

Description of two new *Neobisium* (*Neobisium*) species and redescription of *Neobisium* (*N.*) *speleophilum* from Caucasian Russia, with a key to the *Neobisium* (*Neobisium*) species (Arachnida: Pseudoscorpiones) recorded from Russia

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Abstract

Faunistic sampling in the western Caucasus (Russian side) has yielded two new species belonging to the subgenus *Neobisium* (*Neobisium*) Chamberlin, 1930 which are described and illustrated here: *Neobisium* (*N.*) *catherineae* n. sp. and *Neobisium* (*N.*) *kamenskyi* n. sp. The species *Neobisium* (*N.*) *speleophilum* Krumpál, 1986 is redescribed and illustrated based on the newly collected Russian material. In addition, some notes on the mor-

phological and morphometric variations of *Neobisium* (*N.*) *anatolicum* Beier, 1949 and *Neobisium* (*N.*) *labinskyi* Beier, 1937 are given. In addition, an identification key to adults of the *Neobisium* (*N.*) species so far found in Russia is provided.

Keywords: faunistics • Krasondar Krai • taxonomy • yew-boxwood grove

Introduction

The subgenus *Neobisium* (*Neobisium*) Chamberlin, 1930 currently contains 11 species from Russia (comprising the present study, not including Crimea), which are mostly distributed in the western and southern regions of the country (Harvey 2013; Nassirkhani, Snegovaya & Chumachenko 2018; Nassirkhani, Snegovaya & Chumachenko 2019): *N.* (*N.*) *anatolicum* Beier, 1949, *N.* (*N.*) *artaxerxesi* Nassirkhani, Snegovaya & Chumachenko, 2018, *N.* (*N.*) *carcinoides* (Hermann, 1804), *N.* (*N.*) *catherineae* n. sp., *N.* (*N.*) *golovatchi* Schawaller, 1983, *N.* (*N.*) *granulatum* Beier, 1937, *N.* (*N.*) *kamenskyi* n. sp., *N.* (*N.*) *kovalevskayae* Nassirkhani, Snegovaya & Chumachenko, 2019, *N.* (*N.*) *labinskyi* Beier, 1937, *N.* (*N.*) *speleophilum* Krumpál, 1986, and *N.* (*N.*) *vilcekii* Krumpál, 1983. The distribution of the subgenus *Neobisium* (*N.*) within Russia is poorly known and is likely to be more diverse than the published records in the literature.

Two new epigeal species *Neobisium* (*N.*) *catherineae* n. sp. and *Neobisium* (*N.*) *kamenskyi* n. sp. are described and illustrated. Also, because of a lack of modern description and illustrations of *Neobisium* (*N.*) *speleophilum*, this species is redescribed. It is worth pointing out that Schawaller & Dashdamirov (1988) mentioned this species but did not provide any new record, and considered it as dubious. Therefore, *N.* (*N.*) *speleophilum* is only known

from the type material, and new faunistic as well as some morphological data are provided here.

Moreover, in due attention to the presence of a number of significant morphological and morphometric variations within the specimens studied under *Neobisium* (*N.*) *anatolicum* Beier, 1949 and *Neobisium* (*N.*) *labinskyi* Beier, 1937, particularly those reported from Russia, some remarks about these species are also given.

Additionally, an identification key to the *Neobisium* (*N.*) species from Russia in respect to the presence of a wide range of the morphometric and morphological variations within the species recorded from different localities around the world is provided here. Basically, the trichobothriotaxy, the morphometric characteristics, and further morphological features are used for separating the species in the present key.

Material and Methods

The specimens examined were found in the territory of Caucasian State Reserve (Fig. 1A–B) a yew-boxwood grove, and collected from soil and litter using a trench soil trap. All of them were permanently mounted in Swann's fluid, examined with an Olympus CH-2 compound microscope, illustrated with a drawing tube attached to the microscope, and measured using an ocular graticule. The photographs were made using a digital camera (Canon PC1468).

Specimens are deposited in Zoological Museum of the Moscow University at Lomonosov (ZMMU), and in the Collection of Acarology Laboratory, Islamic Azad University of Arak, Iran (IAUA).

All measurements are expressed in millimetres; the given ratios are length/width for individual articles and the length/depth for legs; when two articles are compared, the ratio is the length/length index. Morphological terminology and measurements follow Chamberlin (1931), Gabbutt & Vachon (1965), Harvey (1992), Harvey *et al.* (2012), and Judson (2007); chelal lyrifissures terminology follows Zaragoza (2017); and trichobothriotaxy follows Chamberlin (1931). Coordinates are given in the Geodetic System WGS 84.

Abbreviations: D = depth, *dat* = dorsal accessory tooth, *fa* = retrolateral lyrifissure of fixed chelal finger, *fb* = dorso-retrolateral lyrifissure of fixed chelal finger, *fd* = dorso-distal lyrifissure of fixed chelal finger, *hp* = proximal lyrifissure of chelal hand, L = length, *ma*₁, *ma*₂, *ma*₃ = retrolateral lyrifissures of movable chelal finger, *se* = sensillum, T = tactile seta, W = width.

Trichobothriotaxy: *eb* = external basal, *esb* = external sub-basal, *est* = external sub-terminal, *et* = external terminal, *ib* = internal basal, *isb* = internal sub-basal, *ist* = internal sub-terminal, *it* = internal terminal, *t* = terminal, *st* = sub-terminal, *sb* = sub-basal, *b* = basal.

Neobisiidae Chamberlin, 1930

Neobisiinae Chamberlin, 1930

Neobisium (*Neobisium*) *catherineae* n. sp. (Figs. 2–15)

Material examined: Holotype ♂, RUSSIA: Krasondar Krai, Khosta, Caucasian State Reserve, yew-boxwood grove, beech forest, 43°32'15.9"N 39°52'38.57"E, 174 m, June 2006, Yu. A. Chumachenko leg., lodged in ZMMU (ZMMUPS31H). Paratype: 1♂ collected simultaneously with holotype, lodged in IAUA (IAUAPSR14P).

Diagnosis: The new species, *Neobisium* (*N.*) *catherineae* n. sp. can be distinguished from all other species of the subgenus by the following combination of characteristics: carapace with a minute and apically rounded epistome; two pair of eyes present, lenses of posterior eyes with low convexity; movable cheliceral finger with a slightly large median tooth; basal half of pedipalpal femur and mediobasal face of chelal hand at base of fixed finger somewhat granulated; the notch on the median side of patella reaching almost to the middle of the patellar club length; movable chelal finger distinctly longer than chelal hand (with pedicel) and also than pedipalpal femur; trichobothrium *ist* situated distal to middle of fixed chelal finger; distal half of fixed chelal finger with almost similar teeth in size and shape; tip of movable chelal finger with a great sub-apical protuberance carrying a large blunt tooth, all other teeth rounded and reducing in size to the base, but still well recognized; anterolateral process of pedal coxa I enlarged and pointed, mediolateral process slightly prominent and denticulate, sub-terminal seta branched, basal ramus very short and not denticulate; morphometric characters, e.g. pedipalpal femur 3.60–3.67× longer than broad (0.65–0.66/0.16–0.18), chelal hand (with pedicel) 1.81–1.92× longer than broad (0.47–0.50/0.26), and movable chelal finger length 0.80–0.81.

Etymology: This species epithet is dedicated to Catherine the Great (1729–1796) who was the Empress of Russia from 1762 until 1796, the country's longest-ruling female leader.

Description of adult males, including holotype: colouration: carapace distinctly darker in colour than tergite I, and clearly lighter in colour than the pedipalp; pedipalpal segments uniformly coloured. Carapace (Fig. 2) posterior border partially not sclerotized and pale; entirely smooth; wider than long (swollen specimens), 0.83–0.86× longer than broad; with two pair of eyes, anterior eyes corneate with well-developed lenses, lenses of posterior eyes not flattened but with low convexity (distance from anterior margin 0.047–0.050, diameter of anterior eyes 0.050–0.052, diameter of posterior eyes 0.037–0.040); with 22 setae, anterior margin with 4 and posterior margin with 6 setae, chaetotaxy: 4:6:6:6; transverse furrows absent; epistome small, short and apically rounded (L 0.012, W 0.020–0.025); glandular pores absent; with 6 microlyrifissures, one pair situated in ocular zone, close to anterior eyes, and two pairs located on posterior margin.

Tergites slightly sclerotized; all setae simple; X with 2 pseudotactile setae located lateromedially and 2 long tactile



Fig. 1: Collection locality: **A** map of Russia showing Krasnodar krai in red; **B** map of Krasnodar krai, showing collecting area in yew forest by black dot.

setae located submedially; XI with 4 long tactile setae; chaetotaxy: 6: 6: 8: 8: 8: 8–9: 11: 10–11: 11: 3T1T4–4T1T4: T2T1T2T: 2.

