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Notes on the spider genus *Bisetifer* Tanasevitch, 1987 (Aranei: Linyphiidae), with the description of a new species

О пауках рода *Bisetifer* Tanasevitch, 1987 (Aranei: Linyphiidae) с описанием нового вида

A.V. Tanasevitch[1], A.V. Ponomarev[2], Yu.A. Chumachenko[3]
А.В. Танасевич[1], А.В. Пономарев[2], Ю.А. Чумаченко[3]

[1] Institute of Ecology and Evolution, Russian Academy of Sciences, Leninsky prospect, 33, Moscow 119071, Russia. E-mail: tanasevitch@gmail.com

Институт проблем экологии и эволюции РАН, Ленинский проспект, 33, Москва 119071, Россия.

[2] Institute of Arid Zones, Southern Scientific Centre, Russian Academy of Sciences, Chekhov str., 41, Rostov-on-Don 344006, Russia. E-mail: ponomarev1952@mail.ru

Институт аридных зон, Южный научный центр РАН, пр. Чехова, 41, Ростов-на-Дону 344006, Россия.

[3] Caucasian State Biosphere Nature Reserve, Sovetskaya av., 187, Maykop 385000 Russia. E-mail: ychumachenko73@mail.ru

Кавказский государственный природный биосферный заповедник, ул. Советская, 187, Майкоп 385000, Россия.

KEY WORDS: Dwarf-spiders, Erigoninae, Caucasus, Russia, Georgia, Azerbaijan, new species.

КЛЮЧЕВЫЕ СЛОВА: Пауки-пигмеи, Erigoninae, Кавказ, Россия, Грузия, Азербайджан, новый вид.

ABSTRACT: Revision of the type series of *Bisetifer cephalotus* Tanasevitch, 1987, shows this species to be heterogeneous and, besides the nominate form, the series to contain another, very similar, new species, *B. gruzin* sp.n. The female, originally described as corresponding to the male of *B. cephalotus*, is actually the female of the new species. The true female of *B. cephalotus* is described for the first time. Fresh samples from the Krasnodar Province, southern Russia and from Georgia show that *B. gruzin* sp.n. seems to be much more widely distributed in the Caucasus than *B. cephalotus*.

РЕЗЮМЕ: Типовая серия *Bisetifer cephalotus* Tanasevitch, 1987, помимо номинального вида, содержит еще один близкий к нему вид, *B. gruzin* sp.n. Самка, первоначально описанная как пара к самцу *B. cephalotus*, в действительности относится к новому виду. Самка *B. cephalotus* описана впервые. Недавние сборы с Кавказа показали, что *B. gruzin* sp.n. распространен здесь значительно шире, чем *B. cephalotus*.

Introduction

The hitherto monotypic genus *Bisetifer* Tanasevitch, 1987, was described from the Krasnodar Province, Russia and from Georgia, Caucasus, with *B. cephalotus* Tanasevitch, 1987, as type-species [Tanasevitch, 1987]. This species has since been recorded (as it appears, mainly erroneously) from numerous localities in Georgia, Azerbaijan [Tanasevitch, 1990], Krasnodar Province [Ponomarev, Chumachenko, 2007], as well as the Crimea [Kovblyuk, 2007].

A new material recently collected in the Caucasus has prompted us to revise all earlier samples, including type specimens. Revision of the type series of *B. cephalotus* shows the taxon to be heterogeneous and, besides the nominate species, the series to contain another, very closely related, new species. Secondly, the female, originally described as corresponding to the male of *B. cephalotus*, appears to be conspecific with the new species.

Descriptions of both the new species of *Bisetifer* and of the true female of *B. cephalotus*, following a re-examination of the type and other comparative material of *B. cephalotus*, are the subject of the present paper.

Material and methods

This paper is based on a study of the type and other comparative material kept both at the Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU) and in the personal collection of Andrei Tanasevitch (CAT). Fresh material from Caucasus was collected by pitfall trapping, preserved in 70% ethanol and studied using a MBS-9 stereo microscope. The epigyne was cleared with a hot 20% KOH solution. A Levenhuk C-800 digital camera was utilized for drawing the vulva. Images of multiple focal sections were combined using Helicon Focus image stacking software, version 5.1.

