Systematic position of *Perkovskius* Lafer 1989 (Coleoptera: Leiodidae: Catopocerinae), with description of a second species from the Far East of Russia

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Abstract. The genus *Perkovskius* Lafer 1989 is placed in Catopocerinae. Two species are recognized, *P. ussuriensis* Lafer 1989 and *P. zerchei* **n. sp.**, both from the Far East of Russia. Their morphologies are described, figured and compared to the two related genera: *Catopocerus* Motschulsky 1870 and *Glacicavicola Westcott* 1868. Both species differ in the general habitus, the shape of aedeagus and apex of paramere in males, and in the morphology of the VIIIth and IXth abdominal segments (ventrite VIII, spermatheca) in females. Distribution of both species is mapped.

Résumé. Position systématique de *Perovskius* Lafer 1989 (Coleoptera : Leiodidae : Catopocerinae), avec la description d'une seconde espèce de la Russie Orientale. Le genre *Perkovskius* Lafer 1989 est placé dans les Catopocerinae. Deux espèces sont reconnues, *P. ussuriensis* Lafer 1989 et *P. zerchei* **n. sp**., toutes deux provenant de Russie extrême orientale. Leurs morphologies externes sont décrites, représentées et comparées aux deux genres apparentés : *Catopocerus* Motschulsky 1870 et *Glacicavicola Westcott* 1968. Les deux espèces diffèrent par la forme générale de l'habitus, la forme de l'édéage et de l'apex des paramères chez les mâles et par la morphologie des segments abdominaux VIII et IX (épipleurite VIII, spermathèque) chez les femelles. Une carte des distributions géographiques est donnée.

Keywords: Catopocerinae, *Perkovskius*, taxonomy, morphology, distribution.

The genus *Perkovskius* was described by Lafer (1989), with the single species *P. ussuriensis* Lafer 1989 from the Primorye region of Russia as the type species. Originally, it was placed in Cholevinae: Leptodirini. However, in a short footnote, Lafer (1989) included the personal communication of E. E. Perkovsky, who placed *Perkovskius* in Catopocerinae, close to the Nearctic *Catopocerus* Motschulsky 1870. Recently, Newton (1998) discussed its dimorphic tarsal formula, and other morphological characters, and placed it in Leiodinae, tentatively in the most primitive tribe Pseudoliodini (Newton 1998: 90).

The original stimulation for the present paper was the relatively abundant material of *Perkovskius*, placed at our disposal by L. Zerche (DEIC), who recognised the variability between series of specimens from different localities and suggested the presence of more than a single species in the material. Later, it was followed by further material loaned by A. Plutenko, A. Pütz and M. Schülke; small series were also found in ZMAS and in the collection of O. Kabakov.

In the present paper, we discuss the systematic position of *Perkovskius*, based on newly discovered morphological characters; formally redescribe *P. ussuriensis* and describe another species, with notes on the geographical distribution.

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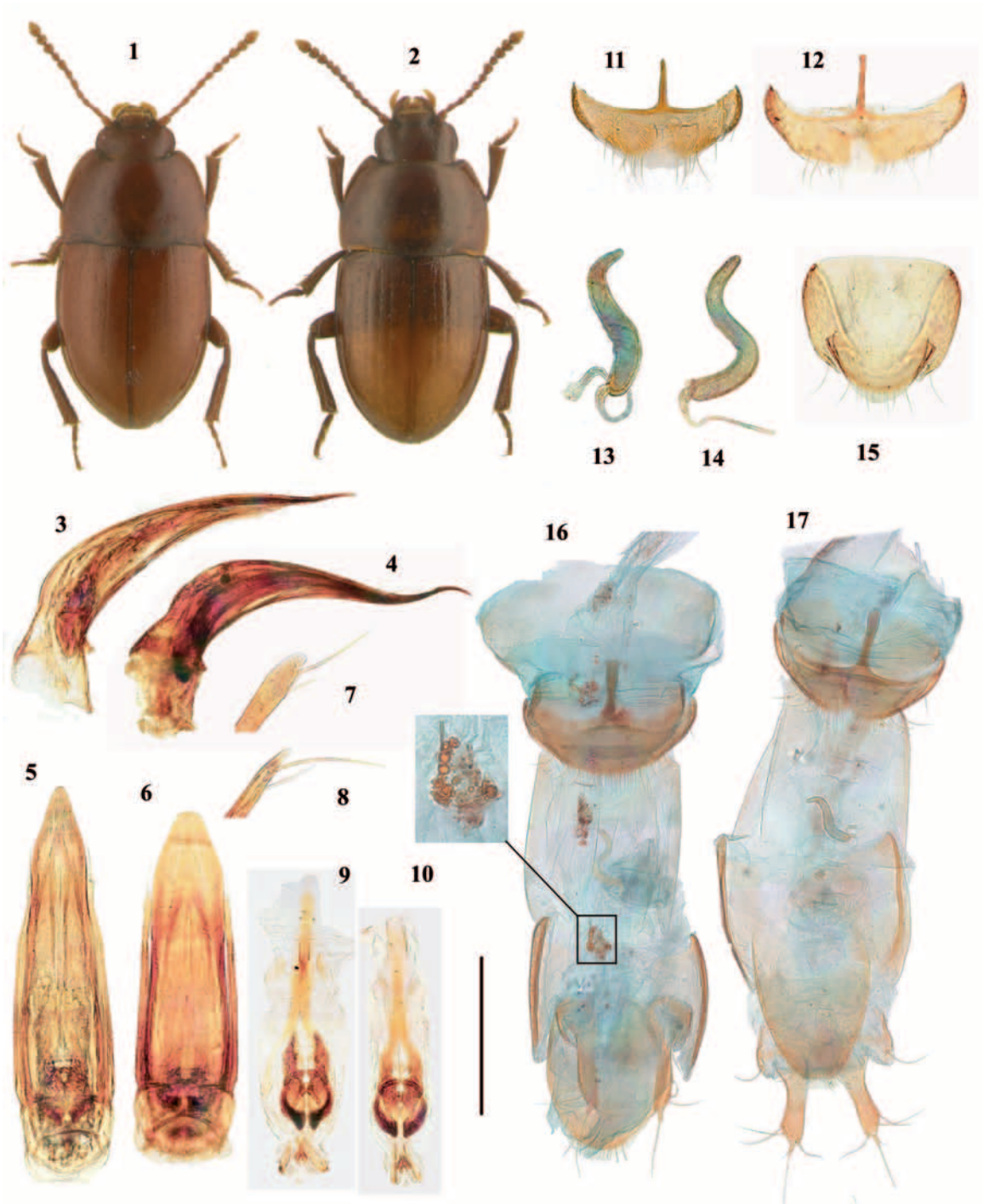
Material and method

