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Four new species of the spider family Linyphiidae (Aranei) from clay semidesert of Western Kazakhstan

Четыре новых вида пауков сем. Linyphiidae (Aranei) из глинистой полупустыни Западного Казахстана

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КЛЮЧЕВЫЕ СЛОВА: Пауки, Linyphiidae, новые виды, Казахстан, опустыненные степи.

ABSTRACT. Four species of the family Linyphiidae, i.e., *Improphantes contus* sp.n., *Silometopus crassipedis* sp.n., *Trichoncus villius* sp.n., and *Walckenaeria stepposa* sp.n. are described from clay semidesert of Western Kazakhstan (environs of Dzhanybek).

РЕЗЮМЕ. Из глинистой полупустыни Западного Казахстана (окр. пос. Джаныбек) описаны 4 вида пауков сем. Linyphiidae: *Improphantes contus* sp.n., *Silometopus crassipedis* sp.n., *Trichoncus villius* sp.n. и *Walckenaeria stepposa* sp.n.

Introduction

The Russian Plain may be characterized as a well taxonomically studied region, so it would seem new linyphiid species are hardly expected. However, steppe regions quite often give us surprises. Seven new taxa of linyphiids have been described from steppe/desert regions of the Russian Plain during recent years [Tanasevitch, 1987, 1993, 2000, 2004], and, as we see, that's not a limit.

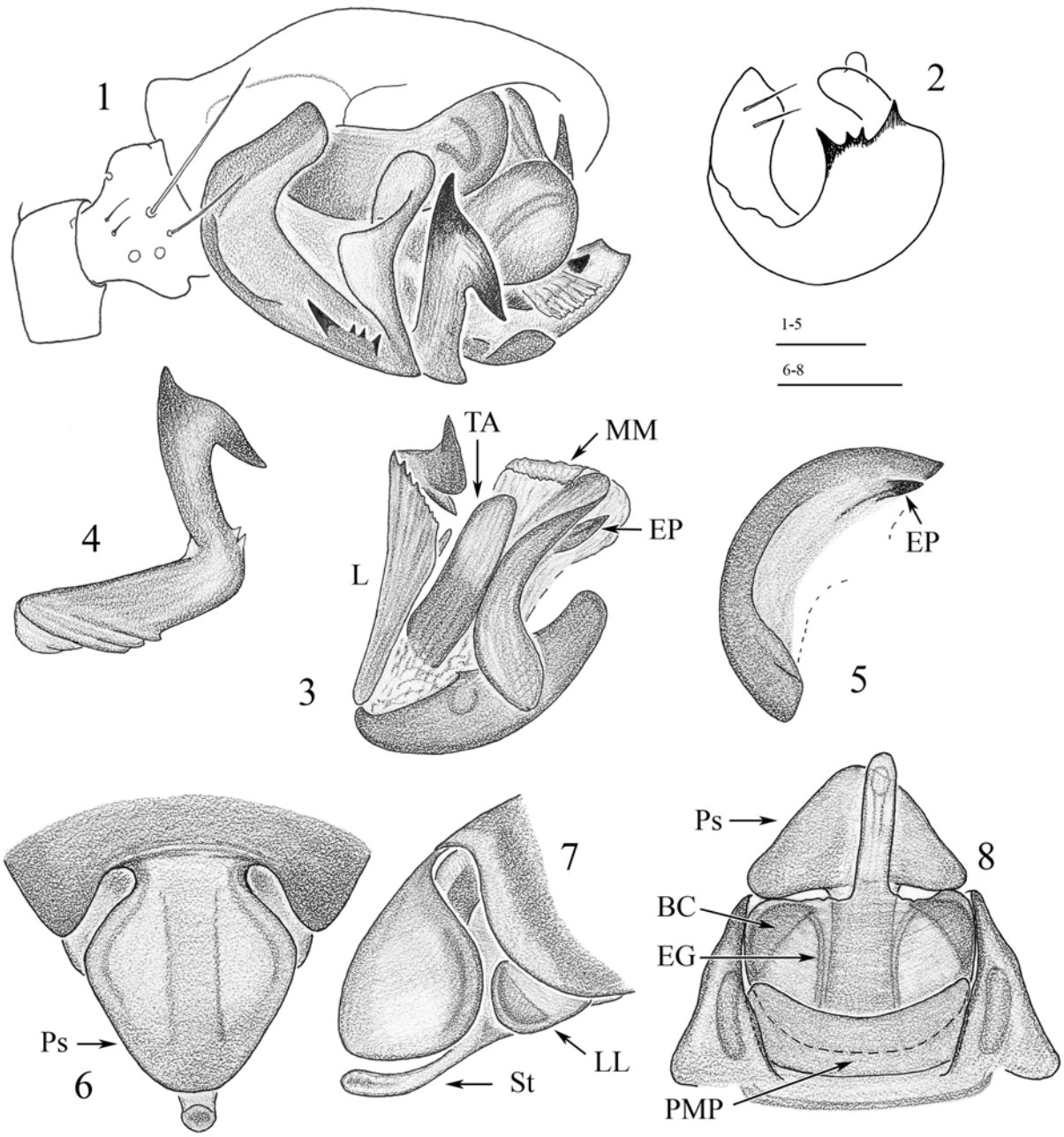
There is very little information about linyphiid spiders from Western Kazakhstan. The only paper [Tanasevitch, 1987] contains a checklist of seven species and a description of a new genus. The revision of that material deposed in ZMMU showed the specimens determined as *Agyneta rurestris* (C.L. Koch, 1836) were actually a mixture of two species, i.e., *A. rurestris* and *A. saaristoi* Tanasevitch, 2000.