The type specimens are shared between the collections of the ZMMU and the Muséum d'histoire naturelle, Geneva, Switzerland (MHNG).

Map. The localities of *Bisetifer cephalotus* Tanasevitch, 1987 (circle) and *B. gruzin* sp.n. (triangle): 1 — Psebe; 2 — Defanovka; 3 — Maykop; 4 — Polkovnitskaya Balka; 5 — Zedazeni; 6 — Kvareli; 7 — Lagodekhi; 8 — Nikortsminda; 9 — Danisparauli; 10 — Khosta; 11 — Batsara State Reserve; 12 — Magalakhari Pass; 13 — Ismailly; 14 — Bash-Laisky.

Карта. Точки сборов *Bisetifer cephalotus* Tanasevitch, 1987 (круг) and *B. gruzin* sp.n. (треугольник): 1 — Псебе; 2 — Дефановка; 3 — Майкоп; 4 — Полковницкая балка; 5 — Зедазени; 6 — Кварели; 7 — Лагодехи; 8 — Никорцминда; 9 — Даниспараули; 10 — Хоста; 11 — заповедник Батсара; 12 — перевал Магалахари; 13 — Исмаиллы; 14 — Баш-Лайский.

In the descriptions, the sequence of leg segment measurements is as follows: femur + patella + tibia + metatarsus + tarsus. All measurements are given in mm. Scale lines in the figures correspond to 0.1 mm unless indicated otherwise.

The chaetotaxy formula means the number of dorsal spines on tibiae I–IV. The terminology of copulatory organs follows that of Merrett [1963], Hormiga [2000] and Tanasevitch [1998, 2015].

The following abbreviations are used in the text and figures: DSA — distal suprategular apophysis; E — embolus; Mt — metatarsus; R — radix; TmI — position of trichobothrium on metatarsus I.

The numbers in square brackets correspond to the numbers of the localities presented on the map.

Taxonomic part

Bisetifer Tanasevitch, 1987

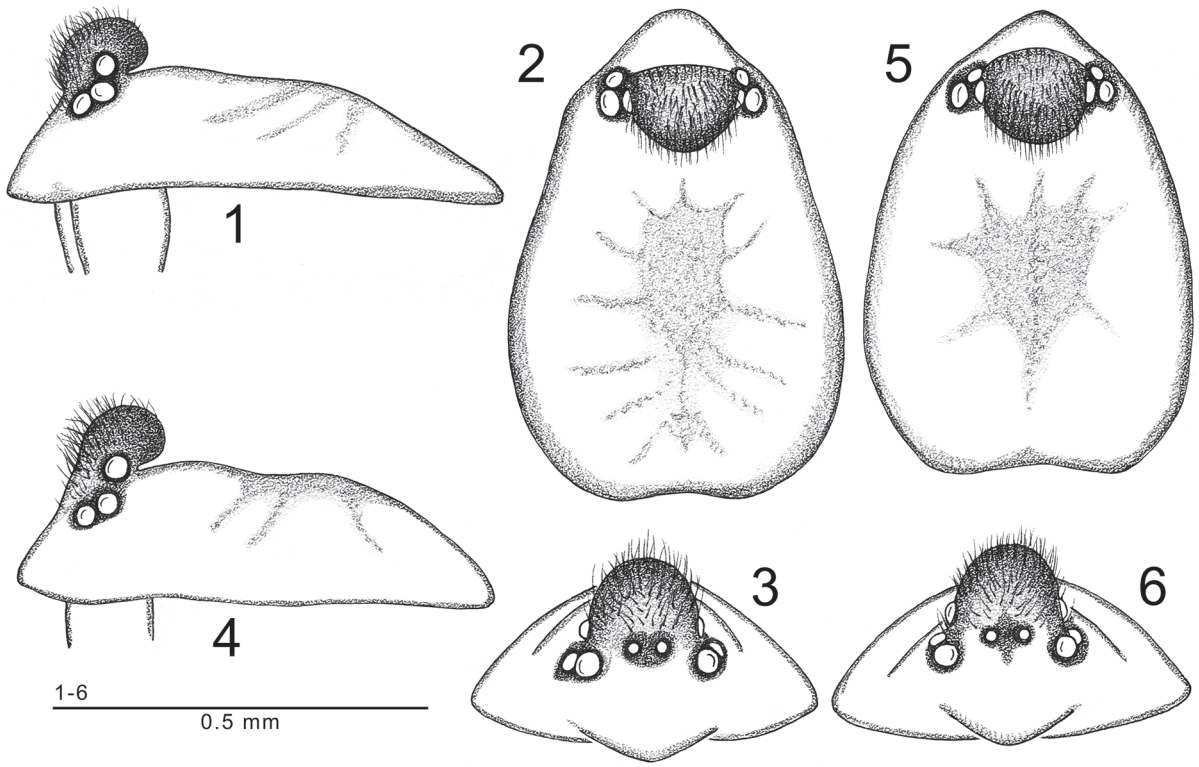
Type species: *Bisetifer cephalotus* Tanasevitch, 1987, by original designation.

