A new species of *Synaphris* (Araneae, Synaphridae) from Ukraine

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Summary

Synaphris lehtineni sp. n. (♂♀), from Crimea, Ukraine is described, figured and diagnosed. The new species is closely related to *S. orientalis* Marusik & Lehtinen, 2003. The terminology of somatic and copulatory organ characters in Synaphridae is considered. The localities of all *Synaphris* species are mapped.

Introduction

The recently established spider family Synaphridae Wunderlich, 1995 comprises two genera, *Cepheia* Simon, 1894 and *Synaphris* Simon, 1894 (Marusik & Lehtinen, 2003; Platnick, 2003). The former genus is monotypic and the latter includes six species distributed in the Ancient Mediterranean region from the Canary Islands to western Turkmenistan (Map 1). Three species of *Synaphris* are restricted to the Canary Islands (Wunderlich, 1987), one is known from the Balkans, one from Egypt (Platnick, 2003) and one from Turkmenistan (Marusik & Lehtinen, 2003).

In the course of a survey of the Crimean spider fauna we discovered a new species of *Synaphris*. As we have large series of specimens of the new species and as spiders of this family are rather poorly known and their micro-morphology is almost unknown, the aim of this paper is to provide a detailed morphological description of the new species.

Material and methods

The body and leg segment lengths were measured using an ocular micrometer with an MBS-9 stereomicroscope. The position of trichobothria was measured using an MBI-3 transmitted light microscope and temporary glycerin slide mounts. Micrographs were made with a Jeol JSM-5200 SEM in the Zoological Museum, University of Turku. All measurements are in mm: minimum–maximum (mean in parentheses). Type material is shared between the Zoological Museum of Moscow State University (ZMMU), Natural History Museum, Stockholm (NRS), Zoological Museum, University of Turku (ZMT), and Zoology Department of Taurida National University, Simferopol (TNU).

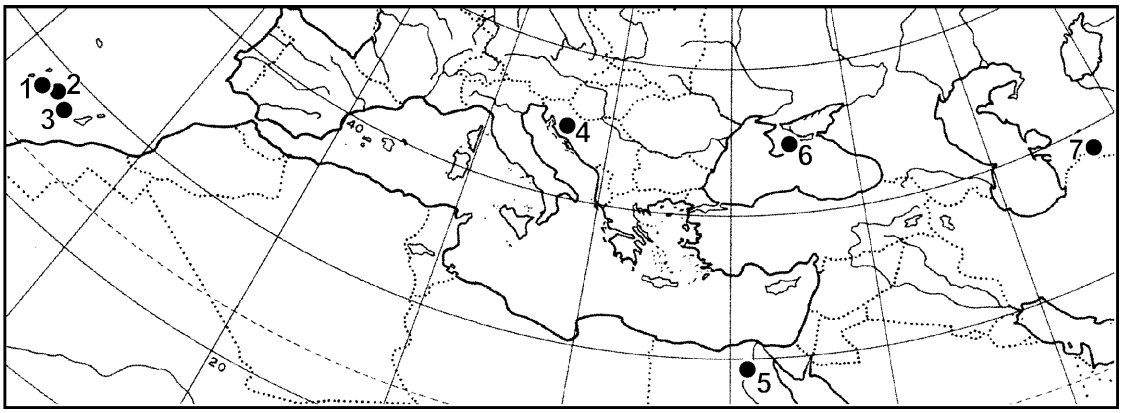
As the terminology for the copulatory organs and somatic characters in Synaphridae has not been considered in detail, we suggest here some terms to be used in their description. It is necessary to stress that our terms do not necessarily reflect homologies with other araneoid families (e.g. paracymbium, lamella, conductor, etc.).

