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# A new species from the *Clubiona caerulescens* group from the Caucasus (Araneae: Clubionidae)

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An illustrated description of *Clubiona caucasica* sp. n., which is closely related to *C. caerulescens* L. Koch, 1867 is provided. The new species is found in the Caucasus (Russia, Georgia, Azerbaijan, Armenia) and in Turkey (one locality).

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**Keywords:** Spiders; taxonomy; Russia; Georgia; Azerbaijan; Armenia; Turkey

## Introduction

*Clubiona* Latreille, 1804 is one of the most species-rich spider genera comprising 494 species (World Spider Catalog, 2017). It remains among the oldest spider genera established by somatic characters only. Several attempts to split *Clubiona* into "genital" genera were rejected (Mikhailov, 2012). The genus is subdivided into 3-4 subgenera, with numerous species-groups within *Clubiona* s. str. listed in Mikhailov (1995) for the Holarctic fauna and added in Deeleman-Reinhold (2001) for Indo-Malaya. *Clubiona* is distributed almost worldwide, with the exception of South America where it is replaced by *Elaver* O. Pickard-Cambridge, 1898. The genus is well studied in the Holarctic and, partly, in Indo-Malayan regions, whereas African and Indian species remain unrevised.

Only one species is known in the *Clubiona caerulescens*-group, namely, *C. caerulescens* L. Koch, 1867, with a transpalaearctic range. When studying spiders collected in Lagodekhi Reserve, Georgia, one of us (S.O.) found specimens differing from the European *C. caerulescens*. Examination of other Caucasian specimens, together with one specimen from Turkey kept in the Zoological Museum of Moscow State University, Moscow (by K.M.) ascribed earlier to *C. caerulescens*, shows clear differences in the genitalia morphology. Thus, we describe a second species in the *C. caerulescens* species-group

### Material and Methods

Spiders were examined using MBS-9 and Olympus™ stereo microscopes. Leg measurements are made from the dorsal part of the respective article. In the description, all measurements are given in mm. The number of specimens measured is indicated in parentheses. In the list of type material, numbers in square brackets refer to localities in Figure 4.

**Abbreviations**: d = dorsally, F = femur, lat = laterally, Mt = metatarsus, pdp = pedipalp, Pt = patella, rlat = retrolaterally, RTA = retrolateral tibial apophysis, T= tarsus, Ti = tibia, v =ventrally.

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**Acronyms:** AUG = Entomological Collection, Agricultural University of Georgia (Sakartvelo), Tbilisi, Georgia; CO = S. Otto personal collection; CP = A. V. Ponomarev personal collection; SMF = Senckenberg Museum, Frankfurt a.M., Germany; ZMMU = Zoological Museum of Moscow State University, Moscow, Russia.

## Description

### *Clubiona caucasica* Mikhailov & Otto, sp. n. (Figures 1a-e, 3a-d)

*Clubiona caerulescens* – Mikhailov, 1990: 315–316.
*Clubiona caerulescens* – Marusik, Kunt, 2010: 13–15, figs 2–3 (female).

Holotype ♂ (ZMMU Ta-7965), Georgia, Lagodekhi [5], Kudigora Mountain, 41.87147ºN, 46.31153ºE, 1350 m, mixed mountain *Fagus* etc. forest, Malaise trap, 5-15.viii.2014, G. Japoshvili & G. Kirkitadze.