DIAGNOSIS. Small-sized Erigoninae, total length 1.18–1.39 mm. Male carapace modified: clypeus slightly prominent conically, head part with a swelling carrying posterior median eyes at base (Figs 1–6). Leg chaetotaxy 2.2.1.1. Metatarsi I–III each with a trichobothrium. TmI 0.40–0.45. Male palp small and compact, palpal tibia with a curved ventro-prolateral outgrowth terminated with a pair of large, strong, distally serrate setae differing in size. Distal suprategular apophysis hypertrophied, hook-shaped, with several apophyses of complicated configuration. Embolus small, short, hook-shaped, its base connecting to radix by a transparent, poorly sclerotized tissue. Duct following through a relatively small radix. Epigyne characterized by presence on its posterior side of special outgrowths where channels of seminal ducts open.

COMPOSITION. Two species: *Bisetifer cephalotus* Tanasevitch, 1987, and *B. gruzin* sp.n.

TAXONOMIC REMARKS. In the absence of a modern classification of the subfamily Erigoninae, it is difficult to understand the position of the genus. The chaeto-, trichobothriotaxy and, especially, the shape of the hypertrophied distal suprategular apophysis superficially indicate a similarity to taxa from the *Savignia* genus-group (sensu Merrett [1963]). In contrast, the structure of the embolic division in *Bisetifer* is quite different. The conformation of the embolic division bears some resemblance to that of many species of the genus *Oedothorax* Bertkau, 1883 (see Tanasevitch [2015]). However, in *Oedothorax*, the duct runs directly from the column to the embolus, escaping the main body of the embolic division, termed “convector” (sensu Tanasevitch [1998, 2015]), while in *Bisetifer* the duct enters the embolus through its main body, this being denominated as “radix”.

DISTRIBUTION. Caucasus. The record of *B. cephalotus* in the Crimea [Kovblyuk, 2007] requires confirmation.



Figs 1–6. Male carapace of *Bisetifer cephalotus* Tanasevitch, 1987 (1–3), specimen from Polkovnitskaya Balka, and *B. gruzin* sp.n., specimen from Zedazeni (4–6). 1, 4 — lateral view; 2, 5 — dorsal view, 3, 6 — frontal view.

Рис. 1–6. Карапакс самца *Bisetifer cephalotus* Tanasevitch, 1987, экземпляр из Полковницкой балки, (1–3) и *B. gruzin* sp.n., экземпляр из Зедазени (4–6). 1, 4 — вид сбоку; 2, 5 — вид сверху; 3, 6 — вид спереди.

Bisetifer cephalotus Tanasevitch, 1987
Figs 1–3, 7–18.

1987 *Bisetifer cephalotus* Tanasevitch: 342, figs 81–86, ♂ holotype and ♂ paratype from Psebe, Krasnodar Province, re-examined.

