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A new blind Genus of the Tribe Trechini (Coleoptera, Carabidae) from the West Caucasus

by **I.A. Belousov** and **A.S. Zamotajlov***

Abstract: *Caucasorites shchurovi* n.gen., n.sp., a new blind genus and species of the tribe Trechini, is described from the Sochi environs, West Caucasus. It belongs to the "phyletic series of *Aphaenops*" and is assumed to be most closely related to *Pseudaphaenops* Winkl. from Crimea and *Meganophthalmus* Kurn. from the Caucasus, readily differing from both genera in not aggregated condition of two anterior pores of umbilicate series, regular and dense pubescence of the body including elytra, quite different shape of the maxillary palpi with the longest ultimate segment, and by other characters of less importance. Easily distinguishable from all hitherto known blind Caucasian Trechini by dense and regular body pubescence and two dilated segments of male protarsi. Externally *Caucasorites* n.gen. is intermediate between true troglobitic genera similar to *Meganophthalmus* Kurn. and *Taniatrechus* Belousov & Dolzhansky, on the one hand, and true endogean genera related to *Nannotrechus* Winkl., on the other.

Key words: Coleoptera Carabidae Trechini – Caucasus – *Caucasorites* – new genus and species – taxonomy.

Introduction

The recent investigations of the caves and endogean zone in the Caucasus contributed considerably to our knowledge of blind Carabids and promoted the descriptions of many new species and some new genera (LJOVUSCHKIN, 1963, 1970, 1972; DOLZHANSKY & LJOVUSCHKIN, 1985, 1989, 1990; BELOUSOV, 1989; BELOUSOV & DOLZHANSKY, 1994; BELOUSOV & ZAMOTAJLOV, 1995; KOMAROV, 1993). The bulk of such taxa derives from the regions seemed to be well-explored. This fact argues in favour of numerous new discoveries in future. During the Caucasians expeditions of 1995–1997, one of the authors (A.Z.) together with two members of the section of the Russian Entomologist Society in Krasnodar, namely Dr. A.I. Miroshnikov and Ing. V.I. Shchurov, have collected a new further taxon of the blind Trechini, the description of which is a subject of the present article.

The morphometric characters are widely used below. Length of the body is measured from the apices of elytra, width of the latter – at their

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broadest part, base of pronotum – at the narrowest part. The discal formula indicates a distance from the anterior margin of elytral lateral gutter to the correspondent pores in percentage, as compared with the length of elytra (PAWLOWSKI, 1979, with some modifications).

Because of monotypy, it was difficult to separate the generic and species diagnoses. So the species' description mainly concerns the proportions, colour and some other characters seem to be less important.

The abbreviations used herein for indication of deposition of the type materials are as follows:

ZISP = Zoological Institute of the Russian Academy of Sciences, St. Petersburg
NHMB = Natural History Museum, Basel
IB = collection of Dr. I. Belousov, St. Petersburg
AZ = collection of Dr. A. Zamotajlov, Krasnodar

Descriptive part

Caucasorites n.gen.

Type–species: *Caucasorites shchurovi* n.sp.

Diagnosis. Distinguished from all hitherto known Caucasian blind Trechini, first of all, by strong pubescence of body, including elytra, and presence of two dilated segments of male protarsi. From the most closely related members of the ''phyletic series of *Aphaenops*'' the new genus is easily distinguishable by not aggregated condition of two anterior pores of umbilicate series. As for the size and proportions, the new genus is intermediate between large troglobitic species similar to *Pseudaphaenops* Winkl. or *Meganophthalmus* Kurn. and true endogean species like *Nannotrechus* Winkl. Copulatory piece symmetrical in ventral position but strongly transverse, without any trace of fused longitudinal components.

Description. Medium-sized, apterous. Eyes totally absent. Depigmented. Habitus (Fig. 1) convex, oval and elongate, strongly constricted at base of pronotum, with long antennae and slender legs. Entire body, including sternites, covered with strong and regular pubescence.