Paratypes. RUSSIA. 1♂ (SMF 36865), Pyatigorsk, Mt. Mashuk [2], 600 m, 29.+31.v.1982, S. I. Golovatch; 1♂ (ZMMU Ta-7987), env. of Sochi [1], right side of East Khosta River Canyon, Navalishinskaya (Muzeynaya) Cave, 14.viii.1994-3.iv..1995, A. G. Koval'; 1♂, 1♀ (ZMMU Ta-7972), North Osetia, Kabardino-Sunzhensky Mt. Ridge [3], 4 km NW of Karjin, WSW slope of ravine 30°, ca. 500 m, young oak forest with *Cornus mas*, pitfall traps, 30.vii.-24.viii.1985, S. K. Alekseev. – GEORGIA. Lagodekhi [5], Kudigora Mountain, mixed broadleaved mountain forest (with one exception for subalpine zone; all leg. G. Japoshvili & G. Kirkitadze in Malaise trap): 2♂, 4♀ (AUG), 1 ♀ (CO), 41.8524°N, 46.2877°E, 670 m, Carpineto-Fagetum-Festucosum: 15.-25.v.2014; 26.vii.-5.viii.2014; 5.-15.viii.2014; 15.-25.viii.2014; 5.-14.ix.2014; 4♂, 1♀ (ZMMU Ta-7968), 7♂, 5♀ (AUG), 41.8558°N, 46.2927°E, 850 m, Fagetum nudum: 12.-23.iv.2014; 23.iv-4.v.2014; 15.-25.vii.2014; 25.viii.-4.ix 2014; 5.-14.ix.2014; 15.-27.ix.2014; 5♀ (ZMMU Ta-7966, Ta-7967), 3♂, 3♀ (AUG), 41.8714°N, 46.3115°E, 1350 m, Fageto-Galiosum: 12.-23.iv.2014; 15.-25.v.2014; 25.vi.-5.vii.2014; 5.-15.vii.2014; 5.-15.viii.2014; 25.viii.-4.ix.2014; 4.-14.ix.2014; 15.-27.ix.2014; 7 ♂♂ (AUG), 41.8827°N, 46.3218°E, 1840 m, upper mountain forest, Fagetum-Acereto-Rubosum: 23.IV.-4.v.2014; 5.-15.v.2014; 15.-25.v.2014; 25.v.-4.vi.2014; 25.viii.-4.ix.2014; 1♂ (AUG), 41.8855°N, 46.3241°E: 1900 m, upper mountain forest, Acereto-Rubosum, 15.-27.ix.2014; 1 ♀ (AUG), 41.8980°N, 46.3338°E: 2230 m, subalpine zone, Juniperetum, 15.-27.ix.2014. 1 ♀ (ZMMU Ta-7977), Tbilisi National Park [8], NE of Mtskheta, Zedazeni, 1100-1200 m, *Fagus, Carpinus, Acer* etc. forest, litter & under bark, 20.v.1987, S. Golovatch & K. Eskov. 1♂ (ZMMU Ta-7978), 40 km W of Mestia [4], Kharkhvashi E of Nakra (= Naki), 1250-1700 m, *Quercus*, *Fagus*, *Carpinus*, *Picea*, *Abies* etc. forest, litter & bark, 21.viii-21.ix.1986, S. Golovatch. 1♂ (ZMMU Ta-7979), Algeti State Reserve [7], W of Manglisi, *Fagus*, *Picea*, *Acer* etc. forest, 1400-1450 m, litter & under bark, 16.-18.v.1987, S. Golovatch & K. Eskov. 1 ♀ (SMF 36866), Mariamdjvari Reserve, ENE of Sagaredjo [9], 1150-1250 m, *Fagus*, *Carpinus*, *Acer*, *Pinus* etc. forest, litter, under bark & stones, 13.-14.v.1987, S. Golovatch & K. Eskov. 1♂, 1♀ (ZMMU Ta-7969), Batumi, Korolistavi Vill., Mtirala Mt. [6], ca. 1000 m, *Fagus*-*Castanea* forest, litter, 18.iv.1988, D. v. Logunov & A.Yu. Ivantsov. – AZERBAIJAN. Shemakha Distr., Pirkuli Reserve [15]: 2♀ (ZMMU Ta-7976), 21.v.1984, D. v. Logunov; 2♀ (SMF 36868), 1200-1300 m, 24.v.1984, D.v. Logunov; 2♂ (ZMMU Ta-7974), 26.v.1984, D.v. Logunov; 2♀ (ZMMU Ta-7973), 27.v.1984, D. v. Logunov; 1 ♂, 1 ♀ (SMF 36869), 1400-1500 m, 17.ix.1984, D. v. Logunov; 1♂, 2♀ (ZMMU Ta-7975), 20.ix.1984, D. v. Logunov; 2♀ (SMF 36870), 1200-1250 m, 30.iv.1987, S. Golovatch & K. Eskov. 1♂, 1♀ (SMF 36867), NW above Bash-Layski [12], ca. 20 km NNW of Sheki, 1250 m, *Fagus*, *Carpinus*, *Acer* etc. forest, litter, 3.v.1987, S. Golovatch & K. Eskov. 3♀ (ZMMU Ta-7971) SW of Kuba [14], 750 m, *Fagus*, *Quercus*, *Carpinus* etc. forest, litter & under bark, 23.iv.1987, S. Golovatch & K. Eskov. 1♀ (ZMMU Ta-7981), Nadirkhanly ca. 12 km NE of Kelbadjar [10], 1200 m, *Fraxinus* & *Juglans* stands, litter, 1.vi.1987, S. Golovatch & K. Eskov. 1♂ (ZMMU Ta-7980), ca. 12 km E of Ismailly, Girdyman-Chay Valley [13], 850-880 m, *Fagus*, *Quercus*, *Carpinus*, *Acer* forest, litter & under bark, 1.v.1987, S. Golovatch & K. Eskov. 1 ♀ (SMF 36871), Dashanty near Shusha [11], 1100-1300 m, *Quercus*, *Carpinus* forest, litter, logs, under stones, 1.v.1983, S. Golovatch. – ARMENIA. 1♂ (ZMMU Ta-7985), Bazum Mt. Ridge, N slope, Pushkin Pass [17], 1700 m, *Fagus* & *Pinus* forest, litter, 22.v.1987, S.

