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NEW SPIDER SPECIES OF *CNEPHALOCOTES* AND *PEPONOCRANIUM* (ARANEI, LINYPHIIDAE) FROM THE NORTH-EAST OF UKRAINE

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New Spider Species of *Cnephalocotes* and *Peponocranium* (Aranei, Linyphiidae) from the North-East of Ukraine. Gnelitsa, V. A. — Two species of the genera *Cnephalocotes* Simon, 1884 and *Peponocranium* Simon, 1884: *Cnephalocotes similis* sp. n. and *Peponocranium fallax* sp. n. (Linyphiidae) from the north-eastern Ukraine are described and illustrated.
Key words: Erigoninae, new species, description.

Introduction

According to World Spider Catalog (2024), the genus *Cnephalocotes* Simon, 1884 contains three species, of which *C. ferrugineus* Seo, 2018 and *C. obscurus* Blackwall, 1834 are very similar and the third one, *C. simpliciceps* Simon, 1900, is based on a male, which more likely does not belong to *Cnephalocotes* according to its description (Simon, 1900). In addition, three females were recently found in my collection. These specimens are similar to *C. obscurus*, but differ noticeably by colouration and genital structure.

Re-examination of *Peponocranium ludicrum* (O. Pickard-Cambridge, 1861) from my collection showed that it differs from each of the four species of the genus except the fifth (*P. dubium* Wunderlich, 1995), the female of which is so far unknown (World Spider Catalog, 2024).

Although only females were found, distinctive characters assign these new species with a confidence to those two genera. The two species, *Peponocranium fallax* sp. n. and *Cnephalocotes similis* sp. n., are hereby described and illustrated.

Material and Methods

All the specimens listed in this work were collected by the author using a hand-held suction sampler (aspirator). Their morphology was observed with a MBR–1 microscope and a MBS–10 binocular microscope, drawings were made with a camera lucida. Epigynes were macerated with 5 % KOH solution for the study of their inner structure. For making microscope mounts of the epigynes, Faure-Berlese mounting medium was used.

Abbreviations of the names of epigyne structures follow Millidge (1984, 1993): DP dorsal plate, FD — fertilization duct, La — lamina, O — genital opening, S — socket, SD — sperm duct, Sp — spermatheca. Other abbreviations in text are following: Cx — coxa; ICh — incoming chamber of spermatheca, MCh — main chamber of spermatheca, Mt — metatarsus, P — projection of epigyne caudal edge; Ti — tibia, Tr — trichobothrium.

Drawings of spiders of the two compared species are based on the following material: *Cnephalocotes obscurus* (Blackwall, 1834): Ukraine, Sumy Region, Grunivka village, 50.99° N 35.11° E, northern 60°–70° slope of chalk hill, sparse young *Acer*, *Malus*, *Pyrus*, *Crataegus* with *Rhamnus*, scanty grass and moss patches, on the ground, 18.05.2015, 1 ♀ (V. Gnelitsa) (VGC); *Peponocranium praeceps* Miller, 1943: Ukraine, Sumy Region, Vakalivshchina village, 51.04° N 34.94° E, grass meadow by the edge of mixed forest (*Quercus, Acer, Fraxinus* with *Pinus*), on the ground, 28.05.2009, 1 ♀ (V. Gnelitsa) (VGC).

All measurements are in mm.

Abbreviations of depositories:

SIZK — I. I. Schmalhausen Inctitute of Zoology, Kyiv, Ukraine.

VGC — Valery Gnelitsa personal collection.

Results

Cnephalocotes similis sp. n. (figs *1–3*)

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Material examined. **Holotype** ♀: **Ukraine**, Sumy Region, Grunivka village, 50.99° N 35.11° E, northern 60°–70° slope of chalk hill, sparse young *Acer*, *Malus*, *Pyrus*, *Crataegus* with *Rhamnus*, scanty grass and moss patches, on the ground between pieces of chalk under the moss, 01.09.2021 (leg. V. Gnelitsa) (SIZK); paratypes: 2 ♀, same locality, 13.10.2022 (V. Gnelitsa) (VGC).

Diagnosis. Female of the new species can be easy distinguished by the light colored epigyne of a fresh specimen as well as epigyne and vulva structure.