Head comparatively large, only slightly narrower than pronotum. Eyes replaced by a distinct suture bifurcate in the middle. Frontal furrows deep and complete. Two normal supraorbital setae lying on lines somewhat convergent posteriad and being considerably longer than the temporal pubescence. Two pairs of clypeal setae. Sometimes one or

two seta directed somewhat posteriad and hardly distinguishable against the background of the temporal pubescence directed mainly anteriad. Labrum transverse, sexsetose, with almost straight, hardly concave anterior margin and faintly protruding blackish median part. Mandibles (Fig. 2) very slender, subconical, slightly curved distally with minutely serrulate inner side. Retinacle of the right mandible tridentate, with relatively long base, proximal denticle being more salient. Left mandible obtusely bidentate. Labium not fused, with a very distinct and straight labial suture between submentum and mentum, the latter bearing long and acute tooth in deep apical emargination (Fig. 5), this tooth only a little shorter than lateral lobes of mentum. 9–11 (usually 10) submental setae of which 6 distinctly larger and more stable. Sensory organ well–defined and situated somewhat closer to labial suture than to apical emargination of mentum, more exteriorly as compared with the anterior setae of mentum (Fig. 5). Surface of mentum slightly reticulate. Ligula slightly prominent in the middle, with two long median setae and three shorter ones on each side; paraglossae slightly arcuate, extending much beyond ligula. Maxillae long and fine, with moderately arcuate lacinia. Palpi slender, ultimate segment of both maxillary and labial palpi subconical and very slender. Penultimate segment of maxillary palpus subpyriform, considerably shorter and thicker than ultimate one (Fig. 3). Maxillary palpi entirely glabrous and asetose. Penultimate segment of labial palpi (Fig. 4) almost as long as ultimate one but thicker and bearing 4 long setae of usual disposition. Antennae slender, distinctly longer than elytra, all antennomeres much longer than wide. Pubescence of head well–developed, more long on temples and front, lacking only on clypeus, vertex and labrum (Fig. 1).

Pronotum strongly cordate, a little wider than long, with lateral borders strongly sinuate before hind angles, the latters distinctly protruding outwards. Basal part of lateral surface of prosternum partly visible in dorsal view. Front angles completely rounded and effaced. Base narrow, feebly concave, with a small but deep emargination at every side near hind angles (Fig. 6). Two subequal marginal setae, of which anterior one situated just before the broadest part of pronotum and posterior distinctly removed anteriorly; lateral border in front of hind marginal seta almost straight. Median line clearly impressed, broadened in basal area, latter longitudinally wrinkled. Basal transverse impression deep and continuous; apical transverse impression shallow and often indistinct in the middle; basal foveae very small but well-impressed. Postangular carina absent. Lateral gutter of pronotum very narrow and hardly reflexed.

Lateral borders glabrous, not ciliate. Pubescence of the pronotum long, dense, and regular. Scutellum medium–sized and well-defined.

Elytra oblong-ovate and convex, broadest at midlength with shoulders completely effaced and apices jointly rounded. Base of elytra with transverse impression on basal peduncle. Lateral gutter very narrow, about as wide as that of pronotum. Lateral borders slightly serrulated at humeri and thoroughly ciliated. Striae superficial, only a few inner striae rather continuous, exterior ones completely obliterated. All striae not punctate. Scutellar striole very deeply impressed, scutellar pore present, but seta considerably shorter than setae of discal pores. Striae obliterated apically, only stria 8 engraved more deeply near apex. Apical carina hardly distinguishable. Anterior discal pore lacking. Preapical one less developed than discal and larger than apical pore. Only two pores of apical triangle present, exterior being completely reduced. Humeral group of umbilicate series aggregated, two anterior pores situated just near marginal gutter, about equidistant from lateral border, two posterior pores, especially pore 4, strongly distant from lateral border. Pore 5 closer to pore 4, so humeral group is not distinctly separated from median one. Posterior pore of median group considerably closer to lateral border than anterior one. Both pores of apical group equidistant from lateral border. Pubescence of elytra long and adherent, very dense. Strongly developed piliferous tubercles situated in 2–3 longitudinal and irregular rows on each of middle interspaces.

Ventral surface relatively regular pubescent, this pubescence much shorter than two median pores situated on each segment and reduced towards anterior margin. Anal sternite usually with a pair of marginal setae in male and two pairs in female.

Microsculpture well-engraved thoroughly on upper side, consisting of polygonal and isodiametric meshes.

Legs slender, protibiae slightly bowed, distinctly dilated towards apices, entirely pubescent and not grooved externally. Tarsi thin and comparatively short; segment 1 of metatarsi equal to segment 5 and somewhat shorter than three following segments together; tarsomere 4 of pro– and mesotarsi with hyaline appendages beneath in both sexes.