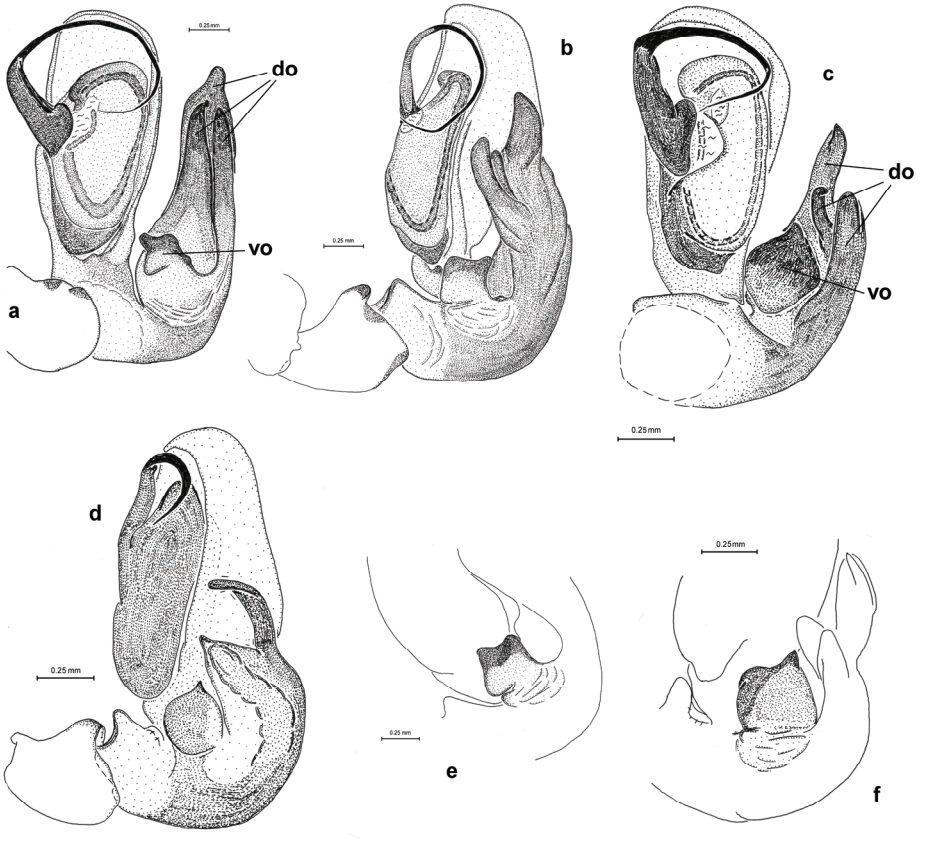


Figure 1. *Clubiona caucasica* sp.n., paratype from Lagodekhi (a, b, e) and *C. caerulescens* (c, d, f) from Oryol Area, left male palp. a, c: ventral view, b, d: ventro-lateral view, e, f: ventral RTA outgrowth, ventro-ventro-lateral view. Abbreviations: do = dorsal RTA outgrowth; vo = ventral RTA outgrowth.

