

Redescription of the Caucasian species *Geolycosa charitonovi* (Mcheidze, 1997) (Araneae: Lycosidae), with the first description of the male

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Summary

The poorly known wolf spider “*Alopecosa*” *charitonovi* Mcheidze, 1997 is redescribed and a new combination *Geolycosa charitonovi* (Mcheidze, 1997) n. comb. ex *Alopecosa* is proposed. The male of this species is described for the first time. *Geolycosa charitonovi* is distributed across the whole Caucasus Major from Krasnodar Province in Russia to Azerbaijan and Dagestan. Data on its natural history are provided.

Introduction

One hundred and ten species of the family Lycosidae have been reported so far from the Caucasus ecoregion (Otto & Tramp 2011). The taxonomic status of many of these species and records is unresolved because descriptions of new species were often based on only a few specimens of only one sex, and the type material was often not available for study (e.g. in small museums in post-Soviet countries). Therefore, critical studies and revisions of the wolf spiders of the Caucasus are needed. Very little is known about the large-sized wolf spiders (“tarantulas”) of the Caucasus. Some of these large spiders from the Caucasus were described and/or redescribed in just four publications: Mcheidze (1997), Zyuzin & Logunov (2000), Marusik, Guseinov & Koponen (2003) and Logunov (2010).

One of these poorly known Caucasian lycosids is “*Alopecosa*” *charitonovi* Mcheidze, 1997, which had been described from the mountainous region of Tusheti in northeastern Georgia, based on a female only. Recently, numerous specimens of this species were collected in the

Caucasus Major, including the first males. Furthermore, the lectotype recently became accessible during an inventory of the spider collection of the Janashia Museum Tbilisi and, together with the original description of this species by Mcheidze (1997), there was sufficient information for a redescription and evaluation of its generic position.

Mcheidze (1997) originally placed her new species in *Alopecosa* Simon, 1885: a species-rich and seemingly polyphyletic genus currently encompassing almost 150 species distributed chiefly in the Palaearctic (Platnick 2011). “*Alopecosa*” *charitonovi* Mcheidze, 1997 is neither related to nor similar to the type species of *Alopecosa* – the well known species *A. fabrilis* (Clerck, 1757).

The goals of the present paper are to consider the correct generic placement of *A. charitonovi*, to provide the first description of its male, and to review its geographical distribution.

Methods

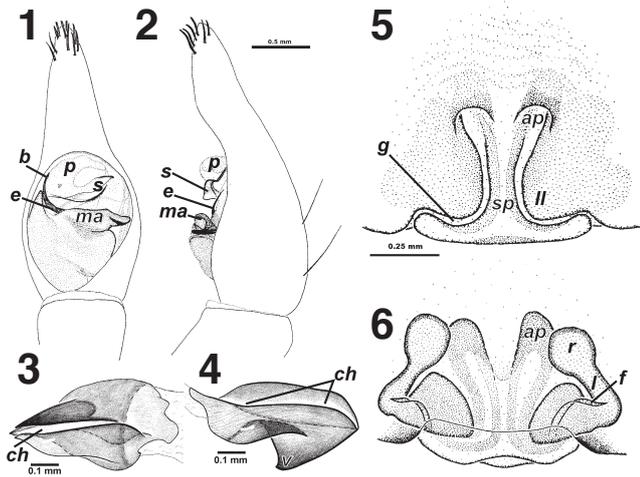
This study is based on material collected by M. Kovblyuk, A. Khalidov, P. Laguta, S. Otto, A. Ponomarev and E. Terskov from the Caucasus Major in Krasnodar Area, Adygea and Dagestan (in Russia), Abkhazia and Georgia, and also by N. Snegovaya and H. Aliev in Azerbaijan. Voucher specimens are deposited in the Museum für Naturkunde, Berlin (ZMB), the private collection of A.V. Ponomarev in Rostov-on-Don (CP), the Siberian Zoological Museum of the Russian Academy of Sciences, Novosibirsk, Russia (SZMN), and in the Zoology Department of the V. I. Vernadsky Tavrda National University in Simferopol (TNU).

Site numbers on the map (Fig. 48) correspond to the numbers assigned to samples in the material list. The map was created using GMT Software (Wessel & Smith 1998) using SRTM 1 radar data (Amante & Eakins 2009).

Terms and abbreviations for morphological structures are adopted from Dondale (1986), Zyuzin (1993), Zyuzin & Logunov (2000) and Logunov (2010): ap, anterior pocket of epigyne; b, base of embolus; br, median row of spine-like bristles on scopula; ch, sinuous channel on dorsal surface of median apophysis; co, conductor; d, tegular depression; e, embolus; f, fertilization duct; g, genital (= copulatory) opening of epigyne; i, insemination duct; ll, lateral lobes of epigyne; ma, median apophysis; p, palea; r, spermathecal reservoir; s, synembolus; sc, scopula; sp, septal pedicle; v, ventrally directed spur of median apophysis.

Illustrations were made using both reflected and transmitted-light microscopes. Microphotographs were made with an EVO-40 XVP (LEO 143 OVP) SEM in the South Scientific Centre RAS, Rostov-on-Don, Russia, and an Olympus Camedia E-520 camera attached to an Olympus SZX16 stereomicroscope at the Zoological Museum, University of Turku. Digital images were montaged using CombineZM image-stacking software. Photographs were taken in dishes of different sizes with paraffin at the bottom. Holes of various sizes were made in the bottom to keep the specimens in the correct position.

All measurements are in millimetres.



Figs. 1–6: Copulatory organs of *Geolycosa charitonovi* n. comb. **1** male palp, ventral view; **2** male palp, retrolateral view; **3** median apophysis, dorsal view; **4** median apophysis, apical view; **5** epigyne, ventral view; **6** epigyne, dorsal view.