Sternites entirely smooth; slightly sclerotized; anterior operculum with 9–10 and posterior operculum with 18 setae, 9–10 of them setae located medially and close to genital aperture (Fig. 3); internal genitalia with short lateral genital sacs, shorter than median genital sac, median genital sac large and swollen, genital opening with 5+4 (5+5) internal setae (Fig. 4); all setae simple; IV–XI uniseriate; chaetotaxy: 9–10: (3)18(3): (2)8–10(2): 10: 8–10: 8–10: 8: 8: 3TT3–1T1T1T1T: TT: 2.

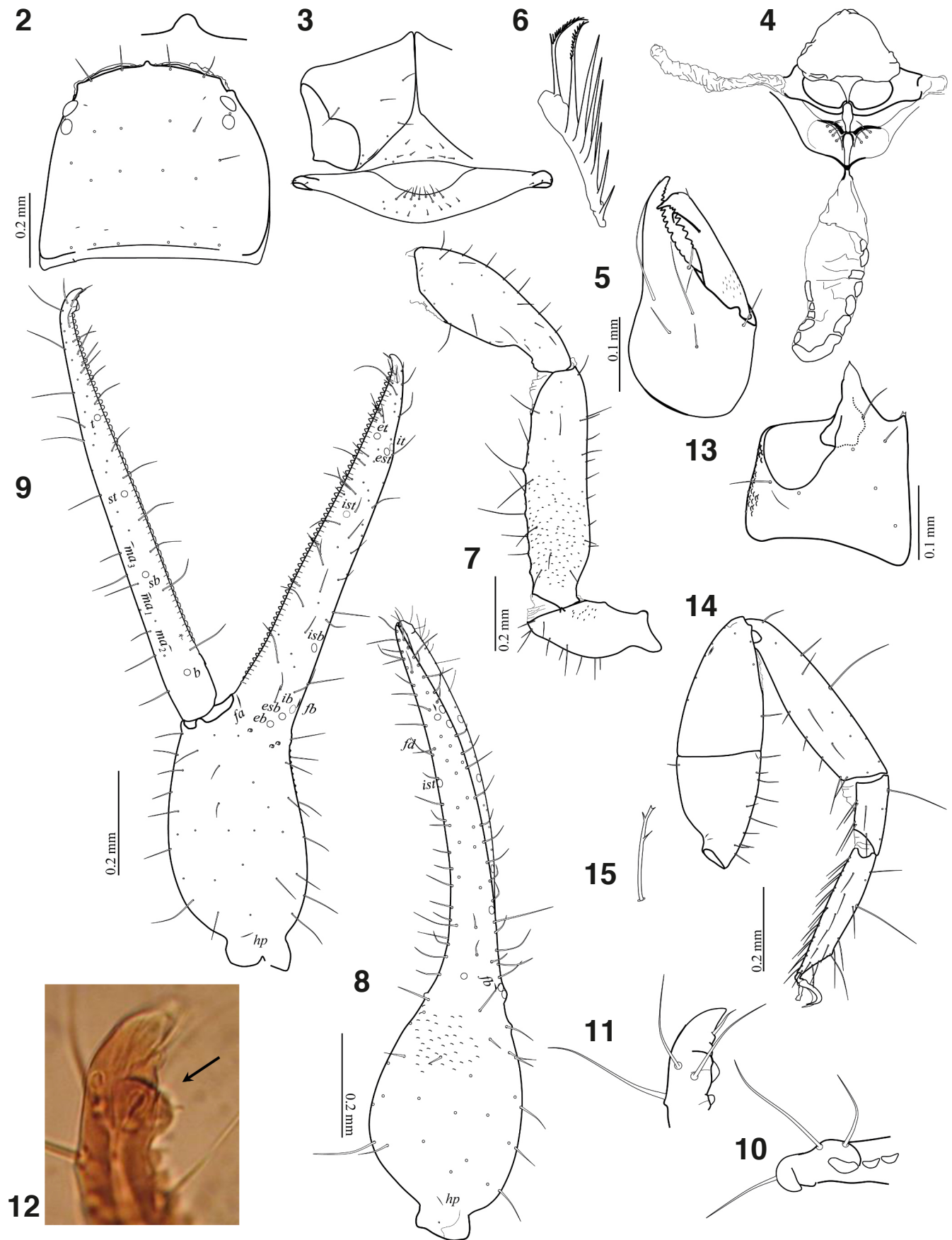
Pleural membrane granulate.

Chelicera hand with 6 acuminate setae; galea knob-like, with a diminutive hyaline convexity; subgaleal seta situated distal to the middle (0.70–0.71); hand entirely smooth, dorsal surface of the base of movable finger finely granulated (Fig. 5); fixed finger with 15–16 teeth not reaching to base; movable finger with 9–10 teeth reaching to middle of the segment, median tooth larger than others (Fig. 5); serula interior with 13–14 and exterior with 18–20 blades; rallum with 8 blades, two distal blades denticulate, distalmost blade located on a high hyaline promontory, and proximalmost blade shortest (Fig. 6).

Pedipalps: dorsal surface of trochanter finely granulate, basal half of femur with very fine granulations (difficult to observe), patella entirely smooth, retrolateral surface of chelal hand with some granulations at base of fixed finger (Figs. 7–8); coxa including manducatory process with 12 setae, manducatory process with 4 acuminate setae, seta located at the base of manducatory process longest; trochanter with a small dorsal tubercle, 2.20–2.23×; femur with short pedicel, prolateral margin with 2–3 tubercles, each tubercle with an apical seta, retrolateral margin without tubercle/s, some long setae without enlarged alveoli located in basal half of the segment (Fig. 7), one glandular pore located dorso-distally, 3.60–3.67×; patella with short and stout pedicel ($L = 0.12–0.14$); patella distinctly shorter than femur, 2.73–2.78×, with 3 lyrifissures situated basally and one lyrifissure located distally, without glandular pore, notch on the median side reaching very close to middle of

the club length, ratio of diameter of distal opening to inner margin of patella (X/Y) 0.77–0.80. Chela with pedicel 4.42–4.50×, without pedicel 4.23–4.27×; hand with pedicel 1.81–1.92×, without pedicel 1.61–1.69×; movable finger distinctly longer than hand (with pedicel) and femur; movable finger 1.60–1.70× longer than hand with pedicel and 1.21–1.25× longer than femur; one micropore located on chelal pedicel in dorsal view; microsetae between trichobothria *eb* and *isb* absent, 2–3 short setae present (Fig. 8); retrolateral surface of hand with 3 glandular pores located proximal to trichobothrium *eb* and one lyrifissure (*hp*) situated very close to pedicel; fixed finger with 3 lyrifissures: one (*fb*) located slightly distal to *ib*, one (*fa*) close to base in retrolateral view and one (*fd*) approximately at same level of *et* in dorsal view; movable finger with 3 lyrifissures in retrolateral view: one (*ma*₂) located distal to trichobothrium *b*, one (*ma*₁) proximal to *sb*, and one (*ma*₃) distal to *sb* (*ma*₁ located midway between *ma*₂ and *ma*₃); movable finger with one sensillum located distal to trichobothrium *b*, close to dental canals on retrolateral surface; fixed finger with 62–66 contiguous triangular teeth reaching to the level of trichobothrium *ib*, distalmost tooth smallest, other teeth almost with equal size, all teeth with dental canal; movable finger with 53–54 contiguous, blunt and apically rounded teeth not reaching to the level of trichobothrium *b*, distalmost tooth large and located on a great sub-apical protuberance (Figs. 9–12), other teeth slightly reduced in size from tip of the finger to its base, all teeth with dental canal; nodus ramosus of venom duct in fixed chelal finger short and situated very close to the fingertip.

Trichobothriotaxy: fixed finger with 8 and movable finger with 4 trichobothria (Figs. 8–9); fixed finger with trichobothria *et*, *est* and *it* making a group in almost distal quarter of the finger, trichobothrium *et* located slightly distal to *it*, *ist* situated distal to middle of the finger ($T = 0.58–0.60$), *ist* distinctly closer to *est* than to *ib*, *isb* on retrolateral surface, *eb* and *esb* located slightly proximal to *ib*; movable finger with trichobothrium *st* situated slightly closer to *t* than to *sb*, trichobothrium *sb* midway between *b* and *st*, distance *b*–*sb* more or less longer than distance *st*–*t*.