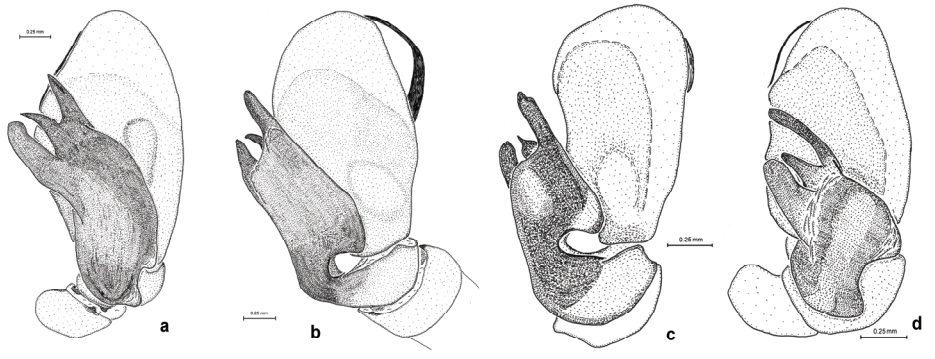


Figure. 2. *Clubiona caucasica* sp. n., paratype from Lagodekhi (a, b) and *C. caerulescens* (c, d) from Oryol Area, left male palp. a, c: dorsal view, b, d: dorso-dorso-lateral view.

Golovatch & K. Eskov. 1♂ (ZMMU Ta-7984), Kirovakan (Vanadzor) [19], *Quercus*, *Acer*, *Fagus* etc. forest, 1600 m, litter, 22-23.v.1987, S. Golovatch & K. Eskov. 1♀ (ZMMU Ta-7983), Ekheknut [18] ca. 20 km N of Kirovakan, 1200-1250 m, *Quercus*, *Carpinus*, *Acer*, etc. forest, litter, 23.v.1987, S. Golovatch & K. Eskov. 1♂, 2♀ (ZMMU Ta-7982), Odzun W of Alaverdi [16], 1500-1550 m, *Quercus*, *Fagus*, *Carpinus* etc. forest, litter & under stones with ants, 23-24.v.1987, S. Golovatch & K. Eskov. 1♂ (SMF 36873), Idzhevan Distr., Tsakhkavan [21], 850-900 m, *Quercus*, *Acer*, *Carpinus* etc. forest, litter & tree hole, 25.v.1987, S. Golovatch & K. Eskov. 1♂ (ZMMU Ta-7986), W of Shamshadyn [22] halfway betw. Idjevan & Berd, 1500-1600 m, *Fagus*, *Carpinus*, *Acer* etc. forest, litter & under bark, 26.-27.v.1987, S. Golovatch & K. Eskov. 1 ♂, 1 ♀ (SMF 36872), Dilizhan Reserve, Agartsyn [20], 1350-1450 m, *Fagus*, *Acer* etc. forest, litter, 28-29.v.1987, S. Golovatch & K. Eskov. – TURKEY. 1♀ (ZMMU Ta-7970), Kastamonu Prov., Azdavay Distr., 41°41.93′N, 33°25.97′E [23], 975 m, 30.v.2009, Yu. M. Marusik.

Other material (examined by A. v. Ponomarev). RUSSIA, North Osetia (CP): 2♀, Alagir, Biz, Shubi, Salix, 13.v.-18.vi.2015, M. Yu. Bakanov; 1♂, 2♀, Alagir Canyon, Shubi, 800-1100 m, 19.-23.v.2014, M. Yu. Bakanov; 1 ♀, Shubi, 11.vii.-30.viii.2015, M. Yu. Bakanov; 1♀, Alagir, Tamisk, 11.vii.-5.viii.2015, F. G. Butaeva; 1♂, 1♀, 2.5 km S of Tamisk, Kraygom Canyon, 850 m, beech forest, 28.viii.-22.ix.2015, S. K. Alekseev & D. Volkov.

