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## Ground-beetles of the genus *Leistus* Froehlich of the Caucasus (Coleoptera Carabidae Nebriini)

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**Abstract.** A revision of the *Leistus* from Caucasus is here proposed. The total number of taxa known from this region is 15, 4 of which new: *Leistus (Pogonophorus) spinibarbis ponticus* n. ssp., *Leistus (Pogonophorus) montanus richteri* n. ssp., *Leistus (Leistus) elegans rosti* n. ssp. and *Leistus (Leistus) megrelicus* n. sp. Each species is described or redescribed, discussed and illustrated, with, when known, the ecological data.

**Резюме.** Предлагается ревизия рода *Leistus* с Кавказа. Общее число таксонов, известное из этого региона, составляет 15, 4 из которых описываются как новые: *Leistus (Pogonophorus) spinibarbis ponticus* n. ssp., *Leistus (Pogonophorus) montanus richteri* n. ssp., *Leistus (Leistus) elegans rosti* n. ssp. и *Leistus (Leistus) megrelicus* n. sp. Даны оригинальные описания всех видов или они описаны повторно; приведены обсуждения, иллюстрации и, при наличии, данные по экологии.

**Key words:** Coleoptera, Carabidae, Nebriini, *Leistus*, Caucasus, new species and subspecies, taxonomy, biogeography, ecology.

### INTRODUCTION

There are no special works on Caucasian *Leistus*; the first data on this subject were published by CHAUDOIR (1846) who described *L. fulvus* from «Lenkoran» and *L. femoralis* from the environs of Abbastumani from Nordmann's collection. The same author (CHAUDOIR, 1867) later described *L. caucasicus* from «Caucasus». Reitter repeatedly studied the genus *Leistus* in his works (REITTER, 1883-1909). In one of these works, REITTER (1905) described three new subgenera and made the subgeneric structure of *Leistus* more advanced. Altogether he described 6 new species of *Leistus* from the Caucasus and *L. rufomarginatus* (Duft.) was recorded by him for the first time for the region. BÄNNINGER (1925) in his review gave an improved determination key for subgenera, elucidated the relationships of many species, verified their distribution and recorded the first time *L. ferrugineus* (L.) for the Caucasus.

In the works of Russian authors data on the Caucasian *Leistus* are almost absent. LUTSHNIK (1921) recorded *L. fulvus* Chaudoir from the environs of Stavropol. In the monograph of IABLOKOFF-KHNZORIAN (1976) only one species, *L. fulvus* Chaudoir with the form *lenkoranus* Reitt., was mentioned for Armenia.

In recent years the French entomologist Perrault especially studied the genus *Leistus* and included material from the Caucasus. He verified the synonymy of some Caucasian species (PERRAULT, 1984, 1985a, 1985b) and in one of his works (PERRAULT, 1986) described *L. chadoiri* from SW Georgia and adjacent territory of Turkey and provided a determination key to the closely related species. It must be noted that the choice of some characters and the scarcity of illustrations made this key difficult to use in practice. Finally, PERRAULT (1988) redescribed 7 species from the Caucasus and designated the lectotypes, providing illustrations of morphological structures and maps of distribution. Unfortunately, the distribution of many species

was given incorrectly due to the lack of available material from the Caucasus.

The subgeneric structure of *Leistus* after Perrault's works changed substantially, since he proposed a new classification based on the structure of the mouth parts and male genitalia (PERRAULT, 1980, 1986). Undoubtedly, his system reflects more correctly the main evolutionary tendencies within the genus, but unfortunately, in his system along with compact and well defined subgenera, two very large and heterogeneous groups - *Pogonophorus* Latreille and *Leistus* s. str. remain, the taxonomic statuses of which are definitely higher than other ones. To improve this unbalanced system PERRAULT (1986) rehabilitated the subgeneric status of *Neoleistus* Erwin, which he had earlier regarded as a synonym of *Leistus* s. str. In my opinion, the American *Leistus* in external characters and genital structure are very close to the European *L. ferrugineus* (Linné) and I see no reasons to treat them as a separate subgenus. At the same time, I do not accept the inclusion in the subgenus *Neoleistus* of the Asiatic species *L. niger* Gebler, which is close to the European *L. piceus* Froehlich. Both species were treated earlier as belonging to the subgenus *Leistidius* K. Dan. These species differ markedly in the structure of the male median lobe of the aedeagus from the American ones. They are a good example of amphynemoral distribution of vicariant species with wide disjunction in Eurasia. A similar type of distributional pattern has been recorded for many plants and animals (KRYZHANOVSKIY, 1952).

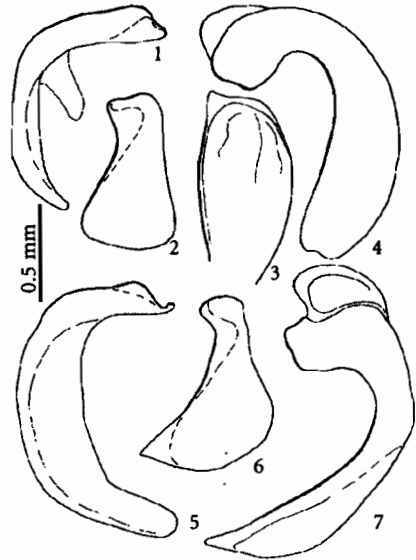
Some morphometric characters are given in table 1. The following measurements were used for morphometry: HW - head width (with eyes), PW - maximum prothoracic width, BW - basal prothoracic width, between hind angles, EW - maximum elytral width of both elytra, HL - head length, measured along midline from apical margin of clypeus to a point opposite posterior margin of eye, PL - pronotum length, EL - elytral length from the tip of pronotum to apex of elytra. SBL - standardized body length, is the sum of HL, PL and EL. The total body length was measured from the tip of longest mandible to the tip of longest elytra. Generally, if the species is well represented in collections, the smallest and the largest specimens were measured.

During this work the types of Reitter from Hungarian Museum of Natural History (HMNH) were studied and lectotypes were designated, as well as the collections of Zoological Institute, Russian Academy of Sciences, St.-Petersburg (ZISP), Zoological Museum of Moscow State University (ZMM), Museum für Naturkunde der Humboldt-Universität, Berlin (MB), and some private collections were studied. The following abbreviations are used in this article: ISU - Irkutsk State University, collection of V. G. Shilenkov; MHNP - Muséum National d'Histoire Naturelle, Paris.

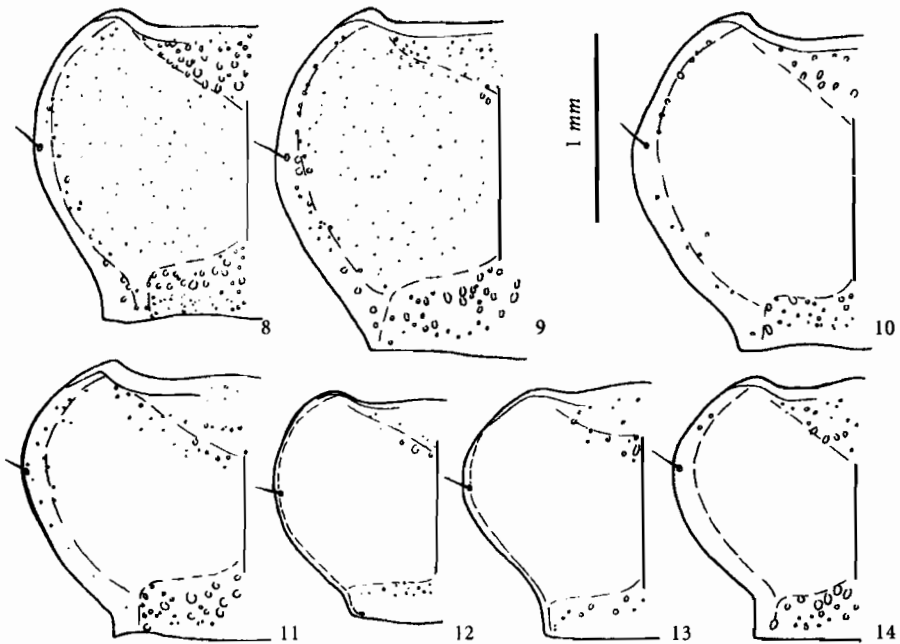
#### Key to the species and subspecies

- 1 (6) Ligula without median denticle, its central process with two stout setae (Fig. 25). Median lobe of aedeagus (Figs 3, 4) asymmetrical with simple short apex, membranous field preapical, twisted on right side (Subgenus *Pogonophorus* Latr.)
- 2 (5) Upper surface with green or blue lustre, head, pronotal disk and elytral intervals with small sparse punctation. Right paramere with large median lobe of aedeagus (Fig. 1).
- 3 (4) Pronotum (Fig. 9) laterally almost not sinuate before obtuse hind angles. Elytra long and narrow, 1.60 times as long as its width, their maximum width in apical third. Microsculpture coarse, isodiametric. . . . . *L. montanus richteri* n. ssp.
- 4 (3) Pronotum (Fig. 8) laterally clearly sinuate before rectangular or slightly acute hind angles. Elytra shorter and broader, 1.46-1.52 times as long as its wide, their maximum width near middle. Microsculpture faint, consisting of short transverse meshes. . . . .  
. . . . . *L. spinibarbis ponticus* n. ssp.