Figs. 2–15: *Neobisium* (*N.*) *catherineae* n. sp., holotype ♂. **2** carapace (epistome magnified), dorsal view; **3** right coxa IV and sternites II–III, ventral view; **4** internal genitalia, in part; **5** right chelicera, dorsal view (serrulae omitted); **6** rallum; **7** right pedipalp (without chela), dorsal view; **8** right chela, dorsal view; **9** left chela, retrolateral view; **10** tip of movable chelal finger (magnified), ventral view; **11** tip of movable chelal finger (magnified), retrolateral view; **12** tip of movable chelal finger (microscope picture), retrolateral view (great sub-apical protuberance shown by an arrow); **13** right coxa I, ventral view; **14** right leg IV (trochanter omitted), retrolateral view; **15** sub-terminal seta (magnified). See Material and methods for abbreviations.

Legs: coxa I with large, triangular, sclerotized and pointed anterolateral process, mediolateral process denticulate (Fig. 13); coxal chaetotaxy: 6–7:6:5–6:7–8; sub-terminal setae with short simple rami (Fig. 15); claws simple and symmetrical; arolia simple and shorter than claws. Leg I: femur 3.50×; patella 3.12×; femur 1.40× longer than patella; tibia 3.71×; metatarsus 2.67–3.00×; tarsus 4.40–5.50×; tarsus 1.37–1.46× longer than metatarsus. Leg IV (Fig. 14): femur 1.37×; patella 1.79×; femur + patella 3.05×; tibia with a long tactile seta situated slightly distal to middle ($T = 0.53$), 4.08×; metatarsus with a long tactile seta situated basally ($T = 0.15$), 2.71–3.33×; tarsus with a tactile seta situated proximal to middle ($T = 0.36$), 4.71–5.50×.

Measurements of holotype ♂: body length 2.12; carapace 0.52/0.60; pedipalp trochanter 0.38/0.17, femur 0.65/0.18, patella 0.52/0.19, chela (with pedicel) 1.15/0.26; chela (without pedicel) 1.11; hand (with pedicel) L. 0.47, hand (without pedicel) 0.43, movable finger L. 0.81; leg I femur 0.35/0.10, patella 0.25/0.08, tibia 0.26/0.07, metatarsus 0.15/0.05, tarsus 0.22/0.04; leg IV femur 0.26/0.19, patella 0.34/0.19, femur + patella 0.58, tibia 0.49/0.12, metatarsus 0.19/0.07, tarsus 0.33/0.06.

Measurements of paratype ♂: body length 2.00; carapace 0.54/0.65; pedipalp trochanter 0.38/0.17, femur 0.66/0.16, patella 0.50/0.18, chela (with pedicel) 1.17/0.26, chela (without pedicel) 1.10, hand (with pedicel) L. 0.51, hand (without pedicel) 0.44, movable finger L. 0.80; leg I femur 0.35/0.10, patella 0.25/0.08, tibia 0.26/0.07, metatarsus 0.16/0.06, tarsus 0.22/0.05; leg IV femur 0.26/0.19, patella 0.34/0.19, femur + patella 0.58, tibia 0.49/0.12, metatarsus 0.20/0.06, tarsus 0.33/0.07.

Remarks: *Neobisium (Neobisium) catherineae* n. sp. is most similar to *Neobisium (N.) kobachidzei* Beier, 1962 recorded from Azerbaijan, Georgia, and Turkey (Harvey 2013). The diagnostic features which are shared between these two species are the chaetotaxy of the carapace and the tergite I (posterior margin of the carapace with 6 setae), the position of notch on the median side of the patella (almost reaching to middle of the patellar club length, see Beier 1962: fig. 1; Schawaller 1983: fig. 21), the position of the trichobothrium *ist* (located distal to middle of the fixed chelal finger, at same level as *st*, see Beier 1962: fig. 1), the chelal dentition (the similar shape and size of teeth in distal half of the fixed chelal finger), the length of the movable chelal finger (distinctly longer than the chelal hand (with pedicel) and somewhat longer than femur), the morphometric characters, e.g. the pedipalpal femur length (less than 1.00), and the shape of the anterolateral and mediolateral processes of the pedal coxa I (Beier 1962). The most important difference between these two species is the granulation pattern of the pedipalp. In *N. (N.) catherineae* n. sp., base of the femur has somewhat fine granulations, and the chelal hand at the base of the fixed chelal finger is slightly granulated, whereas the pedipalp is entirely smooth in *Neobisium (N.) kobachidzei*. Moreover, the chelal is more slender and slightly shorter in *N. (N.) catherineae* e.g., the chela (with pedicel) is 3.8× longer than broad for *N. (N.) kobachidzei* (Beier 1952), while it is 4.4–4.5× longer than broad in the

newly discovered species from Russia. In addition, the chelal hand of *N. (N.) kobachidzei* seems more rounded in dorsal view (see Beier 1952: fig. 1; Schawaller 1983: fig. 21) rather than that of *N. (N.) catherineae* (see present study: Fig. 8). Noticeably, the right pedipalp of *N. (N.) kobachidzei* mentioned by Dashdamirov & Schawaller (1992: fig. 8X) is not similar to those provided by Beier (1952: fig. 1) and Schawaller (1983: fig. 21). Therefore, this illustration is not considered here.

The newly discovered species from Russia is also similar to *Neobisium (N.) reductum* Mahnert, 1977 originally described from Spain, and only known from the Iberian Peninsula. The most important difference between these two species is the presence of a great sub-apical protuberance with only a large marginal tooth toward the dental line at the distal end of the movable chelal finger of *N. (N.) catherineae* n. sp. whereas the movable chelal fingertip of *N. (N.) reductum* has no such large sub-apical protuberance and instead there is/are 1–2 distal tooth/teeth which has/have sub-marginal position in respect to the dental canal (see Mahnert 1977: fig. 14b). Moreover, these species can be differentiated by the chelal teeth structure (in *N. (N.) reductum* the proximal chelal teeth of the movable chelal finger are distinctly reduced, based on Mahnert (1977) who compared it with other Iberian species based on this characteristic (*N. (N.) ischyrum* (Navás, 1918) and *N. (N.) ventraloi* Beier, 1939)).

Neobisium (Neobisium) kamenskyi n. sp. (Figs. 16–25)

Material examined: Holotype ♂, RUSSIA: Krasnodar Krai, Khosta, Caucasian State Reserve, yew-boxwood grove, box-wood forest, 43°31'55.45"N 39°52'34.08"E, 174 m, May 2006, Yu. A. Chumachenko leg., lodged in ZMMU (ZMMUPS32H).

Diagnosis: The new species, *Neobisium (N.) kamenskyi* n. sp. can be separated from all other species of the subgenus by the following combination of characteristics: carapace with a prominent, triangular and apically rounded epistome; with two anterior corneate eyes and two posterior eyespots; movable cheliceral finger without a large median tooth; pedipalp entirely smooth; notch on the median side of pedipalpal patella not extending from the distal third of the patellar club length; movable chelal finger distinctly longer than chelal hand (with pedicel) and clearly longer than pedipalpal femur; trichobothrium *ist* situated distinctly distal to the middle of the fixed chelal finger; distal half of the fixed chelal finger with teeth almost similar in size and shape; anterolateral process of pedal coxa I long, large and apically pointed, mediolateral process denticulate; morphometric characters, e.g. pedipalpal femur 4.91× longer than broad (1.08/0.22), chelal hand (with pedicel) 1.81× longer than broad (0.78/0.43), and movable chelal finger length 1.35.

Etymology: This species is named in honor of Ivan M. Steblin-Kamensky (1945–2018) who was a famous Russian expert in the field of Iranian literature, history and culture.

Description: colouration of carapace more or less darker in colour than tergite I, and similar in colouration with the pedipalp; pedipalpal segments uniformly coloured.

Carapace (Fig. 16) posterior border partially unsclerotized and pale; entirely smooth; wider than long (inflated specimens), $0.77\times$ longer than broad; with two anterior corneate eyes and two posterior eyespots (distance from anterior margin 0.082, diameter of anterior eyes 0.065); with 23 setae, anterior margin with 4 and posterior margin with 7 setae, chaetotaxy: 4:6:6:7; epistome prominent, triangular in shape and apically rounded (L 0.025, W 0.027); glandular pores absent; with 6 microlyrifissures, one pair situated in the ocular zone, close to the anterior eyes, and two pairs located on the posterior margin.

Tergites slightly sclerotized, all setae simple, chaetotaxy: 6: 7: 9: 9: 9: 9: 10: 10: 1T1T1T1T1: T2T1T2T: 2; tactile/pseudotactile setae fallen, but distinguishable by the larger size of their areolar diameters.

Sternites entirely smooth, slightly sclerotized, anterior operculum with 9 and posterior operculum with 20 setae, of them 12 discal setae located close to genital aperture (Fig. 17); internal genitalia with lateral genital sacs approximately as long as median genital sac, genital opening with 7+6 internal setae; all setae simple; chaetotaxy: 9: (2)20(2): (3)9(2): 14: 14: 14: 15: 8: 5T1T3: T2T: 2.