Comparative material of *C. caerulescens* (Figures 1c, d, f, 2c, d, 3e, f). 2♂, 1♀ (ZMMU), Russia, Oryol Area, nr. Setukha ca. 50 km E of Oryol, old *Quercus*, *Acer*, *Betula* etc. forest, in ravine, 15.-16.ix.1990, leg. S. Golovatch & A. Vasilev.

Derivatio nominis: The specific name is an adjective referring to the terra typica of the new species.

Diagnosis. *Male*. The new species differs from *C. caerulescens* by a thinner base of the embolus. The embolus of *C. caucasica* sp. n. protrudes beyond the cymbium margin, whereas in *C. caerulescens* it lies within the cymbium. The chitinized base of the embolus contacts the tegulum, and the shape of the distal part of the tegulum of *C. caucasica* sp.n. differs from that of *C. caerulescens* (Figures 1a, 1c). Slight differences are also found in the coarseness of the sperm ducts (see the same figures). All three branches of the retrolateral tibial apophysis' dorsal outgrowth are of similar length in *C. caucasica* sp. n., whereas in *C. caerulescens*, the two branches are considerably shorter than the third one. The retrolateral tibial apophysis is longer in *C. caucasica* sp. n., reaching, in ventral view, the level of the distal part of the tegulum; in *C. caerulescens*, it is shorter and reaches the basal embolar part only. – *Female*. *C. caucasica* sp. n. differs from *C. caerulescens* by the presence of a more or less pronounced transverse fissure in the anterior third of the epigyne as well as by the lateral position of the copulatory tubes; in *C. caerulescens*, copulatory tubes are close to each other and parallel in the posterior part of vulva, widely diverging in the anterior part. The middle posterior, slightly prominent, tapering part of the epigyne is more membraneous in *C. caucasica* sp.n. than in *C. caerulescens*. Copulatory openings are smaller in diameter and more widely separated from each other in *C. caerulescens* than in *C. caucasica* sp. n. In *C. caucasica* sp. n., the anterior part of the epigyne, with the widely separate copulatory tubes, is considerably longer than in *C. caerulescens*.

All paratype material collected in the 1980s was previously identified as *C. caerulescens* and published in Mikhailov, 1990. The specimen from Turkey was identified earlier as *C. caerulescens* by Marusik & Kunt (2010).

Description. The somatic characters fit the description of the genus *Clubiona* (Dondale & Redner, 1982; Mikhailov, 2012). Male (n=8). Carapace, chelicerae and legs straw-coloured or reddish. Carapace 0.36±0.03 long, 0.27±0.02 wide. Leg spination: Fpdp