- 5 (2) Upper surface without green or blue lustre, dark brown, head, disc of pronotum and elytral intervals without punctation. Right paramere without median lobe of aedeagus (Fig. 5). Pronotum (Fig. 11) strongly rounded laterally, with short basal sinuation before acute hind angles. Elytra subrectangular, elongate, with prominent shoulders. Body length 8.2-8.9 mm. .... *L. rufomarginatus* (Duft.)
- 6 (1) Ligula with median tubercle on which two stout setae are inserted (Fig 26). Median lobe of aedeagus more or less symmetrical, as a rule with modified apex, membranous field situated dorsally and far from the apex (Subgenus *Leistus* s.str.).
- 7 (10) Lateral explanation of pronotum narrow, without punctation.
- 8 (9) Hind angles of pronotum obtuse, rounded apically (Fig. 12). Pronotum and elytra testaceous, head darker, appendages pale yellow. Median lobe of aedeagus - Figs 21, 22. Body length 6.5-7.5 mm. .... *L. terminatus* (Hellw.)
- 9 (8) Hind angles of pronotum rectangular with sharp apex (fig. 13). Body entirely dark piceous, appendages testaceous. Median lobe of aedeagus - Figs 19,20. Body length 6.5-8.0 mm. .... *L. ferrugineus* (L.)
- 10 (7) Lateral explanation of pronotum more or less wide, as a rule with distinct punctation.
- 11 (16) Elytra with prominent shoulders, widened apically or parallel-sided, hind wings fully developed.
- 12 (13) Head dark piceous to black, pronotum and elytra testaceous. Pronotum (Fig. 29) at sides uniformly rounded to small, acute, projected laterally hind angles. Elytra subrectangular. Apical part of median lobe of aedeagus shorter (Fig. 15). Body length 8.4-8.8 mm. .... *L. caucasicus* Chd.
- 13 (12) Colour with less contrast, body uniformly dark piceous, or head somewhat darker. Pronotum with basal sinuation of lateral margin. Elytra evidently widened apically, widest in apical third.
- 14 (15) Pronotum (Fig. 28) with short sinuation laterally before slightly acute hind angles, lateral explanation broader. Head constantly darker than rest of body. Apical part of median lobe of aedeagus longer (Fig. 17). Body length 8.1-9.0 mm. .... *L. lenkoranus* Reitt.
- 15 (14) Pronotum (Fig. 27) with long and rather deep sinuation before rectangular hind angles, parallel-sided basally, lateral explanation narrower. Body colour uniform, more rarely head somewhat darker. Median lobe of aedeagus - Fig. 18. Body length 7.1-9.5 mm. .... *L. fulvus* Chd.



Figs 1-7. *Leistus* spp.: 1-4, *L. spinibarbis ponticus* n. ssp. (holotype); 5-7, *L. rufomarginatus* (Duft.). 1, 5, right paramere; 2, 6, left paramere; 3, apical part of median lobe of aedeagus, right lateral view; 4, 7, median lobe of aedeagus, left lateral view.



Figs 8-14. Pronotum: 8, *L. spinibarbis ponticus* n. ssp. (holotype); 9, *L. montanus richteri* n. ssp. (holotype); 10, *L. femoralis* Chd. (Abbastouman); 11, *L. rufomarginatus* (Duft.); 12, *L. terminatus* (Hellw.); 13, *L. ferrugineus* (L.); 14, *L. chaudoiri* Perr. (holotype).

- 16 (11) Elytra subovoid, widest near the middle (Figs 23, 24), or rarely at apical third, hind wings reduced.
- 17 (26) Elytra elongate. Legs long and slender, proportion hind tibiae length to elytra width equals 0.93-1.31. Upper surface glossy or with very faint microsculpture consisting of transverse meshes on head and pronotum.
- 18 (23) Pronotum laterally with sharp or obtuse lobes (Figs 30, 50).
- 19 (20) Lateral lobes on pronotum rounded apically (Fig. 50). Median lobe of aedeagus - Figs 48, 49. Body length 8.3-8.7 mm. Megrelskij mountain range. . . . . *L. megrelicus* n. sp.
- 20 (19) Lateral lobes on pronotum sharp.
- 21 (22) Pronotum narrower with narrower lateral explanation. Elytra with distinct humeral sinuation, seems longer, widest at apical third. Median lobe of aedeagus massive (Fig. 38), thickened in apical third, with narrow apex. . . . . *L. denticollis* Reitt.
- 22 (21) Pronotum broader, their lateral explanation wider. Elytra subovoid, widest at middle, humeral sinuations invisible or very weak. Median lobe of aedeagus slender, with widened apex (similar to fig. 49). . . . . *L. odvarkai* Dvor.
- 23 (18) Pronotum laterally without lobes, its sides uniformly rounded.
- 24 (25) Eyes small, hardly prominent, temples long, sloped, equaling eye diameter. Elytra (Fig. 24) narrow, elongate (EL/EW=1.74-1.90). Pronotum (Fig. 31) with basal sinuation of lateral margin shallower, hind angles obtuse. Microsculpture very faint, entirely consisting of transverse meshes. Median lobe of aedeagus - Figs 35, 36. Body length 8.1-8.8 mm. . . . . *L. angustus* Reitt.

Table 1. Morphometry of the Caucasian *Leistus* Froeh.

Species	Sex	BL,mm	SBL,mm	HW/HL	PW/HW	PW/PB	PW/PL	EL/EW	EW/PW	EL/PL	No
<i>L. spinibarbis spinibarbis</i> (F.)	m	8.9-9.4	8.00-8.65	1.86-1.91	1.36-1.38	1.47-1.53	1.56-1.61	1.56-1.60	1.24-1.27	3.09-3.19.	3
	f	9.2-9.5	8.45-8.70	1.91-1.95	1.32-1.41	1.49-1.49	1.61-1.66	1.55-1.57	1.26-1.28	3.22-3.23	2
<i>L. spinibarbis ponticus</i> n. ssp.	m	8.2-8.5	7.60-7.75	1.86-1.90	1.37-1.38	1.43-1.44	1.56-1.63	1.46-1.52	1.25-1.40	3.00-3.19	3
	f	8.6-8.7	7.95-7.95	1.86-1.95	1.29-1.36	1.47-1.47	1.56-1.61	1.46-1.52	1.30-1.34	3.06-3.18	2
<i>L. montanus montanus</i> Steph.	m	7.7-8.6	7.05-7.80	1.77-1.85	1.27-1.31	1.59-1.68	1.52-1.59	1.50-1.57	1.27-1.28	2.90-3.19	2
	f	8.1	7.45	1.86	1.36	1.58	1.53	1.52	1.29	3.0	1
<i>L. montanus richteri</i> n. ssp.	f	9.7	8.80	1.79	1.26	1.64	1.54	1.60	1.33	3.11	1
<i>L. rufomarginatus</i> (Duft.), Europe	m	9.2-9.8	8.20-8.60	1.86-2.00	1.35-1.49	1.69-1.85	1.59-1.85	1.59-1.72	1.19-1.23	2.24-3.61	3
	f	9.1-9.8	8.25-8.90	1.83-1.96	1.35-1.38	1.65-1.71	1.71-1.77	1.60-1.62	1.19-1.26	3.43-3.47	3
<i>L. rufomarginatus</i> (Duft.), Caucasus	m	8.2-8.6	7.45-8.00	1.85-1.90	1.32-1.35	1.69-1.74	1.69-1.74	1.61-1.67	1.22-1.27	3.45-3.53	3
	f	8.9	8.25	1.82	1.43	1.73	1.78	1.59	1.23	3.48	1
<i>L. lencoranus</i> Reitt	m	8.1-8.6	7.35-8.10	1.73-1.82	1.28-1.32	1.67-1.76	1.55-1.57	-	-	3.23-3.28	3
	f	8.6-9.0	7.95-8.15	1.77-1.90	1.30-1.35	1.68-1.73	1.58-1.63	1.48-1.53	1.30-1.38	3.15-3.30	3
<i>L. caucasicus</i> Chd.	m	8.4-8.5	7.70-7.95	1.77-1.82	1.30-1.33	1.79-1.86	1.56-1.57	1.54-1.58	1.25-1.27	3.13-3.15	2
	f	8.5-8.8	7.85-8.30	1.73-1.78	1.31-1.34	1.72-1.77	1.58-1.63	1.54-1.56	1.27-1.32	3.09-3.22	2
<i>L. fulvus</i> Chd.	m	7.1-8.4	6.55-7.65	1.79-1.85	1.18-1.29	1.67-1.84	1.47-1.57	1.51-1.55	1.30-1.38	2.97-3.15	5
	f	8.1-9.5	7.35-8.60	1.71-1.83	1.28-1.28	1.70-1.83	1.48-1.56	1.48-1.51	1.32-1.39	3.06-3.14	3
<i>L. denticollis</i> Reitt.	m	8.9	7.00-7.65	1.62-1.68	1.26-1.28	2.05-2.16	1.34-1.37	1.75-1.86	1.20-1.33	3.03-3.13	2
	f	9.2	8.00	1.68	1.19	2.00	1.29	1.79	1.32	3.06	1
<i>L. angustus</i> Reitt.	m	8.6	7.25	1.63	1.29	2.00	1.29	1.90	1.25	3.06	1
	f	8.1-8.8	7.15-7.70	1.60-1.65	1.27-1.39	1.95-2.05	1.26-1.34	1.74-1.85	1.26-1.35	2.94-3.19	4
<i>L. elegans elegans</i> Rost, Mt. Karakaya	m	9.2-9.3	8.15-8.20	1.70-1.77	1.21-1.21	1.88-1.88	1.31-1.38	1.61-1.61	1.40-1.40	2.94-3.12	2
	f	9.2-9.8	8.00-8.65	1.71-1.73	1.16-1.20	1.76-1.81	1.29-1.36	1.58-1.59	1.45-1.50	3.06-3.14	2
<i>L. elegans elegans</i> Rost, Tsei env., Gisendon	m	8.1-8.6	7.10-7.30	1.62-1.71	1.18-1.24	1.90-1.91	1.29-1.40	1.61-1.69	1.35-1.42	3.00-3.17	3
<i>L. elegans rosti</i> n. ssp.	m	7.7-8.2	6.80-7.10	1.60-1.62	1.25-1.26	1.87-1.90	1.38-1.48	1.58-1.61	1.33-1.38	3.00-3.17	2
	f	8.1	7.05	1.70	1.21	1.86	1.41	1.56	1.44	3.17	1