Description (holotype ♀). Total length 1.55, carapace 0.71 long, 0.61 wide, covered with tiny pimples and wrinkles, with a piping along caudal cut of carapace, no sulci, dark brown with black wedges pointed to the central area of carapace. Posterior median eyes are a diameter apart, eyes surrounded with black.

Chelicerae: anterior margin with 3 teeth approximately equal in size, posterior margin with 2 tiny teeth one by one, sparse stridulating files are well visible.

Sternum 0.42× as long as wide, rough rugose, dark brown turns into brown black to the margins, extends between coxae IV, width of extended piece is 0.78× coxa diameter.

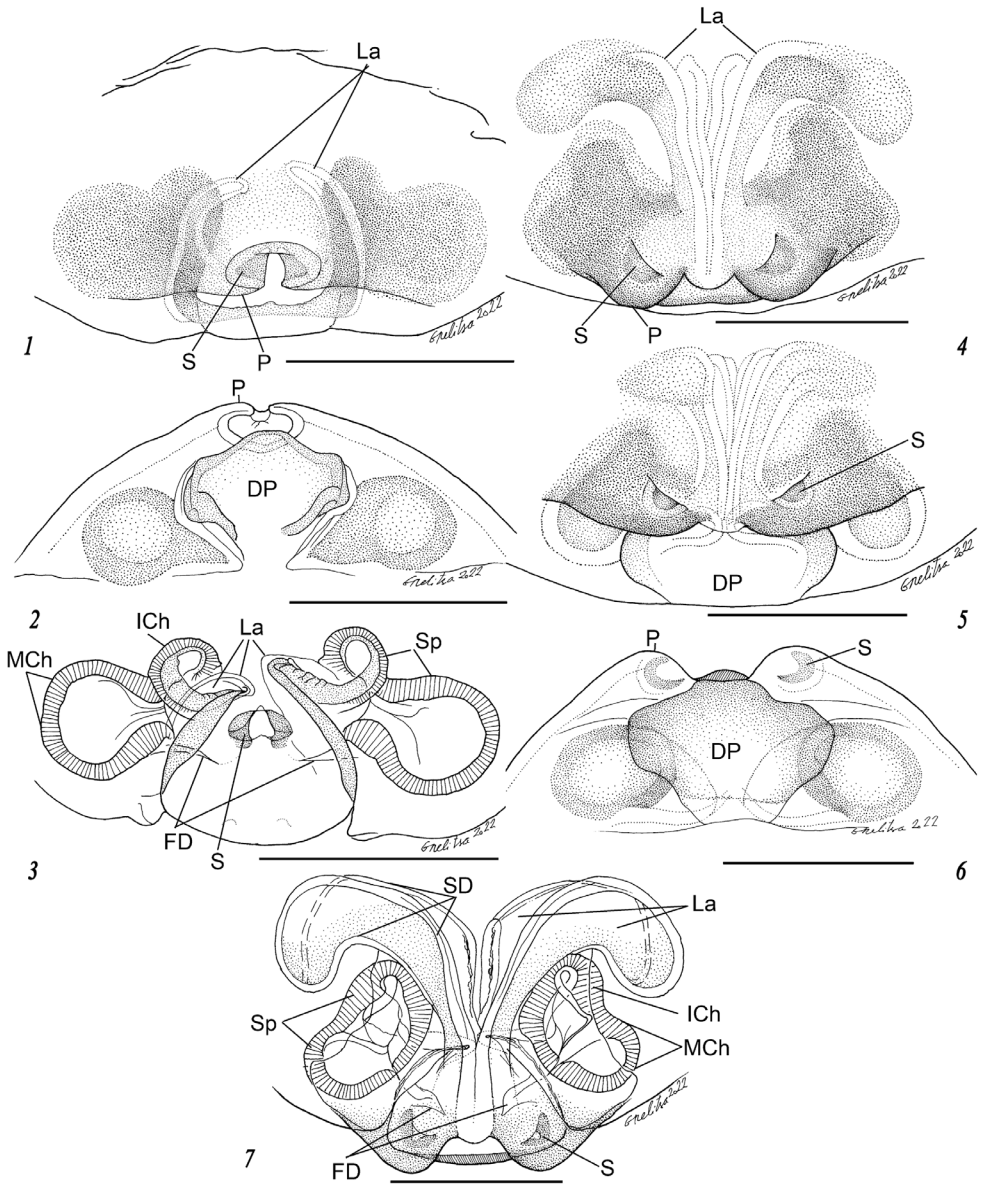
Legs spination: each Ti with one dorsal spine. Position of Ti spines (right/left): I — 0.14/0.12, II — 0.12/0.09, III — 0.23/0.14, IV — 0.28/0.30. Ratio Ti spine length/Ti diameter (right/left): I — 0.64/0.70, II — 0.60/0.63, III — lost/0.56, IV — 0.61/lost.