The recent investigation on spiders from the environs of Dzhanybek gave us some new species, the description of four of which is the subject of this paper.

Material and methods

The material was collected from April to October in 2004 and 2005 on the territory of the Dzhanybek Research Station (DRS) of the Institute of Forestry, Russian Academy of Sciences, in the environs of Dzhanybek village (49°23' N, 46°47,5' E). DRS is situated in the westernmost point of Kazakhstan, just near the border with Volgograd Province of Russia. The area studied is a flat plain in the northwest Caspian Sea Lowland referred to semidesert zone [Milkov & Gvozdetsky, 1986]. Vegetation cover is characterized by the complexity and composed by mosaic of desert and steppe plant communities. Microelevations are desert biotopes with *Kochia prostrata* and *Artemisia pauciflora* associations on solonetz soils. Microdepressions (up to 0.4 m depth) are steppe biotopes with forb-grass vegetation (*Stipa* spp., *Festuca valesiaca, Agropyron cristatum*, etc.) on dark chestnut and meadow chestnut soils. Microslopes are occupied by typical semidesert vegetation (*Agropyron desertorum, Tanacetum achilleifolium, Galatella villosa* etc.) on light chestnut soils.

In the descriptions, chaetotaxy in Micronetinae as follows: Ti I: 2-1-1-2(1), which means that tibia I has two dorsal, one pro- and one retrolateral spine, and two or one ventral spine (the apical spines are herewith disregarded); in Erigoninae is given by the following formula: 2.2.1.1, which refers to the number of dorsal spines on tibiae I–IV, respectively; The sequence of leg segments in measurement data is as follows: femur + patella + tibia + metatarsus + tarsus. All measurements are given in mm. Scale lines in figures = 0.1 mm, unless otherwise indicated.



Figs 1–8. *Improphantes contus* sp.n.: 1 — right palp, 2 — paracymbium (ventro-lateral view), 3 — embolic division, 4 — lamella characteristica, 5 — embolus, 6–8 epigyne (ventral, lateral & dorsal view, respectively).

Рис. 1–8. *Improphantes contus* sp.n.: 1 — правая пальпа, 2 — парацимбиум (вид сбоку и снизу), 3 — эмболюсный отдел, 4 — lamella characteristica, 5 — эмболюс, 6–8 эпигина (вид снизу, сбоку и сверху, соответственно).