- 25 (24) Eyes normal, prominent, temples distinctly shorter than eye diameter. Elytra (Fig. 23) wider and shorter, especially in females (EL/EW=1.56-1.69). Pronotum (Fig. 32) with basal sinuation of lateral margin deeper, hind angles slightly acute. Microsculpture obsolete. Median lobe of aedeagus - Figs 33, 34. Body length 7.7-9.8 mm. .... *L. elegans* Rost
- 26 (17) Elytra wider, subovoid. Legs shorter and stouter, proportion hind tibiae length to elytra width equal 0.82-0.86. Microsculpture distinct, on head and pronotum isodiametric, on elytra consisting of transverse meshes.
- 27 (28) Pronotum (Fig. 14) more cordiform, its basal part parallelsided, lateral explanation widest at middle, narrowed basally. Head near eyes densely rugulose punctate. Apical part of median lobe of aedeagus wide (Fig. 46). Body length 7.3-7.6 mm. .... *L. chaudiroi* Perr.
- 28 (27) Pronotum (Fig. 10) less cordiform, with short sinuation before rectangular or slightly acute hind angles, lateral explanation widened basally. Head near eyes with some longitudinal wrinkles. Apical part of median lobe of aedeagus narrow (Fig. 43). Body length 8.8-8.9 mm. .... *L. femoralis* Chd.

### *Leistus (Pogonophorus) rufomarginatus* (Duftschmid, 1812)

*Carabus rufomarginatus* Duftschmid, 1812, Fauna Austr., 11: 54 (loc. typ.: Austria, Wien env.).

*Leistus rufomarginatus*: Reitter, 1885: 216, fig. 9.

*Leistus (Leistophorus) rufomarginatus*: Reitter, 1905: 219.

*Leistus (Leistophorus) rufomarginatus*: Jakobson, 1906: 258.

*Leistus (Pogonophorus) rufomarginatus*: Bänninger, 1925: 333.

*Leistus (Pogonophorus) rufomarginatus*: Csiki, 1927: 345.

*Leistus (Pogonophorus) rufomarginatus*: Schweiger, 1970: 60, fig. 1.

*Leistus (Pogonophorus) rufomarginatus*: Perrault, 1980: 460, figs 2, 6.

*Leistus (Pogonophorus) rufomarginatus*: Perrault, 1982: 170.

**MATERIAL:** Azerbaijan: 1 ex., Apsheronkij district, Alty-Agatsh, 18. IV. 1984, *Carpinus-Quercus* forest litter near the stream, Belousov leg.; 1 ex., Bazarduzi, Bum valley, summer 1892, Shelkovnikov leg. Georgia: 1 ex., Gagra, 9.III.1928, D. Romashov leg.; 3 ex., Lagodekhi, 28. X. 1965, 1-2. X. 1968, in litter, Kryzhanovskij leg.; 1 ex., Tbilisi env., Tsherepash'e lake, 18. X. 1981, Golovatsh leg.; 1 ex., Adzharia, Khulo, Vedy valley, 11. X. 1981, Golovatsh leg.

**TAXONOMIC REMARKS.** There are no differences in external and genitalic features (Figs 5-7) between the Caucasian and European specimens. From W Turkey the ssp. *ottomanus* Schweiger was described on specimens with more rounded lateral margin of pronotum, with shorter, more robust and almost straight median lobe of aedeagus, with left paramere more strongly curved at apex (SCHWEIGER, 1970). The status of this form requires verification.

**DISTRIBUTION.** Carpathians and Transcarpathia, Moldova, Caucasus (Georgia and Azerbaijan), Central and East Europe to South Sweden on the north, to Holland and France (very sporadic) on the west, to NE Italy, Greece and Turkey on the south, introduced in England.

**ECOLOGY.** Forest species. In Europe it occurs predominantly in beech forests, and very sporadically in coniferous forests. It prefers soil rich of humus, but also lives on moss covered stones. It avoids high shade and moisture (LINDROTH, 1945). Autumn breeder, hibernating almost exclusively in the larval stage (LARSSON, 1939).

### *Leistus (Pogonophorus) spinibarbis ponticus* Kryzhanovskij et Shilenkov, n. ssp.

**MATERIAL:** Holotype ♂, Krasnodarskij region, Kotkh Mts., Goryatshij Klutsh, 19. V. 1956, K. Arnoldi leg. Paratypes, 1 ♂ 1 ♀, the same label; 1 ♂, Krasnodarskij region, Khrebtovoje, 17. V. 1981, Zamotajlov

leg.; 1 ♀, same locality, 20. IV. 1986, Zamotajlov leg.; 1 ♂, Krasnodarskij region, source of Kaverve river, Mt. Stshetka, 600 m, 20. IV. 1986, Zamotajlov leg.; 1 ♀, Krasnodarskij region, Khadyzhensk env., Ryabov Khutor, 22-24. V. 1981, A. Miroshnikov leg.; 1 ♂ 1 ♀, Abkhasia, Gagra, 9. III. 1928, D. Romashov leg.; 2 ♂, «Crimea».

Holotype and part of the paratypes are deposited in ZISP, 2 paratypes in ZMM, 2 paratypes in collection of A. Zamotajlov.

**DESCRIPTION.** Upper surface with bright blue-violet, more rarely with green metallic lustre. Head and pronotum brownish black, lateral margins of pronotum translucent reddish. Elytra brown, pronotal and elytral epipleura yellow-brown, appendages entirely yellow-brownish or yellow-reddish, underside dark with faint metallic reflection, apical sternites dark-reddish.

Head near the eyes rather coarsely and densely punctate, longitudinally rugulose, pronotum on the base, lateral margins and near the apex with dense and rather strong punctation. Moreover, elytrae, pronotal disk and vertex gently and sparsely uniformly punctate. Sides of pronotum, pterothorax and sternites 1-2. with rather dense and coarse punctures.

Elytra convex, subrectangular, weakly rounded laterally, their maximum width near middle; basal margin concave, merged obtusely with lateral one, humeral carina small and sharp; striae rather deep, somewhat flattened near the apex, evidently punctate, intervals moderately convex, flattened near the apex.

Microsculpture very faintly impressed, isodiametric on head, on pronotal disk and elytra consisting of short transverse meshes.

Male genitalia: figs 1-4.

Body length - 8.2-8.7 mm, body width - 3.2-3.6 mm.

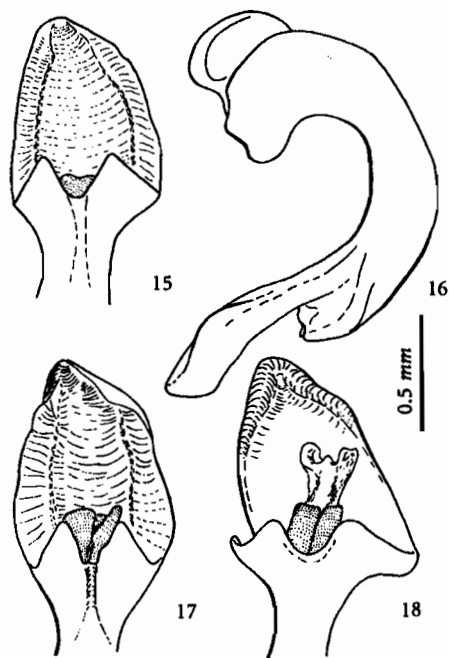
Very close to nominotypical subspecies but noticeably different in the smaller size and other body proportions (Table 1): pronotum narrower and less narrowed to the base, elytra shorter and in general wider than pronotum.