Position of Mt trichobothrium (right/left): I — 0.38/0.41, II — 0.39/0.42, III — 0.38/0.38. No trichobothrium on Mt IV.

Leg measurements are given in table 1.

Table 1. Leg measurements of *Cnephalocotes similis* sp. n. (holotype)

Legs	Femur	Patella	Tibia	Metatarsus	Tarsus	Sum
I	0.48	0.18	0.42	0.35	0.28	1.71
II	0.44	0.18	0.36	0.32	0.27	1.57
III	0.38	0.16	0.29	0.29	0.24	1.36
IV	0.51	0.17	0.48	0.36	0.28	1.80



Figs *1–7*. *Cnephalocotes similis* sp. n.: *1* — epigyne ventrally; *2* — epigyne dorsally; *3* — vulva ventrocaudally. *C. obscurus* (Ukraine, Grunivka): *4* — epigyne ventrally; *5* — epigyne ventrocaudally; *6* — epigyne dorsally; *7* — vulva ventrally.

Epigyne (figs *1–2*) is flat with two short projections (P) of its caudal margin. Two sockets (S) of the epigyne ventral surface stand less than a socket width apart fig. *1*. Dorsal plate (DP) is a rhomb with cut angles fig. *2*. The epigyne of the fresh specimens is not heavy pigmented so its inner structure is visible. Vulva as on figs *3, 8*. Abdomen gray, no clear dorsal pattern. Four dorsal light brown blots form a trapeze frontally directed.

Male: unknown.

Etymology. The name is given due to similarity of the new species in its general appearance with *Cnephalocotes obscurus* (Blackwall, 1834).

The new species can be distinguished with the following key.

Key to the species of the genus Cnephalocotes occurring in Ukraine (females)

Fresh specimens:

1. Epigyne is heavy pigmented, black, no appearance and inner structure are recognizable. ....*C. obscurus*
– Epigyne is of lighter colouration, its shape and inner structure are recognizable. .....*C. similis* **sp. n.**

Specimens after clarification:

1. Caudal projections of epigyne are well manifested, laminae stretched forward to bend aside and skirt spermathecae frontally..... *C. obscurus*
– Caudal projections are weak pronounced, laminae stretched forward and bent toward each other. ....*C. similis* **sp. n.**