Geolycosa charitonovi (Mcheidze, 1997) n. comb. (Figs. 1–7, 10, 13, 16–17, 20, 23–26, 28–29, 31–35, 38, 41–42, 44–46)

Alopecsa [sic] *charitonovi* Mcheidze, 1997: 217, figs. 445–447 (lectotype ♀ from Janashia Museum Tbilisi (Georgia), coll. no. H3-06, Tusheti region, 20 August 1939, examined, designated herein).

Material examined

RUSSIA, Krasnodar Area: 1) 1♂ (CP), Mostovskiy Distr., Caucasian State Nature Biospheres Reserve, kordon Chernorechye (43.93°N, 40.7°E), September 2009, Yu. Chumachenko; 2) 1♀ (CP), Sochi, env. Solokhaul village, pitfalls, 10–17 July 2002, P. Laguta; 3) 2♀♀ (TNU), Sochi, env. Solokhaul village, Shakhan Mt., 900–950 m a.s.l., pitfalls, 10–18 July 2002, P. Laguta; 4) 1♂ (TNU), Sochi, env. Solokhaul village, 700 m, pitfalls, 17–27 July 2002, P. Laguta. Dagestan: 5) 1♀ (CP), Tsuntinski Distr., Tsekhok village, 2800–3000 m a.s.l., 16 August 2008, A. Khalidov; 6) 2♀ (CP), Tlyaratinsky Distr., Khidib village, 2100–2500 m a.s.l., 23 July 2008, E. Terskov. ABKHAZIA, Gagra Distr.: 7) 3♂♂, 5♀♀ (TNU-2652/1), Gagra Mt. Range, Mamdzyskhka Mt. (1866 m a.s.l.), from border of forest (43.3132°N, 40.2494°E, 1705 m a.s.l.) to peak, wood (*Abies*, *Fagus*, *Acer*) and alpine meadows, 7–15 July 2009, M. Kovblyuk. GEORGIA, Lower Svaneti: 8) 1♂, Tskhenistsyali valley, between the villages Lentekhi and Sakdari (42.8299°N, 42.8140°E), montane zone, 1100 m a.s.l., under rocks in rock slide near the road, 12 July 2010 (adult 17 July), S. Otto; Stepantsminda Region: 9) 1♀, NE slope of Mt. Kazbek, Devdorak valley (42.7251°N, 44.5980°E), montane zone, 1700 m a.s.l., on grazed pasture, 5 August 2007, S. Otto; Dusheti Region: 10) 1♂, Tetri Aragvi valley, N of Ananuri village (42.26265°N, 44.67897°E), montane zone, 700 m a.s.l., under rock on the roadside, 11 July 2009 (adult 19 July), S. Otto; Khevsureti Region: 11) 1♀, Khevsuris Aragvi valley, S of Barisakho village (42.4287°N, 44.9433°E), montane zone, 1100 m a.s.l., under rock on the roadside, 27 June 2009, S. Otto; 12) 5♀♀, Argun valley, SW of Shatili village (42.6446°N, 45.1473°E), montane

zone, 1500 m a.s.l., under rock on the roadside, 24 June 2009, S. Otto; 13) 1♂, Kharoki valley, N of Mutso village (42.6376°N, 45.2000°E), montane zone, 1500 m a.s.l., under slate rock on the roadside, 25 June 2009, S. Otto; Tusheti region: 14) 1♀ (lectotype (see above), Tusheti region, deposited at Janashia Museum Tbilisi (Georgia), arachnological collection, coll. no. H3-06), Tusheti region, 20 August 1939; 15) 3♂♂, 2♀♀ (coll. No. ZMB 48442), Tshantshakhi valley, SW of Omalo village (42.3605°N, 45.6230°E), montane zone, 1800 m a.s.l., under rocks on slate slide near road, 2 July 2010, S. Otto; 16) 1♀, Khiso valley, SW of Omalo village (42.3333°N, 45.5870°E), montane zone, 1800 m a.s.l., under slate rock on the roadside, 30 June 2010, S. Otto; Kakheti Region: 17) 1♂, 2♀♀, Stori valley, N of Letshuri village (42.2415°N, 45.4960°E), montane zone, 1500 m a.s.l., under rocks on the roadside, 30 June 2010, S. Otto. AZERBAIJAN, Zagatala distr.: 18) 2♂♂ (# 1570), Zagatala Reserve, 23 June 2003, N. Snegovaya & H. Aliev.

