

**A new subfamily of linyphiid spiders based on a new genus created
for the *keyserlingi*-group of the genus *Leptyphantes*
(Aranei: Linyphiidae)**

**Новое подсемейство линифид на основе нового рода,
выделенного для группы видов *keyserlingi* рода *Leptyphantes*
(Aranei: Linyphiidae)**

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KEY WORDS: Micronetinae, Linyphiinae, taxonomy, new combination, new synonym, male palp, epigyne.

КЛЮЧЕВЫЕ СЛОВА: Micronetinae, Linyphiinae, таксономия, новая комбинация, новый синоним, пальпа самца, эпигина.

ABSTRACT. A new linyphiid subfamily, Irapinae subfam.n., is established to include seven genera and 26 species, of which one genus is new to science: (1) The type genus *Ipa* gen.n., containing *I. keyserlingi* (Ausserer, 1867), comb.n. (the type species), *I. terrenus* (L. Koch, 1879), comb.n. = *I. quadrimaculatus* (Kulczyński, 1898), syn.n., comb.n., *I. spasskyi* (Tanasevitch, 1986), comb.n. and *I. pepticus* (Tanasevitch, 1988), comb.n., all ex *Leptyphantes*; (2) *Epibellowia* Tanasevitch, 1996, containing *E. septentrionalis* (Oi, 1960) (the type species), *E. pacificus* (Eskov & Marusik, 1992) and *E. enormitus* (Tanasevitch, 1988); (3) *Metaleptyphantes* Locket, 1968 *ad partem*, containing *M. bifolius* Locket, 1968, *M. carinatus* Locket, 1968, *M. clavator* Locket, 1968, *M. dentiferens* Bosmans, 1979, *M. machadoi* Locket, 1968 (the type species), *M. ovatus* Scharff, 1990, *M. perexiguus* (Simon & Fage, 1922), *M. praecipuus* Locket, 1968 and *M. vicinus* Locket, 1968; (4) *Solenysa* Simon, 1894, containing *S. circularis* Gao, Zhu & Sha, 1993, *S. geumoensis* Seo, 1996, *S. longqiensis* Li & Song, 1992, *S. melloteei* Simon, 1894 (the type species), *S. protrudens* Gao, Zhu & Sha, 1993 and *S. wulingensis* Li & Song, 1992; (5) *Uralophantes* Esynin, 1993, containing *U. troitskensis* Esynin, 1993 (the type species); (6) *Wubanooides* Eskov, 1986, containing *W. uralensis* (Pakhorukov, 1981) = *W. longicornis* Eskov, 1986 (the type species) and *W. fissus* (Kulczyński, 1926); and (7) *Epigytholus* Tanasevitch, 1996, containing *E. tuvensis* Tanasevitch, 1996 (the type species). Because both Micronetinae and some representatives of the new subfamily Irapinae have the so-called Fickert's gland inside their radix, they are hypothesized to be sister groups despite otherwise greatly deviating secondary genital organs.