Discussion

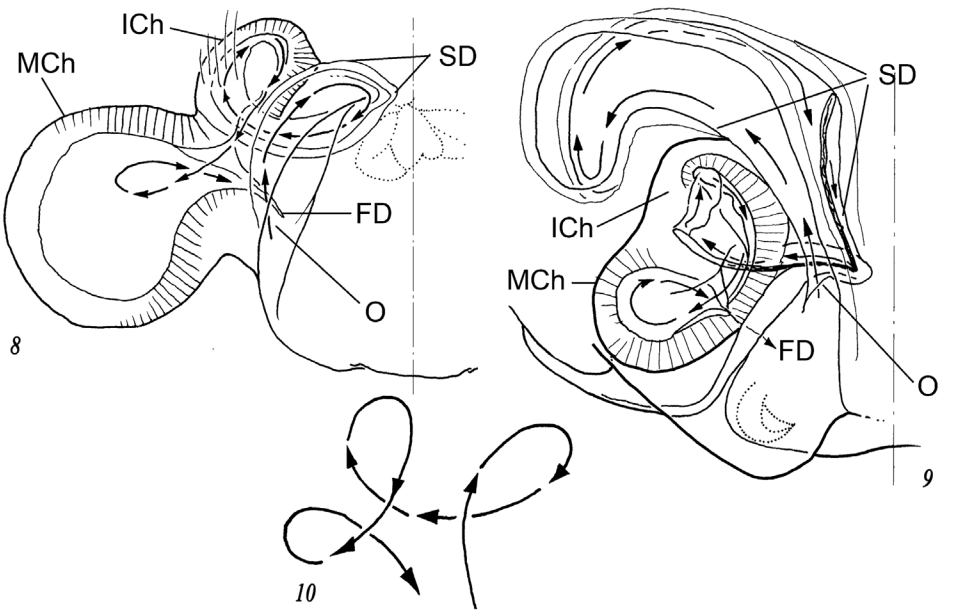
Cnephalocotes obscurus (Blackwall, 1834) (figs *4–7, 9*) is a Eurasian species of the genus already known in Ukraine. The second species of the genus, *C. ferrugineus* Seo, 2018, described from Korea, is very similar to *C. obscurus* (Blackwall, 1834). The last species, Hawaiian *C. simpliciceps* Simon, 1900 cannot be identified as *Cnephalocotes*. Simon (1900) used no specific characters of the genus in its short description. Furthermore, the fact that abdomen of Hawaiian spider covered with black shine scutum ("suprascuto nigro-nitido") which is not inherent to *Cnephalocotes* strongly support my doubts as well as the male palp figure, which lacks a long embolus so evident and striking in the *Cnephalocotes* male. I compare the new species with *C. obscurus*.

A combination of seven characters given in the literature (Locket, Millidge, 1953; Miller, 1971; Heimer, Nentwig, 1991; Wiehle, 1960) confirm the position of the new species in the genus *Cnephalocotes*:

1. Mt IV without a trichobothrium (Locket, Millidge, 1953; Miller, 1971; Heimer, Nentwig, 1991; Wiehle, 1960).
2. Ti I–IV with one spine (Locket, Millidge, 1953; Miller, 1971; Heimer, Nentwig, 1991; Wiehle, 1960).
3. Position of Mt I trichobothrium less 0.5 (Locket, Millidge, 1953; Heimer, Nentwig, 1991). It is hard to identify the Ukrainian *Cnephalocotes* using a key of Miller (1971) because position of TrMt I should fit 0.3–0.4 limit. Actual position in many cases is slightly more than 0.4.
4. Sternum roughly rugose (Locket, Millidge, 1953; Heimer, Nentwig, 1991; Wiehle, 1960).
5. Impossible to see details of the black epigyne on a fresh specimen (Locket, Millidge, 1953).
6. Tarsus shorter than metatarsus (Miller, 1971).
7. Posterior median eyes are less than 1.5 their diameter apart (Miller, 1971).

The Ukrainian specimens of *Cnephalocotes* have a relatively shorter Ti spine than given by Wiehle (1960). This is the only conflict with genus identification according to this key.

Other features shared by both species are as follow: sternum is projected between Cx IV. Epigyne is flat with two projections (P) of its caudal edge. Its ventral surface bears a pair of sockets (S) that stand against each other (figs *1, 4, 5*), dorsal plate (DP) has a shape of a rhombus with cut angles. Both species reveal a similar structure of seminal ducts (fig. *10*): genital opening (O) leads to sperm duct (SD) which goes forward, then curves in an opposite direction, and finally bends laterally towards spermatheca (figs *8, 9*). After entering mesial side of spermatheca, the sperm duct loops in the incoming chamber (ICh) and continues along mesial side of spermatheca toward the main chamber (MCh) (*figs* 8–9). Lamina (La) of both *Cnephalocotes* species is stretched forward (figs *1, 3–5, 8, 9*).



Figs *8–10*. Vulva: course of seminal ducts: *8* — *C. similis* sp. n.; *9* — *C. obscurus*; *10* — diagrammatic course of seminal ducts for both species.

Fresh specimens of *C. similis* sp. n. differ from those of *C. obscurus* by light color epigyne, which in *C. obscurus* (Blackwall, 1834) is so heavy pigmented in black that no details are recognizable.