The following abbreviations are used for institutions and private collections cited in this paper: APUC, A. Pütz collection, Eisenhüttenstadt; DEIC, Deutsches Entomologisches Institut, Müncheberg (L. Zerche); JRUC, J. Růžička collection, Praha; FMNH, Field Museum, Chicago (A. F. Newton); MPEC, M. Perreau collection, Paris; MSCC, M. Schülke collection, Berlin; OKAC, O. Kabakov collection, St. Petersburg; UPMC, Université Pierre et Marie Curie, Paris 6, Paris; ZMAS, Russian Academy of Sciences, Zoological Institute, St. Petersburg (M. G. Volkovich).

Specimens of the newly described species are provided with one red printed label "HOLOTYPUS or PARATYPUS (male or female symbol) / *Perkovskius zerchei* sp. n. / Michel Perreau et Jan Růžička det. 2005". Exact label data are cited for all material studied, separate lines on labels are indicated by "/", separate labels by "//". Author's remarks and comments are found in square brackets; [p], preceding data within quotation are printed; [hw], the same but hand-written. When necessary, data in Cyrillic has been transliterated into the Roman alphabet.

The microscopic slides of female genitalia were obtained after treatment in KOH 0.1 N, stained with Azoblack and mounted in Euparal or DMHF. The observations and pictures were made on a photonic microscope ZEISS axiolab with a digital camera SPOT. SEM pictures have been taken on a JEOL JSM 840A scanning electron microscope after metal coating.



Figures 1–17
Genus *Perkovskius* Lafer, habitus dorsal view. **1,** *Perkovskius ussuriensis* Lafer (male, Ussuriysky Zapovednik, body length 3.3 mm; DEIC). **2,** *P. zerchei* n. sp. (male, Gorelaya Sopka, body length 3.5 mm; MSCC). Genus *Perkovskius* Lafer, genital segments. **3,** *Perkovskius ussuriensis* Lafer, aedeagus, lateral view. **4,** *P. zerchei* n. sp., aedeagus, lateral view. **5,** *P. ussuriensis* Lafer, aedeagus, ventral view. **6,** *P. zerchei* n. sp., aedeagus, ventral view. **7,** *P. ussuriensis* Lafer, paramere, lateral view. **8,** *P. zerchei* n. sp., paramere, lateral view. **9,** *P. ussuriensis* Lafer, internal sac of the median lobe, ventral view. **10,** *P. zerchei* n. sp., internal sac of the median lobe, ventral view. **11,** *P. ussuriensis* Lafer, ventrite VIII male. **12,** *P. zerchei* n. sp., ventrite VIII male. **13,** *P. ussuriensis* Lafer, spermatheca. **14,** *P. zerchei* n. sp., spermatheca. **15,** *P. ussuriensis* Lafer, abdominal segment IX male. **16,** *P. zerchei* n. sp., abdominal segments VIII and IX female, with a detailed view of the content of the alimentary canal. **17,** *P. ussuriensis* Lafer, abdominal segments VIII and IX female. The scale bar is 200 µm for figs. 7, 8, 13, 14 and 500 µm for figs. 3 to 6, 9 to 12 and 15 to 17.

