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**The tiger-beetles of the hybrida species-group.
II. A taxonomic review of subspecies of *Cicindela
sahlbergii* Fischer von Waldheim, 1824
(Coleoptera Carabidae Cicindelini)**

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Abstract. Some taxa of *Cicindela* (s.str.) Linnaeus, 1758, of the *hybrida*-group are discussed. The status and geographical distributions of separate forms are clarified. *C. sahlbergii* F.-W., 1824, and *C. monticola* Mén., 1832, are considered as separate species, each being divided into three subspecies. *C. khersonensis* Motsch., 1845, is regarded to be a subspecies of *C. sahlbergii*. It is shown that the names *C. tokatensis* and *C. rumelica* are in fact attributable to *C. monticola*, as is *C. kozhantshikovi* to *C. hybrida* L., not to *C. sahlbergii* as erroneously done by GEBERT (1995). Lectotypes of *C. caspia* Mén., 1832 and *C. khersonensis* Motsch., 1845 as well as lectotypes and paralectotypes of *C. fracta* Motsch., 1844 and *C. sahlbergii kozhantshikovi* Lutsh., 1924 are designated. The new synonymy *C. monticola tokatensis* Chaud., 1863 = *C. fracta* Motsch., 1844 is established. A new subspecies, *C. sahlbergii lutshniki* n. ssp. is described from the lower course of the Dnepr River. The probable homology of soft parts and sclerites of the internal sac is given. The results of phylogenetic analysis are discussed. A key is proposed to the Palearctic groups of *Cicindela* (s.str.), and subspecies of *C. sahlbergii* and *C. monticola*.

Резюме. Обсуждаются некоторые таксоны группы *hybrida* рода *Cicindela* (s.str.) Linnaeus, 1758. Прояснен статус и географическое распространение отдельных форм. *C. sahlbergii* F.-W., 1824 и *C. monticola* Mén., 1832 рассматриваются как отдельные виды, каждый из которых включает три подвида. *C. khersonensis* Motsch., 1845 рассматривается как подвид *C. sahlbergii*. Показано, что названия *C. tokatensis* и *C. rumelica* на самом деле относятся к *C. monticola*, так же как *C. kozhantshikovi* к *C. hybrida* L., а не к *C. sahlbergii*, как ошибочно считал GEBERT (1995). Обозначены лектотипы *C. caspia* Mén., 1832 и *C. khersonensis* Motsch., 1845, а так же лектотипы и паралектотипы *C. fracta* Motsch., 1844 и *C. sahlbergii kozhantshikovi* Lutsh., 1924. Установлена новая синонимия: *C. monticola tokatensis* Chaud., 1863 = *C. fracta* Motsch., 1844. Описывается новый подвид *C. sahlbergii lutshniki* n. ssp. из низовой Днепра. Приведена возможная гомология между мягкими частями и склеритами внутреннего мешка. Обсуждаются результаты филогенетического анализа. Предлагается определительная таблица для палеарктических групп *Cicindela* (s.str.), подвидов *C. sahlbergii* и *C. monticola*.

Key words: Carabidae, *Cicindela*, the *hybrida*-group, *C. sahlbergii*, *C. monticola*, taxonomy, Palearctic, new subspecies, key, phylogeny.

INTRODUCTION

The *hybrida*-group has long been known as the most species-rich within *Cicindela* (s.str.) Linnaeus, 1758. According to different authors (HORN, 1915, 1926; MANDL, 1935-1936; GEBERT, 1995), the group comprises one to nine species, with a number of infraspecific categories proposed, including many colour morphs (FISCHER VON WALDHEIM, 1820-22, 1823-24, 1825-28, 1832; BEUTHIN, 1888, 1893; MANDL, 1935-36; CSIKI, 1946). As a result, the status of at least some species and subordinate taxa requires clarification.

Earlier, *C. hybrida* Linnaeus, 1758, the type species of *Cicindela*, was accepted as comprising eleven varieties (CHAUDOIR, 1863). Later, this species was

divided into four subspecies, while the remaining four constituents of the *hybrida*-group were elevated to full species (II. Gruppe, II. Untergruppe sensu HORN & ROESCHKE, 1891). Then HORN (1905, 1915, 1926, 1930) changed the group's composition so that *C. hybrida* included 18 subspecies. Following HORN (1905, 1915), JAKOBSON (1905-16) recognised 14 subspecies of *C. hybrida*. According to MANDL (1935-36), the *hybrida*-group included five species, while *C. hybrida* itself comprised 15 subspecies. However, RIVALIER (1950) divided the group into three different groups, the *hybrida*- (Groupe II), the *maritima*- (Groupe III) and the *transbaicalica*-group (Groupe IV). This point of view was accepted by all following authors (FREITAG, 1965; CASSOLA & VAN NIDEK, 1984; KOREL, 1988; WERNER, 1991, 1992; WIESNER, 1992; ZABALLOS, JEANNE, 1994; GUÉORGUIEV & GUÉORGUIEV, 1995). Finally, GEBERT (1995) rejected the wide treatment of *C. hybrida* and considered *C. hybrida*, *C. sahlbergii* Fischer von Waldheim, 1824, *C. transversalis* Dejean, 1822, and *C. lagunensis* Gautier, 1872, as separate species. Yet *C. sahlbergii* and *C. lagunensis* seem to be in need of a stricter treatment than Gebert's.

The present paper deals with the status of several forms which appear to actually belong to two closely related species in the *hybrida*-group (s.str.).

MATERIAL AND METHODS

The paper is based on material deposited in the following museums:

- DEI - Deutsche Entomologisches Institut, Eberswalde (Dr. L. Zerche)
- MNUB - Museum für Naturkunde der Humboldt-Universität zu Berlin (Dr. F. Hieke, and Dr. M. Uhlig)
- MTD - Staatliches Museum für Tierkunde, Dresden (Dr. O. Jäger)
- NHMW - Naturhistorisches Museum Wien (Dr. H. Schönmann)
- MNCN - Museo Nacional de Ciencias Naturales, Madrid (Dr. I. Izquierdo)
- ZISP - Zoological Institute of the Russian Academy of Sciences, St.-Petersburg (Dr. B. Kataev)
- ZMM - Zoological Museum of the Moscow State University (Dr. N. Nikitsky)
- MTTU - Zoology and Ecology Department of the Moscow State Teachers' Training University
- ZMN - Zoological Museum of the Siberian Branch of the Russian Academy of Sciences, Novosibirsk (Dr. R. Dudko)
- MNHT - Museum of Natural History, Tyumen (Dr. P. Sitnikov).

Many private collectors provided me with the material and assisted thereby in my research: DTS - collection of D. Stshigel, IM - collection of I. Melnik, PU - collection of P. Udovichenko, SM - collection of S. Mursin (all from Moscow, Russia), AK - collection of A. Koval, BK - collection of B. Kataev, IB - collection of I. Belousov (all from St.-Petersburg, Russia), AKR - collection of A. Kravets, EK - collection of E. Komarov (both from Volgograd, Russia), MS - collection of M. Smirnov (Ivanovo, Russia), AN - collection of A. Napolov, DT - collection of D. Telnov (both from Riga, Latvia), SV - collection of S. Vashchenko (Kherson, Ukraine), IK - collection of I. Kabak (Alma-Ata, Kazakhstan).

Altogether, 750 specimens have been analysed, referred to in the material section of each taxon recognised. Terminology referring to the elytral pattern follows that of WILLIS (1968) and ACCIAVATTI & PEARSON (1989), the chaetotaxy that of SPANTON (1988) and ACCIAVATTI & PEARSON (1989), the ♂ genitalia that of FREITAG (1985), SPANTON (1988) and ISHIKAWA (1978), with some corrections, and the ♀ genitalia that of FREITAG (1972). Measurements were performed using an ocular micrometer. The most important measurements were chosen as follows: total body length (from posterior margin of labrum to apex of elytra along suture), length of labrum (along midline), width of labrum

(in widest place), length of pronotum (along midline), width of pronotum (in widest place), length of elytra (along suture), width of elytra (in widest place), length of mandibles (from base of retinaculum to apex), width of mandibles (in widest place), length of tibia, tarsus and penis.

Particulars of internal sac structure of the penis were examined. The internal sac was gradually inflated and dried up in warm air. All species discussed here display structures of two types in the maximally inflated internal sac of the penis, the sclerites and bladders, both being probable homologs of the structures specified by MANDL (1935), RIVALIER (1950), FREITAG (1965) and SPANTON (1988), and, apparently, also of the those found in the remaining species of the *hybrida*-group.

The bladders (Figs 88-91) are as follows: 1) ventro-apical (VA); 2) ventro-lateral left (VLL); 3) ventro-lateral right (VLR); 4) dorso-apical (DA); 5) dorso-lateral left (DLL); 6) basal (B) and 7) basi-lateral right (BLR). Of these, VA, VLL and B probably correspond to FREITAG'S (1965) «darkened areas» or «fields», namely to fields *b*, *a*, and *c*, respectively.

The sclerites are as in the Table 1 and as in the Figs 84-87.

For data analysis, the STATISTICA program, version 5.0 and NTSYS, version 1.70 were used. Clustering was performed using the UPGMA linkage method. 52 peripheral characters, 32 characters of ♂ genitalia, and 15 characters of ♀ genitalia were analysed (Table 2). Three further species from different groups of the nominate subgenus, *C. sylvatica* Linnaeus, 1758, *C. campestris* Linnaeus, 1758, and *C. soluta* Dejean, 1822, as well as *C. (Eumecus) germanica* Linnaeus, 1758, *C. (Myriochile) melancholica* Fabricius, 1798, *C. (Cephalota) elegans* Fischer von Waldheim, 1824, *C. (Cicindina) sublacerata* Solsky, 1874, and *C. (Lophyridia) littoralis* Fabricius, 1787 were also included in the analysis (Table 3). The results of clustering are given in Fig. 226.

RESULTS

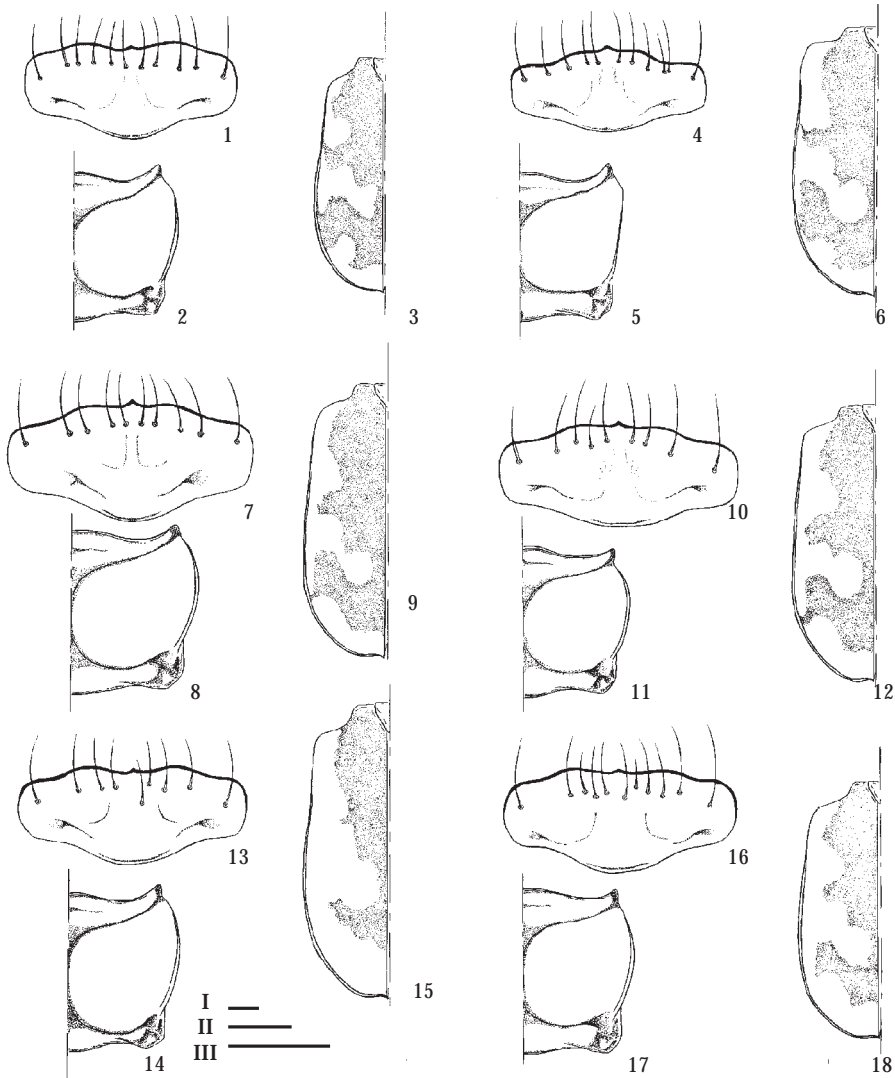
In contrast to GEBERT'S (1995) point of view, I consider *C. monticola* as a separate species different from *C. sahlbergii*. The latter species is distinguishable by a different coloration and the elytra bearing a wider white pattern, with the humeral lunula being always complete, the middle band wider and strongly curved, the occiput densely pubescent, as well as by the longer lanciform apex of the penis, the general composition of its internal sac, and by the ♀ genitalia. To my mind, all these characters combined with the particular range of each form discussed warrant the status of separate species for *C. sahlbergii* and *C. monticola*.

Both *C. sahlbergii* and *C. monticola* are accepted here as divided into three subspecies, the former into the nominate one, *C. sahlbergii khersonensis* Motschulsky, 1845, and *C. sahlbergii lutshniki* n. ssp., the latter into the nominate one, *C. monticola tokatensis* Chaudoir, 1863, and *C. monticola rumelica* Apfelbeck, 1904.

C. khersonensis has been synonymized by HORN & ROESCHKE (1891) under *C. hybrida* and later by HORN (1905b) under *C. sahlbergii*. Yet I regard it necessary to elevate the status of that form to full subspecies. It follows from the fact that *C. khersonensis* is distinctly different from the nominate subspecies in the particulars of white elytral pattern and granulation on the elytra as well as in the shape of the pronotum, ♂ mandibles, apex of the penis, bladders of its maximally inflated internal sac and ♀ genitalia.

The types *C. rumelica* having been revised and compared with other specimens of *C. tokatensis* and *C. monticola* from different localities, a conclusion was made that both those taxa were subspecies of *C. monticola*, not of *C. sahlbergii* as GEBERT (1995) erroneously believed.

C. fracta has been synonymized by FLENTIAUX (1892) with *C. hybrida* v. *riparia* and later by HORN (1915, 1926) with *C. riparia* and by WIENER (1992) with *C. transversalis*. However, the type locality of *C. fracta* is the river Alasan (Caucasus).



Figs 1-18. Type specimens of *Cicindela* sp.: 1-3, *C. sahlbergii* F.-W., lectotype, ♂; 4-6, *C. maritima* Dej., ♀, designated as a paralectotype of *C. sahlbergii* F.-W.; 7-9, *C. lateralis* F.-W., lectotype, ♀; 10-12, *C. gebleri* F.-W., lectotype, ♂; 13-15, *C. pallasii* F.-W., lectotype, ♂; *C. karelini* F.-W., lectotype, ♂. 1, 4, 7, 10, 13, 16, labrum; 2, 5, 8, 11, 14, 17, pronotum (right half); 3, 6, 9, 12, 15, 18, left elytron. Scale bars 1 mm: I, 3, 6, 9, 12, 15, 18; II, 2, 5, 8, 11, 14, 17; III, 1, 4, 7, 10, 13, 16.

So, *C. fracta* is actually a synonym of one *C. monticola* subspecies, since *C. transversalis* does not occur in the Caucasus.

Unfortunately, I have seen no specimens of *C. albanica* Apfelbeck, 1909, for which reason I refrain here from discussion of its status.

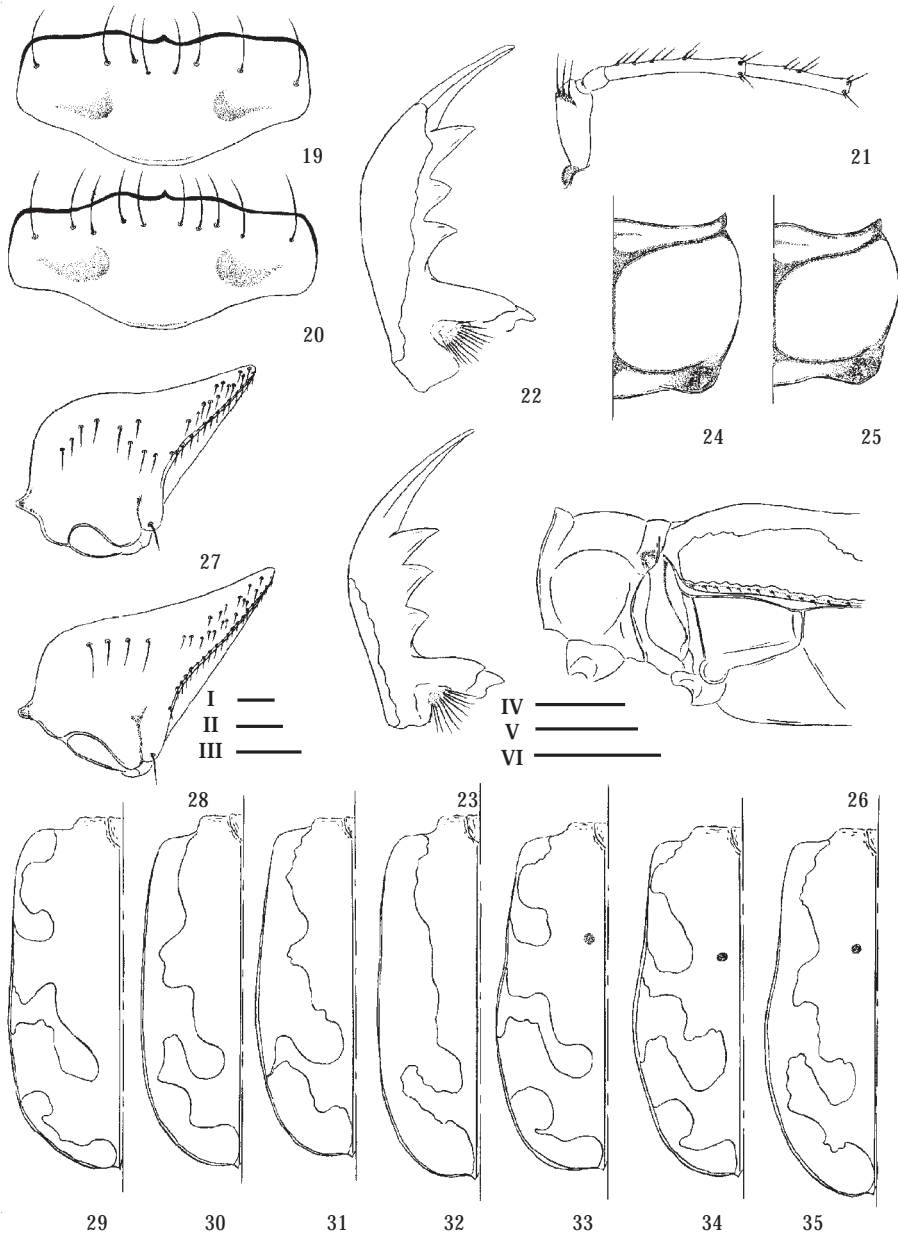
***Cicindela* (s. str.) *sahlbergii* Fischer von Waldheim, 1824** Figs 1-3, 7-111.

Ent. Imper. Ross., 1824, II: 15. Type locality: Siberia.

DESCRIPTION. Total body length 10.0-13.5 mm (n=180).