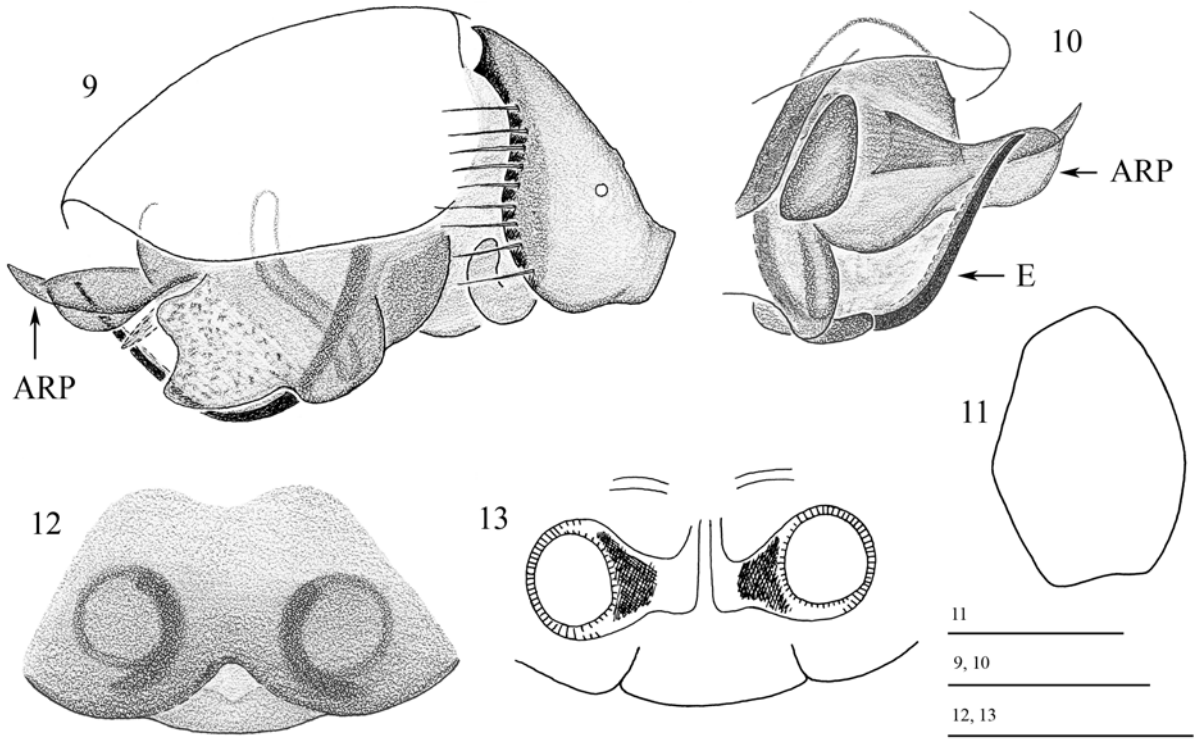
The following abbreviations are used in the text and figures: ARP — anterior radical process, BC — bursa copulatrix, DRS — Dzhanybek Research Station, EG — entrance groove, EP — embolus proper, Fe — femur, L — lamella characteristica, LL — lateral lobes, MM — median membrane, Mt — metatarsus, PMP — posterior median plate, PO — posterodorsal outgrowth, Ps — proscape, SA — suprategular apophysis, St — stretcher, TA — terminal apophysis, Ti — tibia; TmI — the position of the metatarsal trichobothrium, ZMMU — Zoological Museum of the Moscow State University.

Illustrations were made using a binocular with a drawing device.

Improphantes contus **sp.n.**

Figs 1–8.

MATERIAL. Holotype ♂ (ZMMU: Ta-6800), Western Kazakhstan, env. of Dzhanybek, DRS, clay semidesert, steppe associa-



Figs 9–13. *Silometopus crassipedis* sp.n.: 9, 10 — left palp (retrolateral & prolateral view, respectively), 11 — palpal tibia (dorsal view), 12, 13 — epigyne (ventral & dorsal retrolateral view, respectively).

Рис. 9–13. *Silometopus crassipedis* sp.n.: 9, 10 — левая пальпа (вид сбоку и сзади, соответственно), 11 — голень пальпы (вид сверху), 12, 13 — эпигина (вид снизу и сверху, соответственно).

tion with diverse herbs, in pitfall traps, 15–21.IV.2004, leg. T.V. Piterkina.

Paratypes: 6 ♀♀ (ZMMU: Ta-6801), same locality, 15.IV–20.V.2004, leg. T.V. Piterkina.