The terminology of the sclerites of the female abdominal terminalia follows the work of Deuve (2001).

Morphological comparisons of *Perkovskius* with Catopocerinae have been checked on the following species: both sexes of *Glacicavicola bathyscioides* Westcott 1968, *Catopocerus appalachianus* Peck 1975, *C. capizzii* Hatch 1957, *C. cryptophagoides* Mannerheim 1852, *C. subterraneus* Hatch 1935, *C. ulkei* Brown 1933; and female specimen of *C. hamiltoni* Horn 1892, *C. ovatus* Hatch 1957 and a new Chilean genus under description by A. F. Newton (Newton 2000).

Systematics and taxonomy

Perkovskius Lafer

Perkovskius Lafer 1989: 318 (type species *P. ussuriensis* Lafer 1989, by original designation).

Description. Length: 3.2–3.8 mm. Color uniformly reddish brown. Wingless. Eyeless.

Head without occipital carina, with two kinds of punctures: a few large setiferous points, and some randomly distributed small points among a tiny microreticulation. Antennal insertion concealed (fig. 20). Epistomal suture without stem. Gular sutures widely separated (fig. 20).

Pronotum approximately 1.6 times wider than long (length measured in the middle (see table 1 for more accurate measures). Lateral and anterior sides with a marginal carina. Punctured with a small number (~40) of sparsely distributed large setiferous points and other tiny pores located at some intersections of a reticulated network.

Elytra approximately 1.2 times longer than wide together (see table 1 for more accurate measures); parallel in the first third of the length, then regularly narrowed towards the apex, the sides rounded. Surface with more or less strong longitudinal striae according to the species (figs. 21 and 22). Puncture large and irregular, with transversal tiny strigae but without microreticulation (figs. 21 and 22).

Abdomen with five visible abdominal ventrites in both sexes (abdominal segments III to VII), the eighth segment invaginated into the seventh. Ventrite VIII with an expansion of the anterior edge in both sexes (figs. 11,12, 16 and 17). Prosternum longer than the procoxae. Mesosternal carina cut in two parts in the middle by a deep notch (fig. 18). This shape of the mesosternal carina is somewhat similar to *Cainosternum* Notman, 1921 (Leiodinae: Agathidiini) (Wheeler 1986).

Appendages: Procoxae closed. Mesocoxae closed by both a metasternal process and a mesosternal carina (fig. 18). Metacoxae widely separated (fig. 18). Tibiae with strong spines and setae. Tarsal empodium of all tarsi with two setae.

Male. Tarsal formula: 5-5-3. Protarsus (figs. 23, 26) and mesotarsus (fig. 24) dilated, both equipped with a set of adhesive phanerae with a circular apical surface. Metatarsus not dilated (fig. 25). Aedeagus slender in lateral view (figs. 3, 4), internal sac with a complex set of sclerites (figs. 9–10). Parameres with two unequal upturned setae (figs. 7–8).

Female. Tarsal formula: 4-4-3, all tarsi not dilated and without adhesive phanera. Spermatheca elongated, weakly sclerotized and more or less curved according to the species (figs. 13 and 14).

In the alimentary canal some spores have been observed (fig. 17).

Perkovskius ussuriensis Lafer

Perkovskius ussuriensis Lafer 1989: 318.
Perkovskius ussuriensis: Newton 1998: 90-91.

Type material examined. Paratype male (in glycerine, FMNH), labelled "Primorye, r. Dvorov- / ka, s. Lesnoy Kordon, / dolina ruch. Lamazin / 29.5.1983 G. Lafer // (on underside) chernopikhtar- / nik. Zhuk nay- / den v pochve, / privez. iz. L. Kordona [hw, Lafer's MS, in Cyrillic alphabet] [translation: Primorye, Dvorovka region, Lesnoy Kordon village, valley of the Lamazin brook … dark coniferous forest, beetle found in the soil, coming from L. Kordon, 43°38'N 132°33'E] // Sciaphyes / sibiricus Rttr. / G. Lafer det. 1983 [hw, Lafer's MS] // Paratypus / Perkovskius / ussuriensis Laf. / G. Lafer det. 1988 [hw, Lafer's MS, pink label] // LEIODIDAE: / Perkovskius / ussuriensis Lafer / 1 male paratype, in glycerin [hw] / FIELD MUSEUM NAT. HIST. [p]".

