (Acanthobatesianus) guttatus* **nov. comb.**; 84, *Acanthocinus griseus*.





**FIGURES 85–98.** Male tergite VIII. 85, *Leiopus kharazii*; 86, *Leiopus albivittis*; 87, *Leiopus stillatus*; 88, *Leiopus (Carinopus) nigropunctatus* **sp. nov.**; 89, *Leiopus (Carinopus) flavomaculatus* **sp. nov.**; 90, *Leiopus (Carinopus) ocellatus* **sp. nov.**; 91, *Leiopus (Carinopus) nigrofasciculosus* **sp. nov.**; 92, *Leiopus (Carinopus) holzschuhi* **sp. nov.**; 93, *Leiopus (Carinopus) multipunctellus* **sp. nov.**; 94, *Leiopus (Carinopus) fallaciosus*; 95, *Leiopus (Carinopus) shibatai*; 96, *Leiopus (Carinopus) campbelli* **nov. comb.**; 97, *Acanthocinus (Acanthobatesianus) guttatus* **nov. comb.**; 98, *Acanthocinus griseus*.



**FIGURE 99.** Known records of *Leipus* spp. of the subgenus *Carinopus* **subgen. nov.** from China and Taiwan. 1. *L. nigropunctatus* **sp. nov.**; 2. *L. flavomaculatus* **sp. nov.**; 3. *L. ocellatus* **sp. nov.**; 4. *L. nigrofasciculosus* **sp. nov.**; 5. *L. holzschuhi* **sp. nov.**; 6. *L. multipunctellus* **sp. nov.**; 7. *L. shibatai*; 8. *L. fallaciosus*; 9. *L. campbelli* **nov. comb.**