DESCRIPTION. Male. Total length, 2.50. Carapace 1.15 long, 0.98 wide, pale brown with black narrow margin. Chelicerae 0.50 long. Legs yellow. FeI, 1.45 long, other joints lost. Leg IV, 5.29 long (1.43+0.30+1.38+1.38+0.80). Chaetotaxy: see female. Palp (Figs 1–5): Cymbium with a small posterodorsal outgrowth. Paracymbium U-shaped, distal lobe at base with four sharp teeth different in size. Lamella characteristica boat-hook-shaped distally. Embolus semilunar, embolus proper as a sharp tooth. Abdomen 1.40 long, 0.80 wide, grey, dorsal pattern absent.

Female. Total length, 2.85. Carapace 0.98 long, 0.85 wide. Chelicerae 0.50 long. Legs yellow. Femur I, 1.30 long, other joints lost. Leg IV, 4.75 long (1.25 + 0.30 + 1.20 + 1.25 + 0.75). Chaetotaxy: Fe I: 0-1-0-0, II–IV: 0-0-0-0; TiI: 2-1(2)-1(2)-0(1), II–III: 2-0-1-0, IV: 2-0-0(1)-0; MtI-IV: 1-0-0-0. TmI, 0.22. Abdomen 2.00 long, 1.50 wide. Epigyne (Figs 6–8): Proscape egg-shaped, conical in dorsal view. Median part of scape narrow, without expansion. Distal part of scape well-developed, lateral lobes wide. PMP wide and narrow, with a not deep notch. Body and leg colouration as in male.

ETYMOLOGY. The specific name in Latin means “boat-hook”, which refers to the shape of the lamella characteristica.

DIAGNOSIS. This species can be easily distinguished from the other congeners by boat-hook-shaped distal part of the lamella characteristica in male, and by the egg-shaped proscape, conical in dorsal view in female.

TAXONOMICAL REMARKS. According to the shape of the embolus and the epigyne conformation, this species clearly belongs to *Improphantes* Saaristo et Tanasevitch, 1996, recently established for the *improbulus*-species group of *Lepthyphantes* sensu lato [Saaristo & Tanasevitch, 1996]. The epigyne of *I. contus* sp.n. is somewhat similar to *I. geniculatus* (Kulczyński, 1898), but differs by the absence of the projected lateral walls and narrowing distally proscape. Male, besides boat-hook-shaped distal part of the lamella characteristica, well differs from other congener by the number and arrangement of teeth in the paracymbium.

ECOLOGY. Mature specimens occur in April–May in steppe plant associations. All samples were collected by pitfall trapping.