Ventral surface of head metallic blue-green, with a distinct golden or cuprous reflections; genae bronze with green tinge; clypeus cuprous-bronze with green or purple lustre; frons, vertex and occiput green or golden-green, with intensive cuprous, cuprous-bronze or purple reflections, frontal stripes bright green; ocular area bright cuprous with green or golden reflections. Sometimes head fully black with bronze or violet reflections; basal four antennomeres blue-green or deep green with bright cuprous reflections, rarely deep bronze. Labrum white, with a narrowly infuscate anterior margin; 3rd and 4th maxillary palpomeres and 4th labial palpomere metallic green or cuprous-green. Pronotum bright cuprous, with a distinct green or golden reflections, fronsal and basal sutures bright green or blue, with a light golden lustre; mid-line thin, metallic green; proepisternum bright cuprous or cuprous-bronze with a light golden tinge. Pro-, meso- and metathorax green or blue-green, with a bright cuprous or golden lustre on sides. Mes- and metepisternum, as well as mesepimerum, bright cuprous with golden or green reflections. Scutelum bright cuprous with purple lustre, rarely black. Elytral suture bright cuprous, in some specimens, black with light violet tinge. Sometimes, pronotum, pro-, meso- and metathorax black with bronze or violet reflections. Abdominal sternites green or blue-green with a light golden or cuprous lustre on sides, sometimes black with violet tinge. Legs green or blue-green with a light golden tinge, rarely deep bronze. Elytra cuprous or cuprous-bronze, sometimes green with cuprous lustre, rarely black, with sparse, diffused, green or blue-green points. White elytral pattern always complete, narrow (Figs 29, 33, 46-47 and 49-50) or wide (Figs 15, 18, 31-32, 34-35 and 62-67); humeral and apical lunules, and sinuate middle band usually separate (Figs 1, 29, 33-34, 46-51, 62 and 65); humeral lunula and middle band often merging along elytral side margin (Figs 9, 12, 63-64 and 66-67), sometimes all lunules and middle band forming a narrowly to widely interrupted lateral band (Figs 18, 32 and 35).

Head wrinkled on vertex and occiput, with thin, shallow furrows on frons and rough, deep furrows behind eyes. Genae glabrous, with deep, dense, longitudinal wrinkles. Head with 10-15 soft hairs on frons, 8-10 ones on vertex, and 12-16 stout white setae on occiput. Anterior supraorbital setae 2-3 on each side, posterior supraorbital setae 1-2 on each side. Besides 3-4 apical setae, scape glabrous, rarely with 1-2 additional stout white setae. 3rd antennomere 1.2-1.3 (mean 1.25) times as long as 4th, with 7-8 strong white setae, antennomere 4 with 2-3 ones (Figs 21, 38 and 54). Labrum glabrous, transverse, 2.2-2.7 (mean 2.45) times as wide as long, unidentate, with 8-10 long submarginal setae (Figs 1, 7, 10, 13, 16, 19-20, 36-37 and 52-53). Mandibles large, very stout, 4.0-5.75 and 5.0-5.5 times as long as wide in ♂ and ♀, respectively. Pronotum finely wrinkled, transverse, 1.27-1.42 (mean 1.35) times as wide as long, with sides distinctly rounded, slightly converging to base (Figs 2, 8, 11, 14, 17, 24-25, 41-42 and 57-58). Pronotum convex on disc, glabrous except a fairly wide, sparse row of white setae along side margin. Coupling sulcus on ♀ mesepisternum long, slightly sinuate, with a small but distinct pit at base (Figs 26, 43 and 59). Elytra either subparallel, 1.55-1.63 (mean 1.60) times as long as wide in ♂, or broadening in apical 1/3, 1.43-1.54 (mean 1.48) times as long as wide in ♀. Metatibia 0.9-1.05 times as long as metatarsus; metatrochanter with 6-10 (♂) or 4-6 (♀) white setae along anterior margin (Figs



Figs 19-35. *C. sahlbergii sahlbergii* F.-W.: 19-20, labrum; 21, antennomeres 1-4; 22-23, left mandible; 24-25, pronotum (right half); 26, ♀ coupling sulcus, lateral view; 27-28, right metatrochanter; 29-35, left elytron (29, Yanvartsevo; 30, 35, Kok-Dzhada; 31, Semipalatinsk; 32, Naurzum; 33, Volgograd; 34, Ryn-Sands); 19, 21-22, 24, 27, 29-32, ♂; 20, 23, 25-26, 28, 33-35, ♀. Scale bars 1mm: I, 29-35; II, 26; III, 24-25; IV, 21-23; V, 27-28; VI, 19-20.

27-28, 44-45 and 60-61).

Penis 0.55-0.70 (mean 0.625) times as long as elytra, with apex lanciform, distinctly pointed, lacking extended flanks (Figs 68-83). Internal sac distinctly

projected leftward, flag medium-sized, shield large, median tooth long or short, gradually curved at apex, VA large and rounded, VLL rather small, rounded and sclerotised, DLL large, rounded, rather strongly sclerotized, B rounded, large or small, VLR faintly protruding (Figs 84-99).

Posterior margin of ♂ sternum 8 with one to 4-5 setae on each side, apices truncate, with two or, rarely, three stout, short setae, its lateral margin with 5-10 long setae (Figs 101, 105 and 109). Tergite 9 oval, 1.9-2.0 times as long as wide, with 18-24 long setae apically. Tergite 10 membranous, setose in apical 1/3, with 8-14 long setae laterally (Figs 100, 104 and 108). Base of second gonapophyses with two or 4-5 long setae, ventral notch on second gonocoxa rather deep, with 3-5 long setae and 4-5 short ones. An elongate, suboval, additional sclerite present between second gonocoxae. Bursa copulatrix oval, oviduct sclerite large (Figs 102-103, 106-107 and 110-111).

TAXONOMIC REMARKS. A restudy of the lectotype and paralectotype of *C. sahlbergii*, both designated by GEBERT (1995), has revealed that the paralectotype is in fact a misidentified specimen, ♂, of *C. maritima* which displays all characters of this species. This concerns the structural particulars of the labrum, pronotum, white pattern on the elytra (Figs 1-18), as well as the peculiar metatibia/tarsus length ratio.

DISTRIBUTION. E and SE Ukraine, S Russia, mid- and lower flows of the Volga River, Western Caspian Sea coast (Lencoran), S Urals, N and E Kazakhstan, Altaisky Province, (?) China (Kuldzha), (?) Kyrgyzstan (Yssyk-Kul) (Fig. 116). Two last localities are questionable. The record from Kuldzha is given after DOKHTOUROFF (1885). The male with label «Yssyk-Kul» and male with label «Kirgisias, Leman, 40-42» were found in ZISP collection. Perhaps it may be mislabelling, but, on the other hand, there is the probability of such records, because this species is known from the banks of Lake Zaisan.

Cicindela (s. str.) *sahlbergii sahlbergii* Fischer von Waldheim, 1824

Figs 1-3, 7-35, 68-79, 84-91, 100-103.

Ent. Imper. Ross., 1824, II: 15. Type locality: Siberia.

hybrida var. *sibirica* Fischer von Waldheim, 1821: 101, Tab. I: fig. 7 (Type locality: Siberia: Barnaul).

lateralis Fischer von Waldheim, 1824: 12 (Type locality: Barnaul, Siberia).

pallasii Fischer von Waldheim, 1824: 13 (Type locality: Siberia).

gebleri Fischer von Waldheim, 1828: 25 (Type locality: Siberia).

karelini Fisher von Waldheim, 1832: 432, Tab. VI: f. 2 (Type locality: E deserto Kirgisorum).

caspia Ménériés, 1832: 94 (Type locality: Lenkoran, l'île Sara).

decipiens Gautier, 1872: 223 (Type locality: Indersk).

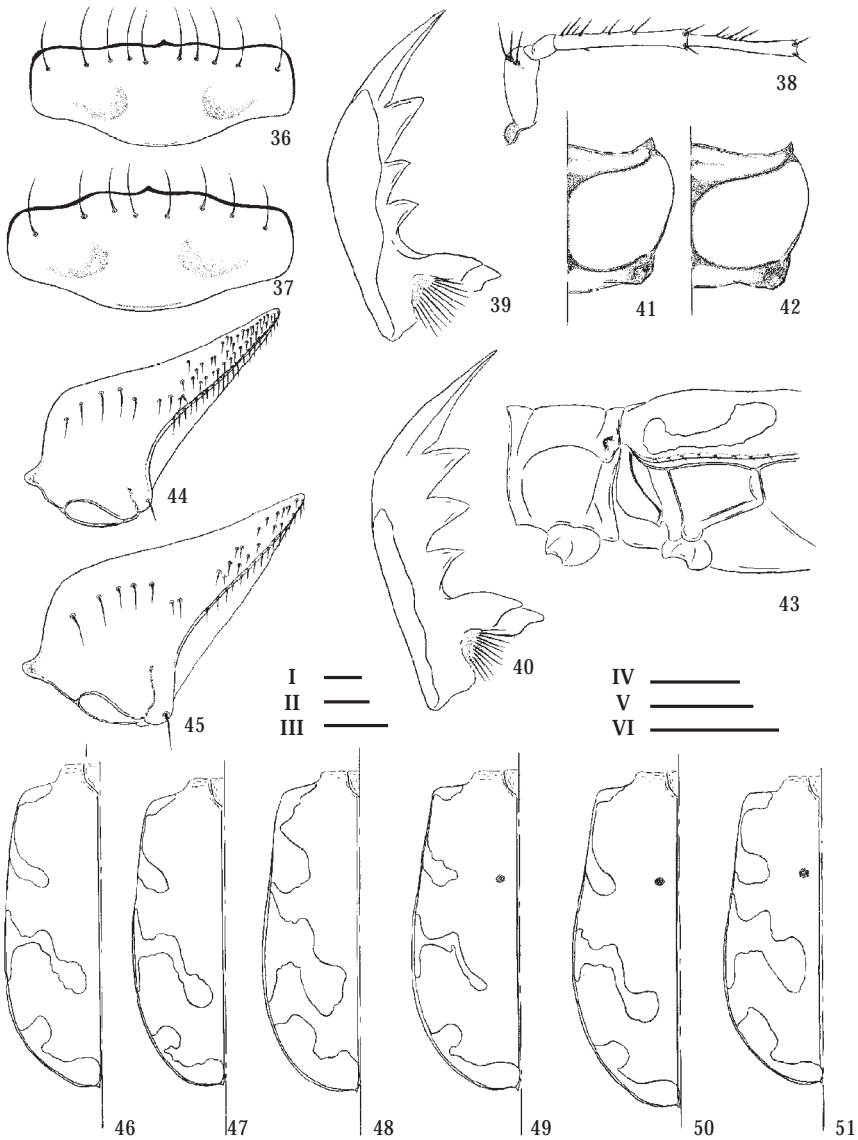
fischeri Beuthin, 1893: 139.

sahlbergi auct.

pallasi auct.

caspica auct.

REFERENCES. FISCHER VON WALDHEIM, 1828: 23-24, Tab. 1: fig. 1-2; GEBLER, 1830: 27-28; 1847: 10-12; DEJEAN, 1833: 3; 1837: 3; FALDERMANN, 1835: 3 (*caspia*); 1839: 41 (*caspia*); MOTSCHULSKY, 1844: 29-31, Tab. 1: figs. 23-25; 1845: 7 (*karelini*); 1850: 1-3; CHAUDOIR, 1863: 203 (*hybrida* var.); DOKHTOUROFF, 1883a: 13; 1883b: 54; 1885: 248; HORN, ROESHKE, 1891: 42, Taf. 1: fig. 10 (*hybrida* ssp.); FLEUTIAUX, 1892: 105 (*hybrida* var.); HORN, 1905a: 158 (*hybrida* ssp.); 1915: 335; 1926: 217; 1930: 52; 1938: 45, Taf. 62: fig. 26, Taf. 63: fig. 1-2; JAKOBSON, 1905-16: 190; LUTSHNIK, 1924: 26 (*maritima* ssp.); MANDL, 1935: 291, Fig. III: 33-53, Fig. V: 33-53, Fig. VI: 17-18 (*hybrida* ssp.); JAGEMANN, 1945: 24; SCHILDER, 1952: 125; 1953: 564; CASSOLA, VAN NIDEK, 1984: 10; WERNER, 1991: 16, T. 11: fig. 73-74, 1992: 83; WIESNER, 1992: 115; DUBATOLOV et al., 1994: 4 (*sahlbergi*); SHILENKOV, 1994: 8 (*hybrida* ssp.); KRZYZHANOVSKI



Figs36-51. *C. sahlbergii khersonensis* Motsch.: 36-37, labrum; 38, antennomeres 1-4; 39-40, left mandible; 41-42, pronotum (right half); 43, ♀ coupling sulcus, lateral view; 44-45, right metatrochanter; 46-51, left elytron (46, Kherson, lectotype; 47, 50, Novotroitskoe; 48, Elisavetgrad; 49, Yampol; 51, Great Aleksandrovka); 36, 38-39, 41, 44, 46-48, ♂; 37, 40, 42-43, 45, 49-51, ♀. Scale bars 1mm: I, 46-51; II, 43; III, 41-42; IV, 38-40; V, 44-45; VI, 36-37.

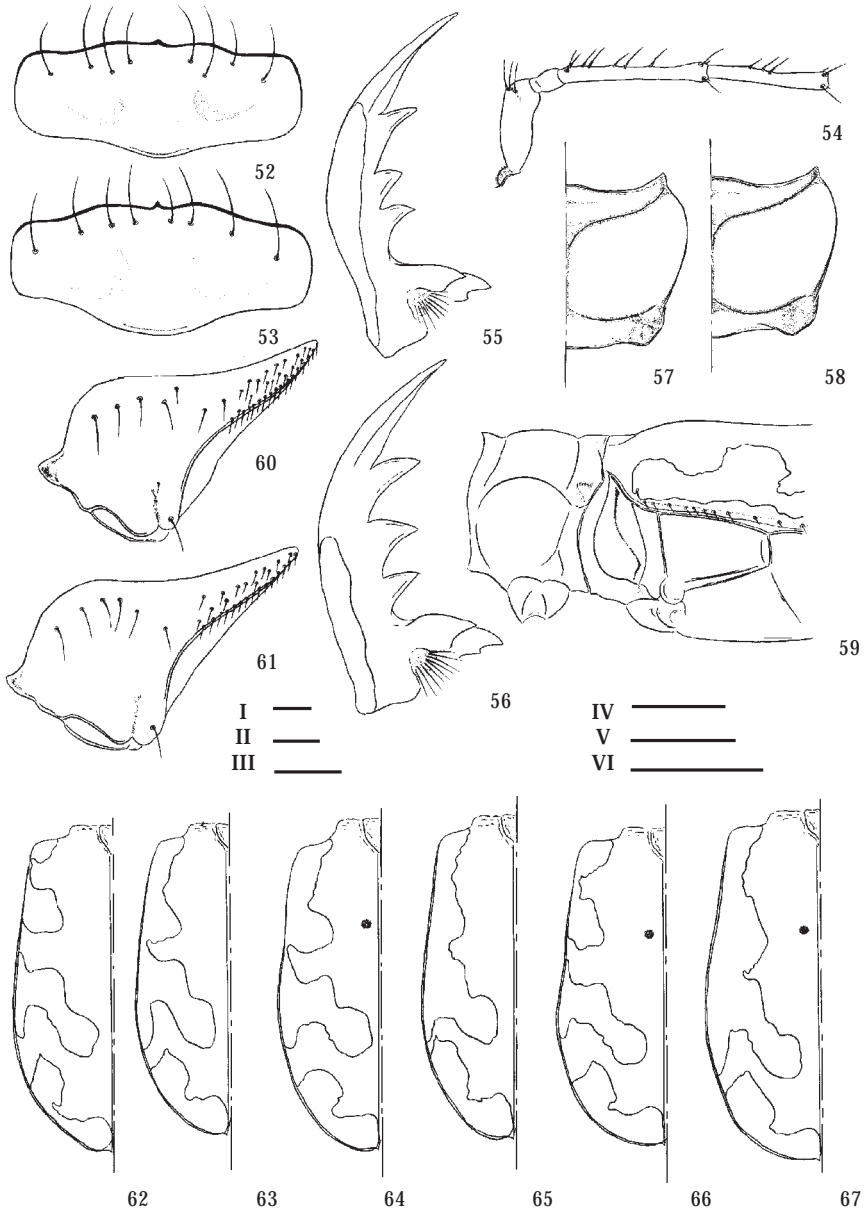
et al., 1995: 26; GEBERT, 1995: 12, Abb. 2.1 (*sahlbergii*); BRIGADIRENKO, 1997: 89 (*hybrida* ssp.).

TYPE MATERIAL: Lectotype of *C. sahlbergii*, ♂, «*Cic. Sahlbergii* Fisch., Sibiria», «Typus», «Fischer von Waldheim», «Lectotypus, *Cicindela* (s. str.) *sahlbergii* Fischer, 1824, des. J. Gebert, 1993», «Staatl. Museum für Tierkunde Dresden». Lectotype of *C. lateralis*, ♀, «*C. lateralis* Gebl.», «*lateralis* Fisch.,

Typus», «Fischer von Waldheim», «Lectotypus, *Cicindela* (s. str.) *sahlbergii* f. *lateralis* Fischer, 1824, des. J. Gebert 1993», «Staatl. Museum für Tierkunde Dresden». Lectotype, ♂, and paralectotypes, 2 ♂ 1 ♀, of *C. pallasii*. Lectotype is labelled «9», «Pallasi Fisch., Typus», «Pallasi Barn., Lan. *Lacteola* Pall., it. G. u.», «Fischer von Waldheim», «Lectotypus, *Cicindela* (s. str.) *sahlbergii* f. *pallasii* Fischer, 1825, des. J. Gebert 1993», «Staatl. Museum für Tierkunde Dresden»; paralectotypes are same labelled, except for the first two labels lacking. Lectotype of *C. gebleri*, ♂, «Gebleri Sibir.», «Typus», «Fischer von Waldheim», «Lectotypus, *Cicindela* (s. str.) *sahlbergii* f. *gebleri* Fischer, 1825, des. J. Gebert 1993», «Staatl. Museum für Tierkunde Dresden». Lectotype, ♂, and paralectotypes, 2 ♂ 3 ♀, of *C. karelini*. Of them, the lectotype and three paralectotypes are labelled «Fischer von Waldheim», «Lectotypus (Paralectotypus), *Cicindela* (s. str.) *sahlbergii* Fischer, 1823, f. *karelini* Fischer, 1832, des. J. Gebert, 1993», «Staatl. Museum für Tierkunde Dresden». Two paralectotypes, 2 ♀ are same labelled, except for the lacking first label (MTD). Lectotype of *C. caspia* (designated here), ♀, rough gold square, «Lencoran», «*caspia* Menet., Lenkoran» (ZISP)