РЕЗЮМЕ. Установлено новое подсемейство Irapinae subfam.n., включающее 7 родов, один из которых новый для науки, и 25 видов: (1) Типовой род *Ipa* gen.n., включающий *I. keyserlingi* (Ausserer, 1867), comb.n. (типовой вид), *I. terrenus* (L. Koch, 1879), comb.n. = *I. quadrimaculatus* (Kulczyński, 1898), syn.n., comb.n., *I. spasskyi* (Tanasevitch, 1986), comb.n. и *I. pepticus* (Tanasevitch, 1988), comb.n.; (2) *Epibellowia* Tanasevitch, 1996, включающий *E. septentrionalis* (Oi, 1960) (типовой вид), *E. pacificus* (Eskov & Marusik, 1992) и *E. enormitus* (Tanasevitch, 1988); (3) *Metaleptyphantes* Locket, 1968 *ad partem*, включающий *M. bifolius* Locket, 1968, *M. carinatus* Locket, 1968, *M. clavator* Locket, 1968, *M. dentiferens* Bosmans, 1979, *M. machadoi* Locket, 1968 (типовой вид), *M. ovatus* Scharff, 1990, *M. perexiguus* (Simon & Fage, 1922), *M. praecipuus* Locket, 1968 и *M. vicinus* Locket, 1968, (4) *Solenysa* Simon, 1894, включающий *S. circularis* Gao, Zhu & Sha, 1993, *S. geumoensis* Seo, 1996, *S. longqiensis* Li & Song, 1992, *S. melloteei* Simon, 1894 (типовой вид), *S. protrudens* Gao, Zhu & Sha, 1993 и *S. wulingensis* Li & Song, 1992, (5) *Uralophantes* Esynin, 1993, включающий *U. troitskensis* Esynin, 1993 (типовой вид), (6) *Wubanooides* Eskov, 1986, включающий *W. uralensis* (Pakhorukov, 1981) = *W. longicornis* Eskov, 1986 (типовой вид) и *W. fissus* (Kulczyński, 1926), а также (7) *Epigytholus* Tanasevitch, 1996, включающий *E. tuvensis* Tanasevitch, 1996 (типовой вид). Поскольку Micronetinae и некоторые представители нового подсемейства Irapinae имеют железу Фикерта внутри радикса, предполагается, что оба подсемейства являются сестринскими группами, несмотря на существенные различия в строении копулятивных органов.

Introduction

It was some 35 years ago when I started to develop the systematics of the linyphiid subfamily Micronetinae. My first paper in this area was a revision of the genus *Maro* O. Pickard-Cambridge, 1906 and several new papers were soon to come [Saaristo, 1971, 1972, 1973a–c, 1974a–b, 1975, 1977; Lehtinen & Saaristo, 1972]. However, due to various reasons these activities were interrupted for almost 20 years. Then in 1989, during the XI International Congress of Arachnology in Turku, I met Dr. Andrei Tanasevitch and since that day a very fruitful co-operation in clarifying the taxonomy of the then extremely chaotic genus *Lepthyphantes* continues in a more or less even pace [Saaristo & Tanasevitch, 1993, 1995, 1996, 1999, 2000, 2001, 2002a–b, 2003; Tanasevitch & Saaristo, 2006]. Later some other authors have also contributed to the taxonomy of Micronetinae [Saaristo & Marusik, 2004; Saaristo & Wunderlich, 1995a–b; Tu et al., 2006].

Altogether, I have revised to some extent about 100 genera of Micronetinae and several dozen genera belonging to other subfamilies. Already at the very beginning of this work it was clear to me that the so-called *keyserlingi*-group as erected by Wunderlich [1985] consisted of species that could not be regarded as members of Micronetinae; nor did they belong to any other subfamilial group of Linyphiidae. Likewise, the placement of the *keyserlingi*-group and related taxa within the Micronetinae was questioned already by Tanasevitch [1996a–b].

Over the past 35 years a lot of new information about the *keyserlingi*-group and its relatives has become available. Accordingly, it has become increasingly necessary to formally recognize the *keyserlingi*-group; so a new genus, *Ipa* gen.n., with *Linyphia keyserlingi* Ausserer, 1867 as its type species, is being created in this paper. Furthermore, the new genus is considered as the type genus of a new linyphiid subfamily. In addition, all four recognized species of *Ipa* gen.n. are thoroughly described and figured while the other genera and species of the new subfamily are merely listed.

Material and methods

The specimens examined are deposited in the Zoological Museum of Turku University (MZT), Finland or Zoological Museum of the Moscow State University, Russia (ZMUM). All measurements are in millimeters. Specimens were examined under a Leitz stereomicroscope and measured under a Wild M5 stereomicroscope. For examination of genital structures right palps of males were detached from the spider body and placed on a cotton bed in a small bowl filled with 75% alcohol. In a few cases they were cleared by a KOH solution to study the inner structures. Female copulatory organs were first studied in situ, then detached and cleared in KOH in order to study the internal structures

or adnexae. Illustrations were made under a Leitz stereomicroscope with a drawing apparatus. Micrographs were obtained with a JEOL (JSM-5200) scanning electron microscope.

ABBREVIATIONS.