Additional material examined. 1 ♂, 2 ♀ (OKAC), labelled "Yuzh. Primorye / Khasan. r-n. Ryazanovka / 20.9.1985 Kabakov [leg.] [hw, in Cyrillic alphabet]" [42°18'N, 131°14'E]; 7 ♂, 6 ♀ (DEIC, JRUC, MPEC), labelled "RUSSIA:Primorskiy kray / Ussuriysky Zapovednik / 33 km SE Ussuriysk // 43.37 N 132.18 E / 13.VI.1993, 500 m / leg. L. Zerche [p]"; 1 ♀ (MSCC), labelled "Russland: Primorie (S36) / Lazovski R., Lazo / Tal der Lazowka / 16.V.1997 / leg. J. Sundukov [p]" [43°10'N, 134°00'E]; 1 ♀ (OKAC), labelled "Yu. Primorye / 5 km W Lazo / 15 IX 1998 Kataev [leg.] [hw, in Cyrillic alphabet]"[43°22'N, 133°50'E]; 3 ♂, 2 ♀ (ZMAS), labelled "Maritime Terr., Lazo / Distr., Priamaya Pad' / ca. 5-8 km W Lazo, / 15. IX. 1998 Kataev leg. [p]" [43°22'N, 133°50'E]; 1 ♂ (MSCC), labelled "Russia or.: Primorie / Lazovsky Nat. Res., Kordon / Proselochny, 134°07′43"E / 43°00′34"N, 4.-6. X. 1999 / leg. J. Sundukov [p]"; 1 ♂ (MSCC), labelled "Russia or.: Primorie / Lazovsky Res., Kordon / Amerika, 134°03′01"E / 43°16′16"N, 30. IX. 1999 / leg. J. Sundukov [p]".

Diagnostic description. Habitus fig. 1. In addition to the characters of the genus. Large setifer points of the head

Table 1. Measurements of species of *Perkovskius* Lafer.

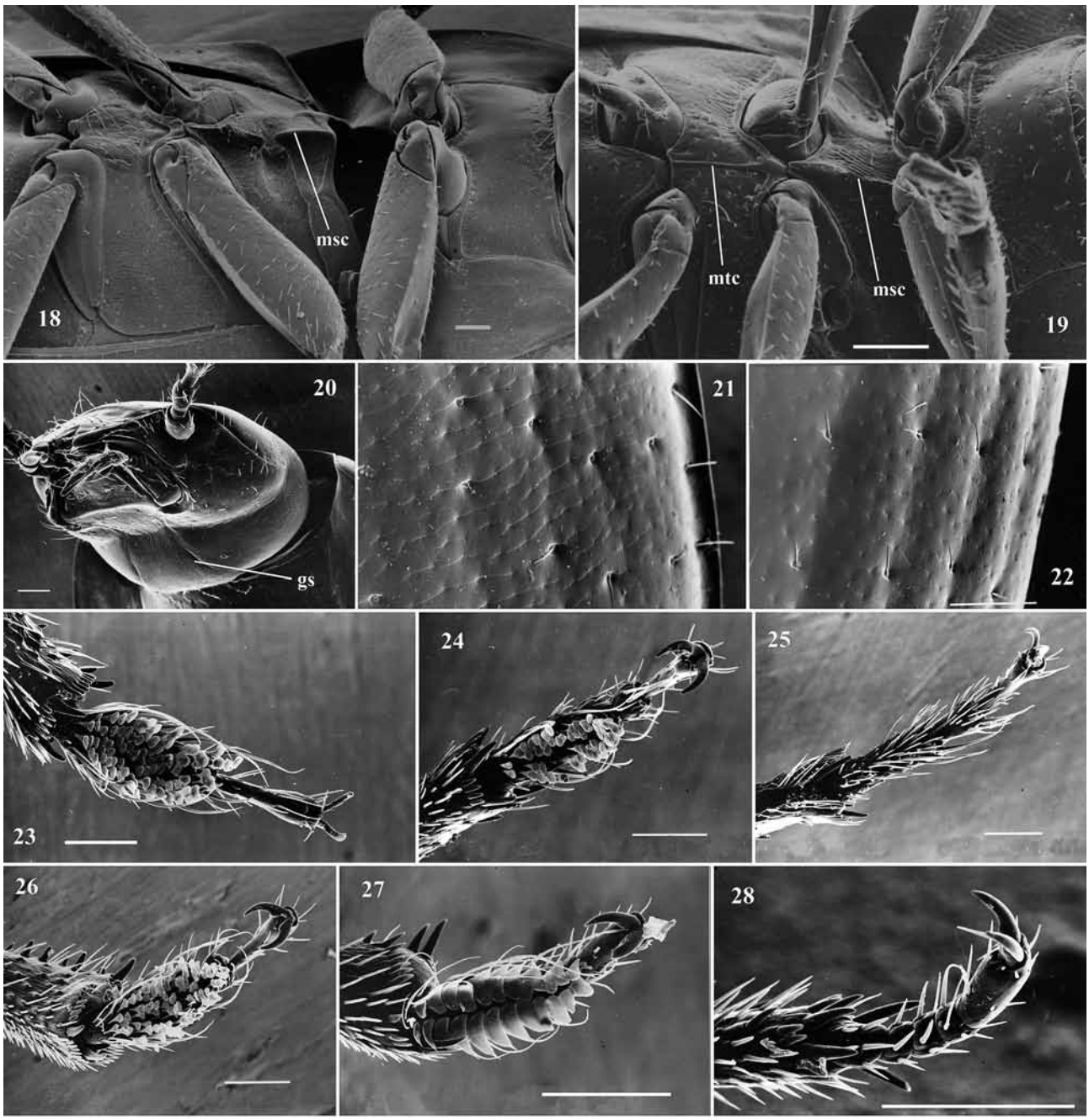
Measurements given for each character in the form "minimum – maximum (mean ± standard deviation)"; TBL, total body length, EW, combined maximum width of elytra, PMW, maximum width of pronotum, PML, medial length of pronotum.