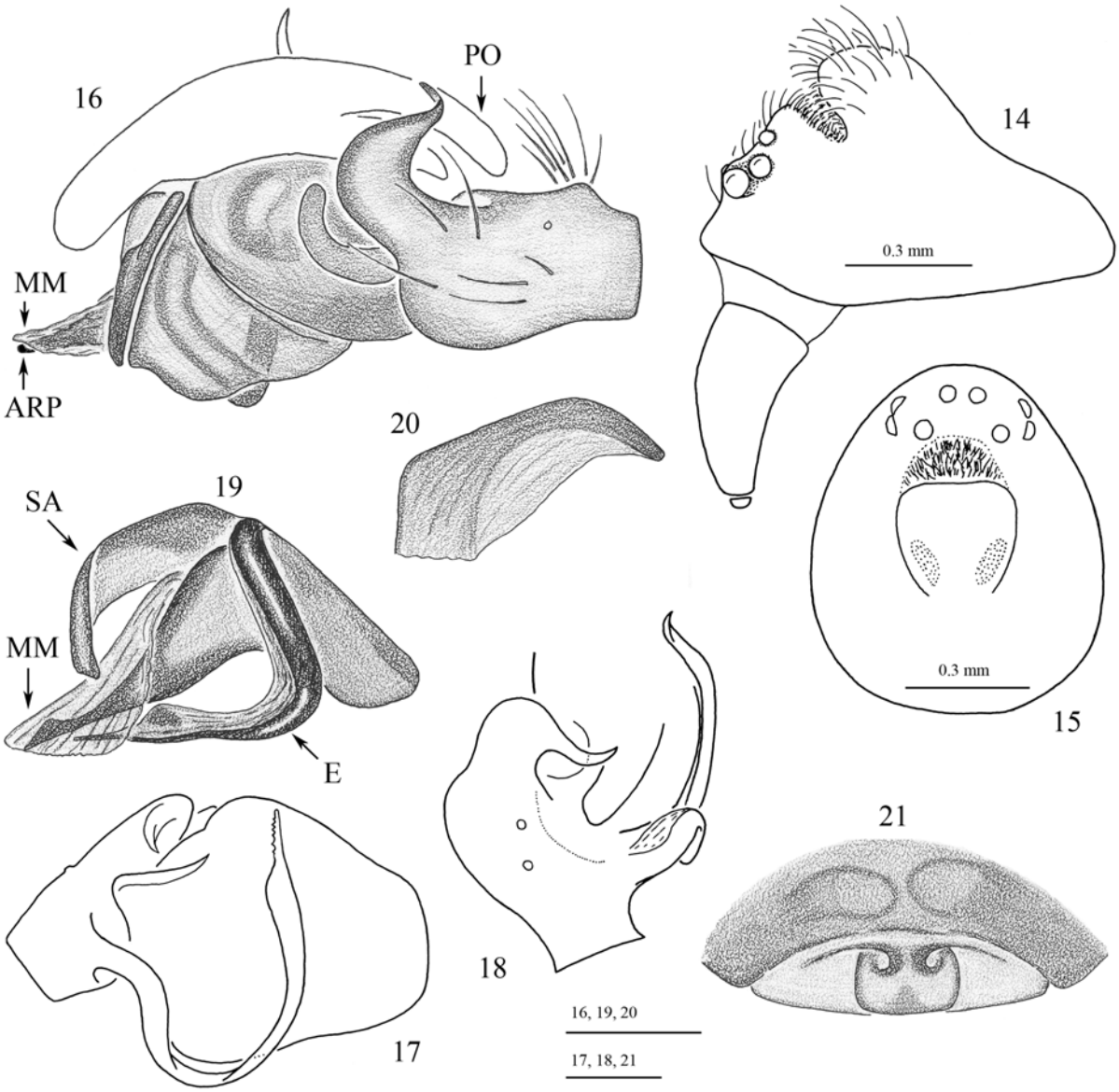
DISTRIBUTION. Known from the type locality only.

Silometopus crassipedis **sp.n.**
Figs 9–13.

MATERIAL. Holotype ♂ (ZMMU: Ta-6802), Western Kazakhstan, env. of Dzhanybek, DRS, clay semidesert, desert association with *Kochia prostrata* and *Arthemisia pauciflora*, in pitfall traps, 14–21.IV.2004, leg. T.V. Piterkina.

Paratypes: 1 ♂, 21 ♀♀ (ZMMU: Ta-6803), same locality, 14.IV–20.V. 2004 & 6.X.2004, leg. T.V. Piterkina.

DESCRIPTION. Male. Total length, 1.53. Carapace unmodified (only head slightly elevated), 0.63 long, 0.58 wide, brown, with dark median spot and dark margin. Clypeus not protruded. Legs pale brown. Leg I, 1.89 long (0.55 + 0.23 + 0.45 + 0.38 + 0.28), leg IV, 2.02 long (0.58 + 0.20 + 0.53 + 0.43 + 0.28). Chaetotaxy: spines on TiI–III reduced (?),



Figs 14–21. *Trichoncus villius* sp.n.: 14, 15 — male carapace (lateral & dorsal view, respectively), 16 — left palp, 17 — palpal tibia & cymbium (retrolateral view), 18 — palpal tibia & basal part cymbium (dorsal view), 19 — embolic division & suprategular apophysis, 20 — suprategular apophysis, 21 — epigyne (ventral view).

Рис. 14–21. *Trichoncus villius* sp.n.: 14, 15 — карапакс самца (вид сбоку и сверху, соответственно), 16 — левая пальпа, 17 — голень пальпы и цимбиум (вид сзади), 18 — голень пальпы и базальная часть цимбиума (вид сверху), 19 — эмболюсный отдел и супратегулярная апофиза, 20 — супратегулярная апофиза, 21 — эпигина (вид снизу).