***Synaphris lehtineni* sp. n.** (Figs. 1–4, 6–14, 18–31, Map 1)

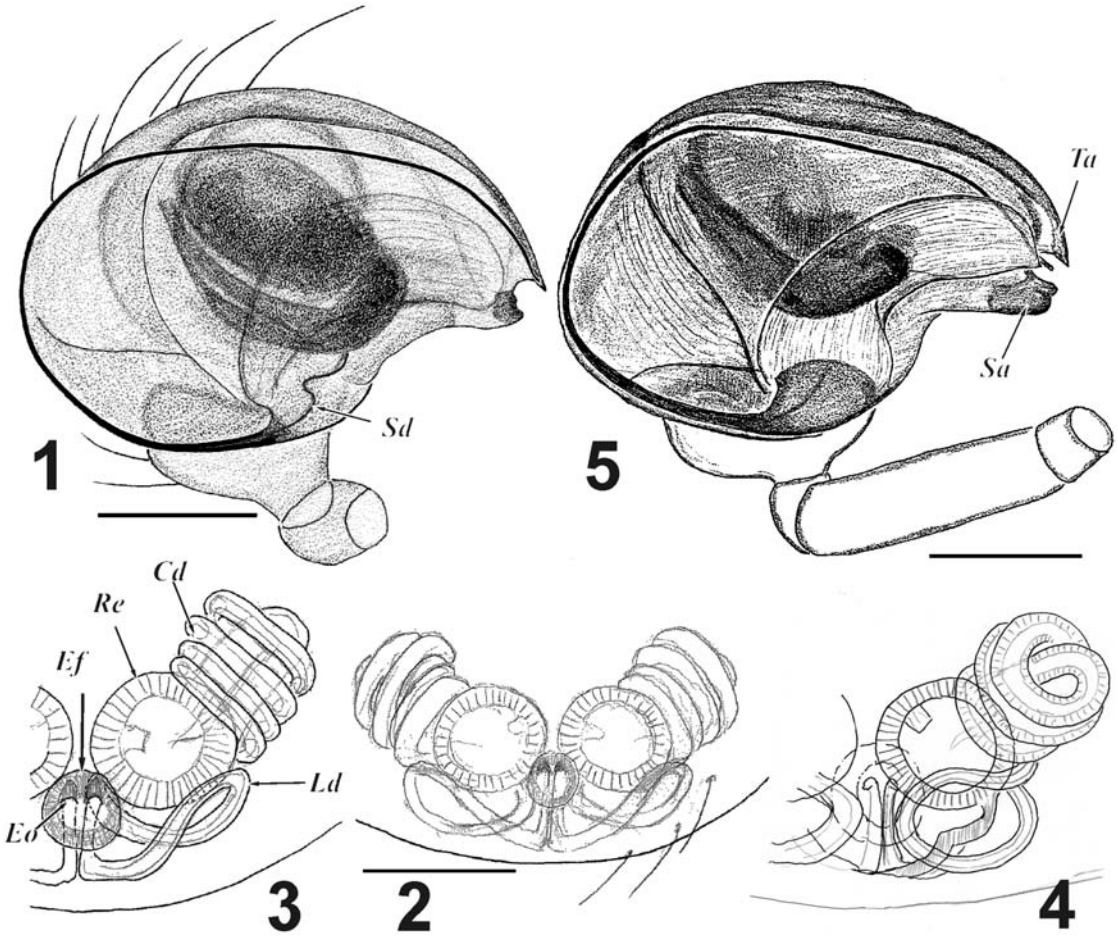
Type material: Holotype ♂ (ZMMU) and paratypes 7♂ 6♀ 1juv. (ZMMU, NRS, ZMT) [#2172], Ukraine, Crimea, Feodosiya Distr., Karadagh Reserve, near Syuryu-Kaya Mt., S exposed steppe slope, *c.* 30–40°, under stones, 10 October 2003 (V. A. Gnelitsa); paratypes 9♂ 7♀ (TNU #15778, ZMT), same locality and date, meadow steppe, in litter (M. M. Kovblyuk).

Etymology: The specific name is a patronym in honour of Pekka T. Lehtinen.