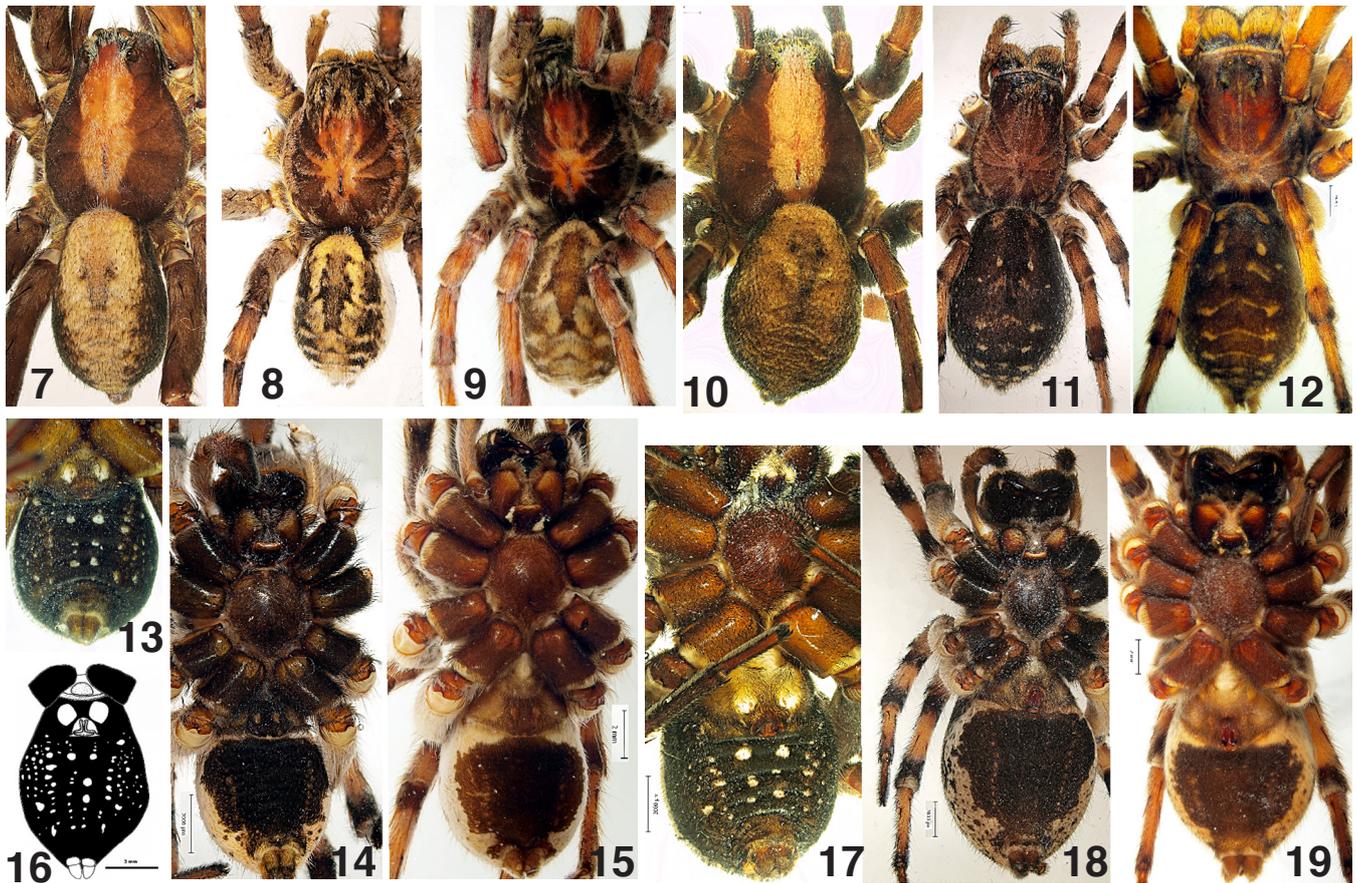
Comparative material

Geolycosa vultuosa (C. L. Koch, 1838) (Figs. 8, 11, 14, 18, 21–22, 27, 30, 36, 39, 43). UKRAINE, Crimea, Bakhchisaray distr.: 3♀♀ (TNU-2567/1), Krasnozorye Vil., 11 May 2008, A. Nadolny; Feodosiya Distr.: 1♀ (TNU-1820/1), Karadag Nature Reserve, Biological station, 28 July 2003, O. Kukushkin; 1♀ (TNU-1821/2), Karadag Nature Reserve, Biological station, July 2003, O. Kukushkin; 2♀♀ (TNU-1823/1), Karadag Nature Reserve, 3 September 2003, O. Kukushkin; 1♀ (TNU-1818/2), Karadag Nature Reserve, near Koktebel', 21 September 2003, O. Kukushkin; 1♀ (TNU-1817/1), Karadag Nature Reserve, Biological station, 23 September 2003, O. Kukushkin; Saki Distr.: 2♂♂, 2♀♀ (TNU), 25 km NE Saky, Kraynee Vil., 26 September 2010, A. Mustafaev; Simferopol Distr.: 4♀♀ (TNU-2188/1), Krasnolesye Vil., 31 March 2000, M. Kovblyuk; 1♀ (TNU-2205/1), env. Simferopol water reservoir, March 2001, M. Kovblyuk; 1♂ (TNU-2082/1), Petropavlovka Vil., 4 September 2002, V. Nazarova; 1♀ (TNU-1770/4), Krasnolesye Vil., 28 June 2003, E. Barkova. RUSSIA, Krasnodar Area: 1♀ (TNU-2428/1), env. Gelendzhik, Betta Mt., 14 September 2007, A. Nadolny; Dagestan: 1♂ (CP), Buinaksky Distr., Verkhnee Kazanische village, 7 August 2008, A. H. Khalidov.

Geolycosa dunini Zyuzin & Logunov, 2000 (Figs. 9, 12, 15, 19, 37, 40). AZERBAIJAN, ♂ holotype (SZMN), 25–30 km NE of Shemakha, Pirkuli Reserve, 1000 m a.s.l., 9 September 1984, D. Logunov; 2♀♀ paratypes (SZMN), together with holotype.

Diagnosis

Geolycosa charitonovi is most closely related to *G. vultuosa* (C. L. Koch, 1838) and *G. dunini* Zyuzin & Logunov, 2000, but can easily be distinguished from them by the pattern and shape of the carapace as well as the structure of the copulatory organs.



Figs. 7–19: Colouration of *Geolycosa* species, dorsal view (7–12), and ventral view (13–19). 7 male *G. charitonovi*; 8 male *G. vultuosa* from Crimea; 9 male *G. dunini* (holotype); 10 female *G. charitonovi*; 11 female *G. vultuosa* from Crimea; 12 female *G. dunini* (paratype); 13 male *G. charitonovi*, abdomen; 14 male *G. vultuosa* from Crimea; 15 male *G. dunini* (holotype); 16 female *G. charitonovi*, abdomen; 17 female *G. charitonovi*; 18 female *G. vultuosa* from Crimea; 19 female *G. dunini* (paratype).