OTHER MATERIAL: **Russia, Voronezh area:** 2 ♂ 1 ♀ (MTTU), «Khoperskij national park, sands along Khoper river, 29.V.1974, leg. A. Scharov»; **Rostovs area:** 1 ♀ (EK), «25 km W Oblivskaya, 3.9.1985, Tcherezova»; 3 ♂ (PU), «USSR, Rostov-Don, 11.05.1992»; 3 ♂ 3 ♀ (MTTU), «Tarasovskij region, Lower Grechiki, 20-24.IV.1995»; **Kalmykia:** 3 ♂ (ZISP), «Elista, steppe»; **Perm' area:** 2 ex. (ZMM), «Perm, *Sahlbergi*, Sib. occ.»; 1 ♂ (ZISP), «Perm gub.»; **Saratov area:** 8 ♂ 3 ♀ (ZISP), «Saratov»; 1 ♂ (ZISP), «Green isl., near Saratov, 15.VI.98, A. Semenov»; 2 ♂ (ZISP), «Upper Buerak, 4.IV.1910, Melnikov»; 1 ♂ (ZISP), «Volsk, 27.VII.26, Vinogradov»; 1 ♂ (ZISP), «Markovskij region, near Zvonarevka, 26.V.1981, B. Kataev»; 1 ♂ (BK), «Markovskij region, near Torsa, 28.V.79, B. Kataev»; 1 ♂ 2 ♀ (BK), «Markovskij region, near Borodaevka, 23.V.80, B. Kataev»; **Volgograd area:** 4 ♂ (EK, PU), «Volgograd, left bank of Volga river, 6.IV.1986, 7.IV.-25.V.1990, 8.VIII.1990, E. Komarov and 20.04.1996 A. Klimenko»; 1 ♂ (AKR), «Near Volgograd, Golodnyi isl., 30.VIII.1991, A. Kravets»; 2 ♂ 1 ♀ (MTTU), «Volgograd, near Gumrak vill., 14.VI.1996, leg. V. Gerasimov»; 1 ♂, «Elton Lake, 1-2.V.1986, E. Komarov»; 2 ♂ (EK), «Kamyschin region, near Belogorki vill., 23.V.1993, E. Komarov»; 1 ♀ (ZISP), «Kamyschin, 20.V.1950, D. Panfilov»; 2 ♂ (EK, AKR), «Mikhailovka, Medveditcha river, 30-31.08.85»; 6 ♂ (ZISP, ZMM), «Sarepta»; 1 ♂ (ZISP), «Krasnoyarskij, 13.VI.07, A. Borodin»; 4 ♂ (ZMM, ZISP), «Tinguta, 27-28.VI.51»; 1 ♂ (ZMM), «Bakalda, 20.VI.51, Alexeev»; 1 ♀ (MTTU), «Tchagan-Nur Lake, 5.VIII.1924»; **Astrakhan' area:** 6 ♂ 1 ♀ (ZISP), «Astrachan»; 5 ♂ 2 ♀ (ZISP), «Khanskaya Stavka, 30.6.09, N. Ikonnikov and 14.VII.887, Plustshevskij»; 6 ♂ 5 ♀ (ZISP), «Ryn-Sands, V. Yakovlev»; 1 ♂ (ZISP), «Vladimirovka, 10.VI.1906, G. Sumakov»; 33 ♂ 18 ♀ (DTS, MTTU), «Krasnoyarskij region, near Dosang, 28.07.1994, leg. D. Stshigel and 12-17.V.1998, leg. K. Makarov & A. Brinev»; 1 ♂ (AN), «*C. sahlbergi*, Baskunchak Lake, 10.05.95 leg. A. Klimenko»; 2 ♂ 1 ♀ (MTTU, PU), «S Upper Baskunchak vill., Schkili sands, 4.V.1995, leg. E. Schanhisa & I. Melnik and 5-6.05.1996, leg. E. Komarov»; 1 ♂ 5 ♀ (MTTU, PU), «Baskunchak Lake, Bogdo mountain, 5.V.1995, leg. E. Schanhisa & I. Melnik»; 1 ♂ (ZMM), «Kopanovka, 8.VIII.1989, E. Antonova»; 2 ♂ 3 ♀ (SM), «Vladimirskij region, New Nikolaevka, 6.8.80, S. Mursin»; **Daghestan:** 1 ♂ (ZISP), «M. Casp., Ulsky»; **Orenburg area:** 1 ♂ 1 ♀ (ZISP), «Orenburg»; 1 ♂ (ZISP), «Upper Dneprovaya, left bank of Ural river, 4.VII.932, L. Zimin»; **Altay Province:** 1 ♂ 2 ♀ (ZMM, ZISP), «Kolyvan»; 1 ex. (ZMM), «Altai»; 1 ex. (ZMM), «Barnaul»; 1 ♂ (ZMM), «Rubchovsk, 8.VII.1928, N. Gorbunov»; 2 ♂ (PU), «Lokot, 11.06.97, leg. V. Polevod»; **Kazakhstan:** 2 ♂ (ZISP), «Uralsk, 28.IV.06, B. Uvarov»; 8 ♂ 2 ♀ (ZISP), «Temir region, Uralsk area, Kok-Dzhida, 18-23.VI.08, D. Borodin, B. Uvarov»; 2 ♂ 2 ♀ (ZISP), «Yanvarchevo, right bank of the Urals river, 21-23.V.949, L. Arnoldi»; 1 ♂ (ZISP), «Solyanka, right bank of the Ural river, 3-5.VII.949, L. Arnoldi»; 1 ♂ (ZISP), «Kharkin, left bank of the Ural river, 16.V.951, Romadina»; 4 ♂ 15 ♀ (MS), «NW Kazakhstan, Aktiubinsk region, Uil, 6-9.05.1997 M. Smirnov»; 1 ♂ 1 ♀ (IK), «Aktiubinsk region, near Oktyabrsk, 16.05.1998 S. Ovtinnikov»; 1 ♂ (ZISP), «Manybaj, 24.IV. N.L. Sacharov»; 1 ♀ (ZISP), «Gaganskaya, 18.VI.06, D. Kor.»; 3 ♂ (ZISP), «Karaagasch, 60 km NW Zhana-Ark, Karaganda region, 19.V.962, G. Medvedev»; 1 ♂ (ZMM), «Pavlodar, Siberia, 15.V.928»; 1 ♂ 1 ♀ (ZMM), «W Kazakhstan, Urda, Zhaskus, 30.IV.53, P. Rafis»; 5 ♂ (ZMM), «Kustanai, 4.V.915, 1-9.V.939»; 1 ♂ (ZMM), «W Kazakhstan, Kalmykovo, 6.VII.36, M. Lurie»; 5 ♂ 2 ♀ (ZISP), «Naurzum, Kustanai region, 31.VII.1898, 3.VII.1939, 19.5.1973»; 21 ♂ 5 ♀ (ZISP, ZMM, MTTU), «Semipalatinsk»; 3 ♀ (ZISP), «Altai mer., 91, Suid Zaisan»; **Kyrgyzstan:** 1 ♂ (ZISP), «Yssyk-Kul»; 1 ♂ (ZISP), «Kirgisija, Leman, 40-42»; **Other localities:** 1 ♂ (MNCN), without label; 1 ♂ 1 ♀ (ZMM, MTTU), «Turcomania»; 4 ♂ 2 ♀ (ZISP, ZMM, MTTU), «Siberia»; 2 ♂ 1 ♀ (ZMM), «Russ. mer.»; 1 ♂ (ZMM), «D. K. occ. *Khersonensis* var.?»; 2 ♀ (ZMM), «Camp. Kirg. or.»; 1 ex. (ZMM), «Volga»; 1 ex. (ZMM), «Irtysh»; 2 ex. (ZMM), «fl. Ural».

DESCRIPTION. Total body length 11.0-13.5 mm (n=75).



Figs 52-67. *C. sahlbergii lutshniki* n. ssp.: 52-53, labrum; 54, antennomeres 1-4; 55-56, left mandible; 57-58, pronotum (right half); 59, ♀ coupling sulcus, lateral view; 60-61, right metatrochanter; 62-67, left elytron; 52, 54-55, 57, 60, 62-64, ♂; 53, 56, 58-59, 61, 65-67, ♀. Scale bars 1mm: I, 62-67; II, 59; III, 57-58; IV, 54-56; V, 60-61; VI, 52-53.

Larger, with moderately to widely isolated humeral and apical lunules and middle band (Figs 3, 29 and 33-34), often with humeral lunula and middle band merging - *f. lateralis* and *f. gebleri*, (Figs 9, 12 and 31), sometimes with a rather

narrow - f. *karelini* (Figs 18, 30 and 35) or wide - f. *pallasii* (Figs 15 and 32) lateral band. Labrum 2.2-2.6 (mean 2.4) times as wide as long (Figs 1, 7, 10, 13, 16 and 19-20), mandibles large and very stout, 4.0-5.0 (mean 4.5) times as long as wide in ♂ (Figs 22-23), lateral margin of pronotum distinctly rounded on sides (Figs 2, 8, 11, 14, 17 and 24-25), ♀ coupling sulcus feebly sinuate, straighter (Fig. 26), metatarsus fairly long, the metatibia/tarsus length ratio 0.95-1.05.

Penis very stout, 0.55-0.60 (mean 0.575) times as long as elytra, its apex lanciform, distinctly depressed on sides in lateral view, with a long and wide median groove (Figs 68-79). Internal sac large, flag medium-sized, median tooth long, rarely short, VA very large, B distinctly larger than DLL, BLR wide and rounded (Figs 84-91).

Posterior margin of ♀ sternum 8 with 4-5 setae on each side and 8-10 long setae laterally (Fig. 101). Tergite 9 with 22-24 long setae apically, tergite 10 with 12-14 long setae laterally (Fig. 100). Base of second gonapophyses with two long setae and numerous short ones. Ventral notch on second gonacoxa deep, with 3-5 long setae (Figs 102-103).

Genitalia studied in 123 ♂ and 26 ♀.

TAXONOMIC REMARKS. One specimen, ♀, from the ZISP collection, with a rough gold square and the labels «Lencoran» and «*caspia* Menet., Lenkoran» is designated here as the lectotype of *C. caspia* Ménéntriés, 1832. It follows from the labels that this specimen belongs to the type series, because the type locality of this species, the Sara Island, is specified as Lenkoran. Formerly it was a small island which is now a part of the peninsula with the town of Narimabad, Azerbaijan, Caspian Sea Coast.

DISTRIBUTION. **Russia:** Voronezh, Rostov-Don, Astrachan, Volgograd, Saratov, Samara, Perm, Orenburg areas, Kalmykia, Daghestan, Tatarstan, Altaisky Province; **Kazakhstan:** Uralsk, Guriev, Aktiubinsk, Turgay, Kustanay, Kokchetav, Akmola (=Tselinograd), Karaganda, Pavlodar, Semipalatinsk and East-Kazakstan areas; **Azerbaijan:** Lenkoran; (?) **Kyrgyzstan:** Yssyk-Kul; (?) **China:** Kuldzha (Fig. 116).

Cicindela (s. str.) *sahlbergii khersonensis* Motschulsky, 1845, n. stat.

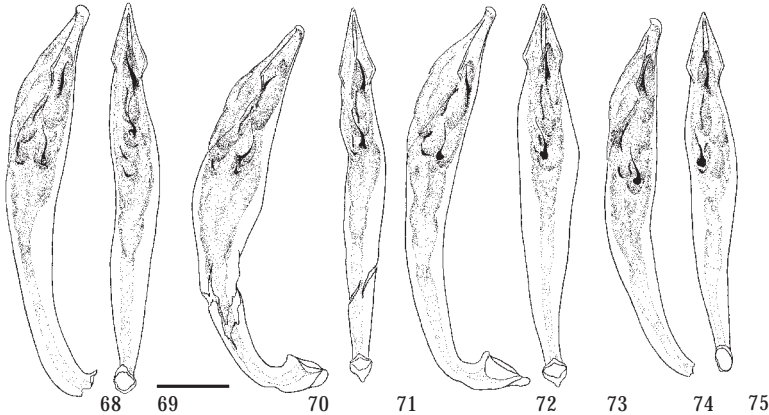
Figs 36-51, 80-81, 92-95, 104-107.

Bull. Soc. Imp. Nat. Mosc., 1845, XVIII, 2: 9-10, Tab. 1: fig. 1. Type locality: Kherson steppe. *chersonensis* auct.

REFERENCES. MOTSCHULSKY, 1850: 1, 1859: 119; HORN, ROESCHKE, 1891: 35, Tab. 1: fig. 8h (*hybrida* var.); HORN, 1905b: 297 (*hybrida sahlbergi*), 1915: 335; 1926: 217; 1938: 45, Taf. 62: fig. 24; JAKOBSON, 1905-16: 190; LUTSHNIK, 1911: 59 (*maritima sahlbergi*); 1914: 269; 1916: 529; MANDL, 1935: 293, Fig. III: 23-25, Fig. VI: 5-6 (*hybrida sahlbergi*); Schilder, 1953: 564; KRYZHANOVSKIY et al., 1995: 26; WIESNER, 1992: 115; GEBERT, 1995: 12 (*sahlbergi sahlbergi*).

TYPE MATERIAL: Lectotype of *C. khersonensis* (designated here), ♂, «*Cicindela khersonensis* m., Kherson» (ZMM).

OTHER MATERIAL: **Russia, Belgorod area:** 1 ♂ (IB), «Borisovka, 19.VI.1975, I.A. Belousov»; **Ukraine, Cherkassk area:** 1 ♂ (ZMM), «Kanev, Kievskaya area, IV.1947, A. Kryschtal»; 1 ♀ (ZISP), «Zolotonosha, Poltavskaya gub., VI. 907, V. Kizeritskij»; 1 ♂ (MTTU), «Kanev nat. park, dunes, 13.VII.1982, K. Makarov»; 2 ♂ 4 ♀ (MTTU), «Kanev nat. park, Kruglik isl., on the sand along bank of Dnepr river, 25-29.IV.1984, leg. A. Matalin»; **Kirovograd area:** 4 ♂ (ZISP), «Elisavetgrad, coll. Kirichenko»; **Dnepropetrovsk area:** 1 ♀ (ZISP), «Verknedneprovskij uезд, Khersonskaya gub., Ya. Shritner»; 8 ♂ 14



Figs 68-75. Aedeagus of the type specimens of *C. sahlbergii* F.-W.: 68-69, *C. sahlbergii* F.-W., lectotype; 70-71, *C. gebleri* F.-W., lectotype; 72-73, *C. pallasii* F.-W., lectotype; 74-75, *C. karelini* F.-W., lectotype; 68, 70, 72, 74, left view; 69, 71, 73, 75, dorsal view. Scale bar 1 mm.

♀ (MTTU, PU, SM), «Novotroitskoe, 10-17.VIII.1995, leg. P. Udovichenko»; 1 ♂ 2 ♀ (MS), «Kirovskoe, 30.05.-1.07.93, M. Smirnov»; **Kharkov area**: 1 ♀ (ZISP), «Zmievskij region, Zamostye, Ilyin, 9.VI.914»; 4 ♂ 1 ♀ (ZISP), «Lisichansk, sands, Arnoldi, 19.VI.937»; 1 ♂ (AK), «Merefa, 10.06.1951, coll. S. Nikulin»; 1 ♂ (ZISP), «Bank of the Oskol reservoir, near Oskol, Kryzhanovskij, VII.967»; **Lugansk area**: 1 ♀ (ZISP), «Persiyonovka, 12.V.1910, V. Kizeritskij»; 4 ♂ (ZISP), «near Lugansk, 7.V.927, V. Talitskij»; 1 ♂ (MTTU), «Derkul, 17.VI.1962, leg. K. Arnoldi»; **Donetsk area**: 1 ♀ (ZISP), «Drobyshevo, Donetsk, sands, 13.VI.37, Arnoldi»; 2 ♂ 1 ♀ (ZISP), «Yampol, sands, Arnoldi, 13.VI.939»; 2 ♂ 2 ♀ (ZISP), «Svyatogorskaya, Arnoldi, 20.VI.938»; 1 ♂ (ZISP), «Novoselovka, Arnoldi, 15-16.VI.938»; **Zaporozhye area**: 3 ♂ 1 ♀ (AK), «Hortitcha isl., 4.VI.1968, A. Koval leg.»; 1 ♀ (MTTU), «Berdyansk, 24.06.38, coll. S. Nikulina»; **Nikolaev area**: 1 ♂ (ZISP), «Nikolaev»; 4 ♂ 7 ♀ (ZISP), «Great Aleksandrovka, Ingulets river, 20.VII.923, D. Znoiko».

DESCRIPTION. Total body length 10.0-12.5 mm (n=45).

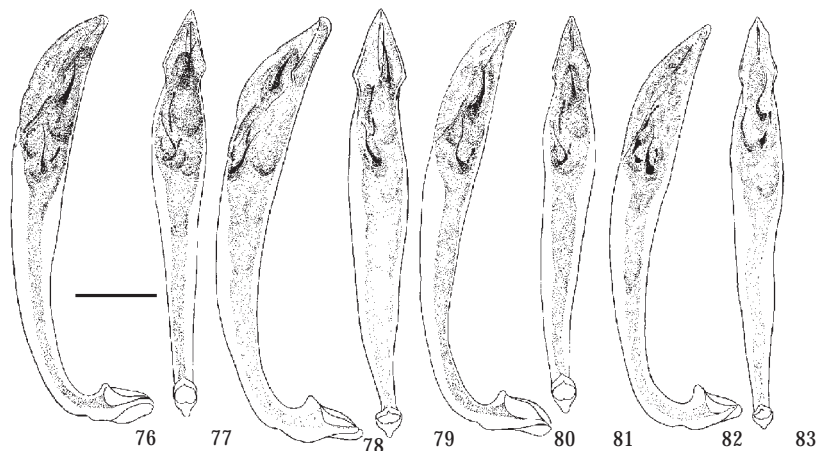
Smaller, always with very narrowly to moderately isolated humeral and apical lunules and middle band (Figs 46-51). Labrum 2.4-2.7 (mean 2.55) as wide as long (Figs 36-37), mandibles rather large, 4.6-5.6 (mean 5.1) times as long as wide in ♂ (Figs 39-40); sides of pronotum slightly converging toward base (Figs 41-42); ♀ coupling sulcus sinuate (Fig. 43); metatarsus longer, metatibia/tarsus length ratio 0.95-1.0.

Penis fairly long, 0.60-0.67 (mean 0.635) times as long as elytra, its lanciform apex rather small, slightly rounded, with a narrow median groove (Figs 80-81). Internal sac medium-sized, median tooth long, gradually curved apically, seldom short, VA medium-sized, B slightly larger than DLL (Figs 92-95).

Posterior margin of ♀ sternum 8 with 3-5 setae on each side and 7-9 long setae laterally (Fig. 105). Tergite 9 with 18-22 long setae apically, tergite 10 with 8-10 long setae laterally (Fig. 104). Base of second gonapophyses with two long setae only. Ventral notch on second gonacoxa shallow, with three long setae (Figs 106-107).

Genitalia studied in 37 ♂ and 14 ♀.

DISTRIBUTION. **Russia:** Belgorod area; **Ukraine:** Cherkassy, Kirovograd, Dnepropetrovsk, Zaporozhie, Nikolaev areas. Belgorod, Kharkov, Lugansk and Donetsk areas populated by the form transitional between *khersonensis* and *lateralis* (Fig.



Figs 76-83. Aedeagus of *C. sahlbergii* F.-W.: 76-77, *C. sahlbergii sahlbergii* F.-W., Russia, Rostov-Don; 78-79, *C. sahlbergii sahlbergii* F.-W., Kazakhstan, Kok-Dzhyda; 80-81, *C. sahlbergii khersonensis* Motsch., 82-83 *C. sahlbergii lutshniki* n. ssp. 76, 78, 80, 82, left view; 77, 79, 81, 83, dorsal view. Scale bar 1 mm.

116).

Cicindela (s. str.) *sahlbergii lutshniki* n. ssp.

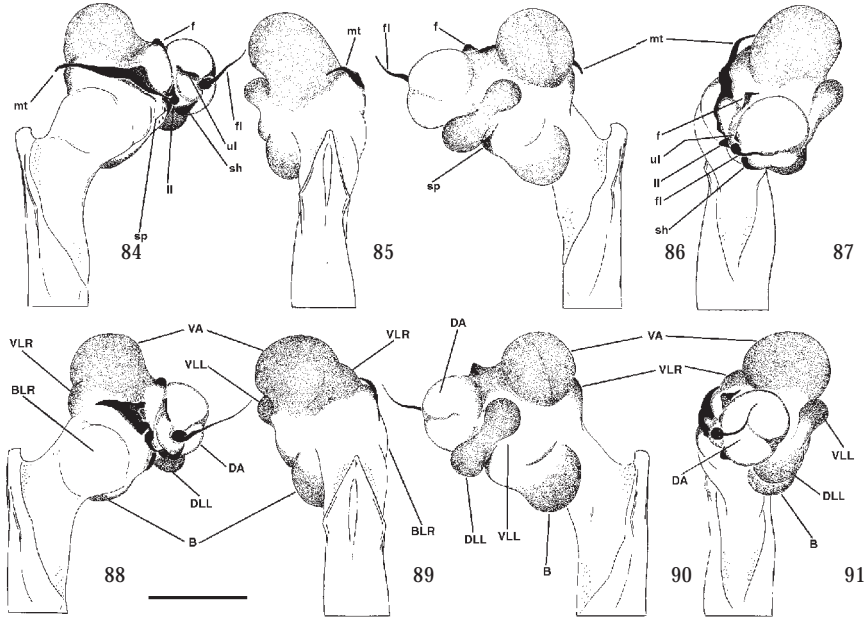
Figs 52-67, 82-83, 96-99, 108-111.