**DISTRIBUTION.** Crimea, southern part of Krasnodar region, Abkhasia.

**ECOLOGY.** Mesophilous; it lives in areas of deciduous forests with predominance of oak or beech, at 200-700 m. Rare species.

***Leistus (Pogonophorus) montanus richteri* n. ssp.**

**MATERIAL:** Holotype ♀ (ZISP), «Prov. Kars, Transcaucasia».



Figs 15-18. *Leistus* spp.: 15, *L. caucasicus* Chd.; 16, 17, *L. lenkoranus* Reitt. (Lectotype); 18, *L. fulvus* Chd. 15, 17, 18, apical part of median lobe of aedeagus, dorsal view; 16, median lobe of aedeagus, left lateral view.

ETYMOLOGY. The name is dedicated to the Russian coleopterist A. A. Richter, who first recognized this subspecies as new.

DESCRIPTION. Upper surface dark, matt, with green luster, appendages yellow-brown, pronotal and elytral epipleurae dark-reddish, underside dark, entire venter dark-reddish.

Frontal furrows wide and deep, rugulose-punctate. Pronotum (Fig. 9) with basal sinuation of lateral margin very short and shallow, their punctation smaller and denser than in nominative form.

Elytral silhouette subovoid-narrowed, with maximum width in apical third, shoulders rounded; basal margin almost straight, forming an obtuse angle with lateral one, humeral denticle very small. Striae shallower than in nominate form, their punctation weaker, intervals less convex, 3<sup>rd</sup> interval with 4 very small pores adjoining stria 3.

Microsculpture totally isodiametric, more coarse on elytra.

Body length 9.7 mm, body width 3.6 mm.

TAXONOMIC REMARKS. For separation of *L. spinibarbis* F. and *L. montanus* Steph. complexes PERRAULT (1982) used such morphometric characters as head width, basal prothoracic width and basal elytral width. After Perrault, the taxa of the *L. spinibarbis* complex have wider pronotum and elytral base, that is why their proportion BEW/HW exceeds 0.96 and the proportion BPW/HW exceeds 0.83. Taxa of the *L. montanus* complex have narrower pronotum and elytral base, proportions BEW/HW and BPW/HW do not exceed 0.96 and 0.83 respectively. The new subspecies has an intermediate position in these indexes (BEW/HW=1.0, BPW/HW=0.77), but undoubtedly belongs in the *L. montanus* complex in several characters like the elongate apically widened elytra with straight basal margin (hind wings developed but not functional) and the coarse isodiametric microsculpture. Moreover, the new subspecies differs from the nominate one in the form of pronotum and proportions (Table 1).

DISTRIBUTION. NE Turkey, could be recorded in Armenia.

### *Leistus (Leistus) terminatus* (Hellwig in Panzer, 1793)

*Carabus rufescens* Fabricius, 1775, Syst. Ent.: 247 (nec Ström, 1768) (loc. typ.: Europe).

*Leistus* (s. str.) *rufescens*: Reitter, 1905:223.

*Leistus* (s. str.) *rufescens*: Bänninger, 1925: 334.

*Leistus* (s. str.) *rufescens*: Csiki, 1927: 351.

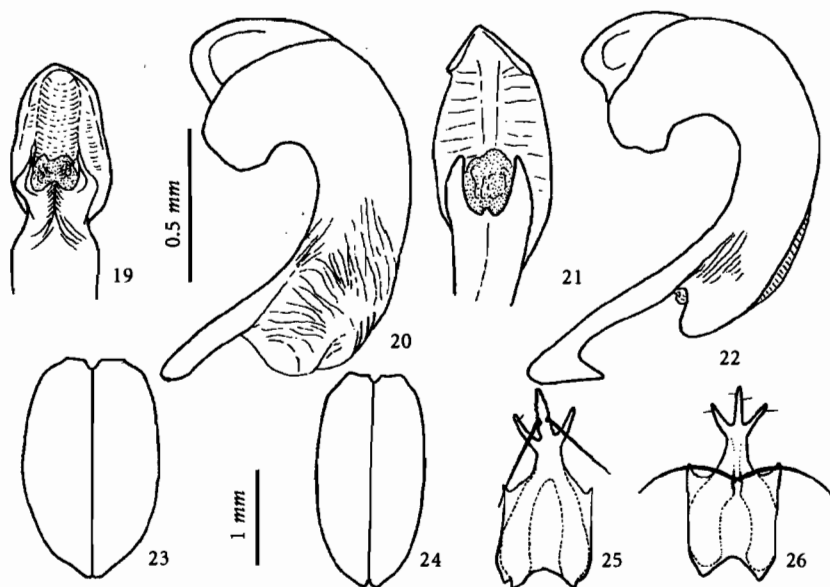
*Carabus terminatus* Hellwig in Panzer, 1793, Fauna Ins. Germ., 7: t. 2 (loc. typ.: Germany).

*Leistus terminatus*: Lindroth, 1985: 68.

MATERIAL: 1 ex., Karachai-Cherkessia: Bolshaya Laba valley, Pkhiya, 100 m, 15. VII. 1980, A. Zamotajlov leg.; 1 ex., Teberda env., 10-11.VI.1967, F. Hieke leg.; 1 ex., 30 km S Naltshik, I. Belousov leg.

DISTRIBUTION. In the European part of Russia mostly on the north, on the Russian Plain not recorded further south than Kaluga, Ukrainian Carpathians, Caucasus (first record!), in Siberia in the East to Baikal and Yakutiya (Lensk), recorded also in the mountains of Kazakhstan (Transili Alatau, Dzhungarskij Alatau, Saur) and adjacent territories of China (Kuldzha). In Northern Europe to the British Islands, in Central Europe sporadic and restricted to mountains. A lot of the disjunctions in the southern part of its range in the mountains are due to a previous wide distribution of the species in Pleistocene time.





Figs 19-26. *Leistus* spp.: 19, 20, *L. ferrugineus* (L.); 21, 22, *L. terminatus* (Hellw.); 23, *L. elegans* Rost; 24, *L. angustus* Reitt.; 25, *L. rufomarginatus* (Duft.); 26, *L. fulvus* Chd. 20, 22, median lobe of aedeagus, left lateral view; 19, 21, apical part of median lobe of aedeagus, dorsal view; 23, 24, elytra shape; 25, 26, ligula.

**ECOLOGY.** Species of shaded and humid places. It lives in forests, mostly in lowlands, more scarcely in coniferous, deciduous or mixed forests. In mountains found in forest zone and sporadically penetrating in alpine zone. Breeding in late summer, the last larvae instar hibernate. Teneral imagos were recorded from May 11 to June 8.

### *Leistus (Leistus) ferrugineus* (Linnaeus, 1758)

*Carabus ferrugineus* Linnaeus, 1758, Syst. Nat., ed. X: 415 (loc. typ.: Sweden).

*Leistus* (s. str.) *ferrugineus*: Bänninger, 1925:334; Csiki, 1927: 351.

**MATERIAL:** Recorded from the following points in the Caucasus and Ciscaucasus: Grozny, Naltshik, Tsheget, Teberda, Dombai, Caucasian natural reserve (Pslukh), Stavropol', Maikop, Krasnodar, Gelendzhik. In the Crimea everywhere except Tarkhankut (personal communication of M. Eidelberg).

**DISTRIBUTION.** Almost all European part of Russia except extreme north, to the Urals on the east, to the North Caucasus, Crimea, Moldova on the south. North and Central Europe, to the North Italy and Balkan peninsula on the south, introduced in North America.

**ECOLOGY.** Lives predominantly in light forests, bush, avoid shadows and high humidity. Found also on wet meadows and cultivated fields. In north it prefers more xerothermic stations, in steppe zone concentrated in ravines, in wet places (ARNOLDI, 1956). Autumn breeder with hibernating larvae. Teneral imagos were recorded from May 5 to July 21 (in north later).

### *Leistus (Leistus) caucasicus* Chaudoir, 1867

*Leistus caucasicus* Chaudoir, 1867: 261 (loc. typ.: «Caucasus»).

*Leistus caucasicus*: Reitter, 1885: 217.

*Leistus (Leistophorus) caucasicus*: Reitter, 1905: 222.

*Leistus (Leistophorus) caucasicus*: Bänninger, 1925: 334.

*Leistus (Leistophorus) caucasicus*: Schweiger, 1970: 64.

*Leistus* (s. str.) *caucasicus*: Perrault, 1986: 59.

*Leistus* (s. str.) *caucasicus*: 1988: 44, figs 1, 12, 18.

? *Leistus schuberti* Jedlička, 1968: 285, fig. 1 (loc. typ.: Anatolia mer., Namrun).