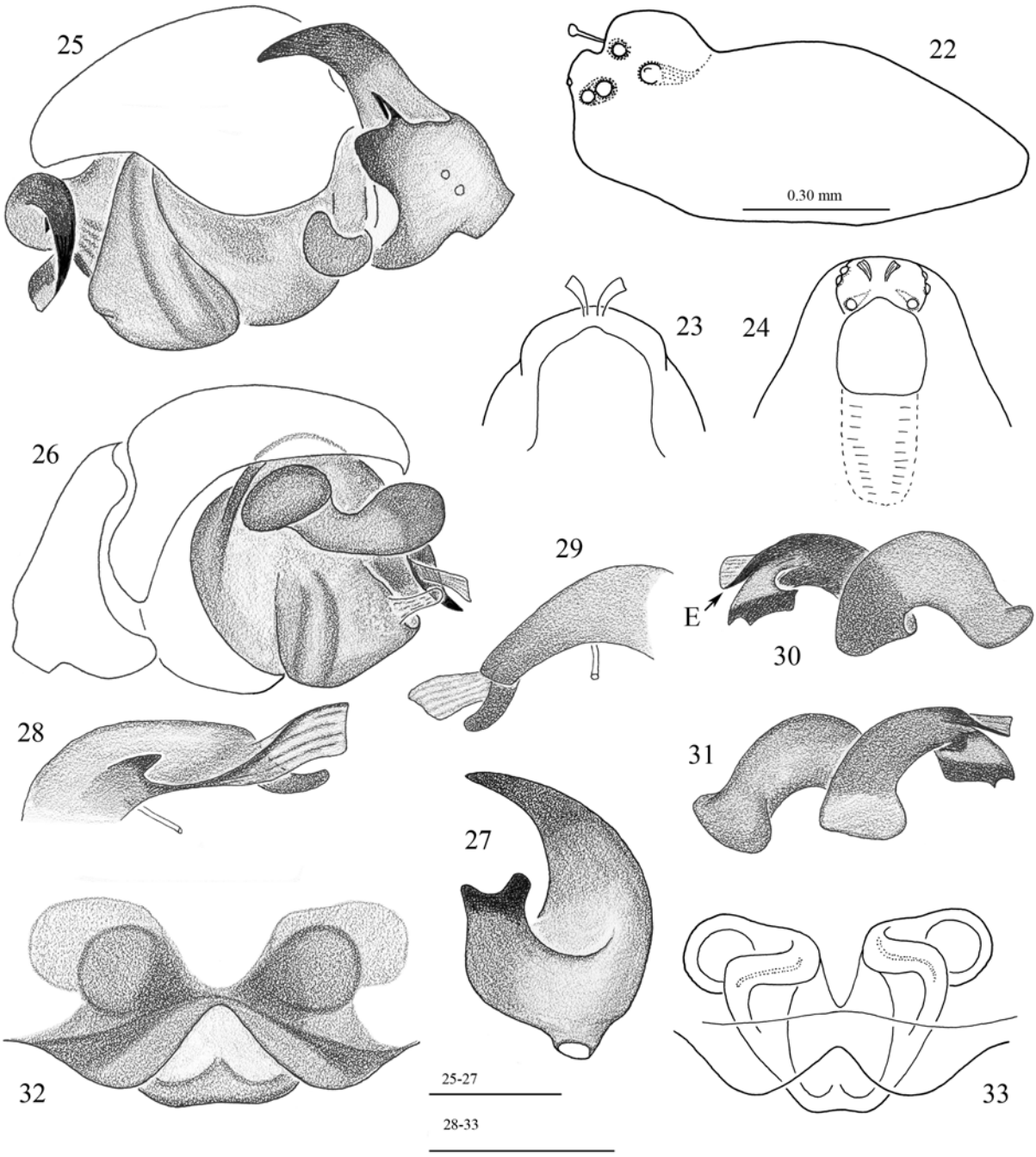
TiIV with a short dorsal spine in position 0.38. Femora and tibiae I–II in 1.5–2 times wider than of III–IV. All metatarsi with a trichobothrium. TmI, 0.69. Palp (Figs 9–11): Tibia unmodified, retrolaterally with a small tooth. Anterior radical process (sensu Hormiga [2000]) of embolic division well-developed, peculiar in shape, tailpiece and embolus relatively short. Abdomen 0.98 long, 0.63, dark grey, almost black.