TYPE MATERIAL: Holotype ♂ (ZISP), «Alyoshki, lower flow of the Dnepr river, Odessa Agricultural Experimental Station, 16.V.926», «*Cicindela sahlbergii* var?», V. Lutshnik det.», «Apparently it is a new form. It differs from *sahlbergii*, from *chersonensis* and from *maguarica*. The much material is need». Paratypes, 2 ♂ (ZISP), with the same label as the holotypus; 1 ♀ (ZISP), with the same label, but 4.VI.926; 1 ♂ (ZISP), with the same label, but 7.VIII.926; 1 ♀ (ZISP), with the same label, but 8.VIII.926; 1 ♀ (ZISP), with the same label, but 18.VIII.926; 1 ♀ (ZISP), «Alyoshki, lower flow of the Dnepr river, D. Znoiko, 6.V.925»; 1 ♂ (ZISP), with the same label, but 31.VII.923; 2 ♂ (ZISP), with the same label, but 8-10.IX.925; 1 ♂ (ZISP), with the same label, but 9.IX.925; 1 ♂ (ZISP), with the same label, but 3.VI.926; 2 ♀ (ZISP), with the same label, but 14.VII.926; 1 ♀ (ZISP), with the same label, but 21.VII.926; 1 ♀ (ZISP), with the same label, but 25.VII.926; 2 ♂ (ZISP), with the same label, but 9-10.VII.928; 6 ♂ 3 ♀ (ZISP), with the same label, but 26.V.926; 2 ♂ (ZISP), «Alyoshki, lower flow of the Dnepr river, L. Zimin, 24.VI.926»; 3 ♂ (ZISP), with the same label, but 28.VI.926; 2 ♂ 1 ♀ (ZISP), with the same label, but 21.VIII.926; 1 ♂ (ZISP), «Alyoshki, lower flow of the Dnepr river, P. Egorov, 7.IV.927»; 1 ♂ 1 ♀ (ZISP), with the same label, but 17.IV.927; 1 ♀ (ZISP), with the same label, but 24.V.927; 1 ♀ (ZISP), with the same label, but 6.VI.927; 1 ♀ (ZISP), «Alyoshki, 10.IX.925»; 1 ♂ (MTTU), «Chersonskaya area, VII.60»; 1 ♀ (MTTU), «USSR, Chersonskaya area, Golaya Pristan, kuchugury, 17.07.1987, A. Putchkov»; 9 ♂ 7 ♀ (MTTU, PU, IM), with the same label, but 6-9.V.1994, P. Udovichenko leg.; 5 ♂ 4 ♀ (MTTU, PU, IM), «Ukraine, Chersonskaya area, near Rybalcha, 6-9.V.1994, leg. P. Udovichenko»; 5 ♂ 2 ♀ (PU), with the same label, but 14.IV.1996; 1 ♀ (PU), with the same label, but 12.V.1997; 38 ♂ 34 ♀ (MTTU, SV), with the same label, but 14-18.IV.1996, S. Vashchenko leg.

ETYMOLOGY. The new subspecies is named in honour of the well-known Russian entomologist V.N. Lutshnik, who discovered this form but didn't give a description.

DESCRIPTION. Total body length 10.2-12.8 mm (n=60).

Rather small-sized, white elytral pattern moderately wide or wide, with humeral and apical lunules and middle band isolated (Figs 62 and 65), often humeral lunula merging with middle band (Figs 63 and 66-67), rarely with a



Figs 84-91. Internal sac of *C. sahlbergii* F.-W.: 84-87, *C. sahlbergii sahlbergii* F.-W., Voronezh area, Khoperskij national park; 88-91, *C. sahlbergii sahlbergii* F.-W., Astrakhan' area, Khanskaya Stavka; 84, 88, right view; 85, 89, dorsal view; 86, 90, left view; 87, 91, ventral view; f, flag; ul, upper limitator; fl, flagellum; sh, shield; ll, lower limitator; sp, spring; mt, median teeth; VA, ventro-apical; VLR, ventro-lateral right; VLL, ventro-lateral left; DA, dorso-apical; DLL, dorso-lateral left; B, basal; BLR, basi-lateral right. Scale bar 1 mm.

practically complete lateral band (Fig. 64). Labrum 2.4-2.6 (mean 2.5) times as wide as long (Figs 52-53); mandibles very slender as compared with those of the other subspecies, 5.5-5.75 (mean 5.625) times as long as wide in ♂ (Figs 55-56), sides of pronotum slightly converging basal (Figs 57-58), ♀ coupling sulcus sinuate (Fig. 59), metatarsus relatively short, with metatibia/tarsus length ratio 0.9-0.95.

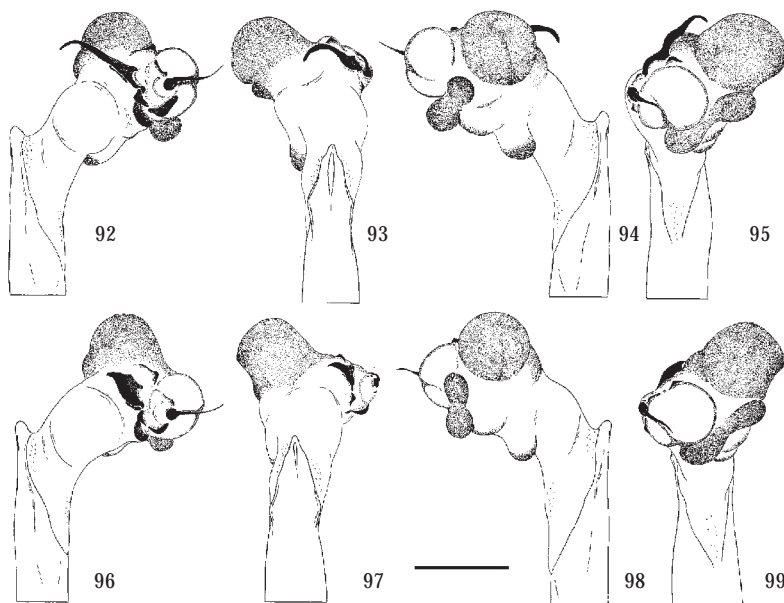
Penis very slender and long, 0.65-0.70 (mean 0.675) times as long as elytra, its apex small, rounded, with a short and narrow median groove (Figs 82-83). Internal sac smaller, median tooth always very short, VA very small, B and DLL subequal (Figs 96-99).

Posterior margin of ♀ sternum 8 unisetose on each side, with 4-6 long setae laterally (Fig. 109). Tergite 9 with 18-22 long setae apically, tergite 10 with 8-10 long setae laterally (Fig. 108). Base of second gonapophyses with 4-5 long setae and several short setae. Ventral notch on second gonacoxa shallow, with four long setae (Figs 110-111).

Genitalia studied in 40 ♂ and 10 ♀.

DISTRIBUTION. Cherson region: sands at Alyoshki and Kinburi spit in the lower flow of the Dnepr River (Fig. 116).

ECOLOGY. Confined to relict sands in the lower flow of the Dnepr River. According



Figs 92-99. Internal sac of *C. sahlbergii* F.-W.: 92-95, *C. sahlbergii khersonensis* Motsch.; 96-99, *C. sahlbergii lutshniki* n. ssp.; 92, 96, right view; 93, 97, dorsal view; 94, 98, left view; 95, 99, ventral view. Scale bar 1 mm.

to Mr. S. Vaschenko and Mr. P. Udovitchenko (personal communication), it occurs on dry sandy dunes supported with sparse cereals.

***Cicindela* (s. str.) *monticola* Ménériés, 1832, bona sp., rest. stat.**

Figs 112-115, 117-171, 174-185, 190-197.

Cat. Rais. obj. zool. Caucase jusq. frons. act. Perse, 1832: 94-95. Type locality: Caucasus, Nalchik.

DESCRIPTION. Total body length 11.0 – 15.3 mm (n=115).

Ventral surface of head metallic blue or black-blue with a light green or golden lustre, sometimes green or green-blue with cuprous or golden reflections. Genae blue or blue-green with violet reflections, sometimes green with cuprous or golden lustre. Clypeus green or cuprous-green with golden or bronze lustre, sometimes blue or blue-green with violet tinge. Frons, vertex and occiput green or green-blue with golden, cuprous or purple reflections, frontal stripes bright green or blue, rarely violet. The ocular area green with cuprous-bronze or purple reflections, sometimes blue with violet lustre. In some specimens, head fully black with bronze or violet reflections. First four antennomeres green or blue-green, with golden, cuprous or bronze reflections, not seldom blue or black. Labrum white, with a narrowly dark anterior margin. Maxillary palpomeres 3 and 4 and labial palpomere 4 metallic green, with a light golden or cuprous lustre, rarely dark blue. Pronotum green or blue-green with light cuprous, golden or bronze reflections, sometimes blue with a greenish tinge; frontal and basal grooves green-blue with golden-cuprous tinge or bright blue. The mid-line thin, green or green-blue, rarely cuprous

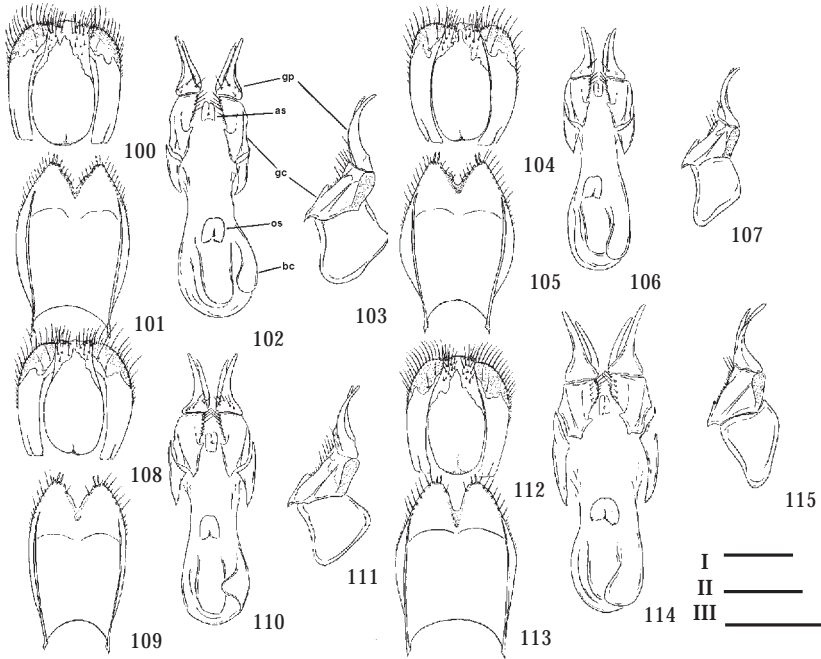


Fig. 100-115. ♀ genitalia of *C. sahlbergii* F.-W. and *C. monticola* Mén.: 100-103, *C. sahlbergii sahlbergii* F.-W.; 104-107, *C. sahlbergii khersonensis* Motsch.; 108-111, *C. sahlbergii lutshniki* n. ssp.; 112-115, *C. monticola monticola* Mén. 100, 104, 108, 112, 9 & 10 syntergite, dorsal view; 101, 105, 109, 113, sternum 8, ventral view; 102, 106, 110, 114, second gonapophyses and gonacoxa, ventral view; 103, 107, 111, 115, second gonapophyses and gonacoxa, lateral left view; gp, gonapophyses; gc, gonacoxa; bc, bursa copulatrix; os, oviduct sclerite; as, additional sclerite. Scale bars 1 mm: I, 101-102, 105-106, 109-110, 113; II, 103, 107, 111, 114-115; III, 100, 104, 108, 112.

or cuprous-bronze. Proepisternum cuprous or cuprous-bronze with golden lustre, or, in some specimens, dark blue with a light bronze tinge. Pro-, meso- and metathorax green or green-blue with cuprous-bronze or golden reflections, sometimes dark blue with a light green or golden-green lustre. Mes- and metepisternum cuprous-bronze, often with golden-green lustre, in some specimens blue-green or dark blue, mesepimerum bronze or cuprous-bronze, often green with cuprous or bronze lustre, rarely deep blue. Sometimes pronotum, pro-, meso- and metathorax black with bronze or violet tinge. Abdominal sternites green or blue-green with cuprous-bronze or golden-cuprous reflections on sides, sometimes blue, with green lustre, rarely violet. Legs green or blue-green with bright cuprous or bronze reflections, often deep blue with bright green reflections, rarely black with blue tinge. Elytra cuprous-bronze, with numerous, diffuse dark blue points, rarely fully black, or, in individual specimens, dull green or dark blue with cuprous or golden-cuprous reflections. Scutelum blue-green with bright golden-cuprous reflections, more seldom dark blue or black. Elytral suture cuprous or golden-cuprous, rarely blue with purple tinge, or black. White elytral pattern complete, humeral lunula often split into two small separate dots (Figs 146-147 and 149), middle band wide (Figs 127-133) or narrow (Figs 144-150 and 161-165), faintly

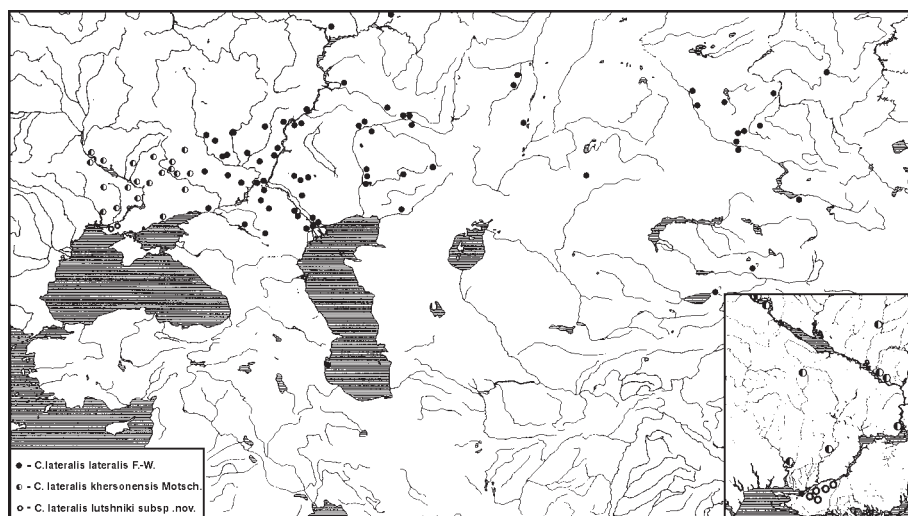
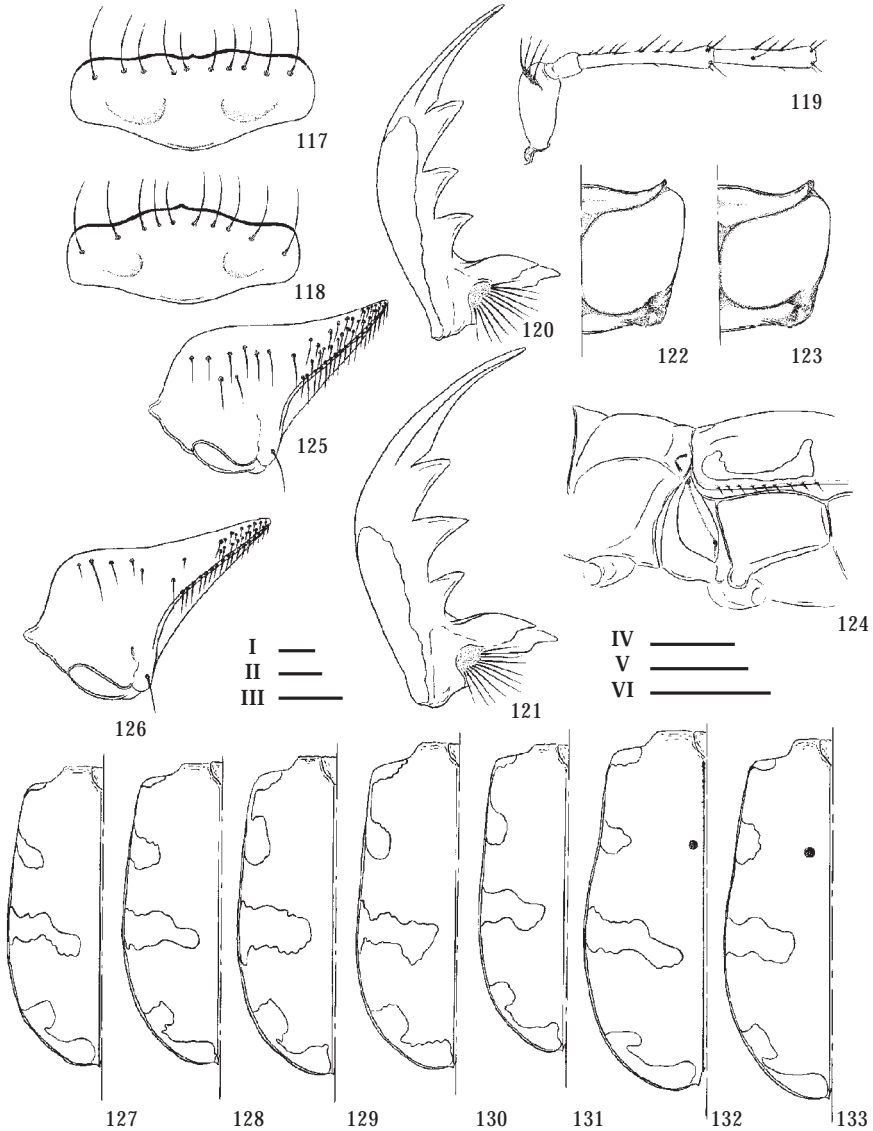


Fig. 116. The distribution area of *C. sahlbergii* F.-W.

sinuate (Figs 144-150) or nearly straight (Figs 127-133), more seldom narrow, distinctly curved, with a short lateral part (Figs 161-165).

Head wrinkled on vertex and occiput, with thin, shallow furrows on frons and rough furrows behind eyes. Genae glabrous, with deep, dense, longitudinal wrinkles. Frons with 4-8 soft hairs, vertex with 2-6 ones, occiput glabrous. Anterior and posterior supraorbital setae 1-2 on each side. Besides three apical setae present, scape glabrous or, in some specimens, sparsely pubescent, with 2-4 short, stout, white additional setae; 3rd antennomere 1.18-1.31 (mean 1.24) times as long as 4th, former with 4-9 strong white seta, latter with 2-4 ones (Figs 119, 136 and 153). Labrum glabrous, transverse, 2.2-2.6 (mean 2.4) times as wide as long, unidentate, with 6-12 long submarginal setae (Figs 117-118, 134-135 and 151-152). Mandibles stout, 4.5-6.25 (mean 5.37) and 4.5-5.75 (mean 5.12) times as long as wide in ♂ and ♀, respectively. Pronotum finely wrinkled, transverse, 1.22-1.45 (mean 1.33) times as wide as long, with sides nearly straight, slightly converging basal (Figs 122-123, 139-140 and 156-157). Pronotum faintly convex on disc, glabrous, except for a row of sparse white setae laterally. ♀ coupling sulcus on mesepisternum long, straight, with a distinct basal groove (Figs 124, 141 and 158). Elytra subparallel (♂) or broadening in apical 1/3 (♀), 1.5-1.6 (mean 1.55) and 1.38-1.46 (mean 1.42) times as long as wide in ♂ and ♀, respectively. Metatarsus 0.90-0.97, seldom up to 1.02-1.07, times as long as tibia. Metatrochanter along anterior margin with 6-12 white setae in ♂ and 2-6 ones in ♀ (Figs 125-126, 142-143 and 159-160).