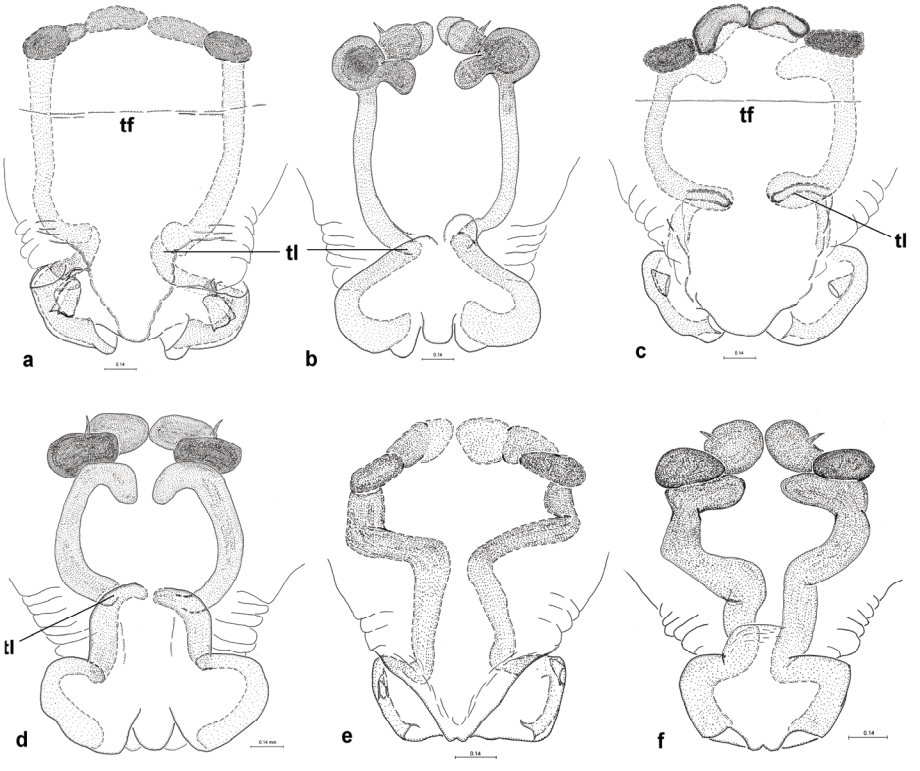


Figure 3. *Clubiona caucasica* sp.n., paratype from Batumi (a, b), paratype from Turkey (c, d) and *C. caerulescens* from Oryol Area (e, f), female genitalia. a, c, e: epigyne, b, d, f: vulva. Abbreviation: tf = transverse fissure; tl = tube loop.

d1.2, F I d1.1.3 (1.1.2), F II-IV d1.1.3 (once F III d1.3.3), Pt III-IV rlat1, Ti I-II v2.2, Ti III d.2.2, v1.1.1 (1.1, twice 1.2.1, once 2.1.1), Ti IV d2.2, v.1.1.1 (1.1, once 2.1.1), Mt I v2 (once 1), Mt II v2, Mt III d2.1.2, lat1.2 (2.2), v.2.2, Mt IV d2.1.2 (once 2.1, 2.2), lat2.2, v2.1.2 (once 2.2). Leg measurements: F I 0.30±0.02, II 0.32±0.02, III 0.26±0.02, IV 0.34±0.02, Pt I 0.15±0.01, II 0.15±0.01, III 0.12±0.01, IV 0.15±0.01, Ti I 0.28±0.02, II 0.30±0.02, III 0.20±0.02, IV 0.30±0.04, Mt I 0.21±0.01, II 0.22±0.01, III 0.23±0.01, IV 0.37±0.03, T I 0.13±0.01, II 0.13±0.01, III 0.09±0.01, IV 0.11±0.01. Palp (Figs. 1a, b, e, 2a, b): F 0.12±0.01, Pt 0.07±0.01, Ti 0.06±0.01, cymbium 0.19±0.01. Abdomen pale brown, 0.45±0.05 long, 0.26±0.06 wide.

Female (n=24 for body, and 7 for legs). Coloration as in male. Carapace 0.38±0.03 long, 0.29±0.02 long. Leg spination: F I d1.1.2, F II d1.1.2 (once 1.1.3), F III d1.1.3, F IV d.1.1.3 (once 1.1.2), Pt III-IV rlat1, Ti I v.2 (once 2.3), Ti II v.2 (once 1.2), Ti III d2.2, v1.1 (1.1.1, once 1), Ti IV d2.2, v1.1.1, Mt I v2 (1), Mt II v2, Mt III d2.1.2, lat1.2 (2.2, once 1.1.2, 2), Mt IV d2.1.2, lat2.2, v2.1.2. Leg measurements: F I 0.25±0.02, II 0.24±0.02, III 0.23±0.02, IV 0.31±0.01, Pt I 0.14±0.01, II 0.14±0.01, III 0.12±0.01, IV 0.14±0.01, Ti I 0.21±0.01, II 0.22±0.02, III 0.17±0.01, IV 0.26±0.01, Mt I 0.15±0.01, II 0.16±0.01, III 0.20±0.01, IV 0.33±0.01, T I 0.10±0.01, II 0.10±0.01, III 0.08±0.004, IV 0.10±0.01. Abdomen 0.55±0.12 long, 0.34±0.08 wide.