Species/character	TBL (mm)	EW (mm)	PMW / PML
P. ussuriensis, males (n = 13)	3.20–3.46 (3.37±0.07)	1.51–1.73 (1.59±0.06)	1.50–1.63 (1.58±0.03)
P. ussuriensis, females (n = 12)	3.15–3.49 (3.32±0.10)	1.46–1.63 (1.54±0.05)	1.55–1.64 (1.59±0.02)
P. zerchei n. sp., males (n = 25)	3.29–3.83 (3.51±0.13)	1.49–1.80 (1.59±0.09)	1.48–1.62 (1.58±0.03)
P. zerchei n. sp., females (n = 10)	3.10–3.63 (3.44±0.17)	1.46–1.61 (1.56±0.04)	1.54–1.67 (1.61±0.04)

roughly aligned in two transversal rows: one on the occipital part of the head and one near the epistomal suture. Elytra with weak longitudinal striae (figs. 1, 21).

Male. Protarsus approximately 0.6 times as wide as the apex of the protibia (fig. 26). Aedeagus regularly curved in lateral view (fig. 3), the apex triangular in dorsal view (fig. 5). Apex of the parameres thick (fig. 7). Posterior edge of the ventrite VIII with a triangular notch (fig. 11).

Female. Posterior edge of the ventrite VIII notched in the median part (fig. 17). Abdominal tergite IX elongate,



Figures 18–28
18, *Perkovskius zerchei* n. sp., ventral view. **19,** *Catopocerus cryptophagoides* Mannerheim, ventral view. **20,** *Perkovskius zerchei* n. sp., head, ventral view. **21,** *P. ussuriensis* Lafer, elytral surface. **22,** *P. zerchei* n. sp., elytral surface. **23,** *P. zerchei* n. sp., protarsus ventral view. **24,** *P. zerchei* n. sp., mesotarsus, ventral view. **25,** *P. zerchei* n. sp., metatarsus, ventral view. **26,** *P. ussuriensis* Lafer, protarsus ventral view. **27,** *C. cryptophagoides* Mannerheim, protarsus, ventral view. **28,** *C. cryptophagoides* Mannerheim, mesotarsus, ventral view. msc=mesosternal carina, mtc=metasternal carina, gs=gular sutures. Scale bars are 100 μm.

approximately 1.45 times longer than wide (fig. 17). Spermatheca short, the basal part weakly curved (fig. 13).

Variability. None noted.

Distribution. Far East of Russia: southern part of the Primorye region (fig. 36).

Perkovskius zerchei n. sp.

Type material. Holotype ♂ (DEIC), **labelled** "Russia or., Far East / Primorskij Kraj / Lasovskij distr. // Mt. Sestra,1500-1600 m / 30km NO-Laso / 7.-11. 9. 1994 / leg. J. Sundukov [p]" [43°31'N, 134°05'E]. Paratypes: 8 ♂ 1 ♀ (1 ♂, 1 ♀ teneral) (DEIC, JRUC, MPEC), labelled ditto; 1 ♂ (JRUC), labelled "Russia, Primorskyi reg. / S Sikhote Alin mts., / Mt. Oblachnaya, 1500–1700 m, / 18.VI.1982, A. Plutenko leg. [p]" [43°40'N, 134°08'E]; 5 ♂ (DEIC, JRUC, MPEC), labelled "RUSSIA / Partizansk distr. / Alexeyevsky Khreb. / 20 km E Sergeyevka // S env.Mt. Olkhovaya / 800-1200 m 27.VII. / 1993 Pütz & Wrase [leg.] [p]" [43°20'E, 133°37'E]; 4 ♂ (APUC), labelled "Russia or., Far East / Lasovskij distr. / Mt. Sestra, 1400-1500m / 31.VIII.1995, leg.J.Sundukov [p]" [43°31'N, 134°05'E]; 2 ♀ (MSCC), labelled "Russland: Primorie (S38) / Südl. Sichote-Alin, Parti- / sanski Geb., Lysaja 1400- / 1500m, 14.-17. VI. 1996 / leg. J. Sundukov [p]" [43°27'N, 133°01'E]; 3 ♂, 2 ♀ (JRUC, MSCC, MPEC), labelled "Russland: Primorie (S17) / Südl. Sichote - Alin / Gorelaja Sopka, Taiga / 1400m, 14.-17. VII. 1997 / leg. J. Sundukov [p]" [43°30'N, 134°06'E]; 5 ♂, 4 ♀ (MSCC, JRUC, MPEC), same label except for " (S33) … 31.VIII. 1997 [p]"; 1 ♂ (JRUC), labelled "Russia or. Primorie / Sichote-Alin Mts., Gorelaja / Sopka Mt., 134°06′08" E / 43°30′30" N, 1300-1400 m / 17.-20.VI.1999, Sundukov [leg.] [p]"; 1 ♀ (APUC), labelled "Russia, or., Primorskij Kraj / Sikhote Alin Mt. Range / Partisanskij Chr., spring / valley Olchovoi, 15 - / 17.V.1995, leg. J. Sundukov.