TYPE MATERIAL EXAMINED: ♂ holotype of *Bisetifer cephalotus* (ZMMU, Ta-4471), Caucasus, RUSSIA, Krasnodar Province (= Kray), Tuapse Distr., 15 km of Novomikhailovsky, Psebe [1], deciduous forest, litter, under stones, 29.X.1981, leg. S. Golovatch; ♂ paratype of *Bisetifer cephalotus* (ZMMU, Ta-4471), same locality, together with holotype.

ADDITIONAL MATERIAL EXAMINED: 1 ♀ (ZMMU, from CAT, labeled as gen. sp.), Krasnodar Province, Goryachiy Klyuch, Defanovka (44.42524ºN 38.77865ºE) [2], *Quercus* & *Acer* forest, litter, 29.X.1981, leg. S. Golovatch; 2 ♀♀ (MHNG), Adygea, Maykop, 300 m a.s.l., (44.582594ºN 40.115125ºE) [3], *Quercus* & *Carpinus* forest, litter, 6.V.2007; 3 ♀♀ (ZMMU), Maykop Distr., 6 km S of Pervomayskiy, environs of "Lesnaya skazka", Polkovnitskaya Balka (44.3454°N 40.18947°E) [4], *Quercus* & *Carpinus* forest, 16.III–1.IV.2011; 23 ♂♂ (ZMMU), 5 ♂♂ (MHNG), same locality, 16.III–15.V.2011; 3 ♂♂, 1 ♀ (ZMMU), same locality, 15.IV–2.V.2011; 1 ♂ (ZMMU), same locality, 2–15.V.2011; 1 ♀ (ZMMU), same locality, 15.V–4.VI.2011; 1 ♀ (ZMMU), same locality, 4–16.VI.2011, all leg. Yu. Chumachenko.

DESCRIPTION. Male, see Tanasevitch [1987], carapace and details of palp structure, see Figs 1–3, 7–16.

Female (specimen from Polkovnitskaya Balka). Total length 1.28. Carapace unmodified, 0.56 long, 0.44 wide, pale brown, with a vague grey radial stripes and a narrow darker margin. Chelicerae 0.24 long. Legs yellow to pale brown. Leg I, 1.14 long (0.42 + 0.14 + 0.35 + 0.26 + 0.24), IV, 1.50 long (0.45 + 0.15 + 0.38 + 0.29 + 0.23). Chaetotaxy 2.2.1.1, length of spines about 1–1.5 diameter of segment. Metatarsi I–IV spineless. Metatarsi IV without trichobothrium. TmI 0.44. Abdomen 0.78 long, 0.59 wide, grey, dorsal pattern absent. Epigyne as in Figs 17 & 18: posterior side with a pair of nipple-shaped outgrowths where channels of seminal ducts open.

REMARKS. *Bisetifer cephalotus* was correctly recorded only from a single locality, i.e., Psebe, Krasnodar Province [Tanasevitch, 1987]. All other records from the Caucasus [Tanasevitch, 1987 in part, 1990; Ponomarev, Chumachenko, 2007] appear to be misidentifications and actually refer to *B. gruzin* sp.n., which is described below. The finding of *B. cephalotus* in the Crimea [Kovblyuk, 2007] requires confirmation.

DISTRIBUTION. Caucasus: Krasnodar Province and Adygea, Russia, see Map.