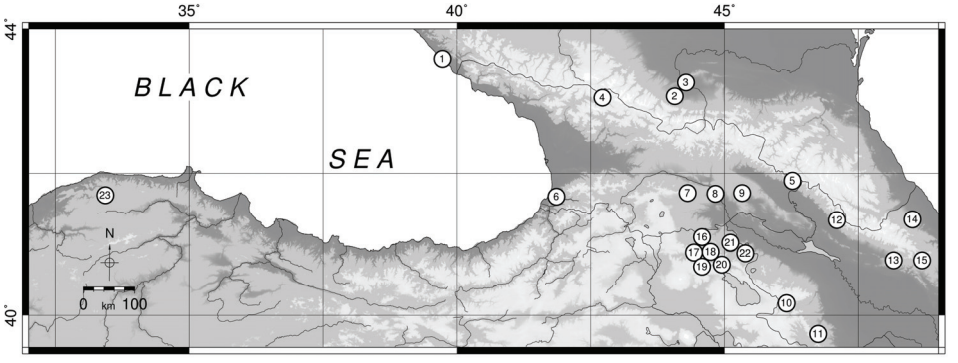


Figure 4. Distribution of *Clubiona caucasica* sp. n. (map generated using GMT, Wessel et al., 2013).

In the epigyne, the coarseness of the copulatory tubes varies. In the Turkish specimen and the specimen from Nadirkhanly (Azerbaijan), the tube loop is more pronounced and closer to the middle part of the vulva (Figure 3c, d), differing from most of the Caucasian specimens. In the latter, the loop is in the posterior third of the vulva. In addition, the copulatory tubes are more rounded anteriorly in both the Turkish and the Nadirkhanly specimens. Compared with Figure 3a-b (paratype from Batumi), the copulatory tubes are shorter in specimens from Lagodekhi Reserve and Odsun (Armenia). Specimens from Lagodekhi Reserve are paler than the other specimens.

Distribution (Figure 4). Russia: North Caucasus; Georgia; Azerbaijan; Armenia; Turkey (one locality). Montane areas only.

Ecology. Based on the 45 specimens collected in a transect study during the whole vegetation period in Lagodekhi, the activity period of this species extends from mid-April to the end of September with one activity peak in April-May and a second activity peak in August-September. During the first activity peak, males are more active/abundant than females, and in July only females were collected. In the second activity period both males and females are active. Most specimens were collected at altitudes of 670-1350 m a.s.l., but one male and one female were collected as high as 1900 m and 2230 m (in September). More data about habitats in Pirkuli Reserve are given in Mikhailov (1990), list of material, under *C. caerulescens*. Most records are from the broadleaved forest belt (sometimes in coniferous stands), both in the Caucasus Major and Caucasus Minor, at altitudes of 500-1700 m. Despite rare findings of *C. caucasica* sp. n. with ants (one locality in Armenia) and in a cave (not very close to the entrance, 200 m, environs of Sochi, in *Buxus* forest), this species seems to be neither myrmecophilic nor troglophilic.

**Discussion**

The *Clubiona caerulescens*-group consists of two species. Within this group, the species are distributed allopatrically. In lowland areas, such as the Rostov Area, only *C. caerulescens* is found (A. V. Ponomarev, pers. comm.), whereas in montane areas such as North Osetia and the environs of Sochi, only *C. caucasica* sp. n. is known. In the West European mountains and in the Urals, the former species has been recorded. As previ-

ously suggested, a transpalearctic range is confirmed for *C. caerulescens*, with the only exception in the montane areas of the Caucasus and Asia Minor.

With the description of this new species, the diagnosis of the *C. caerulescens*-group should be changed from that given in the earlier publication (Mikhailov, 1995): the RTA is large and strongly sclerotized, separated into a small ventral outgrowth (vo), and a large dorsal one (do), diverging into three branches.

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**Disclosure Statement**

No potential conflict of interest was reported by the authors.

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