**MATERIAL:** Crimea: 3 ex., Nikitsky botanical garden, 2-21. V. 1979, S. Kurbatov leg.; 1 ex., same locality, ravine, 13. X. 1964, K. Arnoldi; 2 ex., Gursuf, 24. X. 1924, K. Arnoldi leg.; 3 ex., Angarskij Pass, 700 m, 19. V. 1948, K. Arnoldi leg.; 1 ex., Babugan-Yaila, 1200-1300 m, 20. IX. 1960, V. Zaslavskij; 1 ex., Kyzyl-Khoba, 27. V. 1912, Pliginskij leg.; 1 ex., Simferopol, Baidarskaya Yaila, 11. X. 1982, M. Eidelberg leg.; 1 ex., Starosel'e Mt., Tshufut-Kale, forest, 21. VIII. 1978, M. Eidelberg leg.; 1 ex., Karaevka, Belogorsk, 4. VI. 1978, M. Eidelberg leg.

**TAXONOMIC REMARKS.** The close affinity of *L. caucasicus* Chd. and *L. lenkoranus* Reitt. was recorded by BÄNNINGER (1925), who treated them as subspecies. This point of view was repeated in Csiki's catalog (CSIKI, 1927: 350). But PERRAULT (1986) again considered these two forms as distinct species.

*L. caucasicus* Chd. differs from *L. lenkoranus* Reitt. in the bicoloured body, shape of pronotum (Fig. 29), and the shorter apical part of median lobe of aedeagus (Fig. 15).

The male holotype is deposited in Muséum d'Histoire Naturelle, Paris (MHNP).

**DISTRIBUTION.** The exact distribution of this species is still to be clarified. It was described from the Caucasus without precise locality and was not recorded here later, but only in the collection of ZISP there is an old specimen with label «Caucasus». All modern data refer to the territory of Crimea. Apparently, widely distributed in Turkey as far as Lebanon and Cyprus on the south (see map in PERRAULT, 1988)

**ECOLOGY.** Silvicole, mostly on mountains. Teneral beetles were collected on 19 May and 21 August.

### *Leistus (Leistus) lenkoranus* Reitter, 1885

*Leistus lenkoranus* Reitter, 1885: 217 (loc. class.: Lenkoran, Caucasus).

*Leistus (Leistophorus) fulvus* var. *lenkoranus*: Reitter, 1905: 222.

*Leistus (Leistophorus) caucasicus* ssp. *lenkoranus*: Bänninger, 1925: 334, 339.

*Leistus (Leistophorus) caucasicus* ssp. *lenkoranus*: Csiki, 1927: 349.

*Leistus* (s. str.) *lenkoranus*: Perrault, 1980: 461, fig. 8.

*Leistus* (s. str.) *lenkoranus*: Perrault, 1986: 60.

*Leistus* (s. str.) *lenkoranus*: Perrault, 1988: 48, figs 4, 15, 19.

**MATERIAL:** Azerbaijan: 1 ex., Aurora, 12. IV. 1979, M. Danilevskij leg.; 1 ex., Girkanskij natural reserve, 26. I. 1982; 1 ex., same locality, in litter, 26. I. 1982, K. Makarov leg.; 2 ex., Astarinskij district, Palikesh, 12. X. 1984, I. Belousov leg.; 1 ex., between Veri and Siov, mountain meadows, 1800-2000 m, 2-3. VI. 1983, I. Belousov leg.; 1 ex., Lenkoranskij district, Bilyasar, 2. V. 1979, Dubrovin leg.; 1 ex., Bilyasar, Telyasevi-band, 9. VI. 1936, K. Arnoldi leg.; 1 ex., Lenkoranskij district, Alekseevka, IV. 1979, Vyshynskij leg.; 2 ex., same locality, 3. V. 1979, V. Belov leg.; 1 ex., Astarinskij district, Istisu, 8 km WSW Astara, *Quercus-Acer-Carpinus* forest, in litter and under the logs, 10-20 m, 18. X. 1983, S. Golovatsh leg.; 1 ex., same locality, 27. IV. 1984, Aliev leg.; 1 ex., Stepanakertskij district, Shusha, 18. VIII. 1977, I. Belousov leg.; 1 ex., Ismail'skij district, source of Girdimantshai river, near Dzhul'nya, 1200 m, forest, 11. IX. 1984, I. Belousov leg.; 3 ex., Kirovobad; 1 ex., Adzhikent; 1 ex., Tshaikent. Georgia: 1 ex., Lagodekhsnij natural reserve, 30. X. 1965, O. Kryzhanovskij leg.; 1 ex., Lagodekhi, Mlokosevitsh leg.; Armenia: 2 ex., Kafanskij district, Shikakhokhsnij natural reserve, river banks, 600 m, in litter, 30. IV. 1983, S. Golovatsh leg. Turkmenia: 1 ex., West Kopet-

Dagh Mts., Kara-Kala env., Bagandar, 13. X. 1980, Gromov leg. Iran: 1 ex., «N. Persia, Astrabad, 19. IV. 1905»; 1 ex., «Persia, Kasp. Meer, Hassankiadeh, 1915».

TAXONOMIC REMARKS. It was described by Reitter as a distinct species but later was treated as variety or subspecies of the related species *L. fulvus*. Perrault has reevaluated its specific status.

The male in Reitter's collection (HMNH) is designated here as lectotype. It has following labels: «Lenkoran, Leder (Reitter)», printed on white paper; «coll. Reitter»; «*lenkoranus* m.», handwritten on white paper.

DISTRIBUTION. Mountain parts of Azerbaijan (mostly Talysh), Eastern Armenia, West Kopet-Dagh (first record!), North Iran (see map).

ECOLOGY. Mountain species living in nemoral and mixed forests, founds mostly in valleys of rivers and streams, penetrating sporadically in alpine meadows. Biology unknown. A teneral specimen was collected on April 19.

### *Leistus (Leistus) fulvus* Chaudoir, 1846

*Leistus fulvus* Chaudoir, 1846: 105 (loc. typ.: Lenkoran).

*Leistus fulvus*: Chaudoir 1857: 79.

*Leistus fulvus*: Reitter, 1885: 217.

*Leistus fulvus*: Iablokoff-Khznorian, 1976: 97, tab. 3, fig. 41.

*Leistus (Leistophorus) fulvus*: Reitter, 1905: 222.

*Leistus (Leistophorus) fulvus*: Lutshnik, 1921: 13.

*Leistus (Leistophorus) fulvus*: Bänninger, 1925: 334, 339.

*Leistus (Leistophorus) fulvus*: Csiki, 1927: 350.

*Leistus* (s. str.) *fulvus*: Perrault, 1986: 60.

*Leistus* (s. str.) *fulvus*: Perrault, 1988: 46, figs 3, 14, 19.

*Leistus ellipticus* Reitter, 1885: 219 (nec Wollaston, 1857) (loc. typ.: Smirna).

*Leistus ellipticus*: Reitter, 1905: 224.

*Leistus reitteri* Jakobson, 1906: 259 (nom. nov. pro *L. ellipticus* Reitter).

*Leistus reitteri*: Perrault, 1985a: 158.

*Leistus fulvus* var. *obscurus* Reitter, 1905: 222 (loc. typ.: «Circassien, Swanetien, Kaukasus»).

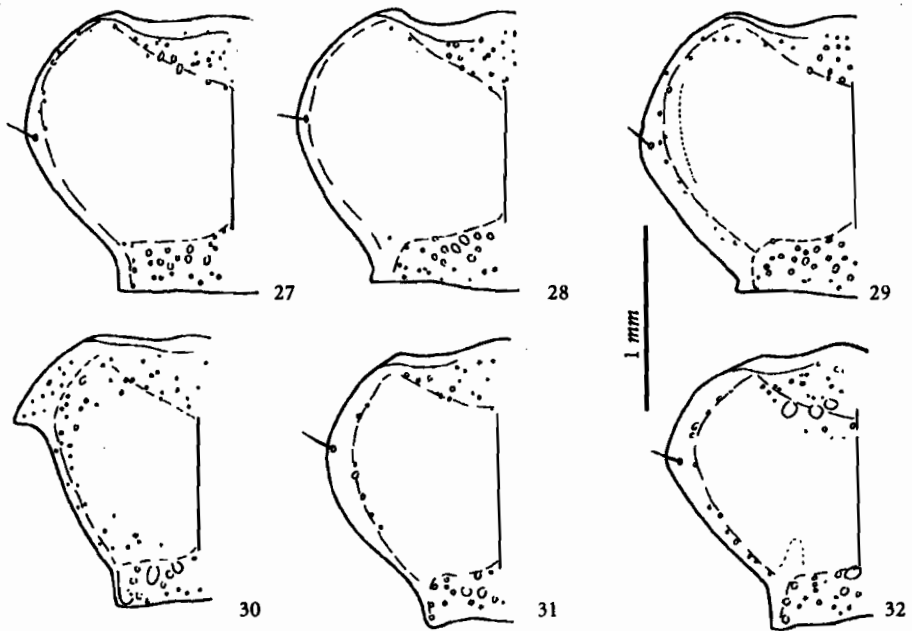
*Leistus voriseki* Jeanne, 1972: 83 (loc. typ.: «Caucase occident, Roperetsh-chrel»).

*Leistus voriseki*: Perrault, 1984: 104.

MATERIAL: More than 180 specimens from different points of the Caucasus and Transcaucasus (see map).