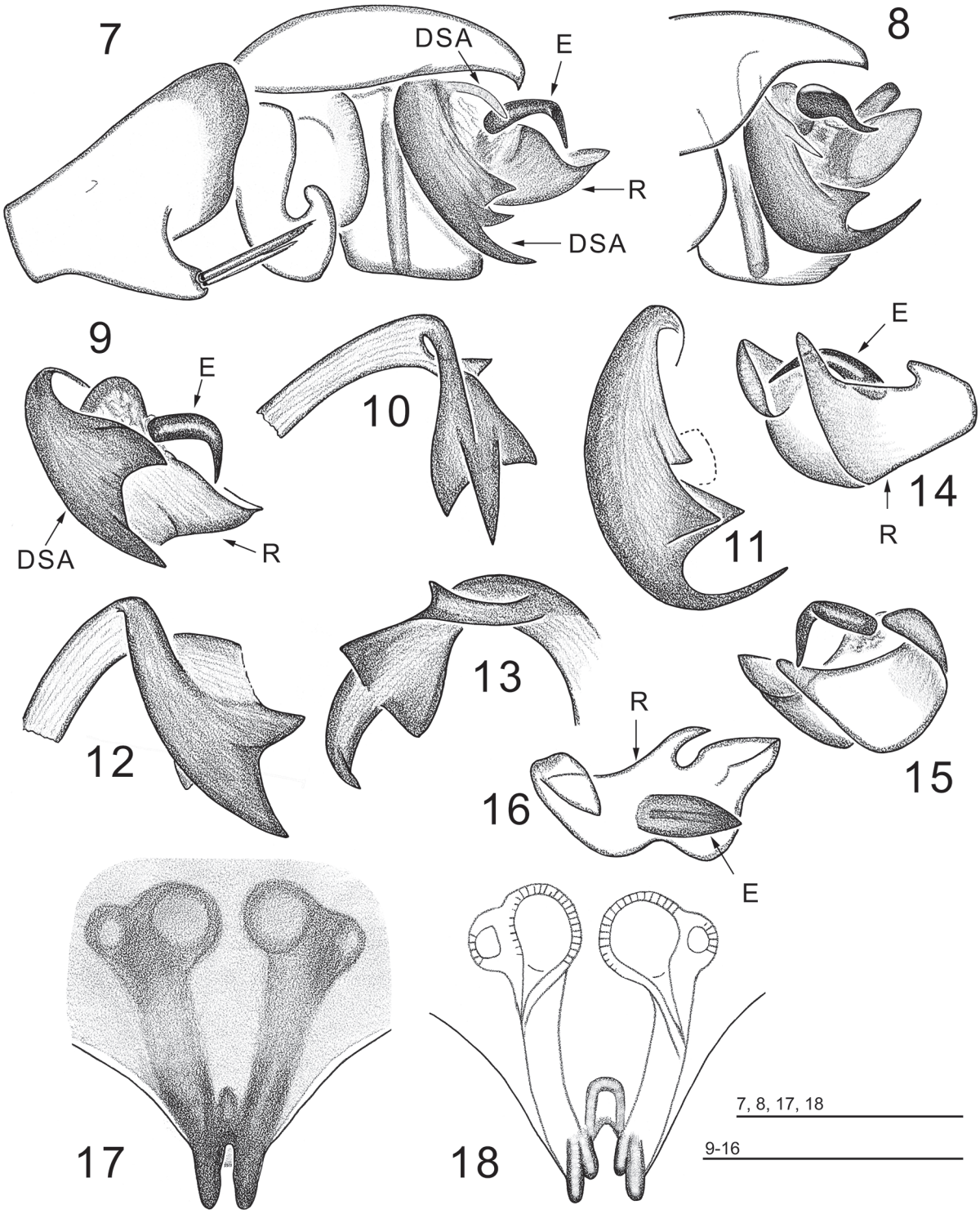
TAXONOMIC REMARKS. See Diagnosis under *Bisetifer gruzin* sp.n.

Bisetifer gruzin **sp.n.**
Figs 4–6, 19–31.

1987 *Bisetifer cephalotus* Tanasevitch: 342, fig. 87, ♂♂ in part, ♀♀, re-examined.