Pleural membrane granulate.

Chelicera hand with 6 acuminate setae; galea knob-like, with a diminutive hyaline convexity; subgaleal seta situated distal to the middle (0.66); hand entirely smooth, dorsal surface of the base of movable finger finely granulated; fixed finger wrinkled and without obvious teeth; distal half of movable finger with 3 minute blunt teeth, and 5 triangular medium-sized teeth (Fig. 18); serrula interior with 18 and exterior with 25 blades; rallum with 7 blades, two distal blades denticulate, distalmost blade located on a high hyaline promontory, and proximalmost blade isolated (Fig. 19).

Pedipalps entirely smooth; coxa including manducatory process with 9 setae, manducatory process with 5 acuminate setae, seta located at the base of manducatory process longest; trochanter with a small dorsal tubercle, $2.52\times$; femur with short pedicel, marginal tubercles absent, long setae without enlarged alveoli (Fig. 20) located in basal half of segment, one glandular pore located dorso-distally, $4.91\times$; patella with short and stout pedicel (L = 0.23), $3.37\times$, with 3 lyrifissures situated basally and 2 microlyrifissures located distally, with one glandular pore, notch on the median side reaching to one third of the club length, ratio of diameter of distal opening to inner margin of patella (X/Y) 0.59. chela with pedicel $4.53\times$, without pedicel $4.23\times$; chelal hand with pedicel $1.81\times$, without pedicel $1.51\times$; movable chelal finger $1.73\times$ longer than chelal hand with pedicel and $2.07\times$ longer than chelal hand without pedicel; movable chelal finger distinctly longer than femur; three micropores at base of chelal pedicel in dorsal view; presence/absence of microsetae between trichobothria *eb* and *isb* undistinguishable, most setae fallen (Figs. 21–22); retrolateral surface of hand with 3 glandular pores located proximal to trichobothrium *eb* and one lyrifissure (*hp*) situated very close to pedicel; fixed

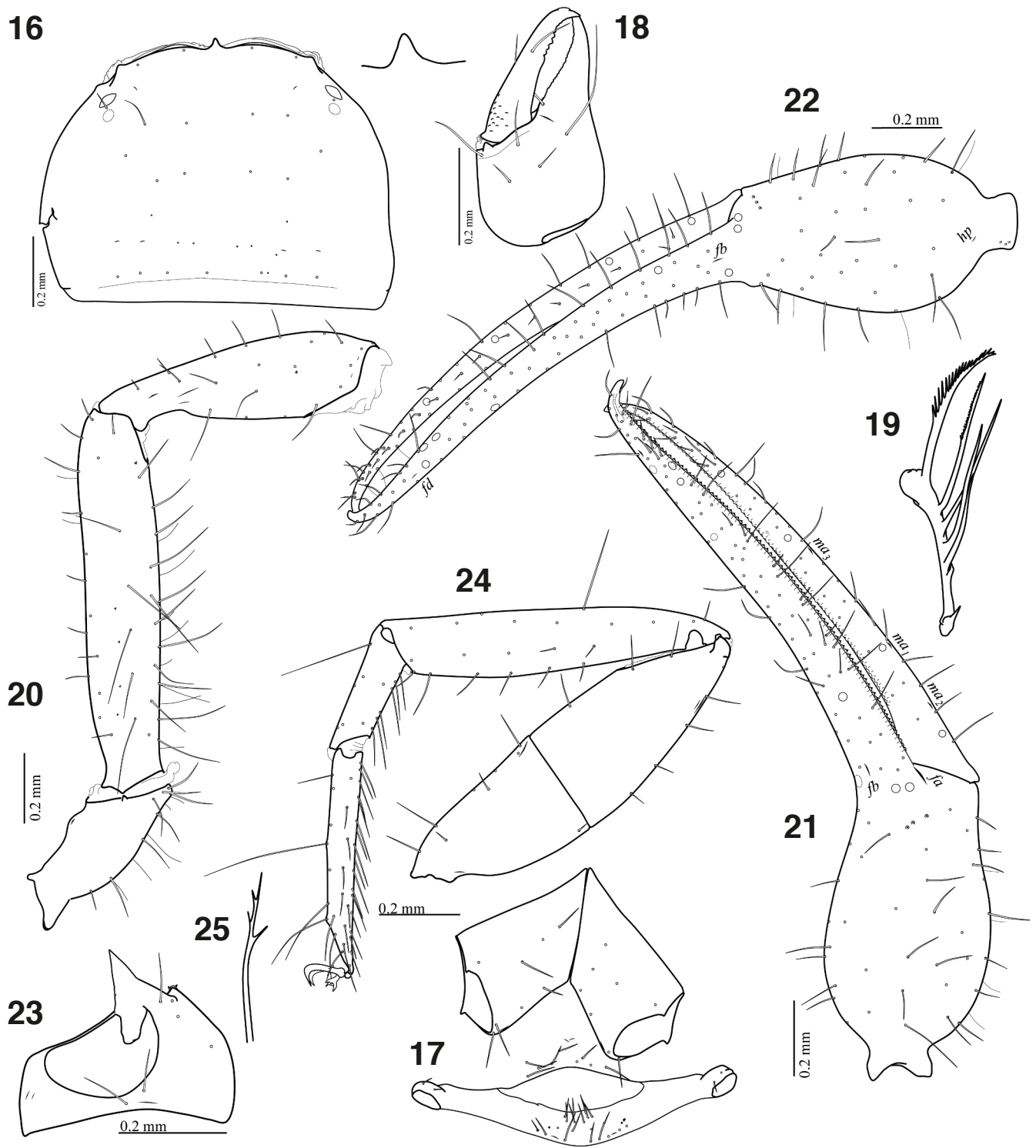
finger with 3 lyrifissures: one (*fb*) located slightly distal to trichobothrium *ib*, one (*fa*) close to base in retrolateral view and one (*fd*) distinctly distal to trichobothrium *et* in dorsal view; movable finger with 3 lyrifissures in retrolateral view: one (*ma₂*) located distal to trichobothrium *b*, one (*ma₁*) at same level as *sb*, and one (*ma₃*) slightly proximal to *st*; the sensillum cannot be distinguished; fixed finger with 86 contiguous triangular teeth reaching to the level of trichobothrium *ib*, distalmost tooth smallest, other teeth almost with equal size, all teeth with dental canal; movable finger with 81 contiguous, blunt and apically rounded teeth reaching to midway between trichobothria *b* and *sb*, teeth slightly reduced in size from tip of the finger to its base, all teeth with dental canal; nodus ramosus of venom duct in fixed chelal finger short and situated very close to the tip of the finger.

Trichobothriotaxy: fixed finger with 8 and movable finger with 4 trichobothria (Figs. 21–22); fixed finger with trichobothria *et*, *est* and *it* forming group in distal quarter of finger, trichobothrium *et* located slightly proximal to *it*, *ist* situated distal to middle of finger (T = 0.63), *ist* distinctly closer to *est* than to *ib*, *isb* on retrolateral surface, *eb* and *esb* located slightly proximal to *ib*; movable finger with trichobothrium *st* situated closer to *t* than to *sb*, *sb* closer to *b* than to *st*, distance *b*–*sb* approximately as long as distance *st*–*t*.

Legs: coxa I with large, triangular, sclerotized and pointed anterolateral process, mediolateral process denticulate (Fig. 23); coxal chaetotaxy: 6:6:6:8; sub-terminal setae branched, short basal ramus without denticulations (Fig. 25); claws simple and symmetric; arolia simple and shorter than claws; leg I femur $4.67\times$, patella $3.54\times$, femur $1.43\times$ longer than patella, tibia $5.00\times$, metatarsus $3.71\times$, tarsus $6.20\times$, tarsus $1.19\times$ longer than metatarsus; leg IV (Fig. 14) femur $1.67\times$, patella $1.93\times$, femur + patella $3.42\times$, tibia with a long tactile seta situated slightly proximal to middle (T = 0.42), $5.25\times$, metatarsus with long tactile seta situated basally (T = 0.15), $3.67\times$, tarsus with tactile seta situated proximal to middle (T = 0.41), $8.00\times$.

Measurements of holotype ♂: body length 2.75; carapace (inflated specimen) 0.77/1.00; pedipalp trochanter 0.53/0.21, femur 1.08/0.22, patella 0.81/0.24, chela (with pedicel) 1.95/0.43, chela (without pedicel) 1.82, hand (with pedicel) L 0.78 [1.81], hand (without pedicel) 0.65, movable finger L 1.35; leg I femur 0.56/0.12, patella 0.39/0.11, tibia 0.40/0.08, metatarsus 0.26/0.07, tarsus 0.31/0.05; leg IV femur 0.45/0.27, patella 0.54/0.28, femur + patella 0.96, tibia 0.84/0.16, metatarsus 0.33/0.09, tarsus 0.56/0.07.