Penis slender, 0.6-0.65 (mean 0.625) times as short as elytra, its apex indistinctly lanciform, smooth, rather small, with very narrow lateral flanks (Figs 166-171). Internal sac small and slender, flag small, triangular, shield medium-sized, median tooth very long, curved apically, sometimes nearly straight, VA rather large or medium-sized, elongate, protruding apically, VAL slight, DLL rounded, very small, B medium-sized, rounded apically, distinctly protruding leftward, sometimes longitudinal, VLR small, poorly developed, BLR indistinct (Figs 174-185).



Figs 117-133. *C. monticola monticola* Mén.: 117-118, labrum; 119, antennomeres 1-4; 120-121, left mandible; 122-123, pronotum (right half); 124, ♀ coupling sulcus, lateral view; 125-126, right metatrochanter; 127-133, left elytron (127, 132, N Ossetia, Ceis; 128, Kabardino-Balkaria, Yanikoi; 129, Kislovodsk; 130, Ashe, Bekeshei river; 131, Abkhazia, Ganahleba river; 133, Abkhazia, Cherkessian Glads); 117, 119-120, 122, 125, 127-131, ♂; 118, 121, 123-124, 126, 132-133, ♀. Scale bars 1mm: I, 127-133; II, 124; III, 122-123; IV, 119-121; V, 125-126; VI, 117-118.

Posterior margin of ♀ sternum 8 with either a single or 4-5 setae on each side, apices truncate, with 1-3 stout, short setae, side margin with 7-8 long setae (Figs 113, 191 and 195). Tergite 9 oval, 1.6-2.0 times as long as wide, with 16-22 or 30-32 long setae apically. Tergite 10 membranous, setose in apical 1/3-1/2, with 8-

10 or 14-15 long setae laterally (Figs 112, 190 and 194). Base of second gonapophyses without or with 2-3 long setae. Second gonocoxae each with a deep ventral notch, three or 6-7 long setae and numerous short ones; additional sclerite fairly long, suboval. Bursa copulatrix circular, oviduct sclerite large (Figs 114-115, 192-193 and 196-197).

DISTRIBUTION. N Caucasus up to Daghestan in the east, Georgia, Azerbaijan, Armenia, Marmara and Aegean Sea coasts in Turkey, SW Black Sea Coast in Bulgaria (Fig. 206).

Cicindela (s. str.) *monticola monticola* Ménétriés, 1832

Figs 112-115, 117-133, 166-167, 174-177.

Cat. Rais. obj. zool. Caucase jusq. frons. act. Perse, 1832: 94-95. Type locality: Caucasus, Nalchik.

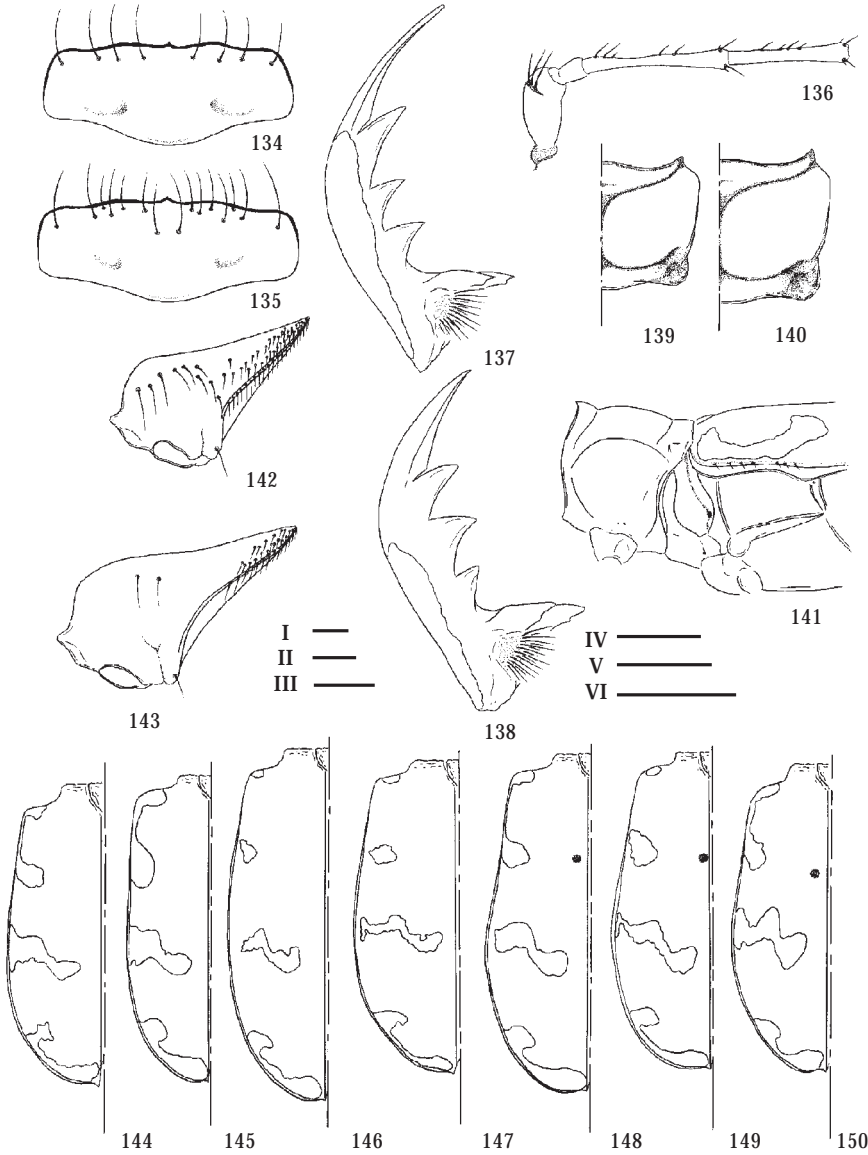
persica Faldermann, 1835: 4-5, Tab. I: fig. 1 (Type locality: Persia).

menetriési Beuthin, 1893: 135.

REFERENCES. DEJEAN, 1833: 3 (*hybrida* var. *integra*); FALDERMANN, 1835: 5, 1839: 41 (including as *persica*, *riparia* and *trasversalis*); MOTSCHULSKY, 1845: 7 (*persica*), 1850: 2; CHAUDOIR, 1863: 202 (*hybrida* var. *integra*); FLEUTIAUX, 1892: 105; HORN, ROESHKE, 1891: 42, Taf. 1: fig. 9 f-g (*hybrida riparia*); LUTSHNIK, 1910: 140; 1914: 269; 1915: 28; 1926: 35-37 (*hybrida* ssp.); JAKOBSON, 1905-16: 189 (*hybrida riparia*); HORN, 1915: 334; 1926: 216; 1938: 46, Taf. 63, fig. 21; BARTHE, 1931: 22; MANDL, 1935, Fig. IV: 101-104, Fig. V: 104-107, Fig. VI: 41-42 (*hybrida* ssp.); 1936: 5; SCHILDER, 1952: 125; 1953: 564; CASSOLA, VAN NIDEK, 1984: 10; KOREL, 1988: 99; 1994: 42; WERNER, 1991: 16, T. 11: fig. 75; 1992: 83; WIESNER, 1992: 117; KRZYZHANOVSKIJ et al., 1995: 26 (*monticola*); GEBERT, 1995: 14, Abb. 2.6 (*sahlbergi* ssp.).

TYPE MATERIAL: Not studied.

OTHER MATERIAL: **Russia, Krasnodar Province:** 1 ♀ (MNHT), «Krasnodar, Kuban riv., 2.5.72, V.E. Beregovoi»; 1 ♀ (ZISP), «Armavir, Kuban reg., 20. IV. 911, Volnukhin»; 3 ♂ (ZISP), «Old Kuban, 26-5-70, B. Korotyayev»; 1 ♂ (ZISP), «lower flow of the Belaya river, 10.V.21. Arnoldi»; 1 ♂ (ZISP), «Kanai, NW Caucasus, 23.VI.30, K. Arnoldi»; 2 ♀ (ZISP), «Western Caucasus, Mzymta river, Kurnakov, 27.VII.954»; 2 ♂ 2 ♀ (ZISP), «Caucasus, 23.VII.1896, Aksai river, Stshukin»; 1 ♂ (ZISP), «Western Caucasus, Sochi, 7.VII.914»; 1 ♀ (IB, AK), «Sochi, Lasarevskoe, Psezuapse river, 23.VII.1984, V. Prasolov and 15. VIII. 1985, A.G. Koval»; 9 ♂ 4 ♀ (PU, IM), «NW Caucasus, Sochi area, near Bzych, Shakhe river, 8.07.1996, leg. I. Melnik»; 3 ♂ (ZMM, ZISP), «Krasnaya polyana, Caucasus ocid.»; 3 ♂ 4 ♀ (AK, EK), «near Ashe, Bekeshei river, 10.VIII.1985, A. Koval»; **Adygea:** 6 ♂ (ZISP, ZMM), «Maikop»; **Stavropol Province:** 16 ♂ 3 ♀ (ZISP), «Stavropol»; 1 ♂ (ZMM), «Kislovodsk»; 1 ♂ (SM), «N. Caucasus, near Kislovodsk, Beriozovaya river, 1000 m, 10.VI.95»; **Karachai-Cherkessia:** 9 ♂ 6 ♀ (ZISP, MTTU, AKR, AN, PU), «North Caucasus, Teberda»; 1 ♀ (AN), «near Leso-Kyafar, 11.08.1980, leg. V. Byalt»; **Kabardino-Balkaria:** 1 ♂ 1 ♀ (ZISP), «Nord Caucas, Elborus G., 8000', E. Koenig»; 3 ♂ (ZMM, EK), «Nalchik, 26.VIII.1928, Richter»; 4 ♂ 4 ♀ (AK), «C Caucasus, Nalchik env., valley of Belaya river, 900 m, 2. VIII. 1996, A.G. Koval»; 1 ♀ (MTTU), «Prokhladnenskij region, Proletarskaya, 26-28.IV.1970, leg. Kh. Shkhashimishhev»; 1 ♀ (IB), «Cheget, 2200 m, river bank, 16.VI.78, I. Belousov»; 2 ♂ (AKR), «Upper Balkaria, on the sands along the river bank, A. Kravets, 2.IX.1984»; 1 ♂ (AKR), «Yanikoi, 14.VII.1985»; 1 ♂ 1 ♀ (AN), «Aushiger, 2.VI.1990, lg., det. Kalashan»; **North Ossetia:** 1 ♀ (ZISP), «Vladikavkas, Demokidov, 22.VI.899»; 1 ♂ (ZISP), «Ardon, Vladikavkaskaj region, Terskaya area, Demokidov, 27.IV.900»; 1 ♂ 1 ♀ (MTTU), «near Bekan lake, 27.VII.87, Busaev»; 1 ♂ 1 ♀ (MTTU), «near Alagir, Ardon river, 08.1984, leg. Alexeev S.»; 1 ♂ 2 ♀ (EK, MTTU), «right bank of Ceidon river, 1750 m, 17.09.1983, leg. Alexeev S.»; 1 ♀ (EK), «Ceis, Kalperskij range, 2000 m, 11.VI.81, leg. Alexeev S.»; **Chechnya:** 1 ♀ (ZISP), «Groznyi, Caucasus boreal, VII.1907, M. Lembitsh»; **Daghestan:** 1 ♀ (ZISP), «Derbent»; 5 ♂ (ZISP), «Madzhalis»; 1 ♂ (ZISP), «Soviet region, near Dagbasch, 1900 m, 10.VII.92, B. Kataev»; 1 ♂ (ZISP), «Manglis, Caucasus, K. Satunin»; 2 ♂ (ZMM), «Hasav-Yurt, 20-25.VI.1953, Mikhailov»; 1 ♂ (ZMM), «Southern Daghestan»; 1 ♀ (ZMM), «Tcharoda, Dzhermud, 20-26.VII.95»; 1 ♂ 1 ♀ (IB), «Tlyarata, Dzhermud river, 27.V.79»; **Georgia:** 3 ♂ 2 ♀ (ZISP), «Abkhazia, Cherkessian Glads, 650 m, 31.VII-2.VIII.981,



Figs 134-150. *C. monticola tokatensis* Chaud.: 134-135, labrum; 136, antennomeres 1-4; 137-138, left mandible; 139-140, pronotum (right half); 141, ♀ coupling sulcus, lateral view; 142-143, right metatrochanter; 144-150, left elytron (144, Anatolia, Tokat; 145, Georgia, Akhaltsihe; 146, Georgia, Alazan river; 147, Azerbaijan, Zakataly; 148, Armenia, Arani; 149, Azerbaijan, Vartashen; 150, Turkey, Smirna); 134, 136-137, 139, 142, 144-147, ♂; 135, 138, 140-141, 143, 148-150, ♀. Scale bars 1mm: I, 144-150; II, 141; III, 139-140; IV, 136-138; V, 142-143; VI, 134-135.

Gusarov»; 1 ♂ 2 ♀ (ZISP), «Abkhazia, Ganahleba river, 12.VIII.981, Gusarov»; 1 ♂ (ZISP), «Dzankvish, Azhar, Kodory river, Sukhum, 19.VII.05, Kalishev»; 2 ♀ (AK), «Abkhazia, Sukhumi distr., Akhalshehi env., bank of W Gumista river, 150 m, 21. VIII. 1990, A.G. Koval»; 3 ♂ 5 ♀ (AK), Abkhazia, Sukhumi

distr., bank of Chedym river, 250 m, 10. VII. 1987, A.G. Koval»; 1 ♂ (ZMM), «Caucas., Gudauta, 1.XI.09, Volnuhin»; **Other localities:** 1 ♂ (ZISP), «Caucasus or., 9.V., Vorobjev»; 1 ♂ (ZISP), «*Cicindela sahlbergii* Fisch.».

DESCRIPTION. Total body length 11.6-13.8 mm (n=60).

Medium-sized, with elytra paler, cuprous-bronze, bronze or greenish-blue, rarely blue-black. White elytral pattern wider, humeral lunula always complete, middle band wide, virtually straight (Figs 127-133). Scape glabrous (Fig. 119). Labrum 2.2-2.6 (mean 2.45) times as wide as long (Figs 117-118), mandibles rather slender, 5.25-6.0 (mean 5.75) times as long as wide in ♂ (Figs 120-121).

Apex of penis fairly long, slender, indistinctly curved (Figs 166-167). Internal sac rather small, flag triangular, shield medium-sized, VA medium-sized, poorly protruding apically, B rather small, smaller than in the other two subspecies, faintly protruding leftward (Figs 174-177).

Posterior margin of ♂ sternum 8 with a single seta on each side, apices with 2-3 stout, short setae (Fig. 113). Tergite 9 1.7-1.9 times as long as wide, with 16-18 long setae apically, tergite 10 membranous, setose in apical 1/3, with 14-15 long setae laterally (Fig. 112). Base of second gonapophyses without setae. Ventral notch on second gonacoxa small, with 3-4 long setae and numerous short ones (Figs 114-115).

Genitalia studied in 35 ♂ and 10 ♀.

DISTRIBUTION. Stavropol and Krasnodar Provinces, including Adygea; Karachai-Cherkessia, Kabardino-Balkaria, North Ossetia, Chechnya, Ingushetia, Dagestan, Abkhazia (Fig. 206).

Cicindela (s. str.) *monticola tokatensis* Chaudoir, 1863

Figs 134-150, 168-169, 178-181, 190-193.

Bull. Soc. Imp. Nat. Mosc., 1863, XXXII, 1: 202. Type locality: Anatolia, Tokat.

fracta Motschulsky, 1844: 28, Tab. I: figs 26-28 (Type locality: alpes du Caucase), n. syn.

tokatensis Motschulsky, 1859: 119, nomen nudum.

hybrida var. *tokatensis* Chaudoir, 1863: 202.

REFERENCES. FLEUTIAUX, 1892: 106 (*hybrida* var. *chersonensis*); HORN, ROESHKE, 1891: 35 (*hybrida* var.); HORN, 1915: 334 (*hybrida riparia*); 1926: 216; 1938: 45, Taf. 63: fig. 15; LUTSHNIK, 1915: 28; JAKOBSON, 1905-16: 189; MANDL, 1935: 304, Fig. III: 79-81, Fig. V: 78-80 (*hybrida* ssp.); SCHILDER, 1952: 125; 1953: 564; IABLOKOV-KHNOZORIAN, 1976: 118; CASSOLA, VAN NIDEK, 1984: 10; KOREL, 1988: 97, Abb. 7; 1994: 42; WERNER, 1991: 16, T. 11: fig. 76-77; 1992: 83; WIESNER, 1992: 116; GEBERT, 1995: 14-15, Abb. 2.5 (*sahlbergii* ssp.).

TYPE MATERIAL: Lectotype of *C. fracta* (designated here), ♂ (without head), «Kamilaurta am fl. Alasan»; «*Cicindela fracta* Fisch. Alp. Caucas». Paralectotypes of *C. fracta* (designated here), 2 ♂ (both without head and pronotum), «Kamilaurta am fl. Alasan». Paralectotype of *C. fracta* (designated here), ♀ (right elytron only), «Caucas, *Cicindela fracta* Fisch. Alp. Cauc.». Paralectotype of *C. fracta* (designated here), ♂, without labels (ZMM).

OTHER MATERIAL: **Georgia:** 1 ♂ (ZISP), «Svanetiya, Caucasus»; 1 ♂ (ZISP), «pr. Lentechi, Svanetiya Dadian, 5.VIII.10, Kaznakov»; 6 ♂ 5 ♀ (ZISP), «Caucasu, Borzhom, 1.VIII.907 and 22 .IX. 995»; 2 ♀ (ZISP), «Lagodehy, Sisshah. ar., Tyflis, prov., L. Mlokoslovitch»; 1 ♂ 1 ♀ (ZISP), «Ardanuch, E Artvin, Kutaisi, Derugin, 28.VII.98»; 1 ♂ (ZISP), «Caucasus, Mtsheta, 20.VI.1913, V. Kiseritskij»; 1 ♀ (ZISP), «s-w Georgia, between passes Godersi and Adygeni, 10.VI.977, Dolin»; 1 ♂ (PU), «Georgia, Kazbek, 2000 m, near strem, 25.VII.82»; 1 ♀ (AK), «Egrisskyi Mt. Range, bank of Tekhuri river, 400 m, 13. VIII. 1990, A.G. Koval»; 2 ♀ (ZMM), «Kahetia»; 4 ♂ 1 ♀ (SM), «Georgia, Ahaltsihe, 8.VI.1989, V. Sinyaev»; **Azerbaijan:** 1 ♀ (ZISP), «Talish»; 1 ♂ (ZISP), «Ala-khancaly, dist. Elisavetpol, 2.VII.12.»; 6 ♂ 2 ♀ (ZMM), «Zakataly, Verkittel-Chay, 25.IV.953»; 1 ♀ (MTTU), «Bas Dasagil, dist. Vartashen, 4.VIII.35»;

1 ♀ (MTTU), «Vartashen, Rumlaeh., 24.VII.35»; 1 ♂ 1 ♀ (IB), «Velvichay, 26.IV.1982 V. Filippov»; Armenia: 2 ♂ (ZISP), «Karaklis, 14.IV.1928, L. Arnoldi»; 1 ♂ 1 ♀ (ZMN), «Dilizhan, 6.8.75, V. Mamot»; 1 ♀ (MTTU), «Arani»; 1 ♀ (MTTU), «Sevan, tourist base, mountain slopes, 22-7-63»; Turkey: 1 ♂ (DEI), «*tokatensis* Kind., *hersonensis* Motsch., Tokat»; 1 ♂, 1 ♀ (DEI), «Donckier, Tokat»; 1 ♀ (DEI), «Asia Minor, Biledjik, Bodemeyer»; 1 ♀ (DEI), «Smirna»; 1 ♂ (MNUB), «*Chersonensis* Motsch., Tokat Alpen»; 1 ♂ (ZMM), «*Cicindela khersonensis* Motsch., *tokatensis* Kindm., Anatolia, Tokat»; 1 ♀ (ZMM), «Tokat»; Other localities: 5 ♂ 3 ♀ (DEI, ZISP, ZMM), «Caucasus».