The carapace and abdomen in *G. charitonovi* have a broad, light, median band which is absent in related species. The carapaces of *G. vultuosa* and *G. dunini* have a light patch in the foveal area, with radial yellow stripes, and a dorsal abdomen with a dark brown spot bordered on both sides with yellow stripes (cf. Figs. 7–12). The venter of the abdomen in *G. charitonovi* is black with peculiar white spots which are absent from *G. vultuosa* and *G. dunini* (cf. Figs. 13–19). The legs in *G. charitonovi* are uniformly brown, while in *G. vultuosa* and *G. dunini* the legs are yellow-brownish with dark brown ventral half rings (cf. Figs. 10–12, 20–22). The tibia of the male palp in *G. charitonovi* is dark brown, while in *G. vultuosa* it is light yellow, and it is brown in *G. dunini* (cf. Figs. 35–37). The spur of the median apophysis and septal pedicle of the epigyne in *G. charitonovi* are much shorter than in *G. vultuosa* and *G. dunini* (cf. Figs. 35–40).

Leg	femur	patella	tibia	metatarsus	tarsus	Total
I	5.8	2.6	5.5	5.8	3.0	22.7
II	5.7	2.5	4.7	5.4	3.0	21.3
III	5.3	2.3	4.0	5.5	2.5	19.6
IV	6.5	2.4	5.5	7.8	3.0	25.2

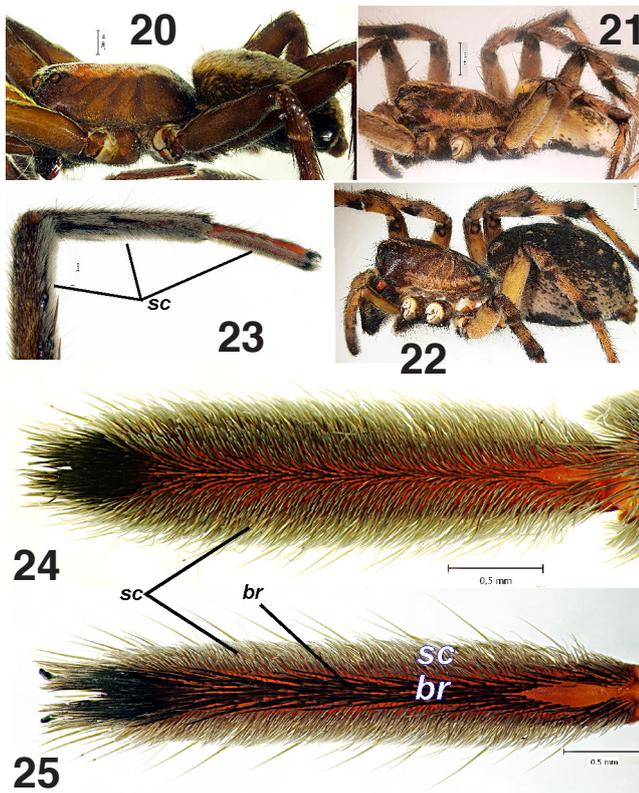
Table 1: Lengths of leg segments in males.

Description

Male from Abkhazia (Mamdzyshkha Mt., TNU-2652/1). Total length 12.5. Carapace 6.7 long, 5.1 wide; length/width ratio 1.3. Abdomen 6.6 long, 4.1 wide. Eye sizes and inter-distances: AM 0.28, AL 0.25, PM 0.60, PL 0.50, AM-AM 0.18, AM-AL 0.10, PM-PM 0.38, PM-PL 0.45, PL-PL 1.32, AM-clypeus 0.15, AL-clypeus 0.20, PM/AM ratio 2.18. Width of anterior eye row 1.32, second row 1.50, third row 2.05. Second row/anterior row of eyes ratio 1.13. AM diameter 1.8 times greater than clypeal height. Chelicerae with 3 pro- and 3 retromarginal teeth.

Leg	femur	patella	tibia	metatarsus
I	d 1-1-1	pl 1	d 1	pl 1-1-2a
	pl 2	rl 1	pl 1-1	rl 1
	rl 1-1-1		rl 1-1	v 2-2-1a
II			v 2-2-2a	
	d 1-1-1	pl 1	d 1-1a	pl 1-1-2a
	pl 1-1	rl 1	pl 1-1	rl 1-1-1a
	rl 1-1-1		rl 1-1	v 2-1-1a
			v 2-2-2a	
III	d 1-1-1	pl 1	d 1-1	pl 1-1-2a
	pl 1-1	rl 1	pl 1-1	rl 1-1-2a
	rl 1-1-1		rl 1-1	v 2-2-1a
			v 2-2-2a	
IV	d 1-1-1	pl 1	d 1-1	pl 1-1-2a
	pl 1-1-1	rl 1	pl 1-1	rl 1-1-2a
	rl 1		rl 1	v 2-1-2-1a
			v 2-2-2a	

Table 2: Leg spination in males.



Figs. 20–25: Lateral views and legs of *Geolycosa* species: **20** male *G. charitonovi*; **21** male *G. vultuosa* from Crimea; **22** female *G. vultuosa* from Crimea; **23** tibia-metatarsus-tarsus I of female *G. charitonovi*, lateral view; **24** tarsus I of female *G. charitonovi*, ventral view; **25** tarsus IV of female *G. charitonovi*, ventral view.

Leg formula: IV, I, II, III. Lengths of leg segments and spination are given in Tables 1 and 2.

Legs I–II are furnished with thick scopulae on the tibia, metatarsus and tarsus; legs III–IV bear thick scopulae on two joints (metatarsus-tarsus). The scopulae on tarsi III–IV bear a median row of spine-like bristles.