In *C. similis* sp. n. sockets (S) are less than their width apart (fig. *1*), while in *C. obscurus* the distance between sockets is more than twice their width (fig. *4*). Epigyne caudal projections (P) of the new species are weakly pronounced while those of *C. obscurus* are well manifested. Laminae (La) of *C. similis* sp. n. stretch forward and bend toward each other (fig. *1*), while those of *C. obscurus* being stretched forward initially then bend aside to skirt spermathecae frontally (figs 4, 5, 7, 9).

In *C. similis*, sternum extension between Cx IV is less wide (0.8 Cx diameter) than that of *C. obscurus* (1.1 Cx diameter).

***Peponocranium fallax* sp. n.** (figs *11–13*, *16, 17*)

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Material examined. **Holotype** ♀: **Ukraine**, Sumy Region, Vakalivshchina village, 51.04° N 34.94° E, grass meadow by the edge of mixed forest (*Quercus, Acer, Fraxinus* with *Pinus*), on the ground, 16.05.1992 (V. Gnelitsa) (SIZK).

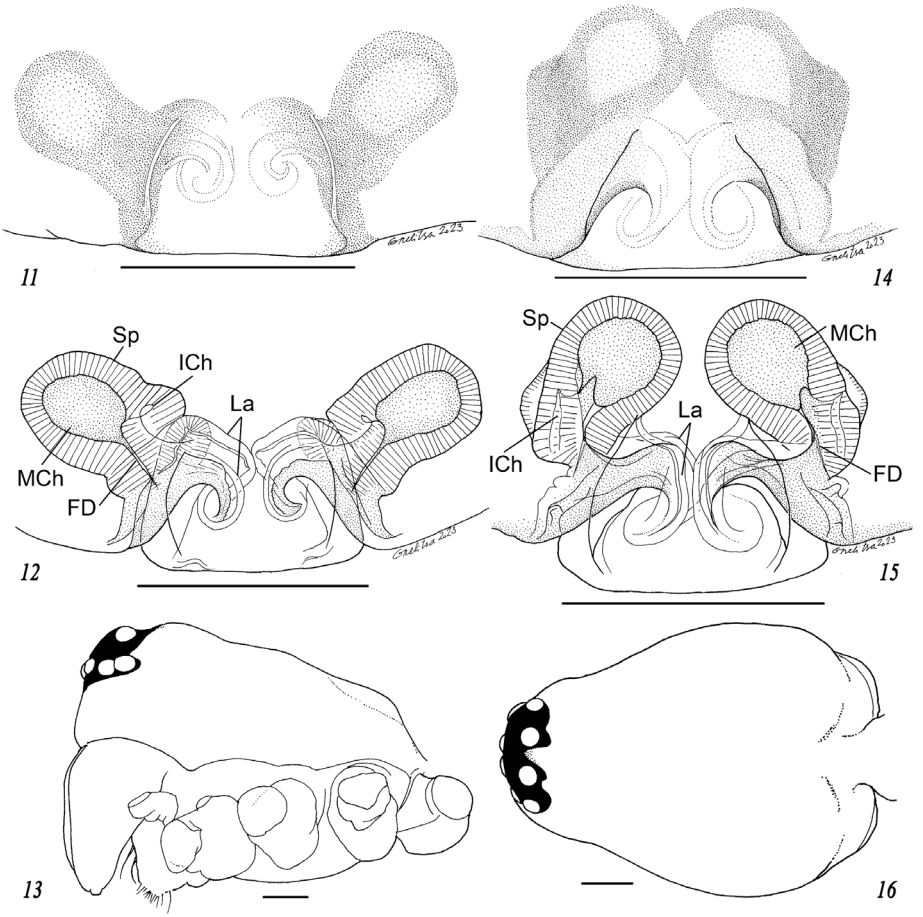
Diagnosis. Female of the new species can be easy distinguished by the epigyne and vulva structure.

Description (holotype ♀). Total length 1.82, carapace 0.8 long, 0.57 wide (figs *13*, *16*), smooth and shining, no sulci, grey-brown-yellow, with grey frontal (head) part.

Posterior median eyes are 0.66 of their diameter apart.

Chelicerae: anterior margin with five teeth, proximal tooth stands apart of the rest four ones. Posterior margin with four tiny teeth gradually diminished distally, fine stridulating files are barely visible.