Description: *Male* ($n=5$): Total length 0.96–1.09 (1.02). Carapace 0.52–0.54 (0.53) long, 0.45–0.46 (0.46) wide; brown with blackish margins, whole surface slightly wrinkled (Figs. 21–22); dorso-medially with two distinct tubercles (*Tu*) bearing hairs and one small tubercle near PME, clypeus with one tubercle (Figs. 18, 20–22); clypeus high (Figs. 18, 21). Sternum brown, with 21 hairs along perimeter, cuticle with scale-like surface, posterior margin wide, separating coxae IV by about two diameters (Fig. 19). Chelicera with one large promarginal tooth (*Pt*), 10 promarginal hairs, and



Map 1: Distribution of *Synaphris* species. **1** *S. calerensis* Wunderlich, 1987; **2** *S. agaetensis* Wunderlich, 1987; **3** *S. franzi* Wunderlich, 1987; **4** *S. dalmatensis* Wunderlich, 1980; **5** *S. letourneuxi* (Simon, 1884); **6** *S. lehtineni* sp. n.; **7** *S. orientalis* Marusik & Lehtinen, 2003.



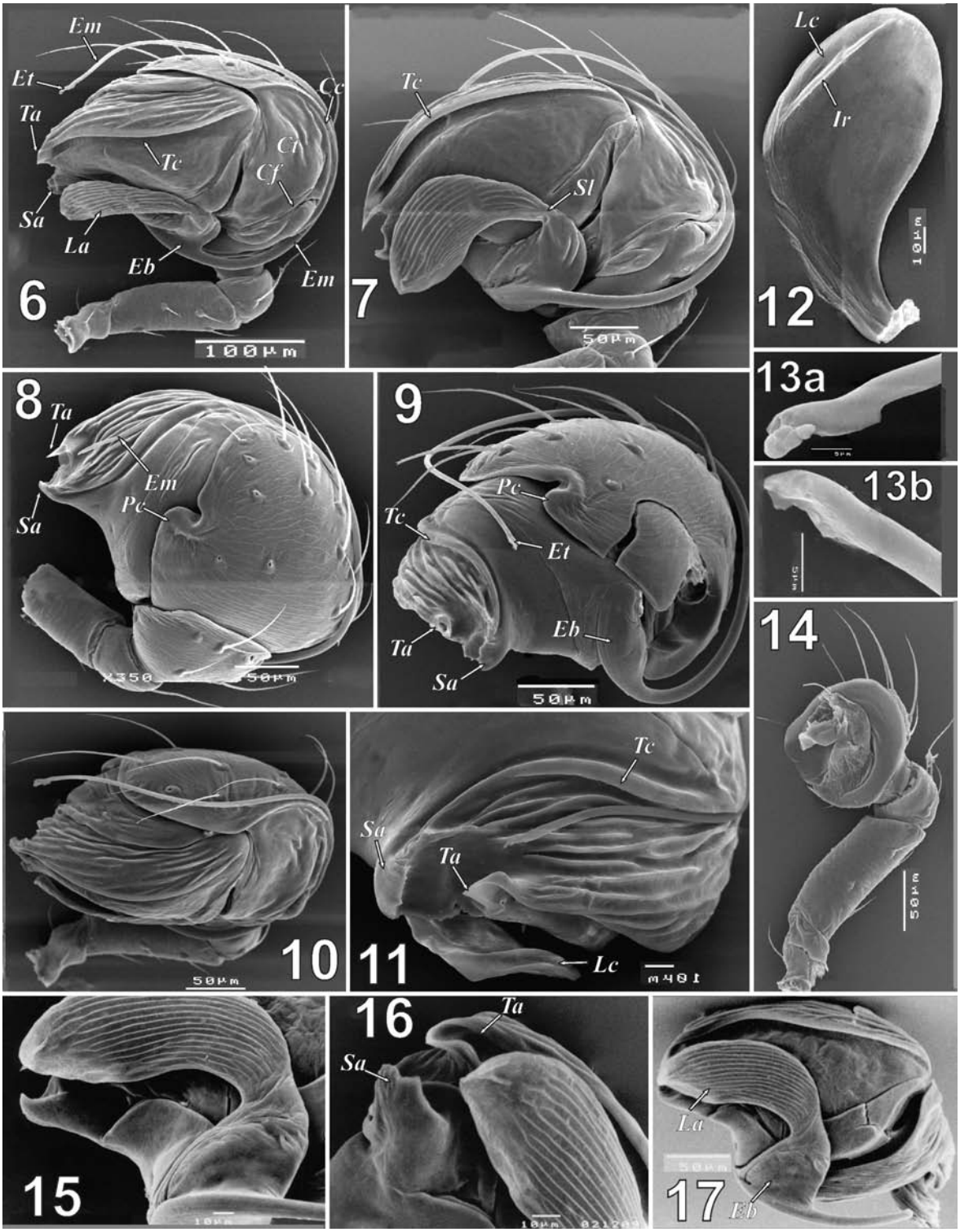
Figs. 1–5: *Synaphris lehtineni* sp. n. **1** Left male palp, ventral; **2** Epigyne, ventral; **3** Vulva, ventral; **4** Vulva, dorsal. **5** *S. orientalis*, left male palp, ventral. Scale lines=0.1 mm. Abbreviations: *Cd*=coiled duct; *Ef*=epigynal fovea; *Eo*=epigynal opening; *Ld*=loop of insemination duct; *Re*=receptaculum; *Sa*=subterminal apophysis; *Sd*=seminal duct; *Ta*=terminal apophysis.