Segments 1 and 2 of protarsi (Fig. 7) strongly dilated and inwardly denticulate at apices, furnished beneath with sexual adhesive appendages in male.

Male genital organ not large as compared with the body size. Aedeagus (Fig. 8) slightly arched and depressed dorsally. Apex simple. Apical orifice very large, reaching basal part of aedeagus. Sagittal aileron

present although not large. Each paramere bearing 4 apical setae. Inner sac armed with a small but well-defined copulatory piece represented by a symmetrical plate in ventral position (Fig. 8b).

Female genital organ (Fig. 9) extremely small, with slender stylus gradually arched and armed with two small hardly distinguishable setae on inner side. A few well-developed setae distinct near base of stylus.

Discussion. Only two cave-dwelling genera with two dilated segments of male protarsi were known from the Caucasus till now: *Inotrechus* Dolzansky & Ljovuschkin (1989) and *Meganophthalmus* Kurnakov (1959). The new genus differs from the former in pubescent body, reduced anterior discal pore of elytra, more numerous submental setae (9–11 vs. 8 in both species of *Inotrechus* Dolzhansky & Ljovuschkin), and quite different aedeagal structure. Doubtless, *Inotrechus* Dolzhansky & Ljovuschkin belongs to the phyletic series of *Duvalius* Delar. This viewpoint is ascertained by the shape of median lobe as well as by structure of copulatory piece. So both genera considered are not related and are compared herein only formally.

Caucasorites n.gen. is easily distinguishable from *Meganophthalmus* by strong pubescence of body, quite different shape of maxillary palpi, penultimate segment of which being considerably thicker and shorter than ultimate one, by 9–11 submental setae, long and acute mental tooth and by aggregated condition of humeral group of umbilicate series. Both known species of *Meganophthalmus* Kurn., *M. mirabilis* Kurnakov (1959) and *M. kravetzi* Komarov (1993), possess glabrous body, penultimate segment of maxillary palpi being of the same width and distinctly longer than ultimate one, 6 submental setae, and finally, umbilicate pore 1 distinctly removed from lateral margin of elytra and placed inwards of pore 2. Nevertheless, both of the above genera share some important characters: frontal furrows deep and complete, maxillary palpi glabrous and asetose, similar striolation, especially as regards the apical part of elytra, the similar regular reticulation of body, two dilated segments of male protarsi, and similar conformation of male genitalia.

It is difficult actually to compare in all respects the new genus with the recently described *Taniatrechus* Belousov & Dolzhansky (1994), considering that the latter one is known only upon one female specimen. But this strongly specialized troglobitic taxon is easily distinguishable from *Caucasorites* n.gen. by well-pronounced ''aphaenopsoid''appearance, by not aggregated condition of humeral group of umbilicate series, by numerous setae situated on exterior surface of

temples and along frontal furrows, by maxillary palpi with penultimate segment longer than ultimate one, and glabrous not pubescent body.

An essential affinity of the new genus with Crimean *Pseudaphaenops* Winkler (1912) should be specially noted. *Caucasorites* n.gen. differs from this genus mainly by the pubescence of elytra, different structure of maxillary palpi, complete frontal furrows, strongly protruding hind angles of pronotum and by the aggregate condition of humeral group of umbilicate series. In both species of *Pseudaphaenops* Winkl. maxillary palpi are similar to *Meganophthalmus* Kurn. by very long penultimate segment, which is as wide as ultimate one and considerably longer. Noteworthy, two known species of *Pseudaphaenops* Winkl. differ strongly from each other in pubescence of pronotum, which is well-developed in *P. jakobsoni* Plyginskij (1912) and reduced to a few setae in *P. tauricus* Winkler (1912). Considering this fact and a regular pubescence of head in both species, it becomes evident that the new genus is more similar to *Pseudaphaenops* Winkl. than to *Meganophthalmus* Kurn. as the pubescence is concerned. These three genera seem to be related to each other and form the eastern branch of the ''phyletic series of *Aphaenops*''(sensu JEANNEL, 1928), characterized besides the pubescence of the head and pronotum proper, by the very similar conformation of aedeagus and two dilated segments of male protarsi. The new genus seems to be more isolated within it, that is especially evident as maxillary palpi shape, pubescence of elytra, the aggregate condition of humeral group, strongly removed pores of median group of umbilicate series, number of discal pores, and total habitus are concerned.