TAXONOMIC REMARKS. Wide distribution and color variability of this species bring to appearance of some synonymy. Lectotype of *L. fulvus* Chd. was designated by PERRAULT (1984) and deposited in MHNP (Paris). This is a male with label «Lenkoran, M104». Lectotype of *L. fulvus* var. *obscurus* Reitt., male, designated here, carries the labels «Cauc. occid., Regio silvestris, Starck» and «coll. Reitter» printed on white paper, is preserved in HMNH. Holotype of *L. ellipticus* Reitt., female, is deposited in collection of Bänninger, Zurich. Its identity with *L. fulvus* Chd. was established by PERRAULT (1985a). Holotype of *L. voriseki* Jeanne is deposited in collection of its author (Bourdox, France). After personal communication of late V.N. Kurnakov the real type locality of this species is the Poperetshny mountain range, between Shakhe and Psezuapse rivers.

The type of *L. fulvus* Chd was repeatedly studied by PERRAULT (1984, 1988) making sure its taxonomic position. The species was described from Lenkoran, but this locality could be a mistake because it is replaced here by closely related species *L. lenkoranus* Reitt. (see map). Probably, Chaudoir's type specimen origin from the westernmost parts of the Caucasus.



Figs 27-32. Pronotum: 27, *L. fulvus* Chd., lectotype of *L. fulvus* var. *obscurus* Reitt.; 28, *L. lenkoranus* Reitt., lectotype; 29, *L. caucasicus* Reitt.; 30, *L. denticollis* Reitt.; 31, *L. angustus* Reitt., paralectotype; 32, *L. elegans* Rost, lectotype of *L. osseticus* Reitt.

**DISTRIBUTION.** Widely distributed in mountain parts of the Caucasus: Krasnodar region, south of Stavropol region, Karachai-Cherkessia, North Ossetia, Kabardino-Balkaria, Chechnya and Ingushetia, Georgia (except Ajaria), Armenia (after IABLOKOFF-KHNZORIAN, 1976, common in all Armenian forests, that must be carefully reinvestigated because of replacing of this species by *L. lenkoranus* Reitt. on the east of republic), West Azerbaijan. Distribution beyond the territory of the late USSR must be verifying. Records for East Europe, Tunisia, Algeria (CSIKI, 1927; IABLOKOFF-KHNZORIAN, 1976) are undoubtedly wrong. After PERRAULT (1988) it is distributed in North Turkey (some localities in Anatolia), the record for Smirna (*L. ellipticus* Reitt.) is standing out.

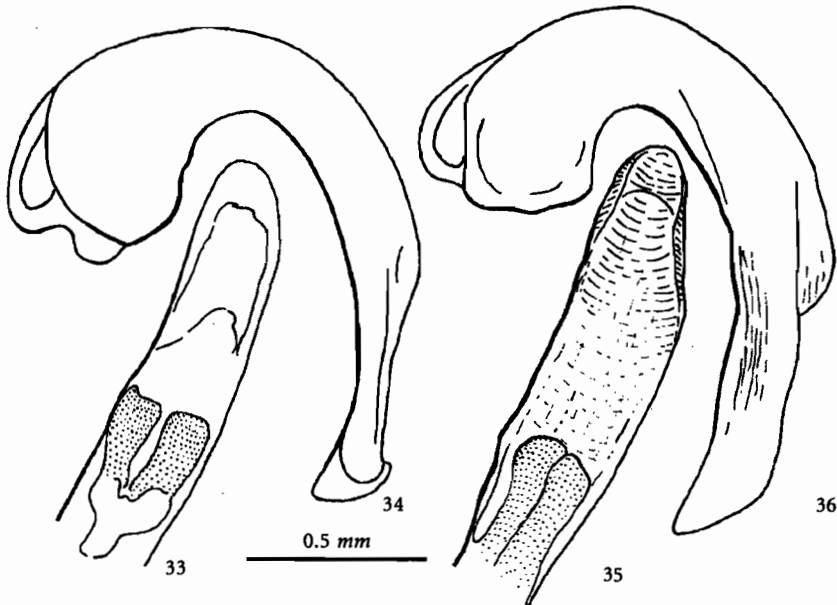
**ECOLOGY.** Monticole and sylvicole, lives in zone of nemoral and mixed forests, mostly in valleys of rivers and streams. It was collected both in lowlands (250-300 m), and in rather high mountains (up to 1600 m). Predominantly found in leaf litter, especially in dry river and creek valleys, as well as under stones, logs etc. Dispersion of collected specimens by months is as follows: February - 3, March - 1, April - 2, May - 19, June - 48, July - 20, August - 31, September - 7, October - 2, November - 2. Teneral imagos were collected on May 2 and 16. Probably, as other *Leistus* species, it is an autumn breeder with a hibernating larva.

### *Leistus (Leistus) denticollis* Reitter, 1887

*Leistus denticollis* Reitter, 1887: 527 (loc. typ.: «West Caucasus, Atschischko»).

*Leistus (Acroleistus) denticollis*: Reitter, 1905: 225.

*Leistus (Acroleistus) denticollis*: Bänninger, 1925: 335.



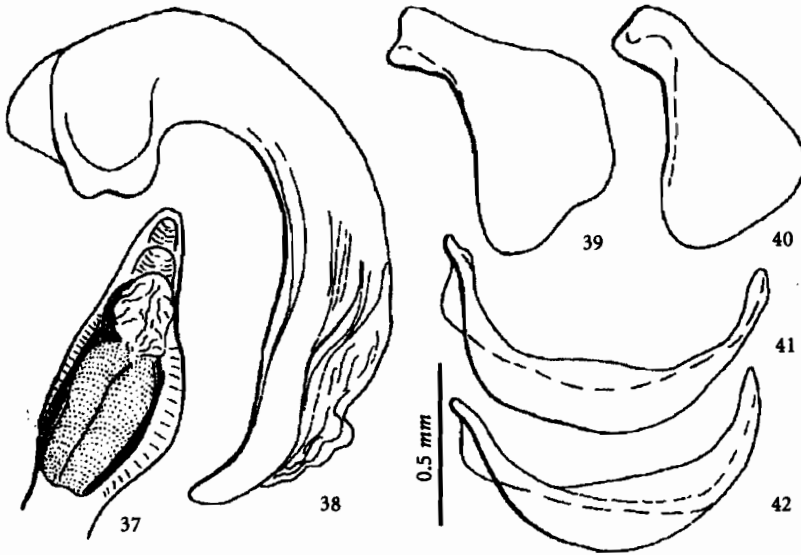
Figs 33-36. *Leistus* spp.: 33, 34, *L. elegans* Rost; 35, 36, *L. angustus* Reitt. 33, 35, apical part of median lobe of aedeagus, dorsal view; 34, 36, median lobe of aedeagus, left lateral view.

*Leistus (Acroleistus) denticollis*: Csiki, 1927: 355.

*Leistus* (s. str.) *denticollis*: Perrault, 1986: 60; 1988: 52.

**MATERIAL:** Krasnodarskij region: 1 ex., Maikopskij district, NE slope of Fisht Mt., 1800 m., subalpine zone, pitfall traps with formaldehyde, 7. VII-11. VIII. 1984, A. Koval leg.; 2 ex., Sotshi env., Krasnaya Polyana, Atshishkho Mts., 1900 m, 19.VII.1986, stony talus, A. Koval leg.; 15 ex., same locality, 1800 m, 19. VII. 1986, A. Koval leg.; 1 ex., Caucasian natural reserve, Babuk-aul, 8. VIII. 1909, Bryanskij leg.; 2 ex., same locality, Pseashkho Pass, 1900-2000 m, VI - VII. 1986, A. Zamotajlov leg.; 1 ex., same locality, 18. VIII. 1987, A. Zamotajlov leg.; 1 ex., source of Belaya river, Lagonakhskoye upland, 2000 m, VII. 1987, A. Zamotajlov leg.; 1 ex., near Fisht-Oshten Pass, 2000 m, 11. VI. 1987, A. Zamotajlov leg.; 3 ex., Mt. Chugush, 2500-2700 m, 15. VII. 1998, A. Zamotajlov leg. Karachai-Cherkessia: 1 ex., source of B. Laba river, near the Alashtrakhu Pass, 2700 m, 17. VII. 1987, A. Zamotajlov leg. Abkhasia: 2 ex., Gudautskij district, N from Duripsh, Khopstinskij part of Bzybskij Mts., 1200-1500 m, stony slope in forest, 6-7. X. 1983, Yu. Meshkov leg.; 1 ex., same locality, 1800 n, subalpine zone, 8. X. 1983, Yu. Meshkov leg.; 2 ex., Bzybskij Mts., Turetskaya Shapka Mt., 2000 m, 14. VI. 1986, stony talus near the snow, A. Koval leg.; 1 ex., Avadkhara, Azhara Mt., 2800 m, 23. VII. 1985, D. Wrase leg.