Female. Total length, 1.70. Carapace unmodified, 0.58 long, 0.50. Leg I, 1.51 long (0.43 + 0.20 + 0.35 + 0.30 + 0.23), IV, 1.74 (0.50 + 0.18 + 0.43 + 0.38 + 0.25). Chaetotaxy 1.1.1.1. Wide of femora and tibiae I–II almost same as III–IV. TmI, 0.67. Abdomen 1.15 long, 0.80 wide. Epigyne (Figs 12, 13): Anterior part of epigyne with a deep notch, receptacles spherical. Body and leg colouration as in male.

ETYMOLOGY. The specific name in Latin means “thick-legged”, masculine.

DIAGNOSIS. This species is characterized by shape of the palpal tibia and thickened femora and tibiae I–II in male, unicameral receptacula in female. Also, both sexes are characterised by the presence of a trichobothrium on metatarsus IV.

TAXONOMICAL REMARKS. The new species is well distinguishable from all other congeners by the presence of a



Figs 22–33. *Walckenaeria stepposa* sp.n.: 22 — male carapace (lateral view), 23, 24 — head (posterodorsal & dorsal view, respectively), 25, 26 — left palp (retrolateral & prolateral view, respectively), 27 — palpal tibia (dorsal view), 28, 29 — suprategular apophysis, 30, 31 — embolic division, 32 — epigyne (ventral view), 33 — vulvae (ventral view). 23 & 24 — no scale.

Рис. 22–33. *Walckenaeria stepposa* sp.n.: 22 — карапакс самца (вид сбоку), 23, 24 — головной отдел (вид сверху и сзади, и сверху, соответственно), 25, 26 — левая пальпа (вид сбоку и сзади, соответственно), 27 — голень пальпы (вид сверху), 28, 29 — супратегулярная апофиза, 30, 31 — эмболюсный отдел, 32 — эпигина (вид снизу), 33 — эндогина (вид снизу). 23 & 24 — без масштаба.

trichobothrium on metatarsus IV. In addition, male can be recognized by the unmodified palpal tibia, thickened femora and tibiae I–II, relatively short and thick embolus, as well as by the peculiar shape of the anterior part of the radix. The relatively short and thick embolus in *S. crassipedis* sp.n. resembles that of *Hypsocephalus* Millidge, 1977 congeners, but all males of that genus have a modified carapace (at least projected clypeus).

ECOLOGY. Mature specimens occur in April–May and October in desert plant associations. All samples were collected by pitfall trapping or sweeping.

DISTRIBUTION. Known from the type locality only.

Trichoncus villius **sp.n.**
Figs 14–21.

MATERIAL. Holotype ♂ (ZMMU: Ta-6804), Western Kazakhstan, env. of Dzhanybek, DRS, clay semidesert, steppe association with diverse herbs, in soil samples, 13.IX.2004, leg. T.V. Piterkina.

Paratypes: 9 ♂, 15 ♀♀ (ZMMU: Ta-6805, Ta-6806), same locality, steppe and desert associations, in pitfall traps and in soil samples, 15.IV–28.IX.2004 & 10.V–24.IX.2005, leg. T.V. Piterkina.

DESCRIPTION. Male. Total length, 2.33. Carapace modified, 0.90 long, 0.83 wide, dark brown, distinctly punctate. Head with a large lobe behind the ocular area carrying long hairs (Figs 14, 15). Legs pale brown. Leg I, 3.07 long (0.88 + 0.28 + 0.73 + 0.68 + 0.50), leg IV, 3.06 long (0.88 + 0.28 + 0.75 + 0.70 + 0.45). Formula of chaetotaxy is unclear, because there are lots of additional spines on tibiae masking the taxonomical spines. All metatarsi with a trichobothrium. TmI, 0.60. Palp as in Figs. 16–20: Cymbium with posterodorsal elongated keel-like projecting. Tibia with two process: retrolateral S-shaped, basally broad, claw-shaped distally; prolateral one very long, narrow, with jagged edge apically. Embolus relatively short and thick. Abdomen 1.50 long, 1.10 wide, dark grey, hairy.