It seems very important to compare the genus in question with *Geotrechus* Jeannel, one further genus belonging to the ''phyletic series of *Aphaenops*''. As the appearance is concerned, the relations between *Meganophthalmus* Kurn. and *Caucasorites* n.gen. are very similar to those between *Aphaenops* Bonv. and *Geotrechus* Jeannel. Both genera, *Caucasorites* n.gen. and *Geotrechus* Jeannel possess the same highly specialized microcavernicolous appearance (strong constriction between fore and hind body, moderately elongated appendices) and share the size intermediate between true troglobitic and true endogean species. Nevertheless this similarity seems to be due to the same mode of life and does not reflect close phylogenetic relations between two genera. Really *Caucasorites* n.gen. differs from the European genus by basal border of elytra completely reduced (usually well–developed in *Geotrechus* Jeannel), by posterior marginal seta of pronotum situated

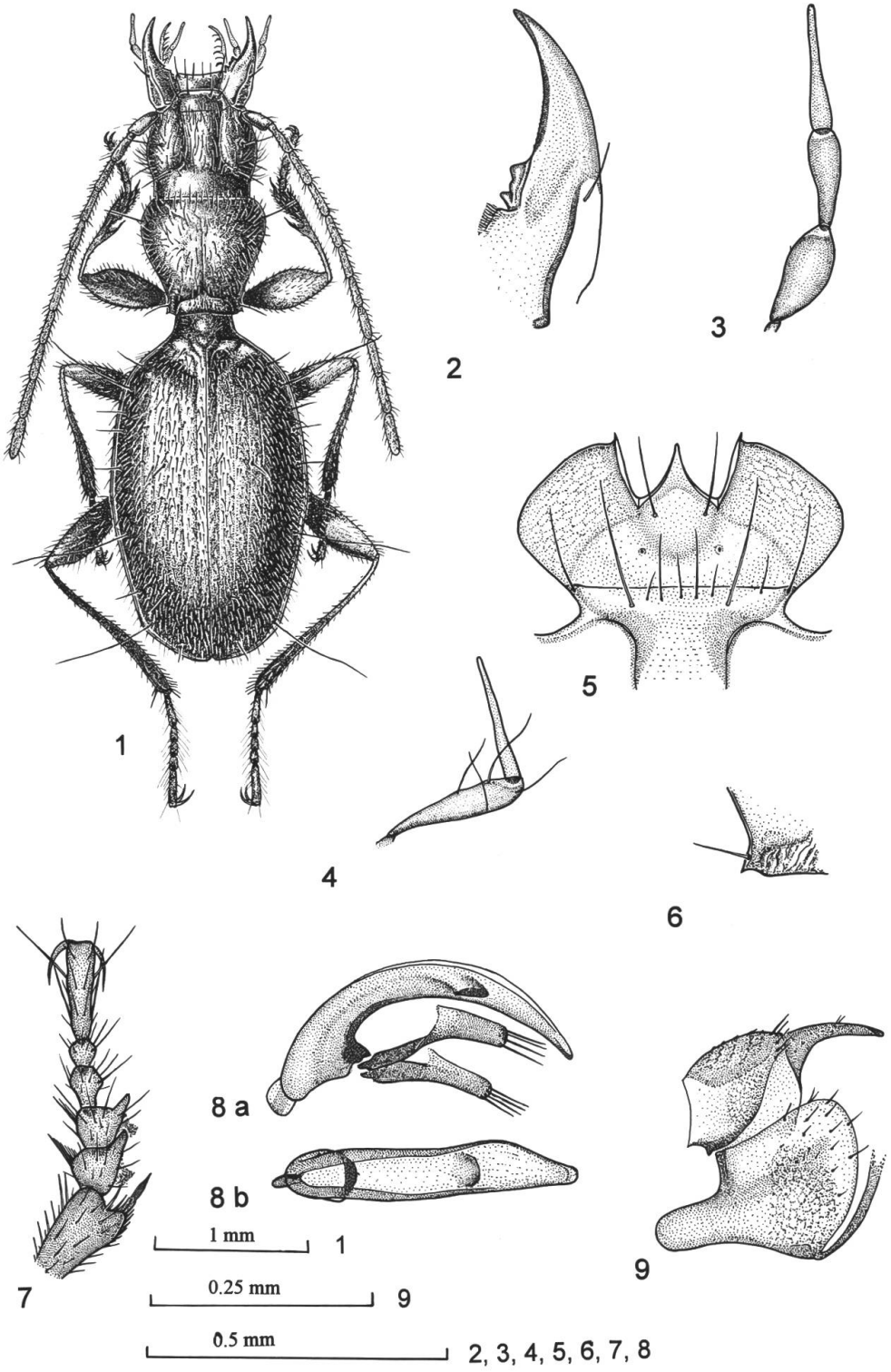
approximately just in hind angles, while it is strongly removed anteriorly in the European genus, almost straight lateral border near posterior lateral seta (usually strongly denticulate in *Geotrechus*–species), entirely effaced anterior angles of pronotum (strongly protruding in *Geotrechus* Jeannel), aggregated condition of humeral group of umbilicate series (habitually not aggregated in the Pyrenean genus), reduced anterior discal pore of elytra, superficial, not punctured striae, and by copulatory piece composed of one transverse plate while it is elongate in *Geotrechus* Jeannel. However, besides the habitus, both genera share some important characters: similar structure of maxillary palpi (ultimate segment distinctly longer and somewhat thinner than penultimate one), long and acute labial tooth, pubescence of dorsum including elytra (although this character is much variable within *Geotrechus* Jeannel), pubescent and not grooved exterior surface of protibiae, and serrulated humeral borders of elytra.