Diagnostic description. Habitus fig. 2. In addition to the characters of the genus.

Large setifer puncture of the head composed of one transversal row of points on the occipital part of the head and several other points more or less randomly distributed forward the row. Elytral surface with strong longitudinal striae (figs. 2; 22).

Male. Protarsus approximately 0.8 times as wide as the apex of the protibia (fig. 23). Mesotarsus approximately 0.65 times as wide as the mesotibia (fig. 24). Aedeagus sinuous in lateral view (fig. 4), the apex rounded in dorsal view (fig. 6). Apex of the parameres thin (fig. 8). Posterior edge of ventrite VIII with a quadrangular notch (fig. 12).

Female. Posterior edge of ventrite VIII regularly rounded (fig. 16). Abdominal tergite IX wider than *P. ussuriensis*, approximately 1.3 times longer than wide (fig. 16). Spermatheca elongate, the basal part strongly curved (fig. 14).

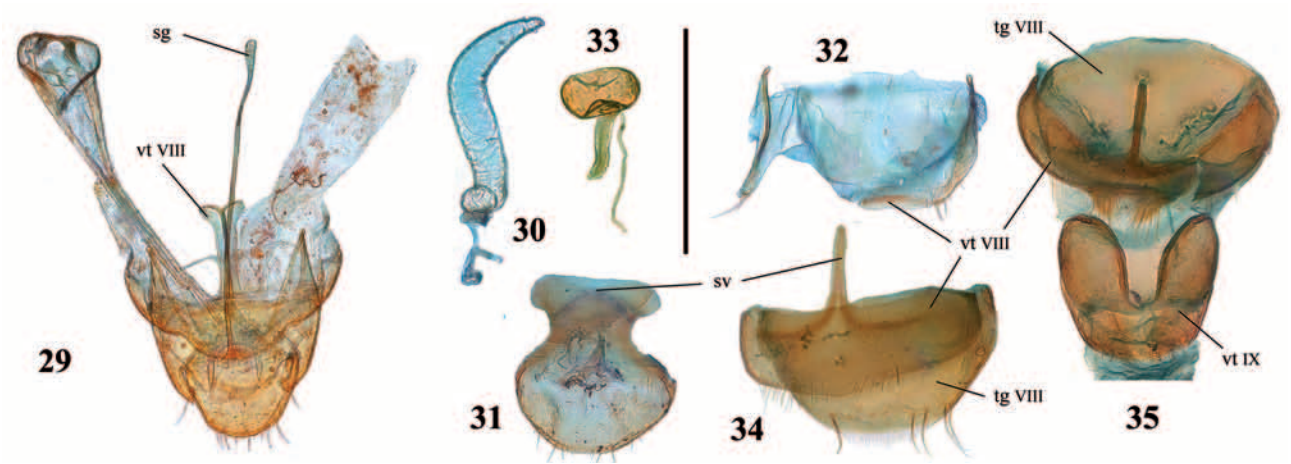
Variability. The series of males from Mt. Olkhovaya (collected at altitude 800–1200 m) and the single male from Gorelaya Sopka Mt. (altitude 1300–1400 m) are larger (body size 3.59–3.83 mm) and more robust (width of elytra 1.73–1.80 mm); material from other localities (mostly collected at altitudes 1400–1700 m) is smaller (body size 3.09–3.63 mm) and more narrow (width of elytra 1.46–1.66 mm). However, no significant differences were found on genital characters, the differences in the habitus are considered only intraspecific and probably only reflect changing microclimatic condition on an altitudinal gradient.

Etymology. Patronymic, named in honour of Dr. Lothar Zerche (DEIC), an eminent specialist in Staphylinidae.

Distribution. Far East of Russia: southern part of the Primorye region (fig. 36).

