Survey of the genus *Phalangium* Linnaeus, 1758 (Phalangiidae: Opiliones) from the Caucasus with description of two new species

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Abstract: Faunistic, distributional, and taxonomic data for the genus *Phalangium* Linnaeus, 1758 from the Caucasus are presented. Eight species of the genus have been found in the region. Two new species: *P. mcheidzeae* from Georgia and *P. gorbunovi* from Volgograd region, Republic of Kalmykia and Krasnodar region are described, the other six species of the area are *P. opilio*, *P. punctipes*, *P. armatum*, *P. staregai*, *P. bakuense* and *P. armenicum*. Each of them is illustrated, their main diagnostic features are summarized and the occurrence of each species is presented. A key to the species of *Phalangium* of the region is provided.

Key words: harvestmen, Caucasus, *Phalangium*, morphological differences, identification key, Azerbaijan, Georgia

INTRODUCTION


While working on the collection of Opiliones from the Caucasian territory preserved in the National Museum of Georgia, Tbilisi (NMG) and the personal research collection of the author (RCNS), two new harvestmen species were recognized: *P. mcheidzeae* from Georgia and *P. gorbunovi* from Volgograd Region, Republic of Kalmykia and Krasnodar Region. They are described below.
MATERIAL AND METHODS

Specimens were collected by manual method and pitfall traps and fixed in 75% ethanol, labeled, and transferred to the laboratory for further studies. Harvestmen were observed and measured using MBS-1 and Leica EZ4D stereomicroscopes and were photographed using a digital Sony DSC camera.


All measurements are in millimeters.

RESULTS

Genus Phalangium Linnaeus, 1758

The diagnosis of the genus Phalangium has been elaborated on by a number of authors (Roewer 1923: pp. 750–751, Šilhavý 1956: 218, Staręga 1976: 231-232, Snegovaya & Staręga 2009: 38). In this report, a slightly reworded diagnosis (Snegovaya & Staręga, 2009) is followed.

Diagnosis. Eye mound relatively high (height = length = width), front and back surface of nearly equal width, deeply furrowed, with distinct denticles on eye rings. Body coloration yellowish with distinct brown/blackish saddle mark.

Chelicerae. 1st segment without modifications; 2nd segment with dorsal apophysis, either thin or strong and very long, or sometimes lacking.

Pedipalps. Without apophysis (if any on patella, then very short), femur with weak armature mainly on dorsal side, in some species leg-like elongated and very thin.

Legs mostly long, femora with rows of denticles, 1st leg thicker than the others.

Penis. Shaft thick, from the broad base gradually narrowing towards glans, with distinct subapical "spoon", glans triangular in profile.


Species survey

Phalangium opilio Linnaeus, 1758

(Figs 1–16, 128)

Phalangium opilio: Mkheidze 1959: 113;
Phalangium opilio: Mkheidze 1964: 120;
Phalangium opilio: Staręga 1966: 401;
Phalangium opilio: Staręga 1978: 215;
Phalangium opilio: Chevirizov 1979: 22, ff. 115–118;
Phalangium opilio: Chemeris 1998: 198, ff. 49–58;
Phalangium opilio: Chemeris & Kovblyuk 2005: 312.

**Phalangium of Caucasus**

(RCNS); Rostov Area: 2 ♀♀ Neklinovskiy Distr., Merzhavino, coast of Taganrog Bay, 01.07.2010, leg. A. Ponomarev (RCNS); 1 ♂, Azov distr., coast of Taganrog Bay, Chumber-Kosa, 02.07.2010, leg. A. Ponomarev (RCNS); 1 ♂ Stephanidinodar, 02.07.2010, leg. A. Ponomarev (RCNS); Karachevo-Cherkessiya: 2 ♂♂, 4 ♀♀, 2 juveniles, Teberda, 07.2010, leg. E. Khachikov (RCNS); Kabardino-Balkaria: 1 ♂, 1 ♀, Subashi Mount, 3000 m a.s.l., 09.08.2006, leg. M. Nabozhenko (RCNS); North Ossetia: 2 ♂♂, 1 ♀, 1.5 km E of Nuzal, ca. 1900 m a.s.l., pine forest, North-Eastern exposure, 24.08.2011, leg. Yu. Komarov (RCNS); Stavropol Area: 12 ♂♂, 30 ♀♀, 2 juveniles, surroundings of Izobilniy, 09.07.–08.08.2011, leg. V. Kozminikh (RCNS); 8 ♂♂, 21 ♀♀, same place and time (RCNS); Georgia: 4 ♂♂, 2 ♀♀ Oni, 20.08.1975 (RCNS); 3 ♂♂, 3 ♀♀, 4 juveniles, Abkhazia, Tsebelda, 07.1914, leg. Y. Voronov (RCNS); 1 ♂, 5 ♀♀ Khevsureti, 1500 m a.s.l., in the grass, 23.08.1987 (NMG N100-14, 863).