one lateral hair (Figs. 18–21). Hairs on chelicera and legs with large elevated bases (*Hb*). Abdomen 0.50–0.60 (0.56) long, 0.38–0.50 (0.46) wide; greyish brown to blackish. Length of leg segments as in Table 1. Leg formula 1-4-2-3. Tibiae I–II with 2 trichobothria, one basal (short) and one distal (long); basal trTiI=0.11–0.18 (0.14); distal trTiI=0.43–0.48 (0.45); basal trTiII=0.13–0.16 (0.15); distal trTiII=0.34–0.44 (0.39). Tibiae III–IV with 3 trichobothria, one short (basal) and 2 long (distal). Distal trichobothria have same position (Fig. 20): basal trTiIII=0.17–0.21 (0.19); distal trTiIII=0.34–0.40 (0.37); basal trTiIV=0.22–0.27 (0.25); distal trTiIV=0.41–0.59 (0.49). Metatarsi I–II with one trichobothrium, trMtI=0.39–0.53 (0.46), trMtII=0.45–0.53 (0.49). Legs I–IV with pseudosegmentation in terminal part of tarsus (Figs. 25–29). *Male palp* (Figs. 1, 6–14): Relatively short. Tibia without apophyses. Retrolateral margin of tibia rounded and lying close to cymbium as in most Theridiidae and Hadrotarsinae. Cymbium complicated, deeply invaginated, forming a kind of capsule. Bulbus elongate. Embolus (*Em*) long, whip-like and thin, originating from circular base (*Eb*) at ventral side of tegulum (Fig. 6), tip of embolus (*Et*) slightly thickened (Fig. 13). Terminal 3/4 of embolus lies in cymbial (*Cc*) and tegular grooves (*Tc*). Lamella (*La*) almost invisible under light microscope, long and ridged (Figs. 6–7, 12), starting from under embolic base. Embolic base with seminal duct (*Sd*) clearly visible (Fig. 1). Lamella can be observed easily under light microscope only after drying the palp. Inner part of lamella with one ridge (*Ir*) in terminal part, furrow between terminal part of lamella and inner ridge seems

	Femur	Patella+tibia	Metatarsus	Tarsus	Total
I ♂	0.36–0.39 (0.38)	0.44–0.45 (0.44)	0.21–0.22 (0.21)	0.24–0.26 (0.25)	1.25–1.32 (1.29)
♀	0.34–0.39 (0.37)	0.39–0.42 (0.41)	0.21–0.22 (0.22)	0.21–0.26 (0.24)	1.16–1.28 (1.23)
II ♂	0.34–0.38 (0.36)	0.39–0.40 (0.40)	0.21	0.20–0.24 (0.22)	1.16–1.22 (1.18)
♀	0.34–0.36 (0.35)	0.38–0.39 (0.38)	0.20–0.21 (0.21)	0.22–0.24 (0.23)	1.14–1.20 (1.17)
III ♂	0.32–0.33 (0.32)	0.34–0.36 (0.35)	0.20–0.21 (0.20)	0.21–0.22 (0.22)	1.08–1.11 (1.09)
♀	0.32–0.36 (0.33)	0.31–0.36 (0.34)	0.16–0.20 (0.18)	0.17–0.22 (0.20)	0.98–1.11 (1.06)
IV ♀	0.39–0.39 (0.38)	0.42–0.45 (0.43)	0.21–0.22 (0.22)	0.22–0.24 (0.23)	1.23–1.28 (1.25)
♂	0.39–0.42 (0.40)	0.40–0.45 (0.44)	0.21–0.22 (0.21)	0.22–0.24 (0.23)	1.23–1.32 (1.28)