DESCRIPTION. Total body length 11.0-13.6 mm (n=40).

Medium-sized, with elytra darker, greenish-blue, bluish-black or fully black. White elytral pattern narrower, humeral lunula split up into two small separate dots (Figs 146-147 and 149) or complete (Figs 144-145, 148 and 150); middle band narrow, slightly sinuate, sometimes straight (Figs 144-150). Scape glabrous (Fig. 136). Labrum 2.2-2.6 (mean 2.45) as wide as long (Figs 134-135), mandibles rather slender, 5.0-6.25 (mean 5.75) times as long as wide in ♂♂ (Figs 137-138).

Apex of penis fairly short, wider and larger, slightly curved (Figs 168-169). Internal sac rather large as compared to the nominate subspecies; flag triangular, shield medium-sized, VA larger, slightly protruding apically, B rather large, distinctly protruding leftward (Figs 178-181).

Posterior margin of ♂ sternum 8 with a single seta on each side, apices with 1-2 stout, short setae (Fig. 191). Tergite 9 1.6-1.8 times as long as wide, with 20-22 long setae apically, tergite 10 membranous, setose in apical 1/3, with 8-10 long setae laterally (Fig. 190). Base of second gonapophyses asetose. Ventral notch on second gonocoxa small, with 5-6 long setae and numerous short ones (Figs 192-193).

Genitalia studied in 20 ♂ and 8 ♀.

TAXONOMIC REMARKS. Five specimens of *C. fracta* (4 ♂ 1 ♀) were found in the Motschulsky's collection (ZMM). According to their labels, these specimens belong to the type series (MOTSCHULSKY, 1844, 1850). The type locality of *C. fracta* is in fact a part of the large range of *C. monticola tokatensis*. Based upon examination of types (see above), the synonymy is established here: *C. monticola tokatensis* Chaudoir, 1863 = *C. fracta* Motschulsky, 1844. The name *fracta* is actually preoccupied, it was attributed originally by FISCHER VON WALDHEIM (1828) for a variety of *C. soluta* Dej.

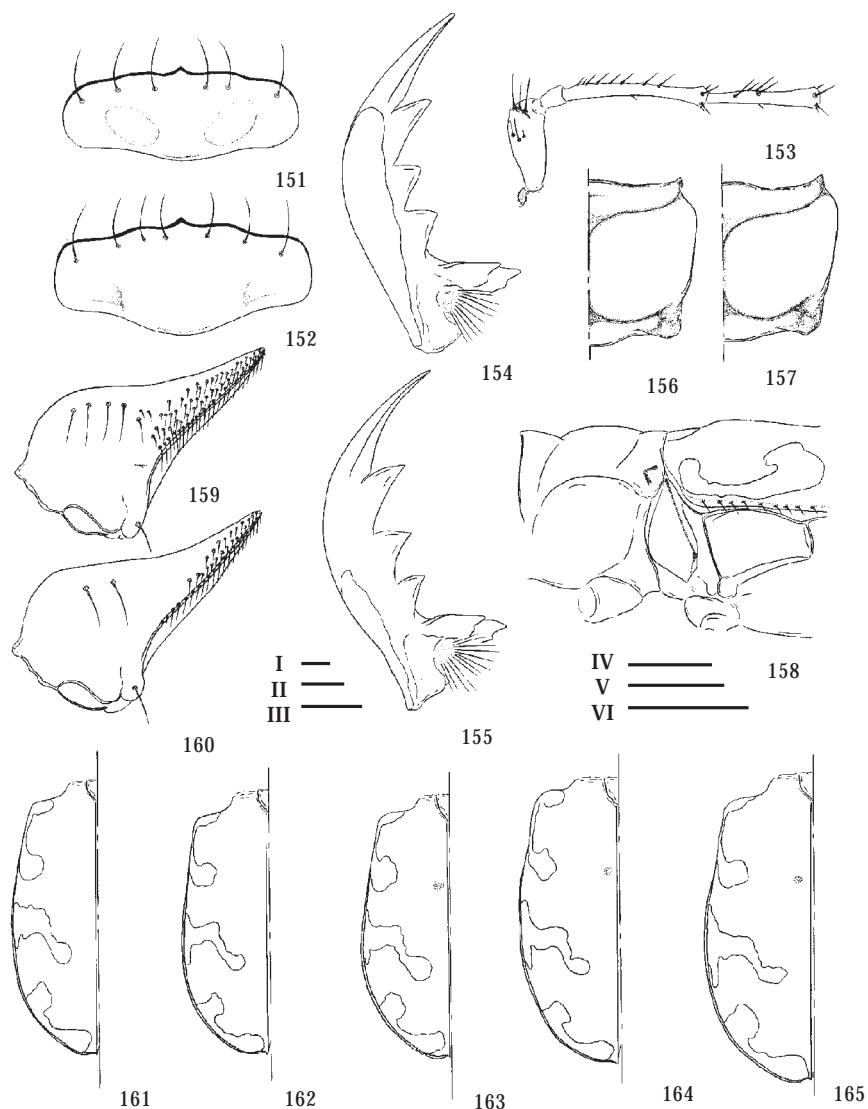
DISTRIBUTION. Georgia: Svanetia, Kakhetia, South Ossetia, Imeretia, Adzharia; Azerbaijan, including Nagorno-Karabakh Autonomous Region, excluding Schirvan and Mugamo-Milsky plane lands; Armenia; Turkey: Pont Mts., Anatolia, Eastern Aegean Sea Coast. Svanetia and Kakhetia as well as southern Dagestan and north-eastern Azerbaijan are populated by the form transitional between true *C. monticola monticola* and *C. monticola tokatensis* (Fig. 206).

Cicindela (*s. str.*) *monticola rumelica* Apfelbeck, 1904

Figs 151-165, 170-171, 182-185, 194-197.

Käfer. d. Balkanhalbins., 1904: 5. Type locality: Burgas, Vajakiöj-S.
hybrida rumelica Apfelbeck, 1904: 5.

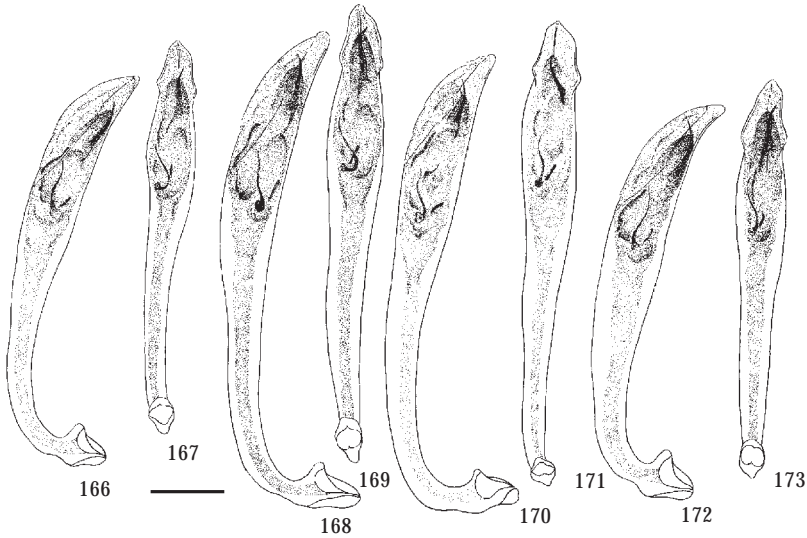
REFERENCES. HORN, 1905a: 158 (*hybrida* ssp.); 1915: 335; 1926: 218; 1930: 50; 1938: 45, Taf. 62: fig. 25; RAMBOUSEK, 1912: 63 (*hybrida* var. *rumelica* and *hybrida* var. *maritima*); JAKOBSON, 1905-16: 190 (*hybrida* ssp.); KANTARDJEVA, 1928: 101; MANDL, 1935: 303, Fig. III: 60-62, Fig. V: 63-64, Fig. VI: 19; JAGEMANN, 1945: 24; PANIN, 1952: 31; SCHILDER, 1952: 125; 1953: 564; CASSOLA, VAN NIDEK, 1984: 10;



Figs 151-165. *C. monticola rumelica* Apf.: 151-152, labrum; 153, antennomeres 1-4; 154-155, left mandible; 156-157, pronotum (right half); 158, ♀ coupling sulcus, lateral view; 159-160, right metatrochanter; 161-165, left elytron (161, Bulgaria, Sozopol; 162, Turkey, Kilyos; 163, Bulgaria, Nesebür; 164, 165, Bulgaria, Burgas, syntypes); 151, 153-154, 156, 159, 161-162, ♂; 152, 155, 157-158, 160, 163-165, ♀. Scale bars 1mm: I, 161-165; II, 158; III, 156-157; IV, 153-155; V, 159-160; VI, 151-152.

KORELL, 1988: 97; 1994: 42; HIEKE, WRASE, 1988: 10; WERNER, 1991: 16, T. 12: fig. 81-82; 1992: 83; WIESNER, 1992: 115; GUEORGUIEV, GUEORGUIEV, 1995: 36; KRZYZHANOVSKU et al., 1995: 26; GEBERT, 1995: 15, Abb. 2.3 (*sahlbergii* ssp.).

TYPE MATERIAL: 1 ♂ 1 ♀, «Apfelbeck, Burgas», «Burgas, Vajakiös-S.», «Type, W. Horn», «Syntypus», «coll. W. Horn, DEI Eberswald»; 1 ♀, «Apfelbeck, Burgas», «Burgas, Vajakiös-S.», «Type, W. Horn», «Syntypus», «ssp. rumelica Apf.», «coll. W. Horn, DEI Eberswald»; 1 ♂, «Burgas, Vajakiös-S.», «Type, W. Horn», «Syntypus», «coll. W. Horn, DEI Eberswald» (DEI).



Figs 166-173. Aedeagus of *C. monticola* Mén. and *C. hybrida kozhantshikovi* Lutsh.: 166-167, *C. monticola monticola* Mén.; 168-169, *C. monticola tokatensis* Chaud.; 170-171, *C. monticola rumelica* Apf.; 172-173, *C. hybrida kozhantshikovi* Lutsh., lectotype; 166, 168, 170, 172, left view; 167, 169, 171, 173, dorsal view. Scale bar 1 mm.

OTHER MATERIAL: **Bulgaria:** 2 ♀ (MNUB), «Nessebar, 1.VI.64 and 20.6-6.7.65, K. Ermisch leg.»; 1 ♂ 1 ♀ (MNUB), «Weselie/Bulg., 10.7.75, leg. W. Wranik»; 1 ♂ (MNUB), «Skutari»; 1 ♂ 1 ♀ (MNUB), «2 km S. v. Micurin am Strand, 1.7.1979, leg. M. Uhlig»; 1 ♀ (MNUB), «Schablas, 5.8.1983, leg. Manersberger»; 1 ♀ (MTTU), «Nesebür/Burgas, 0-5 m., 6.7.1972, leg. Navratil»; 1 ♂ (AK), «Sozopol, 19.5.1991, V. Hosek leg.»; **Turkey:** 1 ♂ (DT), «Kilyos, sea drift, 25.04.1996, leg. F. Savich».

DESCRIPTION. Total body length 12.0-15.3 mm (n=15).

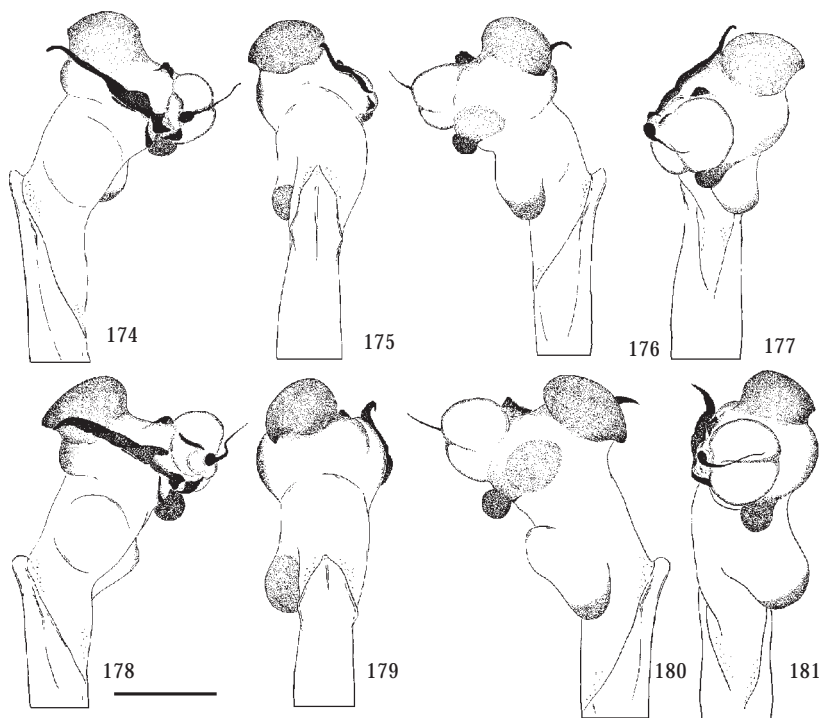
Larger, with elytra paler, cuprous or cuprous-bronze, rarely cuprous-green. White elytral pattern narrow, humeral lunula always complete, middle band distinctly sinuate, with a short lateral part (Figs 161-165). Scape often sparsely pubescent, with 1-4 short and stout white setae added to apical ones (Fig. 153). Labrum 2.2-2.55 (mean 2.33) times as wide as long (Figs 151-152), mandibles stouter, 4.5-6.0 (mean 5.25) times as long as wide in ♂ (Figs 154-155).

Apex of penis larger, nearly straight (Figs 170-171). Internal sac larger, distinctly protruding leftward, flag rounded, shield fairly large, VAB large, distinctly projected apically, B longitudinal, conspicuously prominent leftward (Figs 182-185).

Posterior margin of ♀ sternum 8 with 4-5 setae on each side, apices with three short, stout setae (Fig. 195). Tergite 9 1.95-2.05 times as long as wide, with 30-32 long setae apically, tergite 10 membranous in apical half, setose along apical margin only, with 6-8 long setae laterally (Fig. 194). Base of second gonapophyses with 2-3 long setae and 3-4 very small ones. Ventral notch on second gonacoxa large, with 4-5 long setae and numerous short ones (Figs 196-197).

Genitalia studied in 7 ♂ and 4 ♀.

DISTRIBUTION. On SE Marmara Sea Coast in Turkey and SW Black Sea Coast in Bulgaria (Fig. 206). Wrongly recorded in Odessa (MANDL, 1935).



Figs 174-181. Internal sac of *C. monticola* Mén.: 174-177, *C. monticola monticola* Mén.; 178-181, *C. monticola tokatensis* Chaud.; 174, 178, right view; 175, 179, dorsal view; 176, 180, left view; 177, 181, ventral view. Scale bar 1 mm.

Cicindela (s. str.) *hybrida kozhantshikovi* Lutshnik, 1924

Figs 172-173, 186-189, 198-201, 207, 209, 211, 213, 215, 217-220.

Ezheg. gos. Muz. im. Martyanova, 1924, 2, 1: 25. Type locality: Minusinsk, Tibercul Lake, Kapyrevo.

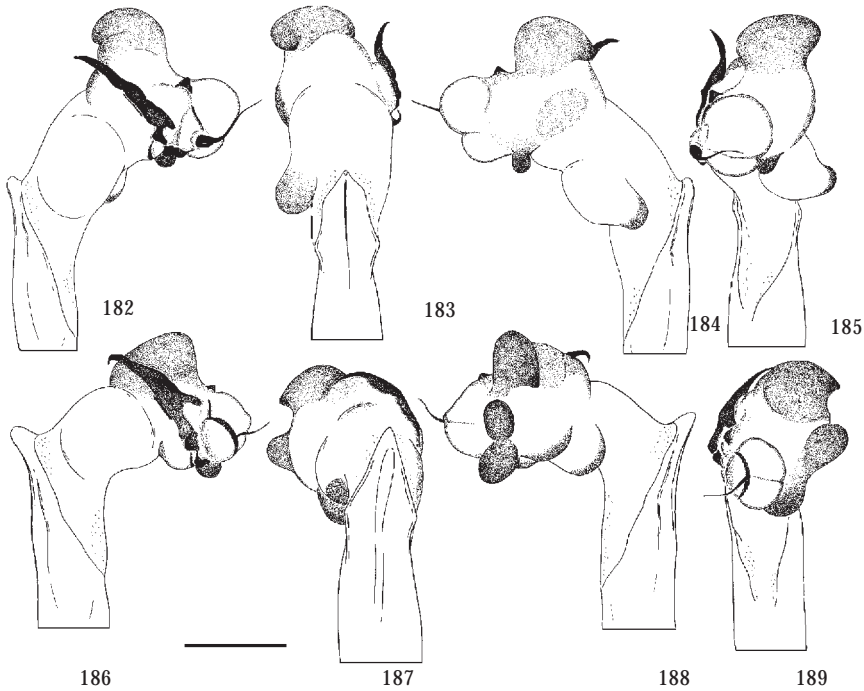
sahlbergi kozhantshikovi Lutshnik, 1924: 25.

koshantchikovi auct.

koshantschikovi auct.

REFERENCES. HORN, 1926: 215 (*hybrida* var.); MANDL, 1935: 298, Fig. III: 15, Fig. V: 25, Fig. VI: 14-15 (*hybrida* ssp.); CASSOLA, VAN NIDEK, 1984: 10; WERNER, 1991: 17, T. 12: fig. 84, 1992: 84; WIESNER, 1992: 115; KRYZHANOVSKIJ et al., 1995: 26 (*hybrida sahlbergi* f.); GEBERT, 1995: 17, Abb. 2.2 (*sahlbergi* ssp.)

TYPE MATERIAL: Five specimens of the type series of this species are deposited in the ZISP collection. The male with the label «Kapyrevo, Minusinskij region, V-VI.1916, Starodubtsev», is selected here as the lectotype. Of the other four specimens, the following three are designated as paralectotypes: 1 ♂, «Kapyrevo, Minusinsk reg., 2-24.VII.1916, Starodubtsev»; 1 ♀, «Minusinsk, Enyseiskaya prov., V.1917, Kozhantshikov», «Syntypus *Cic. hybrida kozhantshikovi* Lutsh., Shilenkov det. 95»V; 1 ♀, «Tiberkul lake, Minusinsk reg., VI.1920, Kozhantshikov», «Syntypus. *Cic. hybrida kozhantshikovi* Lutsh., Shilenkov det. 95». The remaining specimen, ♀, labelled same as the lectotype does actually pertain to a different species, *C. restricta*, thus being non-type. All structural particulars of this specimen, namely, the head pubescence, shapes of the mandibles (Fig. 210), labrum (Fig. 208), pronotum (Fig. 212), ♀ coupling sulcus (Fig. 214), pubescence of metatrochanter (Fig. 216) and white middle band on the elytra (Fig. 221), as well as the peculiar genitalia (Figs 202-205) validate this point of view.



Figs 182-189. Internal sac of *C. monticola* Mén. and *C. hybrida kozhantshikovi* Lutsh.: 182-185, *C. monticola rumelica* Apf.; 186-189, *C. hybrida kozhantshikovi* Lutsh., lectotype, not well blown; 182, 186, right view; 183, 187, dorsal view; 184, 188, left view; 185, 189, ventral view. Scale bar 1 mm.