Taking into account a very strong differentiation of the members of the *Nannotrechus*-complex within the Caucasian region, the relations of the new genus with this complex may be of special interest. At first glance the difference in number of dilated segments of male protarsi is too important to be neglected. But *Pontodytes cavazutii* Casale & Giachino (1989), a remarkable taxon from Northern Anatolia, determines to treat this character more cautiously, as it was yet noted by CASALE & GIACHINO (1989). One further genus and species, *Nunbergites aethiopicus* Pawlowski & Stachowiak (1991) from the northern Ethiopia, also favours this viewpoint. Really both these genera seem to belong to *Neotrechus* phyletic series, despite of two dilated segments of protarsi in males. Beyond the latter, the *Caucasorites* n.gen. shares with the Anatolian genus many further important characters: long and acute tooth of mentum, aggregated condition of two anterior pores of umbilicate series and a similar comformation of maxillary palpi with ultimate segment longer than penultimate one. Nevertheless, both these genera are strikingly different as the shape and pubescence of body is concerned. *Pontodytes* Casale & Giachino is a true endogean genus with comparatively short appendages and moderately constricted at base fore-body. Apart from the difference in habitus, it possesses a hardly pubescent upper side and strongly differentiated pubescence of the fore-body, represented by 4 pairs of setae along median line on pronotum and by a transversal row of 4 setae in occipital impression. At last, *Caucasorites* n.gen. differs from *Pontodytes* Casale & Giachino by the

complete reduction of the fore discal pores of elytra. In general, the Anatolian taxon seems to be considerably closer to the Caucasian members of the *Nannotrechus*-complex as compared with the new genus. As regards species of the *Nannotrechus*-complex, *Troglocimmerites imeretinus* Dolzhansky & Ljovuschkin is the most similar to the new genus. This species is characterized by large size, elongated legs and antennae as well as by developed pubescence of dorsum regularly covering disk of head. But *Caucasorites* n.gen. readily differs from all taxa, related to *Nannotrechus* Winkl., by two dilated segments of male protarsi, much more dense body pubescence (setae situated in 2–3 longitudinal rows on each interspace, while even in the most pubescent species of the Nannotrechus–complex, for example in the genus *Cimmerites* Jeannel, only one irregular row is visible on each of the inner interspaces), and by the reduction of anterior discal pore of elytra.

It should be noted a similarity of the new genus with *Xenotrechus* Barr & Krekeler (1967) from the USA. Both genera manifest many important characters in common: regular pubescence of body, aggregated condition of humeral group of umbilicate series, two dilated segments of male protarsi, simple and acute tooth of mentum, subequal length of both ultimate and subultimate segments of maxillary palpi, strongly spaced umbilicate pores of median group and some others. Formally these genera demonstrate the most similar set of characters. Nevertheless, this affinity seems to be due to the non specialized condition of some characters: strong pubescence of body and aggregated humeral group of umbilicate series, and does not reflect special phylogenetic relationship between them. At any case, *Caucasorites* n.gen. differs easily from the American genus by reduced anterior discal pore, larger number of submental setae (9–11 vs. 4 in *Xenotrechus*), lateral border of pronotum without dentation near hind angles, lateral seta hardly removed anteriad, and completely glabrous penultimate segment of maxillary palpi, while the American genus possesses 2 or 3 short setae. Besides, two genera considered have a quite different endophallic armature consisting of small lamina in *Caucasorites* n.gen. and of scaly patch in both species of *Xenotrechus.*