Table 1: Length of leg segments of ♂ and ♀.

to serve as conductor (*Lc*) (Fig. 12). Stem (*Sl*) of lamella one-third maximal width of lamella (Fig. 7). Tegulum with only one separate sclerite in terminal region (*Sa*) and one spine-like outgrowth (*Ta*), long groove along tegulum (*Tc*) serves as conductor and holds embolus. Cymbium complicated, consisting of two parts (Figs. 6–7, 10), one rounded and covered with hairs (Figs. 8–10), the other (*Ct*) prolateral, transparent, semicircular, hairless, and divided into two unequal parts by a deep, long furrow (*Cf*) (Figs. 6–7). The latter part is poorly visible under light microscopy. Distal margin of hairy part perpendicular to that of transparent part.

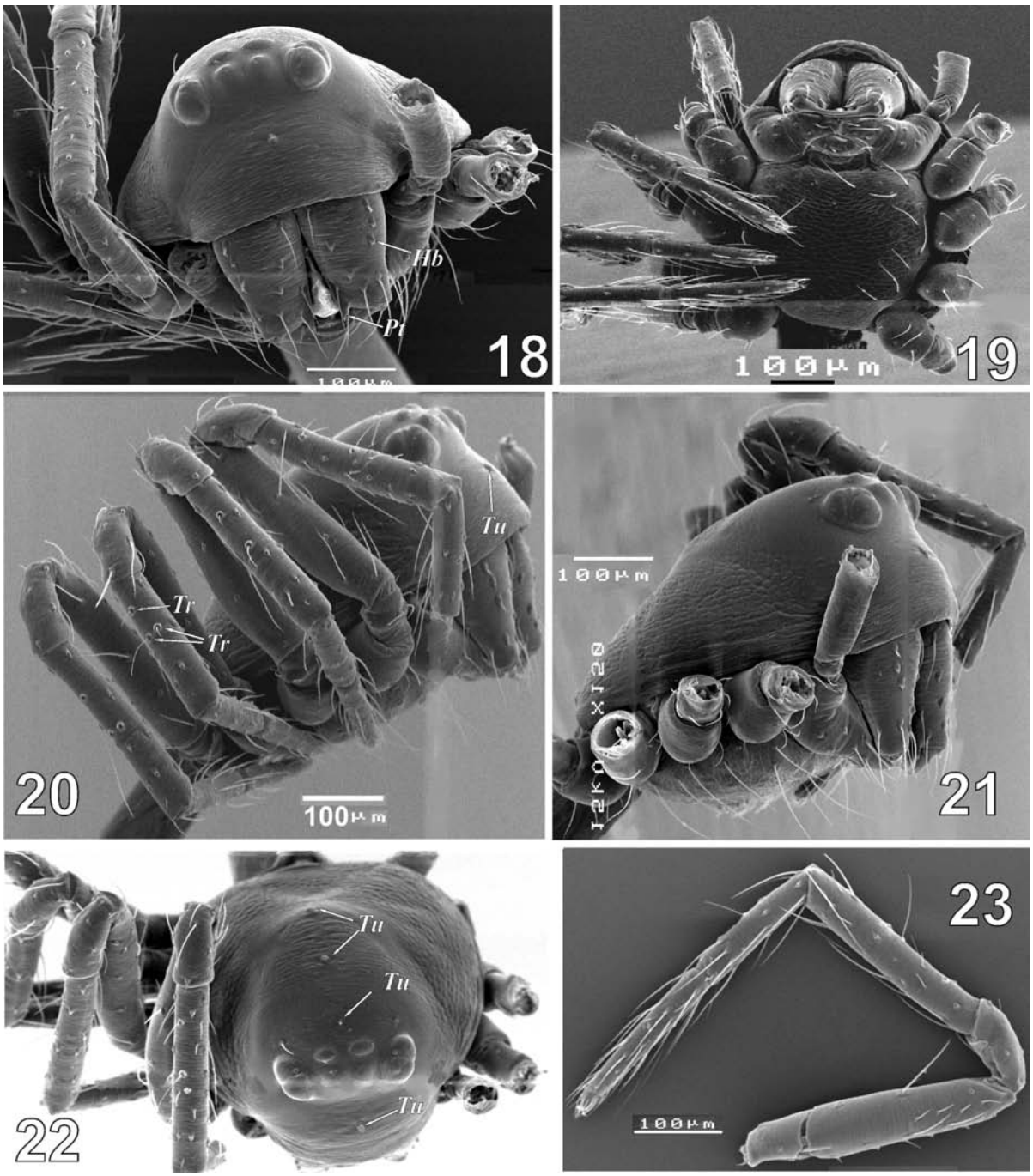