Museums:

MZT = Zoological Museum, University of Turku, Finland; SMNH = Swedish Museum of Natural History, Stockholm, Sweden; ZMUM = Zoological Museum of the Moscow University, Russia.

Morphological terms:

AA1 — anterior apophysis 1; AA2 — anterior apophysis 2; AD — abdominal depression; AM1 — anterior membrane 1; AM2 — anterior membrane 2; BE — median beam; DF — dorsal flanks of epigyne; E — embolus; EA — extensible area of epigyne; EC — embolic complex; EG — starting point of FG; EP — embolus proper; FG — fertilization groove; FGL — Fickert's gland; LB — lower branch of RL; LC — lamella characteristic; LL — lateral lobe; LP — lateral pocket; MM — median membrane; PC — paracymbium; PH — pit hook; PI — pit; PMP — posterior median plate; RA — radix; RL — radical lamella; SR — stretcher; ST — suprategulum; TA — terminal apophysis; TE — tegulum; UB — upper branch of RL; VF — ventral flanks of epigyne.

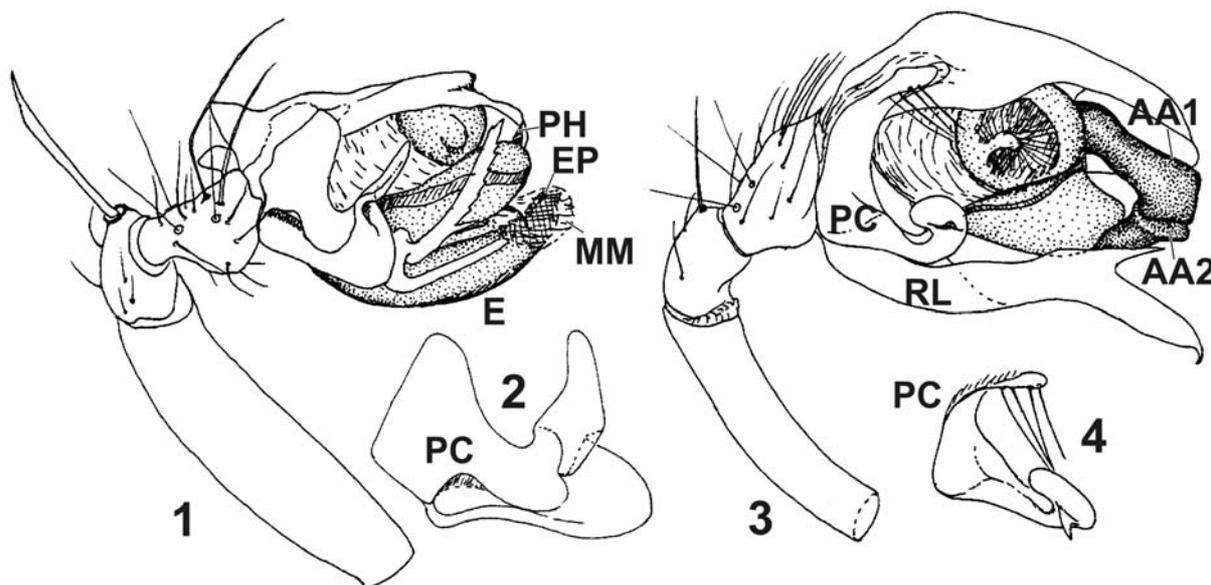
SYSTEMATIC ACCOUNT

*Ipa*inae subfam.n.

Type genus: *Ipa* gen.n.; the type species: *Linyphia keyserlingi* Ausserer, 1867.