Key to species of *Perkovskius*

1. Elytra with superficial longitudinal striae (figs. 1; 21). Apex of the aedeagus straight in lateral view (fig. 3) and triangular at apex (fig. 5). Apex of the parameres thick (fig. 7). Posterior edge of the male



Figures 29–35
Male and female abdominal segments VIII and IX. **29,** *Catopocerus subterraneus* Hatch, male abdominal segments VIII and IX. **30,** *C. subterraneus* Hatch, spermatheca. **31,** *C. subterraneus* Hatch, female abdominal segment VIII. **32,** *Catopocerus hamiltoni* Horn, female abdominal segment VIII. **33,** *Catopocerus hamiltoni* Horn: spermatheca. **34,** *Glacicavicola bathyscioides* Westcott, female abdominal segment VIII (ventral view). **35,** *Glacicavicola bathyscioides* Westcott, male abdominal segments VIII & IX (ventral view). tg: tergum; vt=ventrite; sg=spiculum gastrale; sv=spiculum ventrale (anterior apophyse to the female abdominal VIIIth ventrite). The scale bar is 200 µm for figs. 30; 33 and 500 µm for figs. 29; 31–32 and 34–35.

ventrite VIII with a triangular notch (fig. 11). Posterior edge of the female abdominal ventrite VIII notched (fig. 17). Spermatheca shorter, with the basal part slightly curved, the apex slender (fig. 13). Body length 3.2–3.5 mm ..... ***P. ussuriensis*** Lafer

- Elytra with deep longitudinal striae (figs. 2; 22). Apex of the aedeagus sinuous in lateral view (fig. 4) and rounded at apex (fig. 6). Apex of the parameres thin (fig. 8). Posterior edge of the male ventrite VIII with a quadrangular notch (fig. 12). Posterior edge of the female abdominal ventrite VIII convex (fig. 16). Spermatheca longer, with the basal part strongly curved, the apex more rounded (fig. 14). Body length 3.1–3.8 mm ..... ***P. zerchei*** n. sp.

Discussion

Systematic placement of the genus *Perkovskius*

1. Previous placements of *Perkovskius*

The genus *Perkovskius* has been moved throughout the family Leiodidae by several authors. It was described in Cholevinae as belonging in Leptodirini (Cholevinae). A remark of Perkovsky included it in Catopocerinae. Newton (1998) moved it to Leiodinae Pseudoliodini.

Despite the distant metacoxae and the lack of eyes, the placement in Leptodirini is incompatible with the number of visible abdominal segments (5 versus 6 for Leptodirini), the tarsal formula (male 5-5-3, female 4-4-3 versus male 5-5-5 or 4-5-5, female 4-5-5 for Leptodirini) and the concealed antennal insertions (Leptodirini have antennal insertions visible from above). Pseudoliodini have 6 visible abdominal ventral plates versus 5 for *Perkovskius* and have a short prosternum unlike *Perkovskius*.

2. Presently known synapomorphies of Catopocerinae

The subfamily Catopocerinae presently contains two genera: *Catopocerus* Motschulsky, 1870 and *Glacicavicola* Westcott, 1968. The set of synapomorphies retained by Newton (1998) to support the monophyly of Catopocerinae are: an elongate prosternum (longer than procoxal cavities) (figs. 18, 19); widely separated metacoxae (figs. 18, 19); larval stemmata absent. The two first characters are also shared by the genus *Perkovskius*, the third character cannot be checked as *Perkovkius* larvae are unknown. Three other synapomorphies shared by Catopocerinae+Leiodinae: the concealed antennal insertions; the head flat and large and the body apparently glabrous (Newton 1998: 63) are also shared by *Perkovskius*. Newton (1998) also reports some larval apomorphies shared by Catopocerinae+Leiodinae which are impossible to check in *Perkovskius* since the larvae are not known. All these characters are also shared by a new genus from Chile under description by A. F. Newton (Newton 1998; 2000).

Two others characters have to be taken in account: the invagination of the VIIIth abdominal segment in the abdomen and the presence of an expansion on the anterior margin of the abdominal male ventrite VIII.

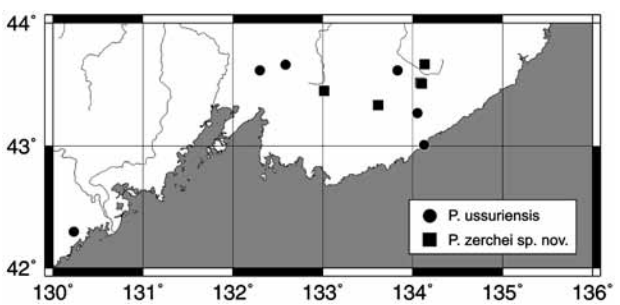


Figure 36
Distribution map of the genus *Perkovskius* Lafer.