The colouration is brown. The dark brown carapace bears a broad, light median band. Sternum, legs and palps are brown; the chelicerae are dark brown. The dorsal part of the abdomen is of bright colour. The ventral side of the abdomen is black with a pair of large white spots in front of the epigastric furrow and four longitudinal rows of peculiar white spots behind the epigastral furrow (Figs. 7, 13, 20).

Palpus as in Figs. 1–4, 26, 28–29, 32–35. Tibia and cymbium are brown. The median apophysis is an elongated blade with a short, sharpened ventral tooth. The synembolus is a wide, blade-shaped lamella.

Female from Abkhazia (Mamdzyshkha Mt., TNU-2652/1). Total length 18.3. Carapace 8.5 long, 6.9 wide; length/width ratio 1.23. Abdomen 9.0 long, 5.5 wide. Eye sizes and interdistances: AM 0.35, AL 0.28, PM 0.7, PL 0.59, AM-AM 0.22, AM-AL 0.14, PM-PM 0.45, PM-PL 0.58, PL-PL 1.5, AM-clypeus 0.31, AL-clypeus 0.22, PM/

Leg	femur	patella	tibia	metatarsus	tarsus	Total
I	6.2	3.1	5.0	4.9	2.6	21.8
II	6.0	3.1	4.7	5.1	2.6	21.5
III	5.7	2.9	4.3	5.4	2.4	20.7
IV	7.1	3.1	5.8	7.6	3.1	26.7

Table 3: Lengths of leg segments in females.

AM ratio 2.0. Width of anterior eye row 1.58, second row 1.8, third row 2.58. Second row/anterior row of eyes ratio 1.1. AM diameter 1.1 times greater than clypeal height. Chelicerae with 3 pro- and 3 retromarginal teeth.

Leg formula: IV, I, II, III. Lengths of leg segments and spination are given in tables 3 and 4. Legs I–II are furnished with thick scopulae on three terminal joints (tibia–metatarsus–tarsus) (Fig. 23), legs III–IV bear thick scopulae on its two joints (metatarsus-tarsus). In tarsi III–IV a line of spine-like bristles is developed in the medial part of the scopula (Fig. 25).

Colouration is similar to that of the male.

Epigyne as in Figs. 5–6, 16, 31, 38, 41. Its septum is anchor-shaped with a short pedicle, and longitudinal groove. Lateral lobes are present.

Variation: Male body length 12.4–13.8, carapace 6.7–7.0 long, 5.1–5.9 wide. Female body length 18.3–21.0, carapace 7.5–10.0 long, carapace 6.0–7.6 wide.

Remarks

According to the diagnoses provided by Dondale (1986), Zyuzin (1993) and Dippenaar-Schoeman & Jocqué (1997) *Geolycosa charitonovi* would belong to the subfamily Lycosinae.

Zyuzin (1993) subdivided Lycosinae into two tribes, Lycosini Sundevall, 1833 and Trochosini Zyuzin, 1990. The tribe Lycosini is characterized by the absence of the ventrally or retrolaterally directed outgrowth on the median apophysis and by a variability in shape – but not anchor-shaped – septum of the epigyne. The tribe Trochosini is correspondingly distinguished by the presence of a ventral spur on the median apophysis and an anchor-shaped septum of the epigyne. In species belonging to Trochosini the lengths of the septal pedicle are correlated with that of the ventral spur on the median apophysis of the bulbus (Zyuzin 1993; Zyuzin & Logunov 2000). In *G. charitonovi*, both the septal pedicle and the ventral spur on the median apophysis are short (Figs. 1–5, 26, 28, 29, 31–33, 35, 38). Thus, according to these characters, *G. charitonovi* should belong to the Trochosini.

Some Trochosini species make burrows; others do not. According to this character, Zyuzin (1993) subdivided Trochosini into two subtribes: Trochosina Zyuzin, 1990 (no

Leg	femur	patella	tibia	metatarsus
I	d 1–1–1	pl 1	pl 1–1	pl 1a
	pl 2		v 2–2–2a	rl 1a
	rl 1–1–1			v 2–2–1a
II	d 1–1–1	pl 1	pl 1–1	pl 1a
	pl 1–1		rl 1	rl 1a
	rl 1–1–1		v 2–2–2a	v 2–2–1a
III	d 1–1–1	pl 1	d 1–1	pl 1–2a
	pl 1–1	rl 1	pl 1–1	rl 1–1–2a
	rl 1–1–1		rl 1–1	v 2–2–1a
IV	d 1–1	pl 1	v 2–2–2a	
	pl 1–1	rl 1	d 1–1	pl 1–1–1a
	rl 1		pl 1–1	rl 1–1–1a
			rl 1–1	v 2–1–2–1a
		v 2–2–2a		

Table 4: Leg spination in females.