Description. See Yıgit et al. (2007).

Distribution. Widespread in the Holarctic (native in Europe and Asia, introduced to USA, Canada and New Zealand) (Martens, 1978). In the Caucasus *P.opilio* occurs in North Caucasus and Georgia (Staręga 1978).

**Phalangium punctipes** (L. Koch, 1878)

(Figs 17–33, 128)

Zacheus caucasicus Meheidze 1959: 113;

Zacheus caucasicus: Meheidze 1962: 185;

Zacheus caucasicus: Meheidze 1964: 121;

Phalangium punctipes: Staregąa 1966: 401–402;


Phalangium punctipes: Staregąa 1978: 216–217;

Phalangium punctipes: Chevrizov 1979: 19, fig. 110-111;

Zachaeus crista: Snegovaya 1999: 458 (only IZB 63);

Phalangium punctipes: Snegovaya 2000: 316;

Phalangium punctipes: Chemeris & Kovblyuk 2005: 307, 309–312, ff. 9–18;

Phalangium punctipes: Snegovaya 2010: 497-501, ff. 1-7;


Material: Azerbaijan, Absheron: 1 ♂, 1 ♀ Shagan, under stones, 16.03.1994, leg. E. Guseinov (IZB 15); 1 ♂, 1 ♀ Gara-Chukhur, 14.–23.06.1994, leg. N. Snegovaya (IZB 14); 5 ♂ Baivol, under stones, 29.04.1996, leg. N. Snegovaya (IZB 40); 2 ♂, 10 juveniles, Baku, near Zoological Institute, 07.04.2003, leg. N. Snegovaya (IZB 138); 1 ♂, 1 ♀, 3 juveniles, same place, 05.–09.05.2004, leg. Kh. Aliev (IZB 225); 76 ♂♂, 77 ♀♀, 1 juvenile, Yasamal valley, pitfall traps, April–October 2010, leg. N. Snegovaya (RCNS); 7 ♂♂, 8 ♀♀, 2 ♀♀ environs of Baku, Volch`i Vorota, 05.07.2007, leg. N. Snegovaya (IZB 316); 93 ♂♂, 59 ♀♀, 5 km E of Surakhani, soil traps, April–October 2010, leg. N. Snegovaya (RCNS); Gobustan: 4 ♂♂, 4 ♀♀, 2 ♀♀ Baku–Tbilisi–Jeyhan (BTC) oil pipeline, 17.–21.04.2003, leg. I. Alekperov (IZB 134); 1 ♂, 2 ♀♀ (IZB 270, 272), Boyukdash, 11.–16.04.2005, leg. E. Guseinov (IZB 279), ibidem, 15.04.2005, leg. E. Guseinov; 1 ♂, 3 ♀♀ (RCNS), Jeyrankechmez, 11.05.2012, leg. D. Kasatkin; Gusar Distr.: 3 ♂♂ (IZB 84), near Shakhdag Mt., 3000 m a.s.l., under stones, 06.08.2001, leg. N. Snegovaya, Kh. Aliev, E. Guseinov; 2 ♀♀ (IZB 86), Laza vill., 06.08.2001, leg. N. Snegovaya; Lerik Distr.: 1 ♂ (IZB 119), Divagach, 1400 m a.s.l., 25.05.2003, leg. N. Snegovaya; 1 ♂ (IZB 198), ibidem, leg. Yu. Marusik; 7 ♂♂, 6 ♀♀ (RCNS), environs of Gosmolyan vill., 18-20.05.2012, leg. D. Kasatkin; 1 ♂ (RCNS), Peshtatuyk Vill., 22-23.05.2012, leg. D. Kasatkin; Lenkoran Distr.: 2 ♀♀ (IZB 327), Moscow forest, 21.05.2007, leg. N. Snegovaya; Astara Distr.: 3 ♂♂, 2 ♀♀ (RCNS), Sim vill., 15-16.05.2012,
Phalangium armatum Snegovaya, 2005
(Figs 34–50, 128)