Female. Total length, 2.70. Carapace unmodified, 1.00 long, 0.90. Leg I, 3.21 long (0.88 + 0.30 + 0.80 + 0.68 + 0.55), IV, 3.40 (0.95 + 0.30 + 0.90 + 0.75 + 0.50). Chaetotaxy as in male. TmI, 0.56. Abdomen 1.75 long, 1.25 wide, hairy. Epigyne as in Figs 21. Body and leg colouration as in male.

ETYMOLOGY. The specific name in Latin means "long-wooled, shaggy".

DIAGNOSIS. This species is characterized by the presence of a large lobe behind the ocular area and by peculiar form of the palpal tibia in male. The female is characterized by the rectangular in shape of the median plate of epigyne.

TAXONOMICAL REMARKS. The new species is similar to Caucasian *T. hispidosus* Tanasevitch, 1990, but well differs by the modified carapace and shape of the retrolateral outgrowth of the palpal tibia in male, as well as by the rectangular shape of the median plate of epigyne in female.

ECOLOGY. Mature specimens occur from April to September mainly in steppe plant associations, rarely – in desert plant communities. All samples were collected both by pitfall trapping and soil sampling.

DISTRIBUTION. Known from the type locality only.

Walckenaeria stepposa **sp.n.**
Figs 22–33.

MATERIAL. Holotype ♂ (ZMMU: Ta-6807), Western Kazakhstan, env. of Dzhanybek, DRS, clay semidesert, steppe association with diverse herbs, in pitfall traps, 21–25.IV.2004, leg. T.V. Piterkina.

Paratypes: 3 ♂, 2 ♀♀ (ZMMU: Ta-68008, Ta-6809), same locality, desert associations with *Kochia prostrata* and *Arthemisia pauciflora*, in pitfall traps, 15–25.IV.2004, 15–20.V.2005, leg. T.V. Piterkina.

DESCRIPTION. Male. Total length, 1.70. Carapace modified, 0.80 long, 0.60 wide, dark reddish-brown, distinctly punctate. Head elevated into lobe; in front of elevation between posterior median eyes there are two cornicles (Figs 22–24). Postocular pits large, drop-shaped. Legs pale brown. Leg I, 2.19 long (0.63 + 0.20 + 0.55 + 0.48 + 0.33), leg IV lost. Chaetotaxy 2.2.1.(1), spines extremely short and inconspicuous. Tarsal claws highly pectinate. All metatarsi with a trichobothrium. TmI, 0.53. Palp (Figs 25–31): palpal tibia with large, prolateral, claw-shaped, pointed process, retrolaterally with short outgrowth, carrying rounded tubercle, pointed in lateral view. Radical part of embolic division screw-curved, with flat outgrowth at the base of embolus. Embolus relatively short, with wide membranous edge. Abdomen 0.98 long, 0.58 wide, dark grey.

Female. Total length, 2.13. Carapace unmodified, 0.90 long, 0.65. Leg I, 2.21 long (0.63 + 0.25 + 0.55 + 0.48 + 0.30), IV, 2.49 (0.68 + 0.23 + 0.63 + 0.60 + 0.35). Chaetotaxy 2.2.1.1, spines short. TmI, 0.52. Abdomen 1.30 long, 0.78 wide. Epigyne as in Figs 32, 33. Body and leg colouration as in male.

ETYMOLOGY. The specific name in Latin means "steppe".

DIAGNOSIS. This species is characterized by the peculiar shape of the palpal tibia, short embolus, and presence of two cornicles erased not from tubercle, as in *W. antica*, but just from surface. The female is characterized by the presence of deep notch in anterior part of epigyne.

TAXONOMICAL REMARKS. The new species belongs to subgenus *Prosopotheca* Simon, 1884 and is similar to many Western Mediterranean species, e.g., *W. abantensis* Wunderlich, 1995, *W. cretaensis* Wunderlich, 1995, *W. gomerensis* Wunderlich, 1987, *W. coniceps* Thaler, 1996, and some others, but differs by details of the palpal tibia, and short embolus in male. Male carapace of *W. stepposa* sp.n. is similar to that of *W. suspecta* (Kulczyński, 1882), but in the last species the cornicles are situated on a small tubercle.

ECOLOGY. Mature specimens occur in April–May mainly in desert plant associations, rarely — in steppe plant communities. All samples were collected by pitfall trapping.

DISTRIBUTION. Known from the type locality only.

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