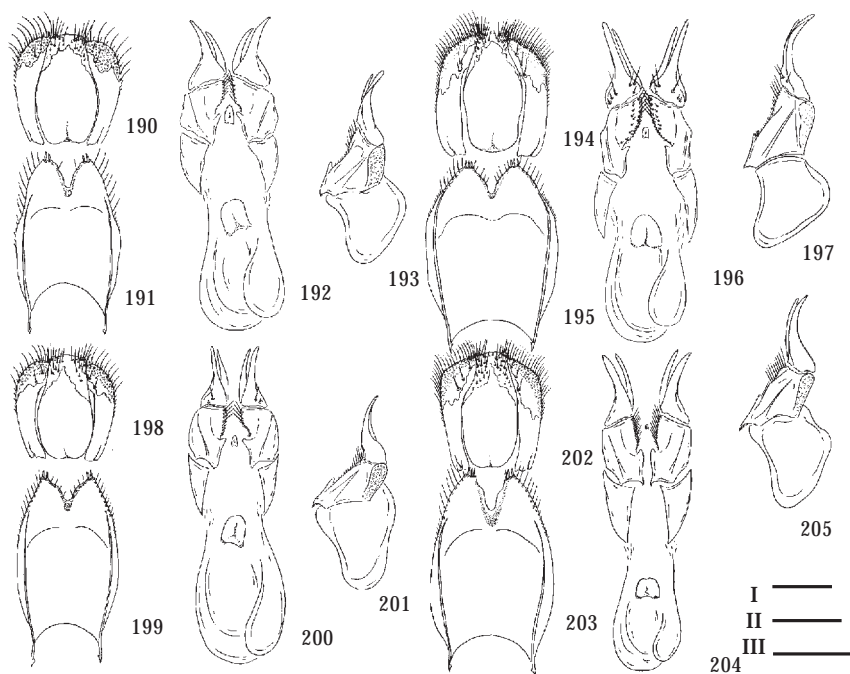
TAXONOMIC REMARKS. Here I follow HORN'S (1926) treatment of *C. kozhantshikovi*, because its all characters, such as the setose head, shapes of the labrum (Fig. 207), mandibles (Fig. 209), pronotum (Fig. 211), ♂ coupling sulcus (Fig. 213), pubescence of metatrochanter (Fig. 215) and white elytral pattern (Figs 217-220) and the aedeagus (Figs 172-173), as well as the general composition of the internal sac of the penis (Figs 186-189) and structure of ♂ genitalia (Figs 198-201) make us refer this form to *C. hybrida*, not to *C. sahlbergii*, as done by GEBERT (1995).

A thorough detailed revision of the *C. hybrida* infraspecific structure to be followed.

DISCUSSION

According to GEBERT (1995) *Cicindela sahlbergii* is subdivided into six subspecies widespread in the Balkans, Caucasus, along the Black Sea Coast in Bulgaria and Turkey, as well as in the southern parts of both Ukraine and Russia, N Kazakhstan, S Siberia up to Irkutsk in the east. The conclusion on the subspecific status of these taxa was drawn from the study of the aedeagus structure only, chiefly the penis shape. At the same time, the particulars of both the endophallus and the ♂ genitalia have remained beyond the scope of his research. Also, no key has been proposed for identification of *C. sahlbergii* subspecies.

Noteworthy, there are a few trends that manifest themselves in the *C. sahlbergii* populations. Of them, the first trend concerns alterations of the white



Figs 190-205. ♂ genitalia of *C. monticola* Mén. and *C. hybrida kozhantshikovi* Lutsh.: 190-193, *C. monticola tokatensis* Chaud.; 194-197, *C. monticola rumelica* Apf.; 198-201, *C. hybrida kozhantshikovi* Lutsh., paralectotype, Tiberkul lake; 202-205, *C. restricta* F.-W. 190, 194, 198, 120, 9&10 syntergite, dorsal view; 191, 195, 199, 203, sternum 8, ventral view; 192, 196, 200, 204, second gonapophyses and gonacoxa, ventral view; 193, 197, 201, 205, second gonapophyses and gonacoxa, lateral left view. Scale bars 1 mm: I, 195; II, 191, 199, 203; III, 190, 192-194, 196-198, 200-202, 204.

pattern on the elytra. The area it occupies distinctly increases from *C. sahlbergii khersonensis* to *C. sahlbergii lutshniki*. Thus, no other specimens can be found in the north-western populations but those displaying the humeral and apical lunules and the middle band narrow and isolated. More southerly, individuals with such a pattern gradually decrease in number from still reaching 58-95 per cent in intermediate populations to 5 per cent in the south-westernmost ones, while specimens with a wide pattern and those with both wide and merged one considerably rise in number up to 35-40 and 50-55 percent, respectively (Fig. 222).

The second trend concerns the length of the median tooth of the endophallus which undergoes the following transformations when gradually passing from *C. sahlbergii khersonensis* to *C. sahlbergii lutshniki*. Namely, individuals from the north-western populations are distinctive in having only a long median tooth as well as those from south-western populations in having only short one. Therewith, in transitional populations, the ratio between the specimens with long/short teeth ranges from 2:1 to 5:1 (Fig. 223).

A similar trend is revealed when gradually passing within the species range from *C. sahlbergii khersonensis* to *C. sahlbergii sahlbergii*. Individuals with isolated humeral and apical lunules and middle band and those with partly to entirely merged white pattern on the elytra are dominant in the western and eastern

populations, respectively, former specimens reaching there to 57-68 per cent, latter ones to 53-73 per cent (Fig. 224).

Somewhat less distinct transformations are observed in the length of median tooth which can be either long or short. The former character state is displayed by the individuals from the throughout species range, while the latter state is sporadically found in the population from the lower flow of the Volga River only, ranging between 6 and 8 percent (Fig. 225).

Some differences are also observed between specimens from the western and eastern populations, in the shape of the penis apex. It is slender and conspicuously rounded in lateral view in individuals from the western parts of species range west of Dnepropetrovsk and Kherson, while being large and distinctly constricted on sides in those populating the eastern parts of the range east of Voronezh, Rostov and the lower flow of the Volga River, with intermediate conditions being found in the populations along the Kharkov-Lugansk-Donetsk-Berdiansk line (Fig. 116).

Of *C. sahlbergii* subspecies, *C. sahlbergii khersonensis* and *C. sahlbergii lutshniki* are much more closely allied to each other than to the nominate subspecies (Fig. 226). Indisputably, that divergence of *C. sahlbergii sahlbergii*, *C. sahlbergii khersonensis* and *C. sahlbergii lutshniki* finished very late. This is particularly true for the two last subspecies. The similar situation is known for *C. soluta* Dejean, 1822 and *C. nordmani* Chaudoir, 1848 (AVERIN, 1945).

It seems a very difficult task to delimit *C. monticola monticola* from *C. monticola tokatensis*. Traditionally, the nominate subspecies is accepted as populating the Caucasus within the ex-USSR, while *C. monticola tokatensis* as occurring in the Pontic Mountains and the Turkish part of the Caucasus Minor (MANDL, 1935-36; KORELL, 1988, 1994; GEBERT, 1995), with the USSR's frontier with Turkey being considered as the natural barrier. Both these subspecies are very similar, yet, as a rule, the former is distinctive in the paler body, with wider white elytral pattern, and in the smaller endophallus. To my mind, *C. monticola monticola* populates only the northern and south-western slopes of the Caucasus Major, as well as adjacent plains, whereas the range of *C. monticola tokatensis* is confined to the south-eastern slopes of the Caucasus Major and the rest of the above-listed territories. Intergradation zones are found in Svanetia - Abkhazia as well as in NE Azerbaijan - S Daghestan. Thus the Caucasus Major should be better considered as a natural barrier between the subspecies (Fig. 206).

The remaining subspecies discussed, *C. monticola rumelica*, seems more strongly isolated (Fig. 226). It is easily distinguishable by the sparsely pubescent scape, thin, long, distinctly sinuate middle band on the elytra, large ♂ mandibles, as well as by the shape of the endophallic bladders and particulars of ♀ genitalia. This difference from the other subspecies could be explained as having resulted from a stronger isolation in the course of adaptation to living in rather specific habitats on the sea coast. Yet I am inclined to define the status of this form as at most subspecies because the general composition of the internal sac fully corresponds to that of the other subspecies. Transitional populations between *C. monticola rumelica* and *C. monticola tokatensis* can be expected to be found along the Black and Marmara Sea Coasts (Fig. 206).

C. monticola and *C. sahlbergii* seem to compose though a small but separate

grouping within the *hybrida*-group sensu RIVALIER (1951). Together with *C. majalis* Mandl, 1935, and *C. transbaicalica* Motschulsky, 1844, this grouping apparently form a monophyletic unit, latter being a sister group for *C. hybrida*, *C. lagunensis* and their close relatives (Fig. 226).

Also, it seems interesting that the subspecies of each of the three following species, *C. sahlbergii*, *C. monticola*, and *C. lusitanica*, display a very similar differentiation level between one another, except for *C. monticola rumelica* only (Fig. 226). Most probable causes of such a phenomenon was discussed above.

A key to the Palearctic groups of *Cicindela* (s.str.), and subspecies of
C. sahlbergii and *C. monticola*

- 1 (2) Humeral area with a compact group of strong, stout white setae. the *soluta*-group
- 2 (1) Humeral area without compact group of strong, stout white setae. 3
- 3 (4) Vertex concave, scape with numerous, over 15, setae added to apical ones, sides of pronotum straight, distinctly converging basal, elytral apex not serrulate, labrum long. 5
- 4 (3) Vertex flat or slightly convex, scape without or with only several (less than 10) setae added to apical ones, sides of pronotum distinctly rounded, rarely faintly converging basal, elytral apex serrulate, labrum short. 7
- 5 (6) Occiput concave, labrum shorter, without median longitudinal ridge, primary colour of dorsum green, sometimes with cuprous lustre, seldom dark blue or black. the *campestris*-group
- 6 (5) Occiput flat, labrum longer, with a distinct median ridge, sometimes with a sharp median carina, primary colour of dorsum black, sometimes with greenish or bronze lustre, rarely green. the *sylvatica*-group
- 7 (8) Metatarsus distinctly shorter than tibia, 0.7-0.8 as long as tibia. ♂ mandibles slender, at least 6.5 times as long as wide. Apex of penis with distinct, widely extended flanks. Internal sac of penis without median tooth. the *maritima*-group
- 8 (7) Metatarsus at most slightly shorter than tibia, 0.9-1.05 times, as long as tibia. ♂ mandibles stout, at most 6.0-6.5 times as long as wide. Apex of penis without or with very poorly extended flanks. Internal sac with a distinct median tooth (the *hybrida*-group). 9
- 9 (10) White elytral pattern on elytra wider, always complete, its elements either merging or isolated; middle band sinuate, with a long lateral part (Figs 29-35, 46-51, 62-67). ♂ mandibles rather stout, 4.0-5.75 (mean 4.87) times as long as wide. Occiput densely pubescent. Side margin of pronotum sinuate (Figs 24-25, 41-42, 57-58). ♀ coupling sulcus sinuate (Figs 26, 43, 59). Penis with a sharp lanciform apex (Figs 68-83). Internal sac large, median tooth long or short, VA large and rounded, VLL small, DLL large, B rounded, large or small (Figs 84-99). Second gonapophyses with two or 4-5 long setae basally (Figs 102, 106, 110). *C. sahlbergii* F.-W.
- a (b) ♂ mandibles large, 4.0-5.0 (mean 4.5) times as long as wide. Penis stout, 0.55-0.60 times as long as elytra, its apex sharp, lanciform, distinctly depressed on sides (Figs 68, 70, 72, 74, 76, 78). Internal sac large, B distinctly larger than DLL (Figs 84-91). Tergite 9 with 22-24 long setae apically, tergite 10 with 12-14 long setae laterally (Fig. 100). Ventral notch on second gonocoxa deep (Fig. 102). 11.0-13.5 mm. *C. sahlbergii sahlbergii* F.-W.
- b (a) ♂ mandibles more slender, at least 4.5-5.0 times as long as wide. Penis slender, at most

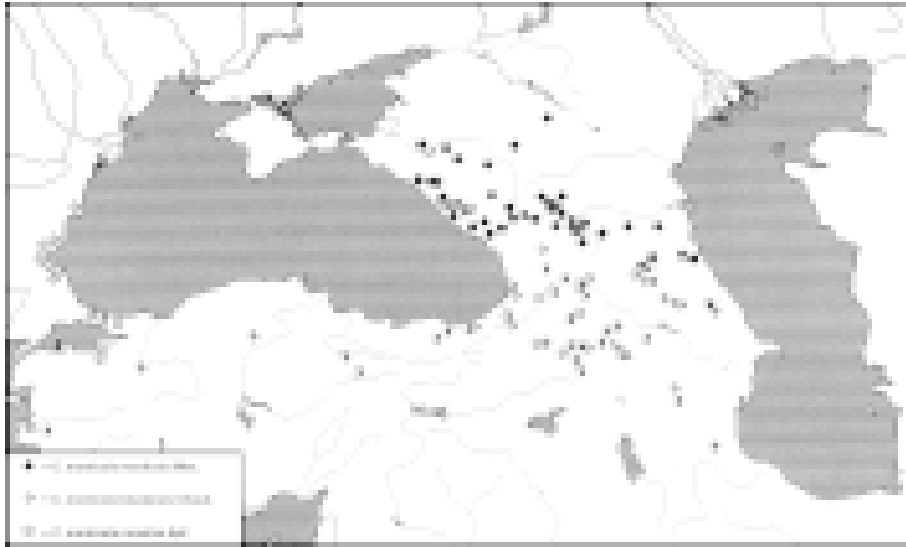


Fig. 206. The distribution area of *C. monticola* Mén.

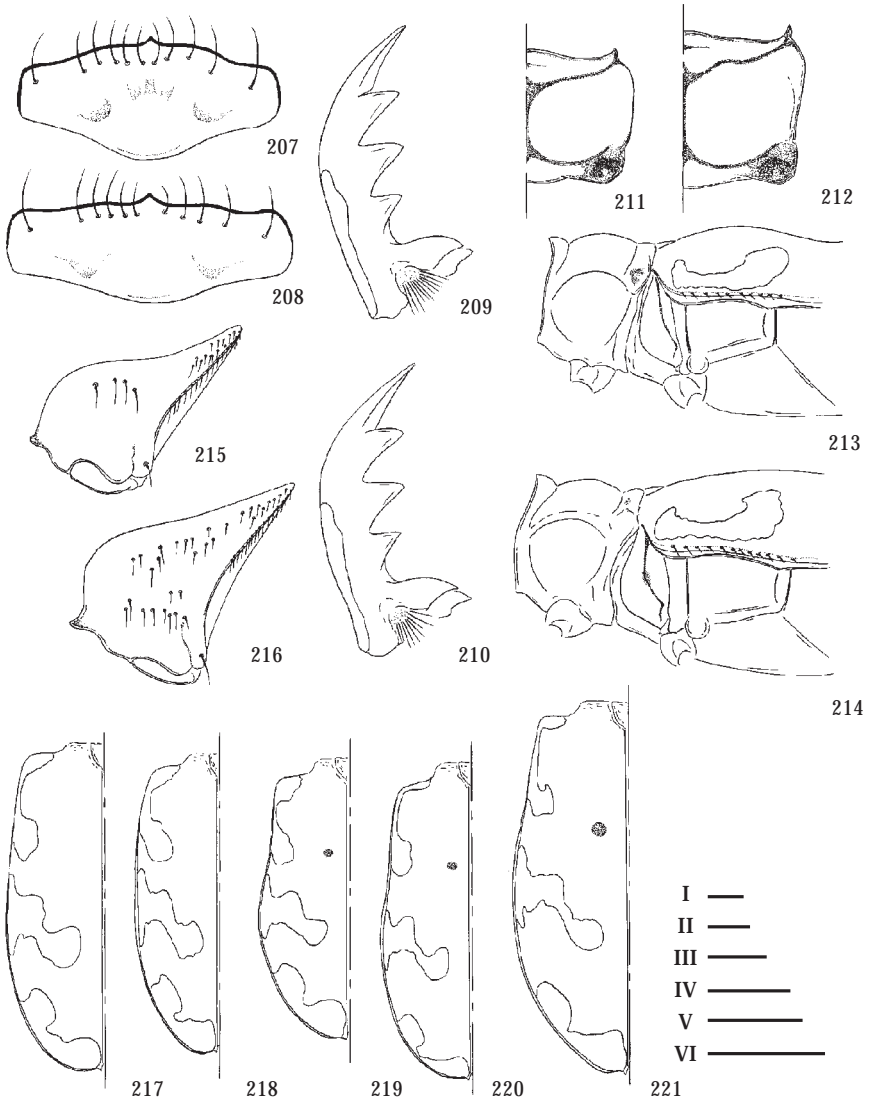
0.60-0.65 times as long as elytra, with apex small, rounded, not depressed on sides (Figs 80, 82). Internal sac slender, B slightly larger or equal to DLL (Figs 92-99). Tergite 9 with 18-22 long setae apically, tergite 10 with 8-10 long setae laterally (Figs 104, 108). Ventral notch on second gonocoxa shallow (Figs 106, 110).....c

c (d) White elytral pattern narrow, lunules and middle band always isolated (Figs 41-51). σ mandibles 4.6-5.6 (mean 5.1) times as long as wide, metatibia/tarsus length ratio 0.95-1.0. Median tooth long, rarely short, B slightly larger than DLL (Figs 92-95). Posterior margin of σ sternum 8 with 3-4 setae on each side and 7-9 long setae laterally (Fig. 105). Second gonapophyses with two long setae basally (Fig. 106). 10.0-12.5 mm. *C. sahlbergii khersonensis* Motsch.

d (c) White elytral pattern moderately wide or wide, lunules and middle band isolated or merging (Figs 62-67). σ mandibles 5.5-5.75 (mean 5.6) times as long as wide, metatibia/tarsus length ratio 0.90-0.95. Median tooth always short, B and DLL subequal in size (Figs 96-99). Posterior margin of σ sternum 8 with a single seta on each side and 4-6 long setae laterally (Fig. 109). Second gonapophyses with 4-5 long setae basally (Fig. 110). 10.2-12.8 mm. *C. sahlbergii lutshniki* n. ssp.

10 (9) White elytral pattern narrower, always isolated, complete or incomplete, middle band straight or sinuate (Figs 127-133, 144-150, 161-165). σ mandibles rather slender, 4.5-6.25 (mean 5.37) times as long as wide. Occiput glabrous. Sides of pronotum straight, converging basal. σ coupling sulcus straight (Figs 122-123, 139-140, 156-157). Apex of penis smooth, indistinctly lanciform (Figs 166-171). Internal sac slender, median tooth always long, VA small and curved apically, VLL slight, DLL very small, B longitudinal, medium-sized (Figs 174-185). Second gonapophyses without or with 2-3 long setae basally (Figs 114, 192, 196)..... *C. monticola* Mén.