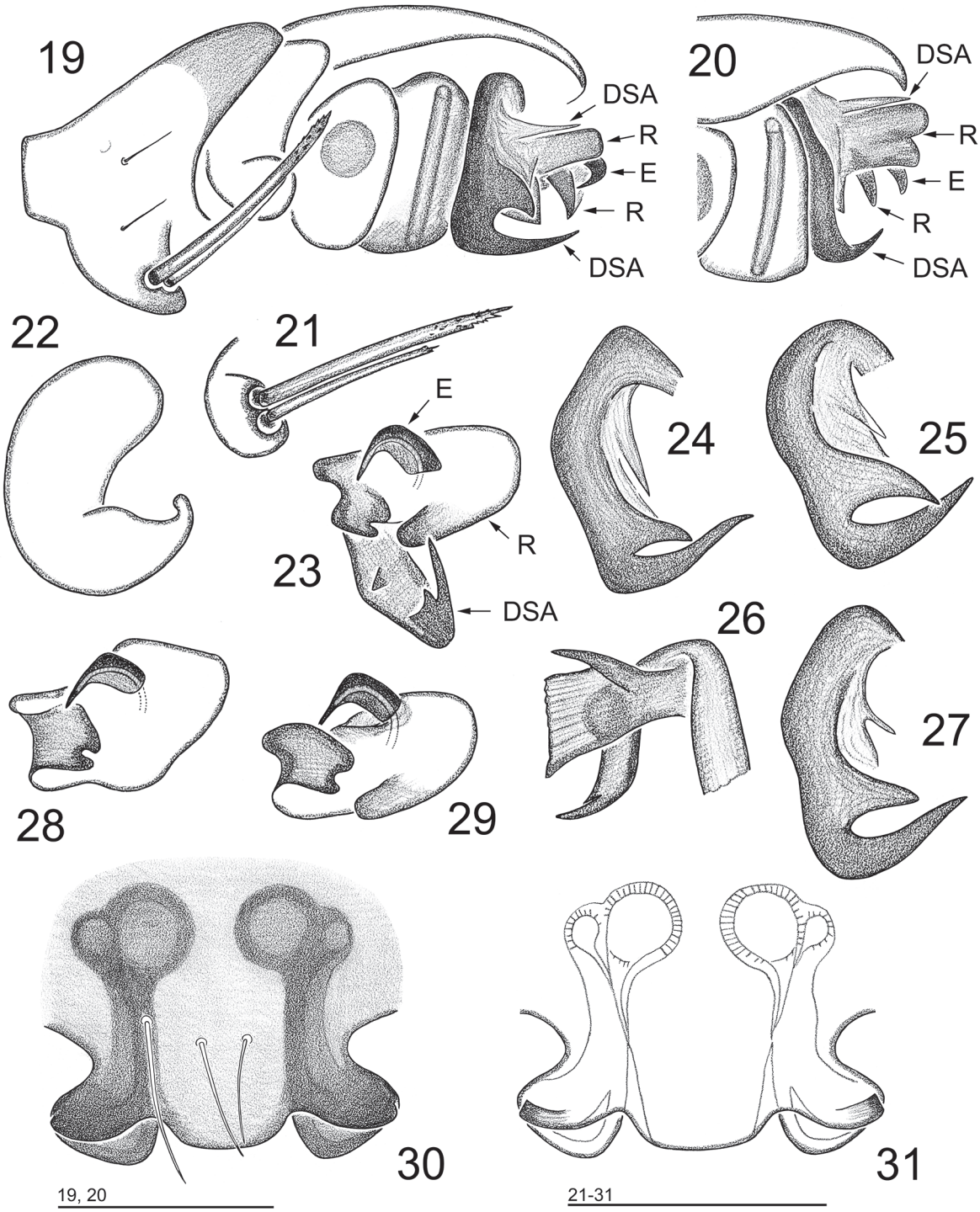
1990 *B. cephalotus* Tanasevitch: 45, ♂♂ & ♀♀, partly re-examined.

2007 *B. cephalotus* Ponomarev, Chumachenko: 154, examined.



Figs 7–18. Details of male palp structure and epigyne of *Bisetifer cephalotus* Tanasevitch, 1987, ♂ paratype from Psebe, ♀ specimen from Polkovnitskaya Balka. 7, 8 — right palp, different aspects; 9 — distal suprategular apophysis and embolic division; 10–13 — distal suprategular apophysis, different aspects; 14–16 — embolic division, different aspects; 17 — epigyne, ventral view; 18 — cleared epigyne, ventral view.