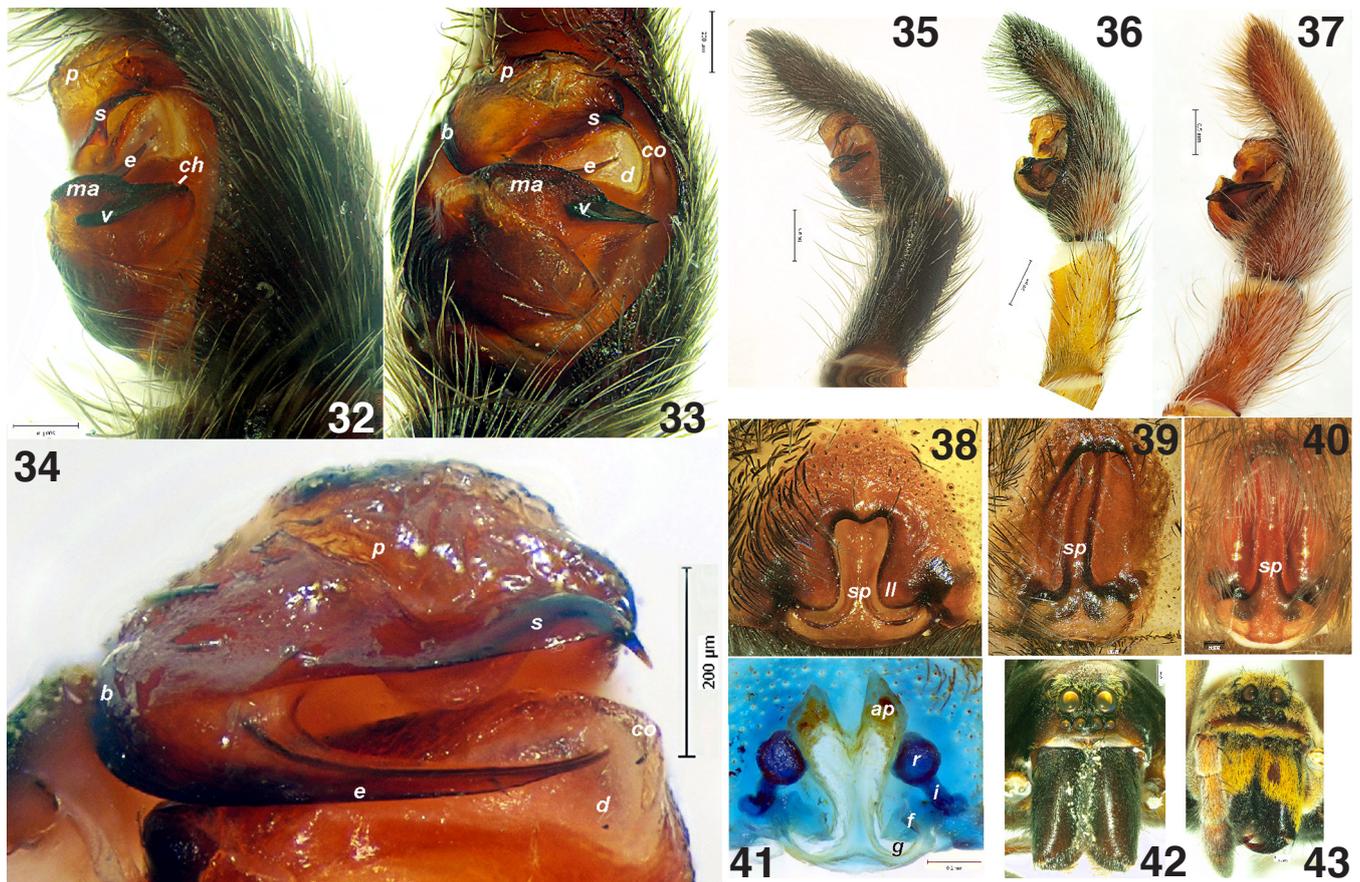
Figs. 26–31: Copulatory organs of *Geolycosa* species. **26** male palp of *G. charitonovi*, ventral view; **27** male palp of *G. vultuosa*, ventral view; **28** bulbus of *G. charitonovi*, ventro-retrolateral view; **29** bulbus of *G. charitonovi*, ventral view; **30** bulbus of *G. vultuosa*, ventral view; **31** epigyne of *G. charitonovi*, ventral view.

burrows) and Geolycosina Zyuzin, 1993 (make burrows). The adult males of both subtribes have unmodified carapaces (Zyuzin 1990). Females of the subtribe Geolycosina have a characteristic carapace shape, with the cephalic portion abruptly raised above the thoracic portion (Zyuzin 1990), which is an adaptation to living in burrows. In females of the subtribe Trochosina the cephalic part is indistinctly raised above the thoracic part or not raised at all (Zyuzin 1990, fig. 2). Using this character, *G. charitonovi* can be placed in the subtribe Trochosina.

Zyuzin (1993, p. 699) included the following genera in Trochosina (the respective type species are given in parentheses): *Alopecosa* Simon, 1885 (*A. fabrilis* [Clerck, 1757]), *Hogna* Simon, 1885 (*H. radiata* [Latreille, 1817]), *Schizocosa* Chamberlin, 1904 (*S. ocreata* [Hentz, 1844]), and *Trochosa* C. L. Koch, 1847 (*T. ruricola* [De Geer, 1778]). *G. charitonovi* cannot be placed in any of these genera. *G. charitonovi* differs from *Alopecosa* through the lateral position of the embolus base (in *Alopecosa* the embolus base is apical or nearly apical). *G. charitonovi* differs from *Hogna* species by the absence of robust spines on the apical part of the cymbium (such spines are present in *Hogna*) and by the shape of the synembolus (a wide blade-shaped lamella in *G. charitonovi*, which is pointed and sickle-shaped in *Hogna*). *G. charitonovi* differs from *Schizocosa* species by the absence of thick robust spines on the apical part of the cymbium (they are present in *Schizocosa*); by a long (rather

than short) free portion of the embolus; by the absence of a sharp apical bend of the terminal part of the embolus; by the absence of a distal sclerotized outgrowth of the palea (it is often present in *Schizocosa*). *G. charitonovi* differs from *Trochosa* in the absence of the pair of dark stripes on the median band of the carapace and the absence of an anterior dilation of the septum stalk. Thus, it is impossible to refer *G. charitonovi* to Trochosina given that it shows markedly different structures in the copulatory organs.

Nevertheless, Zyuzin's subtribes Trochosina and Geolycosina differ significantly in the shape of the copulatory organs. For example, members of Trochosina have a pointed, sickle-shaped synembolus, in contrast to that of Geolycosina, which have a wide and blade-shaped lamelli-form synembolus. We consider these characters of the copulatory organs more important than somatic characters (such as the elevation of the cephalic part of the carapace) because they (somatic characters) have adaptive value only and are connected with burrowing or non-burrowing behaviour (a raised carapace is an adaptation for living in (thin) burrows). Therefore, we refer *G. charitonovi* to Geolycosina on the basis of the similarity in the shape of the copulatory organs, even though it lacks an elevation of the cephalic part of the carapace in females. This case is a good illustration of the imperfections in the existing classification of the subfamily Lycosinae, and the Lycosidae as a whole.