Material: Azerbaijan, Lerik Distr.: 2 ♀ (IZB 53), Zuvand, under stones, 14.06.2006, leg. N. Snegovaya, O. Gorbunov; 1 ♂, 1 juv. (IZB 120), 5 km from Divagach vill., near river, 26.05.2003, leg. N. Snegovaya; 4 ♂♂, 10 ♀♀, 1 juv. (IZB 124), Pirasora vill., 1740-1900 m a.s.l., 25.05.2003, leg. N. Snegovaya; 4 ♂♂ (IZB 189), Zuvand area, ca. 3 km W of Lerik town, 38°43′34″ N 48°25′66″ E, 1200 m a.s.l., sloppy meadows, 25.05.2003, leg. Yu. Marusik; 2 ♂♂ (RCNS), 6 km N of Gosmalyan vill., 09.05.2004, leg. N. Snegovaya; 1 ♂ (IZB 297), Gosmalyan vill., 28.05.2005, leg. N. Snegovaya; 4 ♂♂ (IZB 337), ibidem, 12.06.2007, leg. N. Snegovaya; 1 ♂ (IZB 339), ibidem, 11.06.2007, leg. N. Snegovaya; 3 ♂♂ (IZB 347), ibidem, 12.06.2009, leg. N. Snegovaya; 4 ♂♂, 4 ♀♀, 1 juv. (RCNS), ibidem, 18-20.05.2012, leg. D. Kasatkim; 3 ♀♀ (RCNS), near Devil bridge, 14.06.2007, leg. N. Snegovaya; 6 ♂♂, 4 ♀♀ (RCNS), ibidem, 21.05.2012, leg. D. Kasatkim; YARDIMLI DISTR.: 1 ♂ (IZB 357), environs of Kyurekchi settlement, ca. 1500 m a.s.l., 25.05.2008, leg. N. Snegovaya; 9 ♂♂, 2 ♀♀ (IZB 361-362), ibidem, 26.05.2008, leg. N. Snegovaya, D. Kasatkim; 1 ♂, 1 ♀ (IZB 372), near Uzyubashi Mt., 29.05.2008, leg. N. Snegovaya, D. Kasatkim; 2 ♂♂, 1 ♀ (IZB 376), ibidem, 26-27.05.2008; 1 ♂ (RCNS), Pirasora vill., 09.06.2008, on stones, leg. D. Kasatkim; Astara Distr.,
Phalangium of Caucasus


Description: See Snegovaya (2005).

Distribution. The species is recorded from Lerik, Yardimli, Astara, and Nakhichevan (Azerbaijan).

Phalangium staregai Snegovaya, 2005
(Figs 51–66, 129)

Phalangium staregai Snegovaya 2005: 26–29, f. 46–62;
Phalangium staregai: Snegovaya & Starega 2011: 50;


Description: See Snegovaya (2005).

Distribution. The species is currently only known from Azerbaijan.

Phalangium bakuense Snegovaya, 2006
(Figs 67–88, 129)

Phalangium bakuensis: Snegovaya 2006: 95–99, f. 1–16

Material: Azerbaijan, Absheron: 2 ♂♂, 1 ♀ (IZB 305), environs of Baku city, Volch”i Vorota, 10.05.2006, leg. N. Snegovaya; 3 ♂♂ (IZB 318), ibidem, 05.2006, leg. N. Snegovaya; 10 ♂♂ (IZB 313), Vishneveka, 09.05.2006, leg. N. Snegovaya; 1 ♂, 1 ♀ (IZB 317), ibidem, 12.05.2007, leg. N. Snegovaya; 4 ♂♂, 3 ♀♀, 1 juv. (RCNS), Yasamal valley, April-October 2010, pitfall traps, leg. N. Snegovaya; 41 ♂♂, 42 ♀♀, 51 juv. (RCNS), near Surakhani settlement, April-October 2010, pitfall traps, leg. N. Snegovaya; 3 ♂♂, 3 ♀♀ (IZB 278), Gres “Severnaya”, 01.05.2005, leg. E. Guseinov.