Remarks: The newly collected species from Russia is very similar to *N. (N.) anatolicum* and *N. (N.) labinskyi*. This is based on the morphological and morphometric variations within the species *N. (N.) anatolicum* and *N. (N.) labinskyi* (discussed in the present study; see table 1), and the following characters: the loss of the preocular setae on the carapace; the presence of a small tubercle on dorsal surface of the pedipalpal trochanter; the position of notch on the median side of the pedipalpal patellar club (located far of the middle of the patellar club length); the chelal teeth



Figs. 16–25: *Neobisium (N.) kamenskyi* n. sp., holotype ♂. **16** carapace (epistome magnified), dorsal view; **17** coxae IV and sternites II–III, ventral view; **18** left chelicera (serrulae omitted), dorsal view; **19** rallum (second proximal blade broken); **20** left pedipalp (without chela), dorsal view; **21** left chela, retrolateral view; **22** right chela, dorsal view; **23** right coxa I (damaged), ventral view; **24** left leg IV (trochanter omitted), dorsal view; **25** sub-terminal seta (magnified). See Material and methods for abbreviations.

structure (similar in size and shape in distal half of the fixed finger); the trichobothriotaxy (especially *ist* being located distinctly distal to the middle of the fixed finger); other morphometric characters, including the movable chelal finger being clearly longer than the chelal hand (with pedicel), and the length of the pedipalpal femur ($1.00 < L < 1.50$).

Despite of the present small morphometric differences, *Neobisium (N.) kamenskyi* n. sp. can be easily separated from *N. (N.) anaticum* and *N. (N.) labinskyi* based on the

ratio between the length of the movable chelal finger versus the length of the chelal hand (with pedicel), that is $1.7\times$ in *N. (N.) kamenskyi* n. sp., and only is $1.1–1.3\times$ in *N. (N.) anaticum*, and $1.1–1.5\times$ in *N. (N.) labinskyi* (Beier 1949, 1963; Ćurčić 1984; Nassirkhani & Doustaresharaf 2018; Petrov & Šťáhlavský 2007).

It is worth mentioning that the metatarsus IV of *N. (N.) labinskyi* previously recorded from Russia has two tactile setae (see Ćurčić 1984: fig. 40), whereas there is only one

basal tactile seta on the metatarsus IV of the new species from Russia (Fig. 24).

Regardless of some morphometric differences (Table 1), the new species discovered in Russia resembles the male of *N. (N.) validum* (L. Koch, 1873) reported from Caucasia, Georgia, and Turkmenistan. *N. (N.) kamenskyi* n. sp. differs from *N. (N.) validum* by the shape of the mediolateral process of coxa I (denticulate in *N. (N.) kamenskyi* n. sp., not denticulate in *N. (N.) validum*) (e.g. in Beier 1949, 1963). This character was clearly described for the species, *N. (N.) turcicum* from Turkey by Beier (1949) which has been synonymized with *N. (N.) validum* by Schawaller (1983).

***Neobisium (Neobisium) speleophilum* Krumpál, 1986**
(Figs. 26–39)

Neobisium speleophilum Krumpál, 1986: 163–168, figs. 1–7.

Material examined: 3♂, 1♀, RUSSIA: Krasnodar Krai, Khosta, Caucasian State Reserve, yew-boxwood grove, yew forest, 43°32'22.87"N 39°52'22.94"E, 70 m; June 2006; Yu. A. Chumachenko leg.; lodged in ZMMU (ZMMUPS37; ZMMUPS39) & IAU (IAUAPSR18; IAUAPSR19).

Redescription of ♂♂ (♀ in parentheses): colouration: carapace distinctly darker in colour than tergite I, and slightly lighter in colour than pedipalp; pedipalpal segments uniformly coloured (generally darker in colour than in males).

Carapace (Fig. 26): posterior border partially not sclerotized and pale; entirely smooth; wider than long (inflated specimens), 0.76–0.97× longer than broad; with two pair of corneate eyes, anterior eyes slightly larger than posterior eyes, distance from anterior margin 0.060–0.065 (0.075), diameter of anterior eyes 0.072–0.075 (0.080), distance between eyes 0.012–0.017 (0.027); with 21–22 setae, anterior margin with 4 and posterior margin with 6 setae, chaetotaxy: 4:6:5–6:6; transverse furrows absent; epistome prominent, short and apically rounded, L 0.017–0.020, W 0.027 (epistome short, length 0.015, width 0.030); glandular pores present, 3 glandular pores located close to each anterior eyes (with 2 glandular pores located close to each anterior eyes); anterolateral corners with 2 small protuberances located lower than surface of carapace; with 6 microlyrifissures, one pair situated in ocular zone, close to anterior eyes, and two pairs located on posterior margin.

Tergites slightly sclerotized; all setae simple; X with 2 pseudotactile and 2 tactile setae; XI with 4–5 tactile setae; chaetotaxy: 6–7: 6: 8: 10: 10: 10: 12: 11: 11: 3T1T3: TT2T1TT: 2 (6: 6: 8: 9: 9: 9: 9: 9: 9: 3T1T3: T2T1T2T: 2).

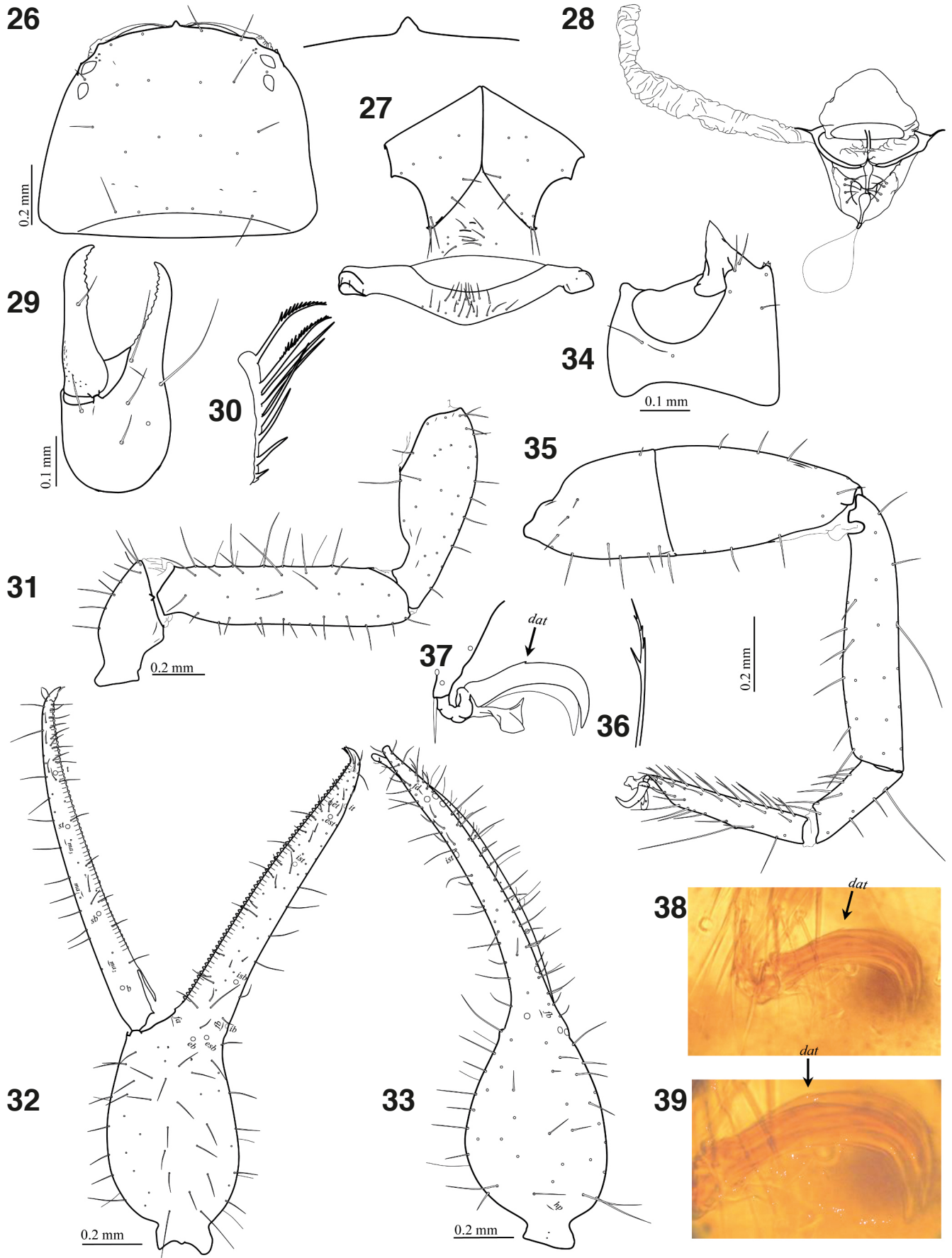
Sternites entirely smooth; slightly sclerotized; anterior operculum with 11–12 and posterior operculum with 21–24 setae, of which 11–13 setae located close to the genital aperture (Fig. 27); internal genitalia with relatively long lateral genital sacs and a short swollen median genital sac, genital opening with 5+4 (in 1♂ 4+4; in 1♂ 5+5) internal setae (Fig. 28) (with one large median cribriform plate and two small lateral cribriform plates); all setae simple; IV–XI

uniseriate; chaetotaxy: 11–12: (2–3)21–24(2): (2–3)9–10(2–4): 14–16: 14–17: 12–14: 14–15: 14–15: 5T1T6–6T1T6: T2T–T4T: 2 (5: (4)17(4): (3)12(3): 16: 13: 15: 15: 14: 5TT5: T2T: 2).