Рис. 7–18. Детали строения пальпы самца и эпигины самки *Bisetifer cephalotus* Tanasevitch, 1987, паратип ♂ из Псебе, ♀ из Полковницкой балки. 7, 8 — правая пальпа, разные аспекты; 9 — distal suprategular apophysis и эмболюсный отдел; 10–13 — distal suprategular apophysis, разные аспекты; 14–16 — эмболюсный отдел, разные аспекты; 17 — эпигина, вид снизу; 18 — просветлённая эпигина, вид снизу.



Figs 19–31. Details of male palp structure (19–29) and epigyne (30, 31) of *Bisetifer gruzin* sp.n., ♂ & ♀ specimens from Zedazeni. 19, 20 — right palp, different aspects; 21 — setae at apex of palpal tibial apophysis; 22 — paracymbium; 23 — distal suprategular apophysis and embolic division; 24–27 — distal suprategular apophysis, different aspects; 28, 29 — embolic division, different aspects; 30 — epigyne, ventral view; 31 — cleared epigyne, ventral view.

Рис. 19–31. Детали строения пальпы самца (19–29) и эпигины самки (30, 31) *Bisetifer gruzin* sp.n., экземпляры ♂ и ♀ из Зедазени. 19, 20 — правая пальпа, разные аспекты; 21 — сеты на выросте голени пальпы; 22 парацимбиум; 23 — distal suprategular apophysis и эмболюсный отдел; 24–27 — distal suprategular apophysis, разные аспекты; 28, 29 — эмболюсный отдел, разные аспекты; 30 — эпигина, вид снизу; 31 — просветлённая эпигина, вид снизу.

NAME. A noun in apposition transliterating the Russian word “gruzin”, meaning a native of Georgia, Transcaucasia.

DIAGNOSIS. The new species is very similar to the single congener, *Bisetifer cephalotus*, but the male differs by certain details of structure of the distal suprategular apophysis (Figs 10–13 cf. Figs 24–27), as well as by the shape of the embolic division (Figs 14–16 cf. Figs 28–29); the female can easily be distinguished by the shape of the outgrowths on the posterior side of the epigyne: nipple-shaped in *B. cephalotus*, versus bow-shaped in the new species (Figs 17 & 18 cf. Figs 30 & 31).

HOLOTYPE ♂ (ZMMU, from CAT, labeled as *Bisetifer cephalotus*), Caucasus, GEORGIA, Saguramo Nature Reserve, NE of Mtskheta, Zedazeni (41.900282°N 44.760311°E) [5], 1100–1200 m a.s.l., *Fagus*, *Carpinus*, *Acer* etc. forest, litter and under bark, 20.V.1987, leg. S. Golovatch & K. Eskov.

PARATYPES: 1 ♂, 4 ♀♀ (ZMMU), 1 ♂, 2 ♀♀ (MHNG), same locality, together with holotype, 20.V.1987, leg. S. Golovatch & K. Eskov; 2 ♀♀ (ZMMU, from CAT, labeled as *Bisetifer cephalotus*), GEORGIA, N of Kvareli (41.948043°N 45.817127°E) [6], 700–750 m a.s.l., *Fagus*, *Carpinus*, *Quercus* etc. forest, litter and under bark, 4.V.1987, leg. S. Golovatch & K. Eskov; 1 ♀ (ZMMU, paratype Ta-4473 of *B. cephalotus*), environs of Lagodekhi (41.825222°N 46.281596°E) [7], Lagodekhi National Park, *Fagus*, *Fraxinus*, *Acer* etc. forest, litter, 600–700 m a.s.l., 5–6.V.1983, leg. S. Golovatch; 1 ♂, 1 ♀ (ZMMU, Ta-4475, paratypes of *Bisetifer cephalotus*,), Ambrolauri Distr., Nikortsminda (42.462178°N 43.090795°E) [8], mixed *Abies* & deciduous forest, litter, 24.X.1981, leg. S. Golovatch; 1 ♀ (ZMMU, Ta-4474, paratype of *B. cephalotus*), Adjara (= Adjaria), Khulo Distr., 3 km W of Danisparauli (41.648027°N 42.462171°E) [9], deciduous forest, litter, 10.X.1981, leg. S. Golovatch; 1 ♀ (ZMMU), RUSSIA, Krasnodar Province, Sochi, Khosta, Caucasian Nature Reserve, *Taxus* & *Buxus* grove (43.523797ºN 39.868919ºE) [10], III–V.2006, leg. Yu. Chumachenko.