Description: See Snegovaya (2006).

Distribution. This species is currently only known from Azerbaijan.

Phalangium armenicum Chemeris, 2012
(Figs 84–98, 129)

Phalangium armenicus: Chemeris 2012: 13-17, Figs. 1-2, 9-10, 17-19, 22-23, 28


Description: See Chemeris (2012).

Distribution. The species was originally found and described from Armenia. Herein it is further recorded from Nakhchivean AR (Azerbaijan).
**Phalangium mcheidzeae** sp. n.  
(Figs 99–112, 129)

Material: Georgia, 1 ♂ holotype (NMG N994), Kiketi, 02.07.1963, leg. T. Mcheidze; 1 ♀, 1 ♂ paratypes (NMG N994), ibidem.

Diagnosis. *Phalangium mcheidzeae* sp. n. is most similar to *P. opilio*, but differs from it by the following characteristics: legs only with setae, leg I considerably thickened, especially femur (Figs. 99-100, 112); legs brown; femora of all legs cylindrical, except femur I pentagonal in cross section; male cheliceral apophysis rigid; penis shaft with equally spaced lateral edges, unlike *P. opilio* with laterally curved shape of the penis; body covered only by setae and small denticles (Figs. 99, 109-111).

Male body length 6.4, width 4.0. Body quadrangular to elongated oval in shape, surface covered with small denticles (Figs. 99-100). Saddle shape mark, brownish. Anterior part of cephalothorax brown. Eye mound relatively small, rounded, with 6 denticles on each side, light-brown. Area infront of eye mound with few large denticles. Chelicera relatively large, with medium sized, distally attenuated, rigid apophysis (Figs. 102-103). Basal segment of chelicera dorsally with a few denticles and setae, distal segment dorsally with differently sized denticles and setae. Lengths of basal segment 2.5, distal segment 6.0, and apophysis 3.0. Pedipalp long, femur dorsally with small hair-tipped denticles, other segments with setae only (Fig. 106). Pedipalp segment lengths: 6.6 + 3.2 + 2.0 + 6.7 = 18.5 total.

Legs relatively long, leg I, especially femur I, considerably thickened. Legs brown. Femur I dorsally with small denticles, other femora only with setae. Tibia and patella ventrally with large denticles, other leg articles with very small setae. Lengths of legs: I – 5.4 + 2.0 + 4.5 + 5.0 + 7.0 = 23.9; II – 7.6 + 1.7 + 6.6 + 7.7 + 12.3 = 35.9; III – 5.1 + 1.6 + 4.0 + 6.0 + 8.0 = 24.7; IV – 7.2 + 2.0 + 5.2 + 9.5 + 11.6 = 35.5.  

Penis. Corpus long, wings relatively narrow, glans relatively narrow (Figs. 109-111). Penis length 3.3, glans 0.35, stylus 0.13.

Female differs from male by having more numerous large denticles in front of eye mound, absence of armament (denticles on femur to metatarsus) on legs, thinner leg femora, absence of cheliceral apophysis and much shorter pedipalps (Figs. 101, 104-105, 107-108). Female body length 6.6, width 4.0. Lengths of legs: I – 3.7 + 1.3 + 3.5 + 4.2 + 6.4 = 19.1; II – 7.5 + 1.2 + 6.0 + 6.2 + 13.2 = 34.1; III – 4.6 + 1.4 + 3.5 + 5.1 + 7.3 = 21.9; IV – 7.6 + 1.5 + 5.0 + 8.8 + 11.0 = 33.9.  

Distribution. The species is known only from Georgia.