Figs. 6–17: Micrographs of male palp. **6–14** *Synaphris lehtineni* sp. n. **6–7** Right palp, ventral (prolateral); **8–9** Left palp, dorsal (retrolateral); **10** Right palp, from above; **11** Right bulbus, terminal part; **12** Right lamella, inner side; **13a–b** Tip of embolus, different specimens; **14** Right trochanter-tibia, retrolateral. **15–17** *S. orientalis*. **15, 17** Right palp, ventral; **16** Right bulbus, terminal part. Abbreviations: *Cc*=cymbial groove; *Cf*=cymbial furrow; *Ct*=transparent part of cymbium; *Eb*=embolic base; *Em*=embolus; *Et*=embolus tip; *Ir*=inner ridge of lamella; *La*=lamella; *Lc*=lamellar conductor; *Pc*=paracymbium; *Sa*=subterminal apophysis; *Sl*=stem of lamella; *Ta*=terminal apophysis; *Tc*=tegular groove.

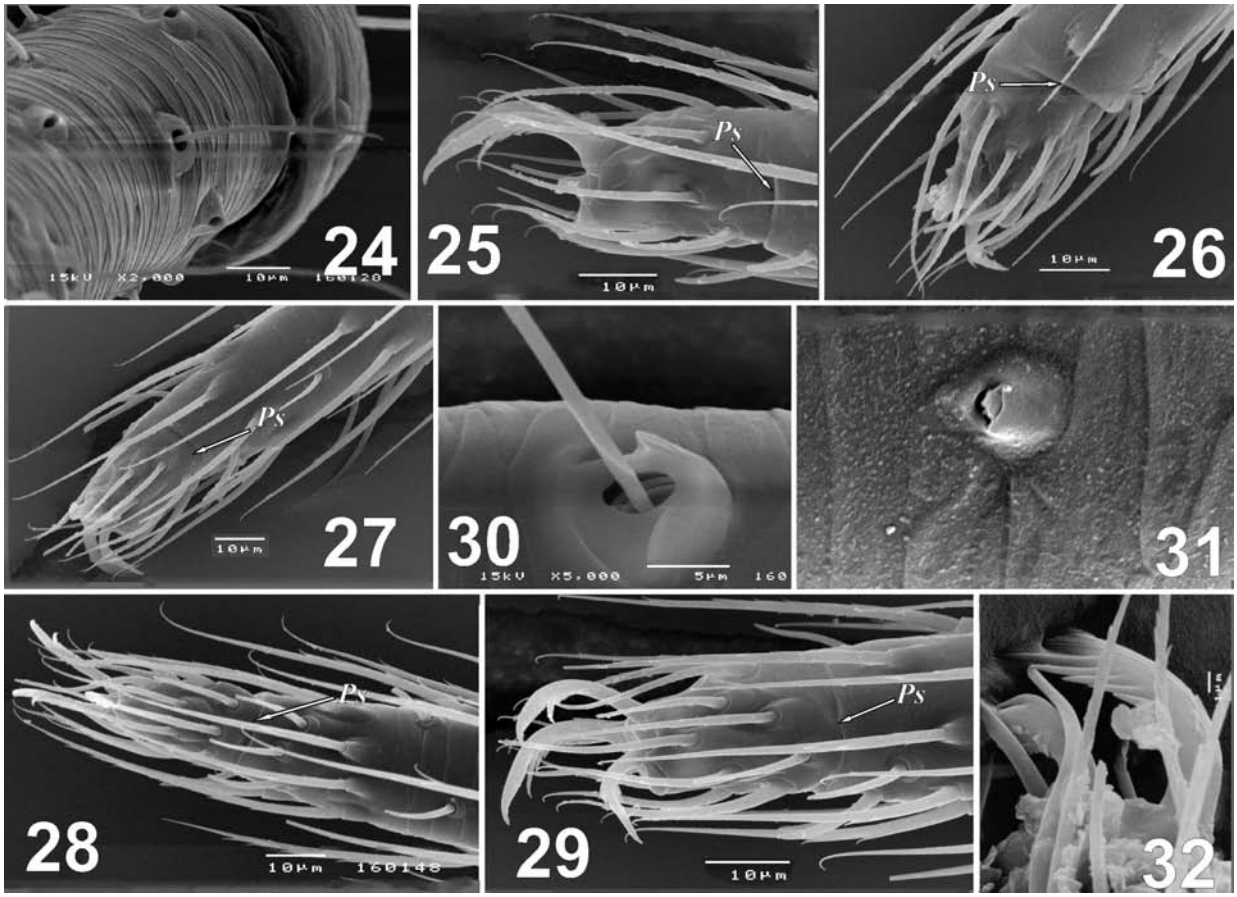
Retrolateral margin of cymbium modified and bearing a kind of ''paracymbium'' (notch-like outgrowth) (Figs. 8–9).