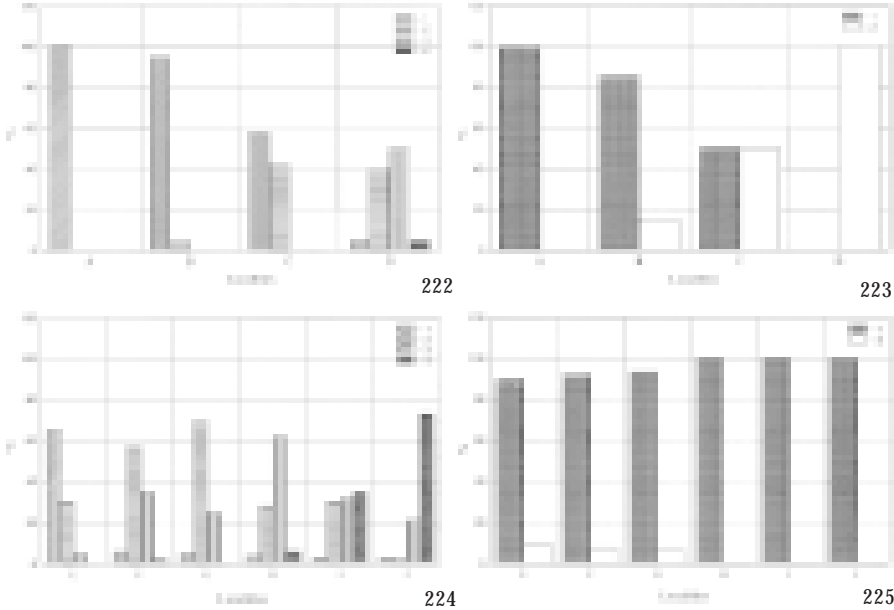
a (b) Elytra cuprous-bronze or cuprous-green. Humeral lunula always complete, middle band curved (Figs 161-165). Scape often sparsely pubescent (Fig. 153). σ mandibles stout, 4.5-6.0 (mean 5.25) times as long as wide. Apex of penis larger (Figs 170-171). Internal sac larger, VA distinctly prominent apically, B longitudinal (Figs 182-185). Posterior margin of σ sternum 8 with 4-5 setae on each side and three short stout setae apically (Fig. 195). Tergite 9 1.95-2.05 times as long as wide, with 30-32 long setae apically, tergite 10 with 6-8 long setae laterally (Fig. 194). Second gonapophyses with 2-3 long setae basally. Ven-



Figs 207-221. *C. hybrida kozhantshikovi* Lutsh. and *C. restricta* F.-W.: 207-208, labrum; 209-210, left mandible; 211-212, pronotum (right half); 213-214, ♀ coupling sulcus, lateral view; 215-216, right metatrochanter; 217-221, left elytron (217-218, 221, Kapyrevo; 219, Minusinsk; 220, Tiberkul lake; 217, lectotype; 218-220, paralectotypes); 207, 209, 211, 213, 215, 217-220, *C. hybrida kozhantshikovi* Lutsh.; 208, 210, 212, 214, 216, 221, *C. restricta* F.-W.; 217-218, ♂; 207-216, 219-221, ♀. Scale bars 1mm: I, 217-221; II, 213-214; III, 211-212; IV, 209-210; V, 215-216; VI, 207-208.

tral notch on second gonacoxa deep (Fig. 196). 12.0-15.3 mm.
 *C. monticola rumelica* Apf.

b (a) Elytra green-blue or blue-black, rarely cuprous-bronze. Humeral lunula often incomplete, middle band straight or faintly sinuate (Figs 127-133, 144-150). Scape always glabrous (Figs 119, 136). ♂ mandibles slender, 5.0-6.25 (mean 5.75) times as long as wide. Apex of penis smaller (Figs 166-169). Internal sac slender, VA feebly prominent apically,



Figs 222-225. Some population characters of *C. sahlbergii* F.-W.: 222, Change of the area of white elytral pattern in populations of *C. sahlbergii khersonensis* Motsch. and *C. sahlbergii lutshniki* n. ssp.; 1, narrow and separated; 2, wide and separated; 3, narrow merged; 4, wide merged. 223, Change of the length of median tooth in the internal sac of the penis of males in populations of *C. sahlbergii khersonensis* Motsch. and *C. sahlbergii lutshniki* n. ssp.; 1, long tooth; 2, short tooth. A, Kanev; B, Kirovograd-Dnepropetrovsk-Zaporozhie; C, Great Aleksandrovka-Nokolaev; D, Alyoshki Snds. 224, Change of the area of white elytral pattern in populations of *C. sahlbergii khersonensis* Motsch. and *C. sahlbergii sahlbergii* F.-W.; 1, narrow and separated; 2, wide and separated; 3, narrow merged; 4, wide merged. 225, Change of the length of median tooth in the internal sac of the penis of males in populations of *C. sahlbergii khersonensis* Motsch. and *C. sahlbergii sahlbergii* F.-W.; 1, long tooth; 2, short tooth. E, Kharkov-Lugansk-Donetsk; F, Rostov/Don-Elista-Astrakhan-Volgograd; G, Saratov-Samara-Perm; H, Orenburg-Yanvartsevo-Kok/Dzhida; I, Naurzum-Kustanai-Karaagash; J, Semipalatinsk-Altai Province.

B rounded and slightly longitudinal (Figs 174-181). Posterior margin of σ sternum 8 with a single seta on each side and 1-2 stout short setae at apex (Figs 113, 191). Tergite 9 1.7-1.9 times as long as wide, tergite 10 with at least eight setae laterally (Figs 112, 190). Second gonapophyses asetose basally. Ventral notch on second gonocoxa shallow (Figs 114, 192). c

c (d) Elytra paler, white elytral pattern wider, humeral lunula always complete, middle band wide, nearly straight (Figs 127-133). Apex of penis more slender (Figs 166-167), B smaller (Figs 174-177). Tergite 9 with 16-18 long setae apically, tergite 10 with 14-15 long setae laterally (Fig. 112). 11.6-13.8 mm. *C. monticola monticola* Mén.

d(c) Elytra darker, white elytral pattern narrower, humeral lunula often split up into two small separated dots, middle band narrow, slightly sinuate (Figs 144-150). Apex of penis wider (Figs 168-169), B larger (Figs 178-181). Tergite 9 with 20-22 long setae apically, tergite 10 with 8-10 long setae laterally (Fig. 190). 11.0-13.6 mm. *C. monticola tokatensis* Chaud.

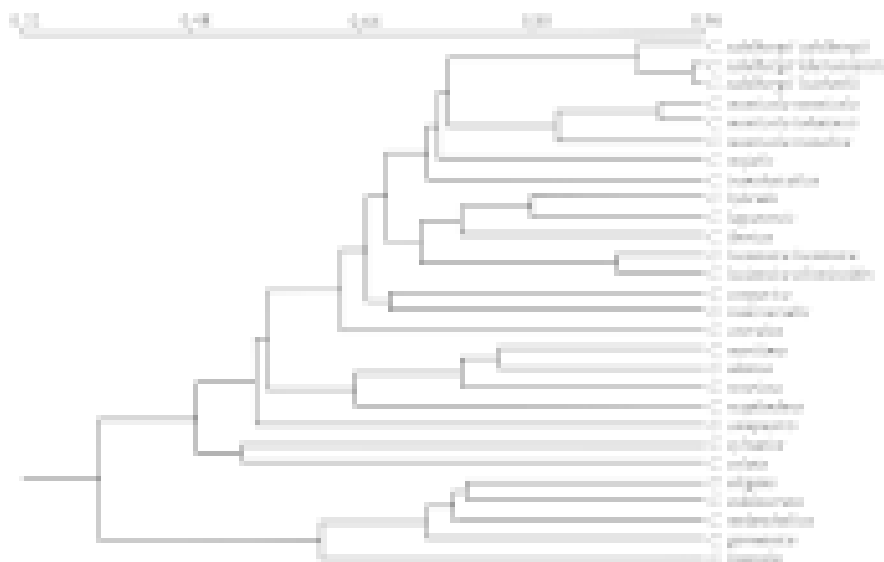


Fig. 226. The phylogenetic relationships between some Palaeartic tiger beetles, which belong to the «hybrida»-species group (*sensu lato*).

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Table 1. The nomenclature of the sclerites in the internal sac of the penis specified by the different researchers.

MANDL, 1935	RIVALIER, 1950	FREITAG, 1965	SPANTON, 1988	MATALIN, 1998
Zentralplatte	piece arciforme	sclerite 1	sclerite 5	shield
Versteifungsrippe (groß)	baguette	sclerite 2	sclerite 2	spring
Versteifungsrippe (klein)	clou	sclerite 3	sclerite 3	upper limitator
Spiralfaden	flagelle	sclerite 4	sclerite 4	flagellum
Chitinzahn	grande dent		sclerite 6	medial tooth
		sclerite 5		flag
		sclerite 6	sclerite 1	lower limitator

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Table 2. The character states used for reconstruction of the phenetic tree for analysed species of the genus *Cicindela*.

- (1) *Body size*. 1, (<9,0 mm); 2, (9,0-10,0 mm); 3, (>10 mm)
- (2) *Head colour*. 1, black; 2, bronze; 3, cuprous with metallic reflections; 4, dull green with metallic reflections; 5, dull blue with metallic reflections; 6, bright metallic green; 7, bright metallic blue
- (3) *Genae rugosity*. 1, shallow; 2, deep
- (4) *Genae setae*. 1, absent; 2, sparse; 3, dense
- (5) *Clypeus*. 1, even; 2, with two shallow pits
- (6) *Clypeus setae*. 1, absent; 2, sparse; 3, dense
- (7) *Frons rugosity*. 1, absent; 2, shallow; 3, deep
- (8) *Frons setae*. 1, absent; 2, sparse soft hairs; 3, numerous long thin setae; 4, numerous, short, stout setae
- (9) *Vertex rugosity*. 1, absent; 2, shallow; 3, deep
- (10) *Vertex setae*. 1, absent; 2, sparse soft hairs; 3, numerous stout setae
- (11) *Supraorbital area rugosity*. 1, absent; 2, shallow; 3, deep
- (12) *Anterior supraorbital setae*. 1, one; 2, more than one
- (13) *Posterior supraorbital setae*. 1, one seta; 2, more than one setae
- (14) *Occiput rugosity*. 1, shallow; 2, deep
- (15) *Occiput setae*. 1, absent; 2, scanty stout; 3, numerous long thin; 4, numerous short stout
- (16) *Labrum colour*. 1, white; 2, black
- (17) *Labrum shape*. 1, narrow; 2, short; 3, moderately long; 4, long
- (18) *Labrum margin*. 1, unidentate; 2, tridentate
- (19) *Labrum, median longitudinal ridge*. 1, absent; 2, broad and blunt; 3, as a sharp carina
- (20) *Labrum setae position*. 1, submarginal; 2, discal
- (21) *Labrum setae*. 1, (<7); 2, (8-15); 3, (>15)
- (22) *Left mandible length/width ratio*. 1, (4,0-6,5); 2, (6,5-8,0)
- (23) *Scape apical setae*. 1, single; 2, 2-3; 3, 4-5
- (24) *Lateral labrum setae*. 1, absent; 2 - present
- (25) *Scape, additional setae*. 1, (0-2); 2, (3-9); 3, (10-15); 4, (16-20)
- (26) *Antennomeres 5-11 colour*. 1, pale; 2, dark brown
- (27) *Pronotum colour*. 1 - black; 2, bronze; 3, cuprous with metallic reflections; 4, dull green with metallic reflections; 5, dull blue with metallic reflections; 6, bright metallic green; 7, bright metallic blue
- (28) *Pronotum rugosity*. 1, absent; 2, finely wrinkled; 3, roughly wrinkled
- (29) *Pronotum shape*. 1, narrow; 2, moderately broad; 3, broad
- (30) *Pronotum setae*. 1, absent; 2, narrow lateral row of long thin setae; 3, broad lateral row of long thin setae; 4, broad lateral row of short stout setae; 5, fully pubescent
- (31) *Proepisternum setae*. 1, absent; 2, sparse; 3, moderately dense; 4, dense
- (32) *Coupling sulcus, shape*. 1, straight groove deep basally; 2, straight groove deep centrally and basally; 3, poorly sinuate groove deep basally; 4, sharply curved groove deep basally; 5, groove with a central pit; 6, central pit
- (33) *Mesepisternum setae*. 1, absent; 2, sparse; 3, moderate; 4, dense
- (34) *Abdominal sternites colour*. 1, metallic; 2, pale apical sternites
- (35) *Middle abdominal sternites setae*. 1, 1-2 pairs of long setae; 2, four pairs of long setae; 3, 4-6 pairs of long and several small erect ones; 4, numerous long and small erect setae; 5, numerous small soft setae
- (36) *Pubescence on lateral part of abdominal sternites*. 1, absent; 2, sparse; 3, moderately dense; 4, dense
- (37) *Legs colour*. 1, metallic, with tibia pale; 2, fully metallic
- (38) *Metatarsus /tibia length ratio*. 1, (0,6-0,8); 2, (0,85-1,05); 3, (1,1-1,2); 4, (1,25-1,35)
- (39) *♂ metatrochanter setae*. 1, one; 2, (3-7); 3, (7-15); 4, (15-25)
- (40) *♂ metatrochanter setae*. 1, one; 2, (2-5); 3, (5-10); 4, (10-15)
- (41) *Elytral ground colour*. 1, black; 2, bronze; 3, cuprous with metallic reflections; 4, dull green with metallic reflections; 5, dull blue with metallic reflections; 6, dull red with metallic reflections; 7, bright metallic green or blue; 8, bright metallic red
- (42) *Elytral white pattern*. 1, narrow; 2, normal; 3, broad

Continuation of table 2

- (43) *Elytral texture*. 1, smooth; 2, not granulate; 3, finely granulate; 4, roughly granulate
 (44) *Elytral microsculpture*. 1, absent; 2, present
 (45) *Elytral apical margin*. 1, not serrulate; 2, serrulate
 (46) *Elytral epipleurum*. 1, entirely pale; 2, pale with metallic apical part; 3, fully metallic
 (47) *Humeral lunule configuration*. 1, only basal portion present; 2, reduced to two dots; 3, complete
 (48) *Apical lunule configuration*. 1, only apical portion present; 2, reduced to two dots; 3, complete
 (49) *Middle band configuration*. 1, sublateral part; 2, subsutural part; 3, sublateral and subsutural parts; 4, complete
 (50) *Middle band configuration*. 1, transversely straight; 2, feebly sinuate; 3, curved caudal, with a short median part; 4, curved backward, with a long, oblique, median part; 5, curved backward, with a long, longitudinal, median part
 (51) *Lateral band*. 1, absent; 2, short; 3, long, isolated; 4, merged with humeral lunula; 5, merged with apical lunula; 6, merged with both humeral and apical lunules
 (52) *Humeral setae*. 1, absent; 2, present
♂ genitalia:
 (53) *shape of penis*. 1, long, slender symmetrical; 2, long, distinctly prominent rightward; 3, short, oval
 (54) *shape of penis apex*. 1, not lanciform; 2, longitudinal, symmetrical, rounded, lanciform; 3, longitudinal, symmetrical, sharply lanciform; 4, longitudinal, asymmetrical, sharply lanciform; 5, short, symmetrical, sharply lanciform; 6, short, asymmetrical sharply lanciform; 7, with extended flanks; 8, short suboval
 (55) *shape of apex*. 1, not curved; 2, slightly curved; 3, distinctly curved; 4, sharply curved
 (56) *apical furrow*. 1, absent; 2, thin and shallow; 3, deep
 (57) *apical carina*. 1, absent; 2, present
 (58) *apical hook on apex of penis*. 1, absent; 2, blunt, with rounded top; 3, small and sharp; 4, transformed into a long projection flattened in lateral view
 (59) *apical flanks*. 1, absent; 2, narrow; 3, broad and short; 4, broad and long
 (60) *internal sac position*. 1, longitudinally; 2, perpendicularly
 (61) *internal sac, sclerites number*. 1, (7); 2, (8-10)
 (62) *flag*. 1, small; 2, large
 (63) *upper limitator*. 1, small; 2, medium-sized
 (64) *flagellum*. 1, short; 2, moderately long; 3, long
 (65) *spring*. 1, single; 2, double
 (66) *lower limitator*. 1, small; 2, moderately long; 3, large
 (67) *shield*. 1, small; 2, medium; 3, large
 (68) *median tooth condition*. 1, absent; 2, short; 3, moderately long; 4, long
 (69) *apical part of median tooth*. 1, straight; 2, sinuate; 3, sharply curved
 (70) *median tooth shape*. 1, flat; 2, twisted
 (71) *ventro-apical bladder shape*. 1, small; 2, large
 (72) *ventro-apical bladder position*. 1, longitudinal; 2, perpendicular
 (73) *ventro-lateral left bladder shape*. 1, poorly distinct; 2, small; 3, medium; 4, large
 (74) *ventro-lateral right bladder shape*. 1, poorly distinct; 2, small; 3, medium; 4, large
 (75) *dorso-apical bladder shape*. 1, small; 2, medium; 3, large
 (76) *dorso-lateral left bladder shape*. 1, poorly distinct; 2, small; 3, medium; 4, large
 (77) *basal bladder shape*. 1, elongated; 2, rounded; 3, flat; 4, V-shaped; 5, H-shaped
 (78) *basal bladder size*. 1, small; 2, medium; 3, large
 (79) *basal bladder*. 1, without apical part; 2, with apical portion
 (80) *basal bladder position*. 1, removed leftward; 2, medially
 (81) *basi-lateral right bladder shape*. 1, poorly distinct; 2, small; 3, large
 (82) *dorsal droplet bladder shape*. 1, absent; 2, poorly distinct; 3, present completely
 (83) *media-apical bladder shape*. 1, absent; 2, small; 3, large
 (84) *ligula*. 1, absent; 2, poorly distinct; 3, small; 4, large
♀ genitalia:
 (85) *abdominal sternum 8 apices*. 1, rounded; 2, truncate; 3, angular; 4, with outer notch bearing; 5, with inner notch bearing
 (86) *longitudinal apical carina*. 1, absent; 2, present
 (87) *abdominal sternum 8, V-shaped apical emargination*. 1, narrow; 2, average; 3, broad

Continuation of table 2

- (88) *abdominal sternum 8, inner long setae*. 1, absent; 2, one; 3, (2-5); 4, (5-10)
 (89) *abdominal sternum 8 stout apical setae*. 1, single; 2, (2-3); 3, (4-6)
 (90) *abdominal sternum 8 lateral long seta*. 1, (4-9); 2, (10-20)
 (91) *9&10 syntergum shape*. 1, oval; 3, circular
 (92) *9&10 syntergum apical long setae*. 1, (5-10); 2, (10-15); 3, (15-20)
 (93) *9&10 syntergum lateral long setae*. 1, (4-8); 2, (8-10); 3, (10-20)
 (94) *9&10 syntergum discal setae*. 1, a longitudinal row of two setae; 2, a longitudinal row of three setae; 3, a longitudinal row of 4-5 setae; 4, a transverse row of 2-3 setae; 5, two rows of longitudinal setae
 (95) *9&10 syntergum*. 1, glabrous; 2, setose
 (96) *base of second gonapophyses*. 1, with outer margin regularly concave; 2, with outer margin notched at base
 (97) *pubescence of base of second gonapophyses*. 1, absent; 2, single long seta; 3, 1-2 long combined with numerous small setae; 3, 3-4 long setae; 5, numerous long setae; 6, numerous small setae
 (98) *pubescence of ventral notch on second gonacoxa*. 1, sparse; 2, dense
 (99) *additional sclerite*. 1, absent; 2, small; 3, large

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Table 3. The character states matrix for analysed species of genus *Cicindela*.

N ^o	sa	kh	lu	mn	tk	rm	so	hy	mj	lg	ib	ls	sv	tv	co	tb	mr	rs	at	rl	sy	cm
1	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
2	3	3	3	4	4	3	5	3	4	3	4	2	2	5	7	3	3	3	4	6	1	6
3	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	2	1	1	2	1	1
4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1
6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2
8	2	2	2	2	2	2	2	2	1	1	1	1	1	2	2	2	2	1	1	1	2	3
9	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2
10	2	2	2	2	2	2	1	2	1	2	1	1	1	1	1	1	1	1	1	1	1	2
11	2	2	2	2	2	2	2	2	2	2	3	2	3	2	3	2	2	2	2	1	2	3
12	2	2	2	2	2	2	2	1	1	1	1	1	1	2	1	1	2	1	2	1	2	2
13	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	2	1	2	1	2	2
14	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1
15	4	4	4	1	1	1	2	1	1	1	1	1	1	1	1	1	4	2	2	1	1	3
16	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1
17	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	3
18	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	3	2
20	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21	2	2	2	2	2	2	1	2	2	2	1	1	1	2	2	1	2	1	2	1	1	1
22	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1	1
23	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2
24	2	2	2	2	2	2	3	3	2	2	2	2	2	2	3	2	2	3	3	2	2	3
25	1	1	1	1	1	2	2	1	1	1	2	1	1	1	2	1	1	1	1	1	3	2
26	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
27	3	3	3	4	5	3	5	3	2	3	4	2	2	5	7	3	3	3	4	6	1	6
28	2	2	2	2	2	2	2	2	2	2	2	2	3	2	3	2	2	2	2	1	2	2
29	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3
30	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	2	2	2
31	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3
32	1	1	1	1	1	1	4	1	4	1	2	1	1	3	3	3	3	3	3	1	3	3
33	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3

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