Figs. 32–43: Copulatory organs and eyes of *Geolycosa charitonovi* (32–35, 38, 41, 42), *G. vultuosa* (36, 39, 43), and *G. dunini* (37, 40). **32** bulbus of *G. charitonovi*, retrolateral view; **33** bulbus of *G. charitonovi*, ventral view; **34** *G. charitonovi*, apical part of bulbus, ventral-posterior view. **35–37** male palps, retrolateral view; **38–40** epigynes, ventral view; **41** epigyne, dorsal view; **42–43** male eyes, frontal view.

Zyuzin (1993, p. 699) included the following genera into Geolycosina (type species again given in parentheses): *Allohogna* Roewer, 1955 (*A. singoriensis* [Laxmann, 1770]), *Arctosa* C. L. Koch, 1847 (*A. cinerea* [Fabricius, 1777]), *Geolycosa* Montgomery, 1904 (*G. latifrons* Montgomery, 1904).

The genus *Arctosa* is characterized by the presence of setae in the epigynal septum and by the peculiar shape of the median apophysis. These characters are lacking in *G. charitonovi*. Therefore, it can be placed in *Allohogna* or *Geolycosa*. However, the genus *Allohogna* is listed as a junior synonym of the genus *Lycosa* Latreille, 1804 (Platnick 2011). Its type species *L. tarantula* (Linnaeus, 1758) differs markedly in many characters from *G. charitonovi* (cf. Logunov 2010, p. 241, figs. 1–2, 9, 16–17, 27, 50), and especially in the conformation of the male palp. Therefore, it is impossible to place *G. charitonovi* in *Lycosa* or *Allohogna*. There is better evidence that *G. charitonovi* belongs instead to *Geolycosa*.

Montgomery (1904, p. 292) established *Geolycosa* for those species, previously placed in *Lycosa*, which have a thick and strong leg I furnished with dense scopulae on its three terminal podomeres (tibia–metatarsus–tarsus). According to this character (dense scopula on tibia–tarsus of leg I), *G. charitonovi* does belong to *Geolycosa*.

Montgomery (1904, p. 293) also mentioned the burrowing behavior of *Geolycosa* species. Species belonging to *Geolycosa* dig cylindrical holes in the ground. *G. charitonovi* exclusively inhabits stony places (Fig. 47), and digs, not

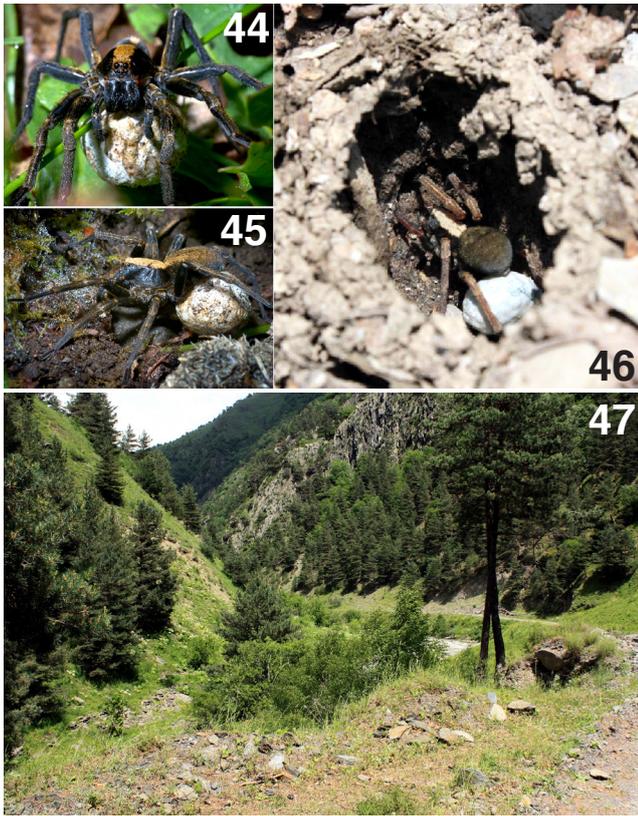
holes, but rather hollows (chambers) under stones (Fig. 46). We (MK, personal observation) observed a similar behaviour (hollow-making under stones) in *Geolycosa vultuosa* inhabiting extremely stony places in the Crimean Mts. (Dolgorukovskaya Yaila Mt., observed 3 May 1996).

According to Zyuzin & Logunov (2000, p. 308), who studied the type species of *Geolycosa*, the genus can be diagnosed by the following characters: 1) carapace clearly elevated anteriorly; 2) subequal width of the rows formed by anterior eyes, and PM eyes; 3) large ventral spur on median apophysis; 4) epigyne with long septal pedicle. Of these characters, only two are present in *G. charitonovi* (subequal eye rows and large ventral spur).

The carapace in females is not elevated in the cephalic part and the epigyne has a short septal pedicle. In our opinion, the elevation of the female carapace is an adaptive character associated with burrowing behaviour and should not be considered as very important. The length of the septal pedicle is correlated with the length of the ventral outgrowth on the median apophysis (see also above).

According to the width of eye rows 1 and 2, *G. charitonovi* could be assigned to *Allohogna* Roewer, 1955 as well as to *Geolycosa*, because both these genera share this character (Logunov 2010). In addition, the epigyne of *G. charitonovi* has lateral lobes similar to that in *Allohogna*.