Female ($n=5$): Carapace 0.45–0.51 (0.49) long, 0.39–0.45 (0.42) wide; coloration as in male. Abdomen 0.51–0.70 (0.60) long, 0.42–0.56 (0.46) wide. Leg formula 4-1-2-3 (in 4 specimens) or 1-4-2-3 (1 specimen). Trichobothria as in male: basal trTiI=0.16–0.20 (0.17); distal trTiI=0.38–0.44 (0.41); trMtI=0.47–0.53 (0.50); basal trTiII=0.14–0.17 (0.16); distal trTiII=0.41–0.43 (0.42); trMtII=0.50–0.53 (0.50); basal trTiIII=0.15–0.20 (0.18); distal trTiIII=0.38–0.45 (0.41); basal trTiIV=0.23–0.33 (0.28); distal trTiIV=0.34–0.58 (0.50). *Epigyne* (Figs. 2–4): With oval fovea (*Ef*) higher than wide. Fovea subdivided into two parts by septum, which separates two openings (*Eo*). Septum easily visible on dissected epigyne. Introductory duct forming long loop (*Ld*), followed by 3–4 coils (*Cd*), and finally turns medially to globular receptacle (*Re*).

Diagnosis: Males of *S. lehtineni* sp. n. are very similar to those of *S. orientalis* Marusik & Lehtinen, 2003, but they can be separated by the shape of the palp, and some somatic characters summarised in Table 2. These two closely related species can be separated most easily by the width of the lamella and its base (thin in the new species and wide in *S. orientalis*, cf. Figs. 7, 17). The new species also has a slightly longer embolus (cf. Figs. 1, 5).



Figs. 18–23: *Synaphris lehtineni* sp. n. Micrographs of cephalothorax (**18–22**) and leg I (**23**). **18** Frontal; **19** Ventral; **20–21** Lateral; **22** Fronto-dorsal; **23** Prolateral. Abbreviations: *Hb*=hair base; *Pt*=promarginal tooth of chelicera; *Tr*=trichobothrium; *Tu*=tubercle of carapace.