To summarize, we can say that the new genus *Caucasorites* n.gen. is strongly isolated as compared with the other Caucasian trechines. It may be placed in the *Aphaenops* phyletic series and shows the most pronounced affinities with the Crimean *Pseudaphaenops* Winkl. and Caucasian *Meganophthalmus* Kurn., although their relationships seem to be rather remote.



Figs 1–9: *Caucasorites shchurovi* n.gen., n.sp. 1, Habitus, female. 2, Right mandible. 3, Maxillary palpus. 4, Labial palpus. 5, Labium. 6, Hind angle of pronotum. 7, Male protarsus. 8, Male genital organ: a, lateral view. b, dorsal view. 9, Female genital organ.

Caucasorites shchurovi n.sp. Figs 1–9.

Description. Medium–sized trechine beetle, body length 3.20–3.90 mm (both sexes subequal in length, even females somewhat larger, their averaged length 3.65 mm vs. 3.52 mm in males, but this difference is not reliable). Monochromously brownish, tinged with amber reddish, dark enough; appendages hardly paler. Slightly shining. Pubescence of body long, dense and relatively regular.

Head comparatively large and elongate, 1.17–1.26 (1.21) times narrower than pronotum. Frontal furrows complete, not angulate in the middle, rather gradually divergent both anteriad and posteriad, hardly arched in the middle, strongly impressed near vertex, becoming shallower posteriorly towards borders of head. Temples feebly and regularly convex. Front strongly convex in the hind part, delimited posteriorly by a vague transverse impression. Antennae long, 1.15–1.25 (1.19) times as long as elytra.

Pronotum strongly cordate, only 1.04–1.12 (1.07) times as wide as long, sharply constricted towards base which is 1.63–1.74 (1.69) times narrower than pronotal maximum width and 1.25–1.35 (1.30) times narrower than front margin. Anterior margin of pronotum almost straight. Front angles effaced. Base concave in the middle. Hind angles small but strongly acute and distinctly protruding (Fig. 6).

Elytra ovate and convex, 1.58–1.72 (1.66) times as long as wide, 1.82–1.97 (1.87) times as wide as head, and 2.63–2.82 times as long as pronotum. On the average, males have larger elytra but this difference is not reliable. Lateral borders somewhat angulate in the middle and near pore 8 of umbilicate series. On the average pores 3 and 2 are most strongly spaced and pores 3 and 4 are closer to each other in humeral group. Pore 5 1.39–2.22 (1.76) times as far from pore 6 as from pore 4 and slightly more removed from humeral group to compare with the distance between pores inside humeral group. Discal formula 0/37-44(40)/81-85(83).

Legs and appendages long, especially in males and larger specimens, shortest in small female exemplars (Fig. 1).

Hyaline appendages of segment 4 of pro- and metatarsi almost reaching apex of ultimate segment.

Microsculpture well-defined isodiametric, rough and deeply engraved on elytra and head, distinctly more superficial on disk of pronotum.

Male genital organ not large. Aedeagus (Fig. 8) feebly bowed and depressed dorsally. Apex simple and obtuse. Apical orifice strongly