**TAXONOMIC REMARKS.** Together with *L. angustus* Reitt. and *L. elegans* Rost this species forms a natural group which was considered in subgenus *Acroleistus* Reitt. PERRAULT (1980) pointed out the heterogeneous structure of this subgenus including some representatives from Central Asia and Siberia. I agree with this point of view but want to stress here the close affinity of the mentioned Caucasian species. On the other hand, there is a remarkable affinity in body shape and even genitalic structure of these Caucasian species with the Iberian *L. angusticollis* group. It is hard to imagine that such an affinity could arise on the basis of convergence alone, while a more probable explanation is an ancient relationship between these groups. The relationship of the Caucasian subgenus *Cechenochilus* with the Pyrenean *Iniopachys* of the genus *Carabus*, as well as other examples, seem to confirm this point of view.



Figs 37-42. *Leistus* spp.: 37-39, 41, *L. denticollis* Reitt.; 40, 42, *L. angustus* Reitt. 37, apical part of median lobe of aedeagus, dorsal view; 38, median lobe of aedeagus, left lateral view; 39, 40, left paramere; 41, 42, right paramere.

The holotype of *L. denticollis* Reitt. is deposited in collection of M. Bänninger, Zürich.

**DISTRIBUTION.** The species was described from Atshishkho Mt., and later was recorded from «Circassia» (Black Sea coast in the territory of the Krasnodar region). It is rare in collections and the range limits need in investigation. Distributed in western part of the Caucasus Major from the Fisht Mt. to the east border of Abkhasia.

**ECOLOGY.** According to scarce findings, this species lives at 1600-2800 m above sea level, mostly in the subalpine zone, where it prefers stony fields mixed with soil. As a rule, it was collected near the snow spots. On personal communication of A. G. Koval, it was found on Fisht Mt (1800 m) together with *Carabus starcki* Heyd. and *C. exaratus* Quens. and on Atshishkho mountain range (1800-1900 m) in community with predominance of *Carabus circassicus* Ganglb., *C. koenigi* Ganglb., *C. starcki* Heyd., *C. constantinovi* Starck, *Pterostichus (Myosodus) starcki* Heyd., *Nebria bonellii* Ad., *Lindrothius horsti* Reitt.

### *Leistus (Leistus) elegans* Rost, 1891

*Leistus elegans* Rost, 1891: 126 (loc. typ.: «vom Elbrus und Schneebergen in Baksan»).

*Leistus* (s. str.) *elegans*: Perrault, 1985b: 158.

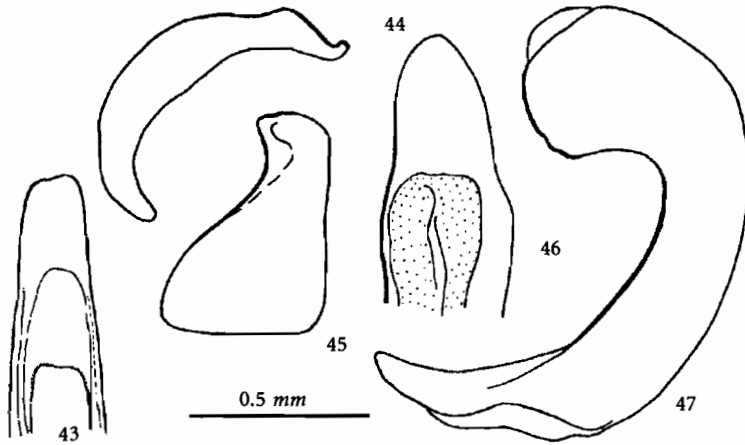
*Leistus* (s. str.) *elegans*: Perrault, 1986: 59, 62.

*Leistus* (s. str.) *elegans*: Perrault, 1988: 53, figs 9, 17.

*Leistus osseticus* Reitter, 1909: 53 (loc. typ.: Caucasus centr., Umg. Kasbek, 8000 ft., Trsi-Pass).

*Leistus (Acroleistus) osseticus*: Bänninger, 1925: 335.

**MATERIAL:** Kabardino-Balkaria: 24 ex., source of Rtshyvashki river, 22. VII. 1985, I. Belousov leg.; 1 ex., Skalistyi Mts., Suukauzkaya, 2800 m, 1-2. VI. 1985, I. Belousov leg.; 6 ex., Skalistyi Mts., Karakal,



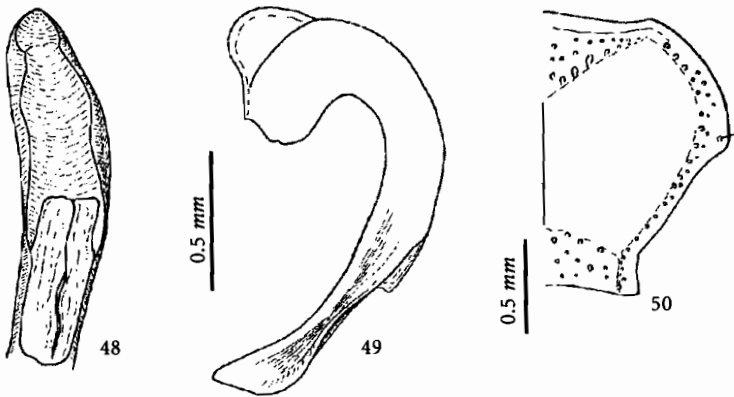
Figs 43-47. *Leistus* spp.: 43, *L. femoralis* Chd. (after PERRAULT, 1986); 44-47, *L. chaudoiri* Perr. 43, 46, apical part of median lobe of aedeagus, dorsal view; 44, right paramere; 45, left paramere; 47, median lobe of aedeagus, left lateral view.

Khushtosyrt, 2200-2600 m, 4. VI. 1985, I. Belousov leg.; 1 ex., Prielbrus'e, subalpine zone, 28. VI. 1985, I. Muratov. North Ossetia: 15 ex., Tseiskij glacier env., 2500 m, 17. VII. 1985, I. Sokolov leg.; 2 ex., Tseiskoye valley, 1982, S. Alekseev leg.; 2 ex., source of Gisel'don river under Dzhemariniskij glacier, 16. VIII. 1957, V. Kurnakov leg.; 2 ex., under Styrykhokh Pass (Khilag-Zakka), 29. VII. 1925, A. Kiritshenko leg.; 1 ex., Kurtatinskoye defile, alpine zone, 3000 m, Volkov leg.; 2 ex., Voennogruzinskaya road, Krestovaya Mt., 7. VII. 1949, V. Kurnakov leg.

**TAXONOMIC REMARKS.** Lectotype and paralectotype of *L. elegans* Rost (both females) were designated by PERRAULT (1985b) and are preserved in collection of Bänninger (Zürich). The lectotype of *L. osseticus* Reitt., female, designated here, has two handwritten labels on white paper «Cauc. Centr. Ossetia, 8000 f.», «*osseticus* m.» and printing label «A. Zolotarew». The lectotype is deposited in HMNH. There are two specimens in the collection of ZISP with labels «Ossetia, Rost, 1895», «*Leistus elegans* Rost», which can not be treated as types, but completely correspond with *L. osseticus* Reitt., although not with *L. angustus* Reitt. Rost compared his new species with the latter. Reitter erroneously synonymized *L. elegans* Rost with *L. angustus* Reitt., but the correct synonymy was established by PERRAULT (1985b).

**DISTRIBUTION.** Mostly northern spurs of the Caucasus Major in Kabardino-Balkaria and North Ossetia.

**ECOLOGY.** This species lives in the subalpine and alpine zones. Petrobiont, frequently found under large stones near cliffs. In upper alpine zone mostly found on the shores of rivers and streams together with *Amara (Oreoamara) cordicollis* Zimm., at higher altitudes it lives in community with *Carabus (Cechenochilus) boeberi felix* Sem. & Zn., *C. riedeli* Mén., lower, in stone taluses, lives together with *C. fossiger* Chd. (personal communication of I. A. Belousov). Populations living at lower altitudes have larger size (see table 1).



Figs 48-50. *L. megrelicus* n. sp.: 48, apical part of median lobe of aedeagus, dorsal view; 49, median lobe of aedeagus, left lateral view; 50, pronotum.

### *Leistus (Leistus) elegans rosti* n. ssp.

**MATERIAL:** Holotype ♂ (ZISP), North Ossetia, Uazokhokh Mt., 16. VI. 1985, I. Belousov leg. Paratypes, 3 ♂ 5 ♀ (coll. I. Belousov; ISU), with the same labels.

**DESCRIPTION.** Close to the nominotypical subspecies, but on the average smaller, with wider pronotum and shorter elytra (see table 1). Lateral margins of pronotum considerably wider, elytra more ovoid and more markedly rounded laterally, legs evidently shorter and stouter. There are no differences in the structure of male genitalia from the nominotypical subspecies.

### *Leistus (Leistus) angustus* Reitter, 1883

*Leistus angustus* Reitter, 1883:40 (loc. typ.: Caucasus, Swanetien).

*Leistus angustus*: Reitter, 1885:218.

*Leistus (Acroleistus) angustus*: Reitter, 1905: 225.

*Leistus (Acroleistus) angustus*: Bänninger, 1925: 335.

*Leistus (Acroleistus) angustus*: Csiki, 1927: 354.

*Leistus* (s. str.) *angustus*: Perrault, 1986: 60.

*Leistus* (s. str.) *angustus*: Perrault, 1988: 52, fig. 5.

*Leistus elegans* auct., nec Rost, 1891.