Etymology. The species was named in honor of the deceased Georgian arachnologist, Dr. Tamara Mcheidze (Marusik & Otto 2008).

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**Phalangium gorbunovi** sp. n.  
(Figs 113–127, 129)

Material. 1 ♂ holotype, 1 ♀ paratype (ZMMGU), 3 ♂♂, 1 ♀ (paratypes – RCNS), Russia, Volgograd region, 2 km NW of Mikhaylovka, 49°46’80" N, 44°24’09" E, 15–17.05.2003, leg. O. Gorbunov; 1 ♂, Krasnodar region, Bolshoy Utrish, 01.–05.05.2008, leg. E. Khachikov (RNCS); 1 ♂, Kalmikiya, environs of Ulan-Khol, 12.05.2007, leg. E. Terskov (RCNS).

Diagnosis. This new species differs from the closest related species *Phalangium punctipes* by much thinner pedipalps, less thickened femur I, the presence of longitudinal rows of large denticles on the legs, especially on femur I (Fig. 127), and differently shaped penis with wider apical part, "spoon", in dorsal view (Figs 124–126).

Description. Body length 5.2, width 3.0. Large harvestmen, with quadrangular shaped body (Figs 113–114). Tergites with large black-tipped denticles. In front of eye mound a group of similar denticles. Eye mound round, high, with 9 large denticles on each side. Body light
brownish with pronounced saddle-shaped mark. Legs not very long, with longitudinal rows of large denticles. All femora cylindrical, femur I thickened (Fig. 127). Lengths of legs: I – 4.5 + 1.6 + 4.0 + 5.0 + 7.4 = 22.5; II – 7.0 + 1.6 + 6.2 + 6.6 + 11.6 = 33.0; III – 4.5 + 1.6 + 4.0 + 5.2 + 8.2 = 23.5; IV – 6.2 + 1.6 + 4.0 + 4.6 + 15.0 = 31.4. Pedipalp long, all segments covered with setae (Figs. 120–121). Pedipalp lengths 4.2 + 1.5 + 2.0 + 4.7 = 12.4. Chelicera large, both segments anteriory covered with denticles (Figs. 116–117). Lengths of basal segment 2.8, distal segment 3.1. Penis typical for *Phalangium* with wide apical part and narrow wings (Figs. 124-126). Penis length 3.1, glans 0.3, stylus 0.15.

Female differs from male by larger, more rounded body, shorter pedipalps and smaller chelicerae (Figs. 115, 118–119, 122–123). Female body length 7.6, width 3.6. Pedipalp length 1.6 + 0.8 + 1.0 + 2.1 = 5.5. Basal chelical segment length 1.8, distal segment 2.1. Lengths of legs: I – 3.2 + 1.5 + 3.0 + 3.5 + 6.2 = 17.4; II – 5.0 + 1.5 + 4.6 + 5.0 + 10.5 = 26.6; III – 4.0 + 1.5 + 3.2 + 4.0 + 7.0 = 19.7; IV – 5.5 + 1.5 + 4.1 + 7.0 + 10.4 = 28.5.

Distribution. The species has been found only in the Volgograd province, Kalmikiya, Krasnodar area (Russia).

Etymology. The species was named in honor of the famous Russian entomologists Dr. O. G. Gorbunov (Moscow, Russia), who collected most of the known specimens of this species.

### COMPARATIVE MORPHOLOGICAL ANALYSIS

The species of the genus *Phalangium* from the Caucasus differ by following features:

<table>
<thead>
<tr>
<th>Species</th>
<th>Body</th>
<th>Ocularium</th>
<th>Chelicera</th>
<th>Pedipalps</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>P. opilio</em></td>
<td>Quadrangular, covered with short black-tipped tubercles</td>
<td>Rounded, with two rows of large 6–8 black-tipped tubercles on each side</td>
<td>Large, with different size cheliceral horn, wide and robust</td>
<td>Long, covered with hairs, patella with a small apophysis</td>
</tr>
<tr>
<td><em>P. punctipes</em></td>
<td>Quadrangle, covered with short hairs and small black-tipped tubercles</td>
<td>Round, carries two rows of 8–12 tubercles on each side</td>
<td>Strong, segment II in male without a process, covered with tubercles and hairs</td>
<td>Moderate length, femora with 3–5 basal tubercles</td>
</tr>
<tr>
<td><em>P. armatum</em></td>
<td>Short, rounded-quadrangular, covered with tall, black-tipped tubercles</td>
<td>Crown-shaped, dorsally with two rows of 10–11 tall tubercles on each side</td>
<td>Large with different size (usually very long) cheliceral horn, narrow</td>
<td>Long, covered with longitudinal rows of tubercles, tarsi covered with hairs, apophyses not distinct</td>
</tr>
<tr>
<td><em>P. staregai</em></td>
<td>Quadrangle, widening towards the caudal end, covered with hairs and small denticles</td>
<td>Rounded, with 10–11 small setae on each side</td>
<td>Segment II in male with long, bent and whip-shaped process</td>
<td>Moderate length, covered with hairs and micro-denticles</td>
</tr>
<tr>
<td><em>P. bakuense</em></td>
<td>Quadrangular, oval, not very large, covered with hairs and small denticles</td>
<td>Rounded with 2–3 rows of black-tipped tubercles</td>
<td>Relatively small, covered with setae and small black-tipped denticles and microdenticles</td>
<td>Not very long, covered with small denticles and setae, patella bears hardly visible apophysis</td>
</tr>
<tr>
<td><em>P. armenicum</em></td>
<td>Medium size, covered with black-tipped denticles</td>
<td>Rounded, with 6–9 tubercles on each side</td>
<td>Distal segment of chelicera elongated, without apophysis, densely covered with numerous black-tipped denticles</td>
<td>Short, femur dorsally with scattered black-tipped denticles, tibia ventrally on the apical part armed of 2–3 tiny denticles</td>
</tr>
<tr>
<td><em>P. mcheidzeae</em></td>
<td>Quadrangular, covered with small denticles</td>
<td>Not very large, rounded, canaliculate, with 6 small denticles on each side</td>
<td>Relatively large, with middle sized, attenuated but rigid, apophyses, covered with denticles and setae</td>
<td>Long, femora dorsally with small hair-tipped denticles, other segments with setae only</td>
</tr>
<tr>
<td><em>P. gorbunovi</em></td>
<td>Large, quadrangular, covered with large black-tipped denticles</td>
<td>Round, high, with 9 large denticles on each side</td>
<td>Large, both segments dorsally covered with denticles</td>
<td>Long, all segments covered with setae</td>
</tr>
</tbody>
</table>
IDENTIFICATION KEY TO MALES OF Phalangium SPECIES FROM THE CAUCASUS.

1. Chelicera without apophysis on distal segment .............................................................. 2
- Chelicera with apophysis ____________________________________________________________ 4
2. Cheliceral fingers strongly antero-ventrally bent ........................................... P. armenicum
- Cheliceral fingers not bent or only slightly bent .............................................................. 3
3. Proximal leg segments with setae and small denticles ...................................... P. punctipes
- Proximal leg segments with large denticles .................................................... P. gorbunovi
4. Cheliceral apophysis rigid ......................................................................................... 5
- Cheliceral apophysis soft .............................................................................................. 7
5. Penis shaft strongly narrowed in the middle, with a conspicuous median keel ...... P. opilio
- Penis shaft slightly narrowed in the middle, without keel ............................................ 6
6. Body and legs with large denticles .............................................................................. P. armatum
- Body and legs with small denticles and setae ....................................................... P. mcheidzeae
7. Penis long (>2.8 mm), with very wide wing-shaped lateral keels ..................... P. staregai
- Penis short (<2 mm), with narrow wing-shaped lateral keels .................................. P. bakuense

Fig. 128. Distributions of Phalangium opilio Linnaeus, 1758, P. punctipes (L. Koch, 1878) and P. armatum Snegovaya, 2005 in the Caucasus.
Fig. 129. Distributions of Phalangium staregai Snegovaya, 2005, P. bakuense Snegovaya, 2006, P. armenicum Chemeris, 2012, P. mcheidzeae sp.n. and P. gorbunovi sp.n. in the Caucasus.

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