Sternum 0.45 long 0.43 wide, yellow, gradually turns into dark grey yellow to the margins, extends between coxae IV.



Figs *11–16. Peponocranium fallax* sp. n.: *11* — epigyne ventrally; *12* — vulva ventrally; *13* — carapace laterally; *16* — carapace dorsally. *P. praeceps* (Ukraine, Vakalivshchina): *14* — epigyne ventrally, *15* — vulva ventrally.

Legs spination: Ti I–IV with one dorsal spine. Ti IV spine length (left/right) 1.52/1.81 of tibia diameter.

Position of Mt trichobothrium (left/right): I — 0.87/0.87, II — 0.90/0.88, III — 0.88/0.84, IV — 0.88/0.86.

Leg measurements given in table 2.

Epigyne: see fig. *11*, vulva: see figs *12, 17*.

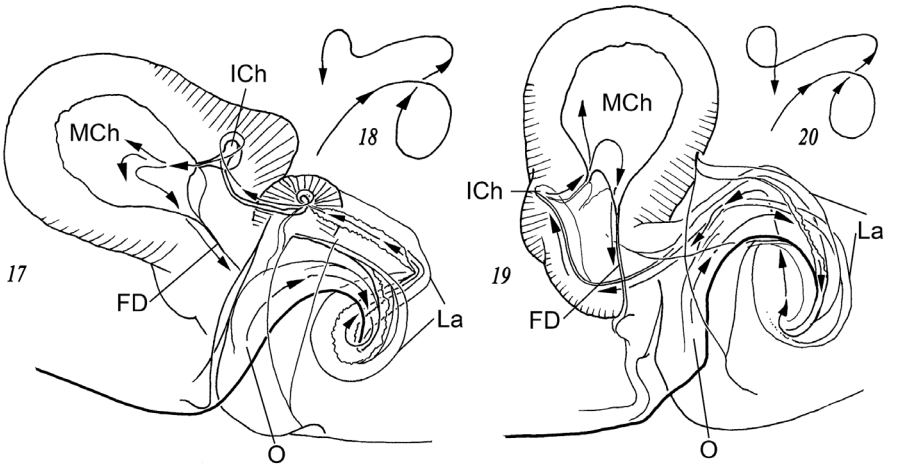
Abdomen grey, no dorsal pattern.

Male: unknown.

Etymology. The name means "fallacious" in Latin and is given due to similarity with *P. ludicrum* (O. Pickard-Cambridge, 1861) that earlier caused a misidentification of this spider specimen (Gnelitsa, 1993, 1998, 2001).

Table 2. Leg measurements of *P. fallax* sp. n. (holotype)

Legs	Femur	Patella	Tibia	Metatarsus	Tarsus	Sum
I	0.58	0.22	0.50	0.42	0.25	1.97
II	0.56	0.23	0.49	0.42	0.25	1.95
III	0.52	0.21	0.41	0.42	0.24	1.80
IV	0.68	0.22	0.62	0.56	0.27	2.35



Figs *17–20*. Vulva, course of seminal ducts: 17 — *P. fallax* sp. n.; *19* — *P. praeceps* (Ukraine, Vakalivshchina); diagrammatic course of seminal ducts: *18* — *P. fallax* sp. n., *20* — *P. praeceps* (Ukraine, Vakalivshchina).

The new species can be distinguished with the following key.

Key to species of the genus *Peponocranium* occurring in Ukraine (females)

1. Receptacles of the epigyne are directed obliquely out and frontally. ..... *P. fallax* sp. n.
– Receptacles are directed frontally and convergent. 2
2. Laminae of the vulva directed frontally and convergent; carapace is pale coloured ..... *P. orbiculatum*
– Laminae directed to each other; carapace is brown..... *P. praeceps*

Discussion

To determine the position of the new species, several identification keys were used (Locket, Millidge, 1953; Miller, 1971; Heimer, Nentwig, 1991). According to those keys, a combination of seven characters confirms the new species as belonging to the genus *Peponocranium*:

1. Ti I–IV with one dorsal spine (Locket, Millidge, 1953; Miller, 1971; Heimer, Nentwig, 1991).
2. Mt IV with a trichobothrium (Locket, Millidge, 1953; Miller, 1971; Heimer, Nentwig, 1991).
3. Position of Mt I trichobithrium — 0.87 (Locket, Millidge, 1953; Miller, 1971; Heimer, Nentwig, 1991).
4. Length of the Ti IV spine is more than 1.5 diameter of the segment (Locket, Millidge, 1953; Heimer, Nentwig, 1991).
5. Tarsal claws with minute teeth (Miller, 1971).
6. Mt IV is nearly of the same length as Ti IV (0.9) (Miller, 1971).
7. Head dorsal line without slope (Heimer, Nentwig, 1991).