**MATERIAL:** Georgia: 1 ex., NE slope of Letshkhums kij Mts., above Ambrolauri, 2700 m, 26. VII. 1985, I. Sokolov leg.; 1 ex., SW slope of Letshkhums kij Mts., above Tshikhareshi, 2800 m, 27. VII. 1985, I. Sokolov leg.; 1 ex., Letshkhums kij Mts., watershed of Tshikhareshi and Ambrolauri, above 3000 m, subnival zone, 25. VII. 1985, I. Belousov leg.; 1 ex., S slope of Svanets kij Mts., above Khaledi, 2600 m, 28. VII. 1985, I. Sokolov leg.; 1 ex., same locality, source of Khaledi river, 2800 m, 30. VII. 1985, I. Belousov leg.; 1 ex., Egriss kij Mts., northern slope of Tsikuri Mt., 1700 m, 20. VIII. 1988, I. Belousov leg.

**TAXONOMIC REMARKS.** The lectotype of *L. angustus* Reitt. was designated by PERRAULT (1988) and is deposited in collection of Bänninger (Zürich). The paralectotype, male, designated here, has a printed label on white paper «Kaukas, Leder», preserved in HMNH.



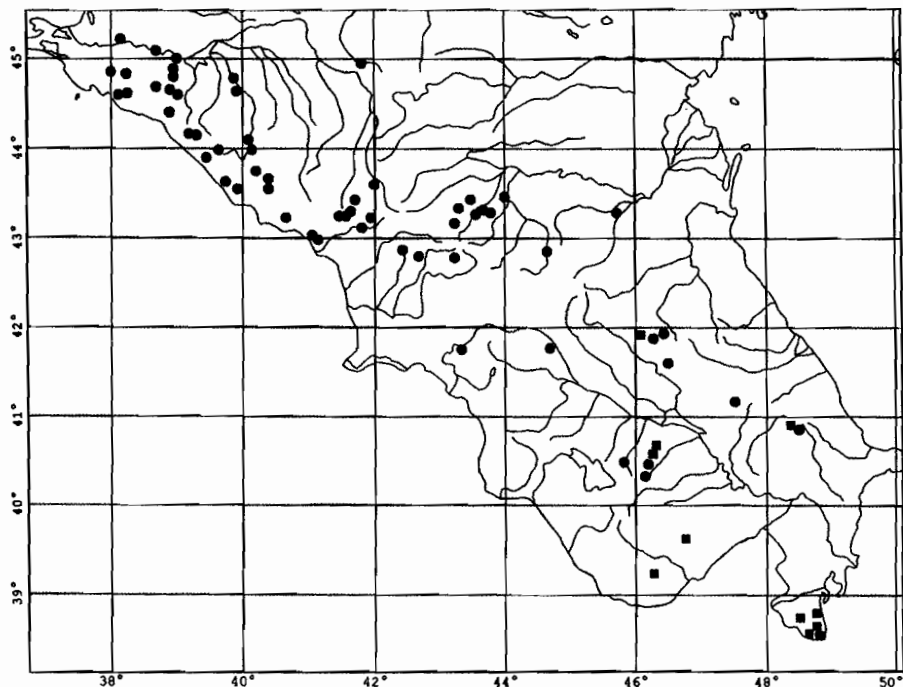


Fig. 51. Distribution map of *L. fulvus* Chd. (circles) and *L. lenkoranus* Reitt. (squares).

**DISTRIBUTION.** This species was described from Swanetia. From the scarce findings of recent years it is known from Swanetskij Mts., Letshkhumsij Mts. and Egrissij Mts. only.

**ECOLOGY.** High mountain species found at altitude 2600-3000 m in the alpine and subnival zones. After personal communication of I. A. Belousov, it lives on the Svanetskij mountain range together with *Nebria tenella* Motsch., *Carabus (Cechenochilus) boeberi longiceps* Chd., *C. (Archiplectes) compressus* Chd.

### *Leistus (Leistus) megrelicus* n. sp.

**MATERIAL:** Holotype ♂ (ZISP), Georgia, Megrelskij (=Egrissij) mountain range, source of Tekhuri river, 2400 m, 16. VIII. 1990, A. Koval leg. Paratypes, 27 ex., with the same label (ZISP, ISU, colls. A. Koval, I. Belousov, I. Kabak, E. Komarov, K. Makarov, A. Rubtshenya, J. Farkač).

**DESCRIPTION.** In external characters and genitalic structure close to *L. angustus* Reitt., but pronotum with evident lateral lobes (fig. 50), elytra shorter (body proportions: HW/HL=1,63-1,70; PW/HW=1,26-1,29; PW/PB=2,11-2,15; PW/PL=1,42-1,43; EL/EW=1,70-1,73; EW/PW=1,30-1,30; EL/PL=3,17-3,21), eyes more convex, median lobe of aedeagus (fig. 48,49) constricted before apical part and somewhat curved dorsally. Close in general appearance to *L. denticollis* Reitt., but pronotum broader, its lateral reflexed margins wider, especially behind the apically rounded lateral lobes (in *L. denticollis* Reitt. lateral lobes acute and situated more apically, see fig. 30); elytra more ovoid, widest at middle (in *L. denticollis* Reitt. in apical third). The median lobe of the aedeagus differs strongly from *L. denticollis* Reitt. (Figs 37, 38).

Body length 8,3-8,7 mm. SBL = 6,85-7,25 mm.

As I can conclude from description of *L. odvarkai* Dvoř. (DVOŘAK, 1994), it is close to the new species in body shape and proportions. The pronotal lateral lobes of new species are distinctly shorter, more obtuse and rounded apically than figured in *L. odvarkai* Dvoř. Unfortunately, the illustrations of male genitalia drawn by Dvořak (Fig. 1 in Dvořak's publication) are not very detailed and make it impossible to compare exactly these structures of both species. In any case, it is rather evident that *L. odvarkai* Dvoř. belongs to the *L. angustus* Reitt. complex. Possibly, *L. megrelicus* sp. n. and *L. odvarkai* Dvoř. are only two subspecies of *L. angustus* Reitt., but this question could be solved only after more precise investigation of types of *L. odvarkai* Dvoř. and additional material from southern slope of the Caucasus Major.

### ***Leistus (Leistus) odvarkai* Dvořak, 1994**

*Leistus (Leistus) odvarkai* Dvořak, 1994: 3 (loc. typ.: Abchasia, Bzybskij chrebet, Mt. Dzychva).

TAXONOMIC REMARKS. After DVOŘAK (1984), it differs from *L. denticollis* Reitt. by wider pronotum and elytra, elytra more rounded laterally, body color darker. Dvořak did not write anything about the median lobe of aedeagus of his species, but from his figure 1 it looks rather different from that of *L. denticollis* Reitt. and close to *L. angustus* Reitt. All specimens from Bzybskij Mts. which I have seen belong to *L. denticollis* Reitt. See above discussion about its taxonomical position.

### ***Leistus (Leistus) chaudiroi* Perrault, 1986**

*Leistus (s. str.) chaudiroi* Perrault, 1986: 62, figs 5, 8a, b (loc. typ.: Abbastouman, Zekar-Pass).

MATERIAL: Georgia: 1 ex., Meskhetskij Mts., source of Supsa river, 21.VI.1958, V. Kurnakov leg.

TAXONOMIC REMARKS. The holotype, male, with label «Zekar Pass, Abbastouman, Armenie» should be deposited in MB, but it was probably lost while mailing. One of the paratypes is here designated as neotype: it is a male with label «Col de Soganli (Gümüşhane) Turquie, 2500 m, nèvè, 19. VIII. 1970 (G. Ledoux leg.)» and it is kept in the Ledoux collection. The other paratypes are deposited in the Perrault collection (now in MHNP) and in the Ledoux collection. It was mixed with close species *L. femoralis* Chd. and form with it a rather isolated group including also the Turkish *L. ledouxi* Perr.

DISTRIBUTION. This species was described from SW Georgia (Abbastumani) and adjacent territory of Turkey (Gümüşhane and Giresun provinces).

### ***Leistus (Leistus) femoralis* Chaudoir, 1846**

*Leistus femoralis* Chaudoir, 1846:106 (loc. typ.: Abbastouman).

*Leistus femoralis*: Reitter, 1885: 106.

*Leistus (Leistidius) femoralis*: Reitter, 1905: 224.

*Leistus (Euleistulus) femoralis*: Bänninger, 1925: 335.

*Leistus (Euleistulus) femoralis*: Csiki, 1927: 354.

MATERIAL: In the collection of ZISP two specimens are deposited, one with label «Abbastouman, Zekar-Pass, Rost, 1900», the second one with label «Awasia».

TAXONOMIC REMARKS. Lectotype, female, and paralectotype, male, were designated by PERRAULT (1988) and are kept in MHNP. Except for the characters mentioned in the key, it differs from *L. chaudiroi* Perr. by flattened elytra, fainter punctation, less

prominent neck constriction and weak medial line of pronotum.

DISTRIBUTION. SW Georgia (Ajzaro-Imeretinskij Mts.), Borzhomi, North Turkey (Artvin).

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