Figs. 24–32: Micrographs of legs. **24–31** *Synaphris lehtineni* sp. n. **24** Basal part of tibia, dorsal, showing surface of cuticle, trichobothria and hair bases; **25–26, 28** Terminal part of tarsus IV, showing pseudosegmentation (*Ps*) and claws; **27, 29** Same, terminal part of tarsus I; **30** Tibial trichobothrium; **31** Hair base. **32** *S. orientalis*, claws of tarsus I.

The epigynal fovea of the new species is similar to those of *S. calerensis* Wunderlich, 1987, *S. agaetensis* Wunderlich, 1987 and *S. franzi* Wunderlich, 1987, but the vulva is very different. The parts of the insemination ducts close to the opening are similar to those of *S. calerensis*. Females of the new species can be easily distinguished from the other congeners by the coiled terminal part of the insemination ducts.

Habitat and biology: All spiders were found on a steppic, gramineous south-exposed slope (30–40°) with sparse hawthorn (*Crataegus*) shrubs and dwarf shrubs of Christ's thorn (*Paliurus spina-christi*) and with some stones. The grass cover was not dense, with mat of prostrate dead grass from 0 to 2–3 cm thick. Besides Gramineae there were some sparse sedge-grass (*Artemisia*) species, *Eryngium campestre*, and plants like Crimean cotton thistle (*Onopordon tauricum*). Spiders were not found under every stone. They seemed to require stones larger than 30 × 40 × 15 cm lying on the surface, without a deep hollow between the stone and the ground.

The spiders spin very thin sheet webs over the hollows, underneath stones. The webs cover small saucer-like depressions. In one 10 cm depression there can be up to 5–7 contiguous occupied webs, but in some cases the spiders are alone. The spiders are relatively slow, and in case of danger they hide in their webs. When a stone is turned over the spiders remain on the webs (on stones).

Character	*S. orientalis*	*S. lehtineni* sp. n.
Eye diameters (♂)	subequal	lateral about 1.5 times larger than median
Tarsal claws with strong teeth (♂)	yes (Fig. 32)	no (Figs. 25–29)
Femur I length (♂)	0.43	0.36–0.39 (0.38)
Base of lamella width/lamella width	0.57	0.28

Table 2: Characters for distinguishing *Synaphris orientalis* and *S. lehtineni* sp. n.

Comments and discussion

The apparent absence of a lamella in species occurring west of Ukraine, at least in *S. letourneuxi* (Simon, 1884) and *S. dalmatensis* Wunderlich, 1980, may be the result of inaccurate observation. The lamella in both *S. lehtineni* sp. n. and *S. orientalis* is almost invisible under light microscopy. With a transmitted light microscope it was possible to trace only the terminal part of the lamella. The whole lamella can be observed easily only after the palp is dried.

Grooves conducting the embolus on the cymbium and tegulum appear to be unique (autapomorphic) among the Araneoidea. Another possible autopomorphy of *Synaphrys*, and possibly Synaphridae, overlooked by Marusik & Lehtinen (2003), is pseudosegmentation of the tarsi (Figs. 25–29).

Acknowledgements

We are grateful to the staff of the Karadagh Nature Reserve UNAS and especially to O. V. Kukushkin for permits and help with work on the territory of the reserve. Special thanks are due to Seppo Koponen for making it possible for us to stay at the Zoological Museum, University of Turku and to use the SEM microscope and other equipment. D. J. Buckle (Saskatoon) helped with the English. This work was supported in part by the Russian Foundation for Basic Research (grant Nos. 04-04-48529 and 04-04-48727), Far East branch of the Russian Academy of Sciences (No. 04-03-A-06-042) and Academy of Finland (No. 202579).

References

MARUSIK, Y. M. & LEHTINEN, P. T. 2003: Synaphridae Wunderlich, 1986 (Aranei, Araneoidea), new family status, with description of a new species from Turkmenistan. *Arthropoda Selecta* **11**(2): 143–152.

PLATNICK, N. I. 2003: *The world spider catalog, version 3.5*. <http://research.amnh.org/entomology/spiders/catalog81-87>

WUNDERLICH, J. 1987: *Die Spinnen der Kanarischen Inseln und Madeiras: Adaptive Radiation, Biogeographie, Revisionen und Neubeschreibungen*. Triops Verlag, Langen. 435 pp.