Pleural membrane granulate.

Chelicera hand with 6 acuminate setae; galea not prominent, with a very small hyaline convexity (Fig. 29) (galea prominent, knob-like, with a diminutive hyaline convexity); subgaleal seta situated distal to the middle (0.62–0.68); hand entirely smooth, dorsal surface of base of movable finger finely granulated; fixed finger with 16–18 teeth reaching to base; movable finger with 10–12 teeth reaching distal to the middle of the segment, large median tooth absent (Fig. 29) (median tooth larger than other teeth); serrula interior with 20–22 (25) and exterior with 25–28 blades; rallum with 8 blades, two distal blades denticulate, distalmost blade somewhat isolated and located on a high hyaline promontory, proximalmost blade shortest, and two proximalmost blades more or less isolated from the third blade (Fig. 30).

Pedipalps entirely smooth; coxa including manducatory process with 10–12 setae, manducatory process with 4 acuminate setae, seta located at the base of manducatory process longest; trochanter with a small dorsal tubercle, 2.08–2.12× (2.20×); femur with short pedicel, margins without tubercles, some long setae without enlarged alveoli mostly located in basal half of the segment (Fig. 31), one glandular pore located dorso-distally (with one glandular pore located in distal quarter of the segment); 4.00–4.23× (3.96×); patella with short and stout pedicel, L = 0.20–0.21; patella distinctly shorter than femur, 2.61–2.69× (2.57×), with 3 lyrifissures situated basally and two lyrifissures located distally, with 1–3 glandular pores located in distal third of the segment, notch on the median side reaching very close to the middle of the club length (notch on the median side passing the middle of the patellar club length), ratio of diameter of distal opening to inner margin of patella (X/Y) 0.80–0.86 (X/Y = 1.00). Chela with pedicel 3.76–4.09× (3.42×), without pedicel 3.44–3.86× (3.28×); movable finger distinctly longer than hand with pedicel and femur; movable finger 1.45–1.53× longer than hand with pedicel and 1.16–1.29× longer than femur; hand with pedicel 1.64–1.77× (1.48×), without pedicel 1.32–1.55×; 2–3 micropores located on chelal pedicel in dorsal view; retrolateral surface of hand with 2 glandular pores located distal to trichobothrium *eb* and prolateral surface with 3 glandular pores located in one row close to trichobothria *eb* and *esb*; fixed finger with 3 lyrifissures: one (*fb*) located at the same level of *ib*, one (*fa*) close to the base in retrolateral view and one (*fd*) distinctly distal to *et* in dorsal view; movable finger with 3 lyrifissures in retrolateral view: one (*ma*₂) located closer to trichobothrium *b* than to *sb*, one (*ma*₁) proximal to *sb*, and one (*ma*₃) very close to *st*, *ma*₁ located slightly closer to *ma*₃ than to *ma*₂ (*ma*₁ and *ma*₂ located between trichobothria *b* and *sb*, *ma*₃ approximately midway between *sb* and *st*); sensillum located between trichobothria *sb* and *st* close to dental canals (two sensilla located between trichobothria *sb* and *st*); movable finger with one glandular pore located



Figs. 26–39: *Neobisium (N.) speleophilum* Krumpál, 1986, ♂. **26** carapace (epistome magnified), dorsal view; **27** coxae IV and sternites II–III, ventral view; **28** internal genitalia, in part; **29** left chelicera (serrulae omitted), dorsal view; **30** rallum; **31** right pedipalp (without chela), dorsal view; **32** left chela, retrolateral view; **33** right chela, dorsal view; **34** right coxa, ventral view; **35** right leg IV (trochanter omitted), dorsal view; **36** sub-terminal seta (magnified); **37** distal part of tarsus of left leg IV, retrolateral view; **38** distal part of tarsus of right leg IV, retrolateral view (microscope picture); **39** claws of leg IV (microscope picture). See Material and methods for abbreviations.

distal to trichobothrium *sb* on the retrolateral surface; fixed finger with 60–66 contiguous triangular teeth reaching to the level of trichobothrium *ib*, distalmost tooth smallest, other teeth almost with equal size, all teeth with dental canal; movable finger with 56–62 contiguous, blunt and apically rounded teeth not reaching to the level of trichobothrium *b*, teeth slightly reduced in size from tip of the finger to its base, all teeth with dental canal; nodus ramosus of venom duct in fixed chelal finger short and situated very close to the tip of the finger.

Trichobothriotaxy: fixed finger with 8 and movable finger with 4 trichobothria (Figs. 32–33); fixed finger with trichobothria *et*, *est* and *it* making a group in almost distal quarter of the finger, trichobothrium *et* located at same level as *it*, *ist* situated distal to the middle of the finger ($T = 0.60–0.62$), *ist* distinctly closer to *est* than to *ib*, *isb* on the retrolateral surface, *eb* and *esb* located slightly proximal to *ib*; movable finger with trichobothrium *st* situated slightly closer to *t* than to *sb*, trichobothrium *sb* clearly closer to *b* than to *st*, distance *b–sb* longer than distance *st–t*.

Legs: coxa I with large, triangular, sclerotized and apically pointed anterolateral process, mediolateral process denticulate (Fig. 34); coxal chaetotaxy: 6–7:4–5:4–6:8–10 (7: 4: 4: 9); sub-terminal setae branched, basal ramus short and smooth (Fig. 36); all claws with a small dorsal accessory tooth (Figs. 37–39); arolia simple and shorter than claws. Leg I femur 3.64–4.15× (4.30×), patella 2.91× (3.17×), femur 1.46–1.54× longer than patella, tibia 4.00–4.33×, metatarsus 3.00–3.17×, tarsus 4.50–5.40×, tarsus 1.28–1.42× longer than metatarsus; leg IV (Fig. 35) femur 1.28–1.52×, patella 1.61–1.92×, femur + patella 2.67–3.29×, tibia with a long tactile seta situated slightly proximal to middle ($T = 0.43–0.45$), 4.60–5.21×, metatarsus with a long tactile seta situated basally ($T = 0.15–0.17$), 3.00× (3.30×), tarsus with a tactile seta situated proximal to middle ($T = 0.35–0.42$), 5.00–6.37×.

Measurements of ♂: body length 2.60–2.82; carapace 0.72–0.78/0.80–0.95; pedipalp trochanter 0.50–0.53/0.24–0.25, femur 0.93–0.96/0.22–0.24, patella 0.70–0.73/0.26–0.28, chela (with pedicel) 1.72–1.80/0.42–0.47, chela (without pedicel) 1.62–1.70, hand (with pedicel) L 0.73–0.80, hand (without pedicel) 0.62–0.70, movable finger L 1.12–

1.20; leg I femur 0.51–0.54/0.13–0.14, patella 0.35/0.12, tibia 0.36–0.39/0.09, metatarsus 0.18–0.21/0.06–0.07, tarsus 0.25–0.27/0.05–0.06; leg IV femur 0.41/0.27–0.32, patella 0.52–0.53/0.27–0.33, femur + patella 0.88–0.90, tibia 0.69–0.73/0.14–0.15, metatarsus 0.30/0.10, tarsus 0.45–0.51/0.08.

Measurements of ♀: body length 2.47; carapace 0.79/0.80; pedipalp trochanter 0.55/0.25, femur 0.99/0.25, patella 0.72/0.28, chela (with pedicel) 1.85/0.54, chela (without pedicel) 1.77, hand (with pedicel) L 0.80, hand (without pedicel) 0.72, movable finger L 1.22; leg I femur 0.56/0.13, patella 0.38/0.12, tibia 0.41/0.10, metatarsus 0.22/0.07, tarsus 0.30/0.06; leg IV femur 0.44/0.29, patella 0.55/0.29, femur + patella 0.95, tibia 0.78/0.15, metatarsus 0.33/0.10, tarsus 0.51/0.08.