Recently, Logunov (2010) used a new character for the differentiation of *Allohogna*, *Geolycosa* and some other large lycosid genera: hair-like spinules on the ventral surface of the tarsi. Similar, and possibly homologous, spinules are



Figs. 44–47: Living females of *Geolycosa charitonovi* with cocoons. **44** frontal view; **45** lateral view; **46** dorsal view, female in a burrow under a large rock; **47** habitat (Khevsureti, Georgia).

present in tarsi III–IV in *Geolycosa* and *Lycosa* but lacking in *Allohogna*. According to the presence of spinules in tarsi III–IV (Fig. 25), *G. charitonovi* can be assigned to *Geolycosa*. These spinules in the scopula are not identical to those seen in *G. vultuosa*, but are nonetheless very similar (D. V. Logunov, personal communication).

The comparison of *G. charitonovi* with genera of other Geolycosina, and the presence of the following characters:

scopulae on tibia-tarsus on leg I, spinules on tarsi III and IV, shape of median apophysis and shape of synembolus, led us to conclude that “*Alopecosa*” *charitonovi* is better placed in *Geolycosa* and therefore we establish the new combination *Geolycosa charitonovi* (Mcheidze, 1997) n. comb.

Distribution

Mcheidze (1997) described *G. charitonovi* based on females originating from four regions of Georgia: Tusheti, Lagodekhi Reserve (Kakheti region), Avadkhara (Abkhazia) and Tshargali (Pshavi region). She also listed the locality “Keda”, which we were not able to localize within the Caucasus Major. It is possible that Mcheidze meant the village of Keda east of Batumi in the Lesser Caucasus near the Turkish border. We were not able to find specimens from that locality among Mcheidze’s material. According to our data, the entire range of this species is restricted to the Caucasus Major (from Krasnodar Province in Russia to north-central Azerbaijan) (Fig. 48).

It is worth mentioning that all Palaearctic *Geolycosa* species (*G. dunini*, *G. charitonovi* and *G. vultuosa*) occur in the Caucasus. The occurrence of additional species in the region is very likely. Further studies of the supraspecific taxonomy of Holarctic Lycosidae may lead to *Geolycosa* being split into two or more genera.

Biology

Geolycosa charitonovi occurs in the Caucasus Major at elevations between 700 and 1800 m a.s.l. It prefers sun-exposed habitats with sparse herbaceous vegetation on old rock slides in the montane forests of mountain gorges (Fig. 47).

Both males and females hide underneath rocks during the day and appear on the ground in the dusky twilight. It is thus

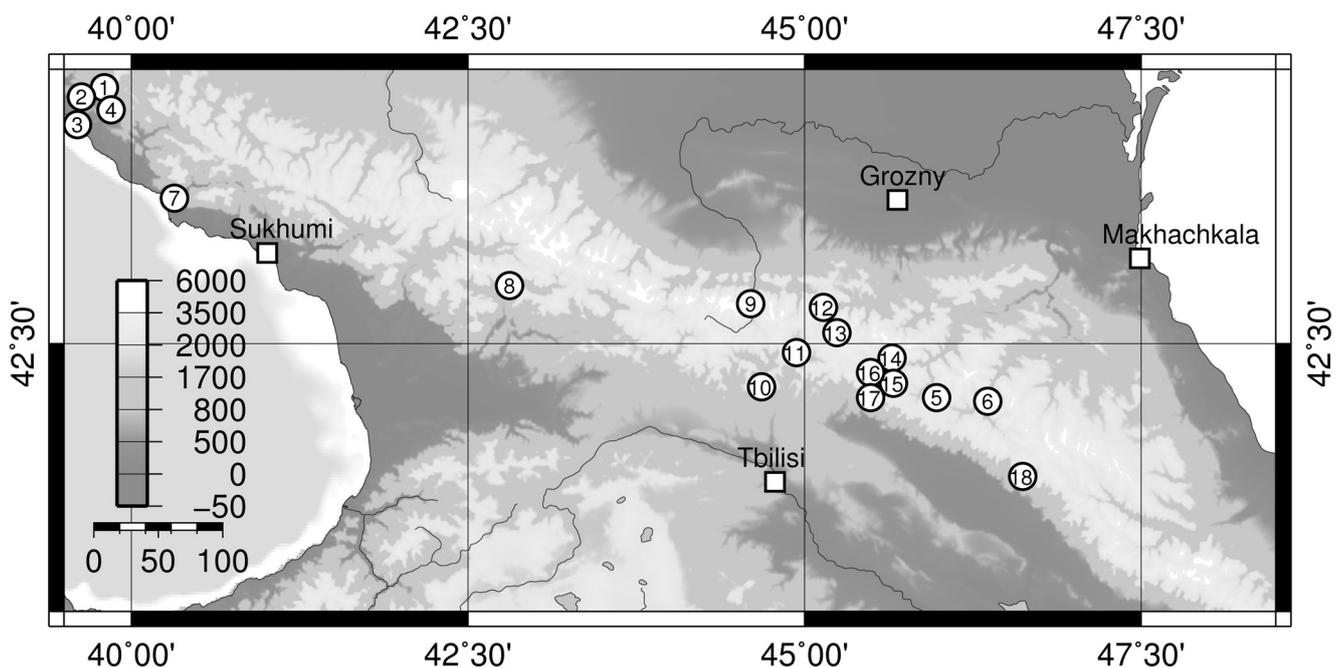


Fig. 48: Collecting sites of *Geolycosa charitonovi*. Numbers of sites in the map correspond to the numbers assigned to samples in the list of material studied.

suspected that *G. charitonovi* is nocturnal. After copulation in spring after snow melt, the female constructs a burrow underneath a rock and hides there with her egg sac and later together with the hatched juveniles on her abdomen.

Mature males have been collected in June and July, females from June to August.

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