Peponocranium fallax sp. n. differs from females of four other species of the genus by the receptacles (spermathecae) position, their inner structure, shape, and position of lamina (La) (figs *11, 12, 17*). The receptacles of *P. fallax* sp. n. are directed obliquely out and frontally, like those of *P. ludicrum*. This was the reason why the new species was previously misidentified as *P. ludicrum* by the author (Gnelitsa, 1993, 1998, 2001). So far, *P. ludicrum* has not been found in Ukraine.

In contrast to *P. ludicrum*, lamina of which is narrow and directed frontally (Wiehle, 1960), the wide lamina (La) of *P. fallax* sp. n. is directed toward body longitudinal axis and curved somewhat caudally (figs *12, 17*) like that of *P. praeceps* (figs *15, 19*). However, in *P. praeceps* the receptacles are directed frontally and convergent (figs *14, 15*).

The incoming chamber of spermatheca (Sp) of the new species is situated mesially to its main chamber (MCh) (figs *12, 17*), while such a chamber (ICh) in *P. praeceps* is located laterally of the spermatheca main chamber (MCh) (figs *15, 19*).

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References

Gnelitsa, V. 1993. *Fauna and ecology of the spider family Linyphiidae of the forest-steppe zone of Ukraine*. Autoreferat of the Dissertation of Candidate of Biological Sciences Degree. Kyivsky universitet, Kyiv, 1–20 [In Russian].

Gnelitsa, V. 1998. Fauna and ecology of spiders from the family Linyphiidae of the Vakalivshchyna environs. *In*: Knysh, M. P., ed. *Vakalivshchyna: do 30-richchia biol. statsionaru Sumskoho pedinstytutu*, Sumy, 20–30 [In Ukrainian].

Gnelitsa, V. 2001. The spider fauna of the family Linyphiidae of the forest-steppe zone of Ukraine: 2. Subfamily Erigoninae. *Izvestiya Kharkovskogo entomologicheskogo obshchestva*, **9** (1–2), 193–201 [In Russian].

Heimer, S. & Nentwig, W. 1991. *Spinnen Mitteleuropas: Ein Bestimmungsbuch*. Paul Parey, Berlin, 1–543.

Locket, G. H. & Millidge, A. F. 1953. British spiders. Vol. II. Ray Society, London, 1–449.

Miller, F. 1971. Pavouci — Araneida. *Klíč zvířeny ČSSR,* **4**, 51–306.

Millidge, A. 1984. The taxonomy of the Linyphiidae, based chiefly on the epigynal and tracheal characters (Araneae: Linyphiidae). *Bulletin of the British Arachnological Society*, **6**, 229–267.

Millidge, A. 1993. Further remarks on the taxonomy and relationships of the Linyphiidae, based on the epigynal duct confirmations and other characters (Araneae). *Bulletin of the British Arachnological Society*, **9**, 145–156.

Simon, E. 1900. Arachnida. *In*: Sharp, D., ed. *Fauna Hawaiiensis, or the zoology of the Sandwich Isles: being results of the explorations instituted by the Royal Society of London promoting natural knowledge and the British Association for the Advancement of Science*, **2** (5). University Press, Cambridge, 443–519.

Wiehle, H. 1960. Spinnentiere oder Arachnoidea (Araneae). XI. Micryphantidae — Zwergspinnen. *Die Tierwelt Deutschlands*, **47**, 1–620.

World Spider Catalog. 2024. *World Spider Catalog. Version 25.0*. Natural History Museum Bern, online at http://wsc.nmbe.ch, accessed 27.03.2024. https://doi.org/10.24436/2

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