Remarks: On the basis of the following characters, the newly collected specimens from Russia are assigned to *Neobisium (N.) speleophilum* Krumpál, 1986: the shape of the epistome (stout, apically rounded and prominent, see Krumpál 1986: fig. 3); the loss of a distinct hyaline convexity of galea (in ♂); entirely smooth pedipalp; the presence of a small tubercle on the dorsal surface of the pedipalpal trochanter; the absence of tubercle/s on prolateral and retrolateral margins of the pedipalpal femur; notch on the median side of the patella reaches to the middle of the patellar club (in ♂); the similar size and shape of teeth in the distal half of the fixed chelal finger; the trichobothriotaxy, e.g. the trichobothrium *ist* located distinctly distal to the middle of the fixed chelal finger, the trichobothria *et* and *it* are situated distal to trichobothrium *t*, and trichobothrium *st* located proximal to trichobothrium *ist* (see Krumpál 1986: fig. 4); the shape of pedal coxa I (see Krumpál 1986: fig. 5); the morphometric characteristics, e.g. the movable chelal finger longer than the chelal hand (with pedicel) and the pedipalpal femur, and the length of the pedipalpal femur (less than 1.00).

The pedipalp of the newly collected specimens from Russia is slightly longer than that of the male type (Table 2). The carapacial chaetotaxy is the other minor difference between the type and the newly found specimens in Russia, e.g. in the type, there are a total of 24 setae on the carapace, of which 8 setae located on posterior margin of the carapace

	<i>N. (N.) labinskyi</i> Beier, 1937			<i>N. (N.) anatolicum</i> Beier, 1949					<i>N. (N.) validum</i> (L. Koch, 1873)	<i>N. (N.) kamenskyi</i> n. sp.
	Type (♀)	Russia (♂)	Bulgaria (♀)	Type (♀)	Russia (♂)	Russia (♀)	Iran (♀)	Iran (♂)	Caucasia (♂)	Russia (♂)
Femur L	1.74–2.00	1.43	1.40–1.61	1.35	1.09	0.99	1.15–1.20	1.12–1.15	1.20	1.08
Femur W	0.34–0.40	0.29	0.29–0.33	0.28	0.22	0.23	0.27	0.26–0.27	0.30	0.22
Femur P	4.8–5.1×	4.9×	4.8–5.1×	4.9×	4.9×	4.3×	4.2–4.4×	4.1–4.6×	4.0×	4.91×
Patella L	1.28–1.53	1.08	1.08–1.27	1.18	0.82	0.75	0.87–0.96	0.91–0.95	0.91	0.81
Patella W	0.42–0.50	0.35	0.35–0.40	0.34	0.27	0.28	0.30–0.32	0.30–0.32	0.35	0.24
Patella P	3.0–3.1×	3.0×	2.9–3.1×	3.5×	3.0×	2.6×	2.9–3.0×	2.8–3.1×	2.6×	3.37×
Chela hand (+) L	1.47–1.76	1.19	0.98–1.21	1.15	0.84	0.77	0.95–1.02	0.84–0.96	0.87	0.78
Chela hand (+) W	0.75–0.90	0.58	0.61–0.69	0.56	0.45	0.46	0.49–0.52	0.44–0.48	0.59	0.43
Chela hand (+) P	2.0×	2.0×	–	2.1×	1.8×	1.6×	1.9×	1.9–2.1×	1.47×	1.81×
Mov. L	2.25	1.37	1.44–1.59	1.30	1.14	1.03	1.12–1.20	1.10–1.12	1.31	1.35

Table 1: Measurements (in mm) and proportions of some pedipalpal segments of the species *N. (N.) labinskyi* Beier, 1937, *N. (N.) anatolicum* Beier, 1949, *N. (N.) validum* (L. Koch, 1873), and *N. (N.) kamenskyi* n. sp. L = length, W = width, Mov. = movable chelal finger, P = proportion, (+) = with pedicel] (based on Beier 1937, 1949, 1963; Ćurčić 1984; Nassirkhani & Doustaresharaf 2018; Petrov & Štáhlavský 2007; present study).

(Krumpál 1986) while the carapace of the newly collected specimens from Russia bear a total of 21–22 setae, 6 of them located on the posterior margin.

Moreover, based on Krumpál's (1986) description, there is a long tactile seta located distal to the middle of the metatarsus IV in the type which is unusual within the *Neobisium* (*N.*) species. In the newly collected specimens from Russia, it is located basally (Fig. 35). It may be erroneously distinguished by Krumpál (1986) or his record was a mistake.

Noticeably, there are no descriptions or illustrations showing the presence/absence of a small dorsal accessory tooth on each tarsal claws I–IV of the type. Therefore, this character is incomparable here, and the type must be re-examined to clarify this point. In this contribution, in addition to the measurements and description provided above, the specimens are identified based on the supposition of the presence of a dorsal accessory tooth on the tarsal claws I–IV of the type.

The male holotype specimen of *Neobisium* (*N.*) *speleophilum* was found in a cave located in Krasondar Krai (Krumpál 1986). The specimens examined here occurred in soil and leaf litter in the same geographical locality. The original description of Krumpál (1986) did not reveal any cavenicolous adaptations and this new finding shows that the species has the ability to live and reproduce in different habitats.

Remarks on some *Neobisium* (*Neobisium*) species and key to the adults of the subgenus from Russia

Many species of the subgenus *Neobisium* (*Neobisium*), from the Middle East, central Asia, and Caucasia are poorly characterized and only briefly described.

For example, there are some serious morphological and morphometric variations within the species *Neobisium* (*N.*) *anatolicum*, including its synonyms reported from Armenia, Azerbaijan, Georgia, Iran, Russia, and Turkey. These include:

1. The pedipalpal femur granulation: the basal half of the pedipalpal femur is finely granulated in the type and the females from Iran, whereas it is entirely smooth in the specimens from Russia.

2. The cheliceral teeth structure: in the type and in the male from Russia, the movable cheliceral finger lacks a

median large tooth while it is present in those of the females from Russia and Iran.

3. The carapacial chaetotaxy: the posterior margin of the carapace bears 6–7 setae in the type, the females from Iran and also in the female from Russia whereas there are 16 setae on posterior margin of the carapace in the male from Russia (Beier 1949; Ćurčić 1984; Nassirkhani & Doustaresharaf 2018).

4. The retrolateral margin of the pedipalpal femur which has a tubercle located medially in the female from Russia (see Ćurčić 1984: fig. 27), nonetheless the presence of any tubercle on the pedipalpal femur of *N. (N.) anatolicum* has been not described or illustrated for the other specimens belonging to this species in the published literature (see Beier 1949: fig. 4; Ćurčić 1984: fig. 32; Schawaller & Dashdamirov 1988: figs. 29–31; Nassirkhani & Doustaresharaf 2018: fig. 16).

5. The trichobothriotaxy: the trichobothrium *ist* located slightly distal to *st*, and *sb* situated approximately midway between *b* and *st* in the type and the females from Iran (Beier 1949: fig. 4; Nassirkhani & Doustaresharaf 2018: fig. 16). In the female from Russia, the trichobothrium *ist* is located at the same level as *st*, and *sb* situated distinctly closer to *b* than to *st* (see Ćurčić 1984: fig. 29); and in the male from Russia, the trichobothrium *ist* is located slightly proximal to *st*, and *sb* located almost midway between *b* and *st* (see Ćurčić 1984: fig. 36).

6. The ratio of the movable chelal finger length versus the length of the pedipalpal femur: the movable chelal finger of the type is shorter than the pedipalpal femur (Beier 1949), while in the specimens from Russia, the movable chelal finger is slightly longer than the pedipalpal femur (Ćurčić 1984). Also, the movable chelal finger is as long as or slightly shorter than the pedipalpal femur in the females from Iran (Nassirkhani & Doustaresharaf 2018).

On the basis of these differences, it strongly seems that the species *N. (N.) percelere* Ćurčić, 1984 and *N. (N.) pal-lens* Ćurčić, 1984 from Soviet Russia were erroneously synonymized with *N. (N.) anatolicum* by Dashdamirov & Schawaller (1992). It is recommended to reexamine the types of these species for clarification. In this contribution, the species *N. (N.) anatolicum* is studied including with its synonyms.