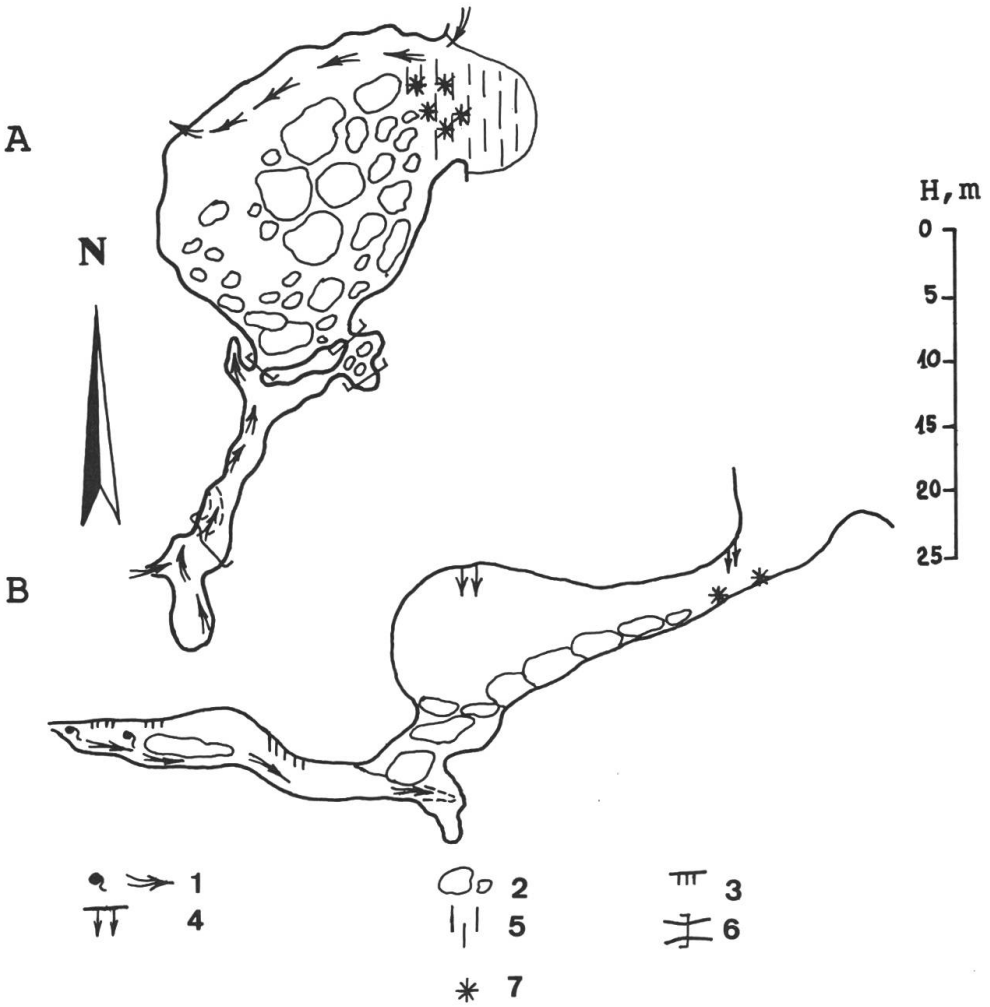


Fig. 10: Scheme of the unnamed cave near Solokhaul. 1, streams. 2, boulders. 3, stalactites. 4, downpour. 5, litter. 6, ledges. 7, findings of *Caucasorites shchurovi* n.gen., n.sp. A: plan. B: section (topographical survey by A. Ostapenko).

extended. Sagittal aileron small but protruding. Parameres of moderate size, widely rounded at apices, each bearing 4 apical setae. Copulatory piece represented by strongly transversal symmetrical plate in ventral position (Fig. 8).

Holotype: ♂ (ZISP), W Caucasus, Sochi, unnamed cave near Solokhaul, 700 m, 15.V.1995, (A. Zamotajlov, V. Shchurov, & A. Miroshnikov). Paratypes: 1 ♀ (NHMB); 1 ♂ (coll. H. Sawada); 3 ♂ & 6 ♀ (AZ,IB) same locality, together with holotype 1 ♂ & 7 ♀ (AZ), same locality, 1.V.1996 (A. Zamotajlov & A. Miroshnikov). 4 ♂ & 8 ♀ (AZ), same locality, 2.V.1997 (A. Zamotajlov & V. Shchurov).

Derivatio nominis: It is a great pleasure for us to dedicate this remarkable species to our friend and colleague Ing. Valeriy I. Shchurov

of Krasnodar, one of its collectors, whose help was always of inestimable value for us during numerous collecting trips in the Caucasus.

Ecology. The taxon under consideration seems to be intermediate in its habitat between true endogean species of the *Nannotrechus*–complex and cave–dwelling species of aphaenopsoid appearance, such as *Meganophthalmus* Kurn. and *Taniatrechus* Belousov & Dolzhansky, representing different from them microcavernicolous life form. Collected from microcavities under stones near entry of the grotto (Fig. 10), it is similar in this respect to some *Geotrechus* (JEANNEL, 1928).

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