3. Invagination of the VIII abdominal segment

In all presently known Catopocerinae and in the genus *Perkovskius*, the VIIIth abdominal segment is invaginated inside the abdomen, decreasing the visible number of abdominal segment to 7 (5 visible ventral plates if we consider as one the ventral parts of the three first segments fused together). This invagination does not necessarily bring with it a reduction of this VIIIth segment, in neither males nor in females (figs. 29; 31; 34; 35). However, such a reduction is observed in the female of *Catopocerus hamiltoni* where the eighth ventrite is reduced to a small transversal lamella (fig. 32), without any anterior expansion (*spiculum ventrale*). It is impossible to know if the reduction affects also the male VIIIth ventrite of *C. hamiltoni* because the male is not yet known (the picture of the aedeagus figured in Peck (1975) is in fact a female genital segment).

It should be noticed that in Platypsyllinae the invagination of the VIIIth segment inside the abdomen also exists in *Leptinus vaulogeri* Jeannel 1922 (Faille & Perreau, *pers. com.*).

4. Presence of an expansion on the anterior edge of male ventrite VIII

An expansion on the anterior margin of the eighth abdominal ventrite exists in both sexes in Catopocerinae and *Perkovskius*, not just in females as in most of Leiodidae. In females, such an expansion is well known in many Leiodidae (Perreau 1989) and also in many female coleopterans and often called "*spiculum ventrale*" (Deuve 1993; 2001). In Leiodidae, its presence in males occurs in Catopocerinae,

(figs. 29; 35), *Perkovskius* (figs. 11–12) and in a few species of Platypsyllinae (Faille & Perreau, *pers. com.*).

It would be misleading to call this expansion "*spiculum ventrale*" in males as well as in females. Within the Deuve's interpretation of the *spiculum ventrale* as probably being homologous to the primary location of the gonopore on the posterior margin of the segment VII (Deuve 2001: 207), such similar structures cannot be homologous in males and females. Moreover, the presence of a "*spiculum ventrale*" in female genitalia should be considered as plesiomorphic based both on Deuve's hypothesis on its origins and on its presence in many female coleopteran species, whereas in males, a similar structure is likely to be considered as apomorphic, based on its absence in most Leiodidae and as far as we know, in most male coleopteran species.

5. Placement of the genus *Perkovskius*

Based on the combination of these four synapomorphies:

1, elongate prosternum,

2, widely separated metacoxae,

3, invagination of the VIII abdominal segment,

4, presence of an expansion on the anterior edge of the VIIIth male ventrite,

shared together by *Perkovskius*, *Glacicavicola* and *Catopocerus*, the most appropriate placement of the genus *Perkovskius* appears to be in Catopocerinae.

The most morphologically distinctive characters of *Perkovskius*, when compared to *Catopocerus*, are the tarsal formula 5-5-3 in males, 4-4-3 in females (versus 5-5-5), the closed procoxal cavities (versus opened), the high mesosternal carina with a median notch (fig. 18) (versus low and continuous carina: fig. 19) and the absence of longitudinal metasternal carina (fig. 18) (versus presence of the metasternal carina: fig. 19). *Catopocerus* have dilated male protarsi (fig. 27), many species have non-dilated male mesotarsi without ventral phanera (*C. subterraneus*; *C. appalachianus*; *C. capizii*; *C. cryptophagoides*: fig. 28) but some others have dilated male mesotarsi as in *Perkovskius* (*C. ulkei*). Some species of *Catopocerus* have a very long *spiculum gastrale* (*C. subterraneus*: fig. 29; *C. capizzii*), unlike *Perkovskius* (fig. 15) and *Glacicavicola* (fig. 29), some others have not (*C. ulkei*; *C. appalachianus*). The spermatheca of *Perkovskius* is similar to that of some species of *Catopocerus* (*C. subterraneus*: fig. 31), but some other species of *Catopocerus* have different morphologies of the spermatheca (*C. hamiltoni*: fig. 33). The following key to genera of Catopocerinae, modified from Newton (1998), summarizes the main differences.

Key to genera of Catopocerinae

1. Gular sutures widely separated (fig. 20). Pronotum wider than long, subequal in width to the combined elytral width, with a lateral margin. Mesocoxal cavities closed (figs. 18, 19). Abdominal ventral plates free. Body ovoid, flattened, with short appendages (Catopocerini Hatch) **2**
- Gular sutures fused medially. Pronotum longer than wide, narrower than a single elytron, without lateral margin. Mesocoxal cavities confluent. Abdominal ventral plates III-IV connate. Body convex, appendages very long and slender (Glacicavicolini Westcott) ..... ***Glacicavicola*** Westcott

2. Epistomal suture with a median stem. Procoxal cavities opened. Metasternum with a median carina (fig. 19). Mesosternal carina low and continuous (fig. 19). Tarsal formula 5-5-5 in both sexes ..... ***Catopocerus*** Motschulsky
- Epistomal suture without stem. Procoxal cavities closed. Metasternum without carina (fig. 18). Mesosternal carina high, with a median notch (fig. 18). Tarsal formula 5-5-3 (male), 4-4-3 (female) ..... ***Perkovskius*** Lafer

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