The other species occurring in the area that also has wide morphometric ranges and some morphological variations is *Neobisium* (*N.*) *labinskyi* Beier, 1937. This was originally described from north-western Caucasia by Beier (1937), and subsequently reported from Azerbaijan, Bulgaria, Georgia, Russia, and Turkey (Harvey 2013). *Neobisium* (*N.*) *hirtum* Ćurčić, 1984 from Russia has been synonymized with *N. (N.) labinskyi* by Dashdamirov & Schawaller (1992) who also suggested the possibility of the synonymy of *N. (N.) vilcekii* Krumpál, 1983 from Russia with *N. (N.) labinskyi*. Moreover, Petrov & Šřahlavský (2007) recorded *N. (N.)* cf. *labinskyi* from Bulgaria.

Unexpectedly, there are some substantial morphological and morphometric features that are not shared between the

Pedipalp	Type	Newly collected specimens from Russia	
	♂	♂	♀
Femur L ratio	0.87 4.0×	0.93–0.96 4.0–4.2×	0.99 3.9×
Patella L ratio	0.64 2.6×	0.70–0.73 2.6–2.7×	0.72 2.6×
Hand (with pedicel) L ratio	0.66 1.4×	0.73–0.80 1.6–1.7×	0.80 1.4×
Movable finger L	1.05	1.12–1.20	1.22

Table 2: *Neobisium* (*N.*) *speleophilum* Krumpál, 1986: lengths (in mm) and proportions of the pedipalpal femur, patella, and chela of the male type and the newly collected adults from Russia.

specimens previously recorded under *N. (N.) labinskyi* from different localities.

One of the most important differences is the length of the movable chelal finger which is slightly shorter than the pedipalpal femur in the male from Russia (Ćurčić 1984), whereas it is distinctly longer than the pedipalpal femur of the type (Beier 1937, 1963). In the females from Bulgaria, the movable chelal finger size is varied from slightly shorter to slightly longer than the pedipalpal femur (Petrov & Šťáhlavský 2007).

The other observable difference is the form of the chelal hand in dorsal view, i.e. the chelal hand of the specimens from Bulgaria is distinctly rounded (see Petrov & Šťáhlavský 2007: fig. 10) whilst it is obviously elliptical in the specimens from the north-western Caucasus, Russia, and Georgia (see Beier 1937: fig. 2; Beier 1963: fig. 103; Ćurčić 1984: fig. 39; Dashdamirov & Schawaller 1992: fig. 8a–b; Schawaller 1983: figs. 8, 11). Interestingly, the chelal hand of the specimens from Krasondar Province and the Kintrish Reservat-Georgia is clearly thin and distinctly tapered in dorsal view (see Dashdamirov & Schawaller 1992: fig. 8b; Schawaller 1983: fig. 11).

The published illustrations of *N. (N.) labinskyi* show some trichobothrial variations within the species, e.g. the trichobothrium *ist* is located distinctly distal to the trichobothrium *st* in the type and the specimens from Bulgaria (see Beier 1937: fig. 2; Beier 1963: fig. 103; Petrov & Šťáhlavský 2007: fig. 9), whereas it is situated approximately at the same level of *st* in the male from Russia (see Ćurčić 1984: fig. 38; Dashdamirov & Schawaller 1992: fig. A).

Based on Beier (1937) and Ćurčić (1984), the epistome is small and apically pointed in the type and the specimen from Russia (see Ćurčić 1984: fig. 37), although it is prominent and apically rounded in the specimens from Bulgaria and the type restudied by Schawaller (1983) (see Schawaller 1983: fig. 10; Petrov & Šťáhlavský 2007: fig. 11).

Moreover, the possibility of synonymy of *N. (N.) labinskyi* and *N. (N.) vilcekii* can be refuted here because of the presence of an accessory tooth on the dorsal surface of each pedal claws IV (see Krumpál 1983: fig. 7), and the short length of the anterolateral process of the coxa I (see Krumpál 1983: fig. 5) in *N. (N.) vileckii*. The pedal claws IV of *N. (N.) labinskyi* lack dorsal accessory teeth (see Ćurčić 1984: fig. 40). Also, the coxa I of *N. (N.) labinskyi* bears a large and stout anterolateral process.

As some of these variations are used as diagnostic characters defining the *Neobisium (N.)* species, it seems necessary to reexamine the *Neobisium (N.)* species from the Middle East, central Asia and Caucasia. Such a reexamination would yield more data that could help to revalidate or synonymize species. Considerably, the differences listed here may be resolved if the genitalia of the males and females from specimens from the different localities will be examined.

Key to the species of *Neobisium (Neobisium)* from Russia

- 1 Distal half of fixed chelal finger with acute teeth of different sizes standing close together, 2 long teeth separated by 2–5 short teeth (e.g. Gabbutt & Vachon 1965: figs. 1–2; Mahnert 1988: fig. 7)
..... *N. (N.) carcinoides* (Hermann, 1804)
[Algeria, Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, India, Ireland, Italy, Kazakhstan, Kenya, Latvia, Luxembourg, Macedonia, Montenegro, Morocco, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tunisia, Ukraine, United Kingdom]
- Distal half of fixed chelal finger with teeth similar in shape and size consistently located close together 2
- 2 Tarsal claw IV with dorsal accessory tooth (see Krumpál 1983: fig. 7; Nassirkhani, Snegovaya & Chumachenko 2019: fig. 9; Figs. 37–39)..... 3
- Tarsal claws IV smooth, without dorsal accessory teeth 5
- 3 Pedipalpal femur length 2.17–2.20; trichobothrium *ist* located at same level as *t* (Nassirkhani, Snegovaya & Chumachenko 2019: fig. 7).....
N. (N.) kovalevskayae Nassirkhani, Snegovaya & Chumachenko, 2019
[Russia]
- Pedipalpal femur length 0.87–1.41; trichobothrium *ist* located distinctly proximal to *t* (Krumpál 1983: fig. 1; Krumpál 1986: fig. 4; Figs. 32–33)..... 4
- 4 Movable chelal finger 1.2× longer than chelal hand (with pedicel); anterolateral process of coxa I short (Krumpál 1983: fig. 6)
..... *N. (N.) vilcekii* Krumpál, 1983
[Russia]
- Movable chelal finger 1.4–1.5× longer than chelal hand (with pedicel); anterolateral process of coxa I distinctly elongated (Krumpál 1986: fig. 5; Fig. 34)
..... *N. (N.) speleophilum* Krumpál, 1986
[Russia]
- 5 Pedipalpal femur distinctly granulate 6
- Pedipalpal femur entirely smooth or finely granulate (difficult to observe)..... 7
- 6 Pedipalpal femur granulated with large granules, sometimes surrounding with small granules; pedipalpal patella only with some coarse granules (e.g. Schawaller 1983: fig. 36; Nassirkhani, Snegovaya & Chumachenko 2018: fig. 15).....*N. (N.) golovatchi* Schawaller, 1983
[Russia]
- Pedipalpal femur granulated with different sized granules, large granules absent; pedipalpal patella entirely smooth (e.g. Ćurčić 1984: fig. 42; Schawaller 1983: fig. 33)*N. (N.) granulatum* Beier, 1937
[Azerbaijan, Georgia, Russia]
- 7 Pedipalpal femur length 0.65–0.66; chelal hand at base of fixed finger distinctly granulate (Fig. 8); movable

- chelar finger with a large distalmost tooth located on a great sub-apical protuberance (Figs. 9–12).....
*N. (N.) catherineae* n. sp.
 [Russia]
- Pedipalpal femur length 0.80–2.00; chelar hand entirely smooth; movable chelar finger without a structure such as above..... 8
- 8 Teeth in basal two thirds of movable chelar finger extremely flattened and only recognizable by dental canals; coxa I with short and relatively small anterolateral process.....
N. (N.) artaxerxesi Nassirkhani, Snegovaya & Chumachenko, 2018
 [Russia]
- Movable chelar finger with continuous and visible cusped teeth; coxa I with long and large anterolateral process..... 9
- 9 Movable chelar finger 1.7× longer than chelar hand (with pedicel)*N. (N.) kamenskyi* n. sp.
 [Russia]
- Movable chelar finger 1.1–1.5× longer than chelar hand (with pedicel) 10
- 10 Large species, e.g. length of pedipalpal femur 1.40–2.00, chelar hand (with pedicel) 0.98–1.76, and movable chelar finger 1.37–2.25.....*N. (N.) labinskyi* Beier, 1937
 [Azerbaijan, Bulgaria, Georgia, Russia, Turkey]
- Medium size species, e.g. length of pedipalpal femur 0.99–1.35, chelar hand (with pedicel) 0.77–1.15, and movable chelar finger 1.03–1.30.....
*N. (N.) anatolicum* Beier, 1949
 [Armenia, Azerbaijan, Georgia, Iran, Russia, Turkey]

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