UNEXAMINED MATERIAL. The material listed below was reported as *Bisetifer cephalotus* by Tanasevitch [1990], but has not been found in any collections, possibly lost. Nevertheless, the specimens most probably belong to *B. gruzin* sp.n., because of the well recognizable females: 2 ♂♂, 8 ♀♀, Caucasus, GEORGIA, Batsaro Nature Reserve [11], 500 m a.s.l., *Fagus*, *Quercus* & *Carpinus* forest, 4.V.1987, leg. S. Golovatch & K. Eskov; 1 ♀, Pass Magalakhari between Akhmeta and Tianeti [12], 1200 m a.s.l., *Fagus* forest, 6.V.1987, leg. S. Golovatch & K. Eskov; 1 ♂, 2 ♀♀, AZERBAIJAN, 12 km E of Ismailly, Girdyman-Chay River Valley [13], 850–880 m a.s.l., *Fagus* forest, litter, 1.V.1987, leg. S. Golovatch & K. Eskov; 2 ♀♀, 30 NW of Sheki, above Bash-Laisky [14], 1250 m a.s.l., *Fagus* forest, litter, 1.V.1987, leg. S. Golovatch & K. Eskov.

DESCRIPTION. Male. Total length 1.38. Carapace 0.65 long, 0.48 wide, reddish-brown, with a narrow darker margin and a vague polygonal grey spot in middle part; modified as in Figs 4–6: head part with a black swelling carrying posterior median eyes at base. Chelicerae 0.21 long. Legs yellow to pale brown. Leg I, 1.57 long (0.45 + 0.15 + 0.38 + 0.30 + 0.29), IV, 1.58 long (0.45 + 0.15 + 0.44 + 0.30 + 0.24). Chaetotaxy 2.2.1.1, length of spines about 1–1.5 diameter of segment. Metatarsi I–IV spineless. Metatarsi IV without trichobothrium. TmI 0.43. Palp (Figs 19–29): tibia with a ventro-prolateral outgrowth bearing two thick, strong, distally serrate setae differing in size: one seta slightly shorter and narrower, in some view aspects the larger seta hiding the smaller one. Paracymbium relatively small, simple, L-shaped. Distal suprategular apophysis very large, well-sclerotized, with a complicated arrangement of apophyses in its middle part, distally stylet-shaped and orthogonally curved. Embolus small, short, hook-shaped, duct entering embolus through radix. Radix relatively small, its edge bent, with a small hollow apically. Abdomen 0.78 long, 0.51 wide, dark grey, dorsal pattern absent.

Female. Total length 1.35. Carapace unmodified, 0.56 long, 0.45 wide. Chelicerae 0.20 long. Leg I, 1.47 long (0.47 + 0.15 + 0.35 + 0.27 + 0.23), IV, 1.51 long (0.45 + 0.15 + 0.39 + 0.29 + 0.23). Chaetotaxy 2.2.1.1, length of spines about 1 diameter of segment. Metatarsi I–IV spineless. Metatarsi IV without trichobothria. TmI 0.44. Abdomen 0.83 long, 0.63 wide, grey, dorsal pattern absent. Epigyne as in Figs 30 & 31: with a pair of bow-shaped outgrowths on it posterior side, in which channels of the seminal ducts open.

REMARKS. All previous records of *B. cephalotus* from the Caucasus [Tanasevitch, 1987 in part, 1990; Ponomarev, Chumachenko, 2007], except for Psebe, Krasnodar Province [Tanasevitch, 1987], actually refer to *B. gruzin* sp.n.

DISTRIBUTION. Caucasus: Krasnodar Province, Russia; Georgia, Azerbaijan, see Map.

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