GENERA AND SPECIES INCLUDED. (1) *Ipa* gen.n., containing *I. keyserlingi* (Ausserer, 1867), comb. n., *I. terrenus* (L. Koch, 1879), comb.n., = *I. quadrimaculatus* (Kulczyński, 1898), syn.n., comb.n., *I. spasskyi* (Tanasevitch, 1986), comb.n. and *I. pepticus* (Tanasevitch, 1988), comb.n.; (2) *Epibellowia* Tanasevitch, 1996, containing *E. septentrionalis* (Oi, 1960) (the type species), *E. pacifica* (Eskov & Marusik, 1992) and *E. enormita* (Tanasevitch, 1988); (3) *Metaleptyphantes* Locket, 1968 *ad partem*, containing *M. bifoliatus* Locket, 1968, *M. carinatus* Locket, 1968, *M. clavator* Locket, 1968, *M. dentiferens* Bosmans, 1979, *M. machadoi* Locket, 1968 (the type species, from Angola, by original designation), *M. ovatus* Scharff, 1990, *M. perexiguus* (Simon & Fage, 1922), *M. praecipuus* Locket, 1968 and *M. vicinus* Locket, 1968; (4) *Solenysa* Simon, 1894, containing *S. circularis* Gao, Zhu & Sha, 1993, *S. geumoensis* Seo, 1996, *S. longqiensis* Li & Song, 1992, *S. melloteei* Simon, 1894 (the type species), *S. protrudens* Gao, Zhu & Sha, 1993 and *S. wulingensis* Li & Song, 1992; (5) *Uralophantes* Esyunin, 1993, containing *U. troitskensis* Esyunin, 1993 (the type species); (6) *Wubanooides* Eskov, 1986, containing *W. uralensis* (Pakhorukov, 1981) = *W. longicornis* Eskov, 1986 (the type species) and *W. fissus* (Kulczyński, 1926); and (7) *Epigytholus* Tanasevitch, 1996, containing *E. tuvensis* Tanasevitch, 1996 (the type species).

DIAGNOSIS. Members of this subfamily can be recognized by the peculiar conformation of the male and female secondary genital organs. The males can be recognized by the following combination of characters of the palp (Figs 3–



Figs 1–4. Right male palp and paracymbium of *Lephyphantes minutus* (Blackwall, 1833) (1–2) and *Ipa keyserlingi* (Ausserer, 1867) (3–4): 1, 3 — palp retrolaterally; 2, 4 — paracymbium dorsally. Original.

Рис. 1–4. Правая пальпа самца и парацимбиум *Lephyphantes minutus* (Blackwall, 1833) (1–2) и *Ipa keyserlingi* (Ausserer, 1867) (3–4): 1, 3 — пальпа ретролатерально; 2, 4 — парацимбиум сверху. Оригинал.

4, 7–8). Paracymbium (PC) is either L- or U-shaped, not tube-like. Embolic division is connected to the suprategulum (ST) via a short, membranous column between the suprategulum and the membranous lateral side of a short, more or less triangular radix (RA); there is a small median membrane (MM) arising from the basal part of the column. Two heavily sclerotized sclerites or anterior apophyses 1 (AA1) and 2 (AA2) are connected to the anterior part of the radix which shows a well-chitinized mesal side, while the posterior part of the radix is drawn into a lamellar extension, here called radical lamella (RL) which firstly curves externally and then turns anteriorly, usually extending about level to the apical part of the cymbium; in lateral view (Figs 3, 22, 24, 26, 28), the radical lamella can be seen to consist of two branches, viz. upper (UB) and lower branches (LB). At the base of both apophyses there are small, transparent, flap-like membranes or anterior membranes 1 (AM1) and 2 (AM2), the former apparently functioning like a conductor. The basal part of the embolic complex (EC) is disc-shaped, bearing a whip-like embolus proper (EP) which is the so-called "Einführungs-Embolus" of Wiehle [1960]. Females are characterized by having a movable epigyne. There is a depression in the abdomen in front of the epigyne. The epigyne is partly sunken into the abdomen. At the base of the epigyne there is a wrinkled area (EA). The stretching this area makes the whole epigyne, including the seminal receptacula, move posteriorly. There is no special structure to accept the embolus but the entrance duct is U-shaped from the very beginning. Finally, possibly the conspicuous metallic shines of the abdomen are also a diagnostic character.

AFFINITIES. Ipainae is hypothesized to be the sister group to Micronetinae. The reason for this is the so-called Fickert's gland. Although perhaps a plesiomorphic character [cf. Saaristo & Tanasevitch, 1996], it is commonly found in members of the Micronetinae and also in some representatives of Ipainae, but not in any other linyphiid supragener-

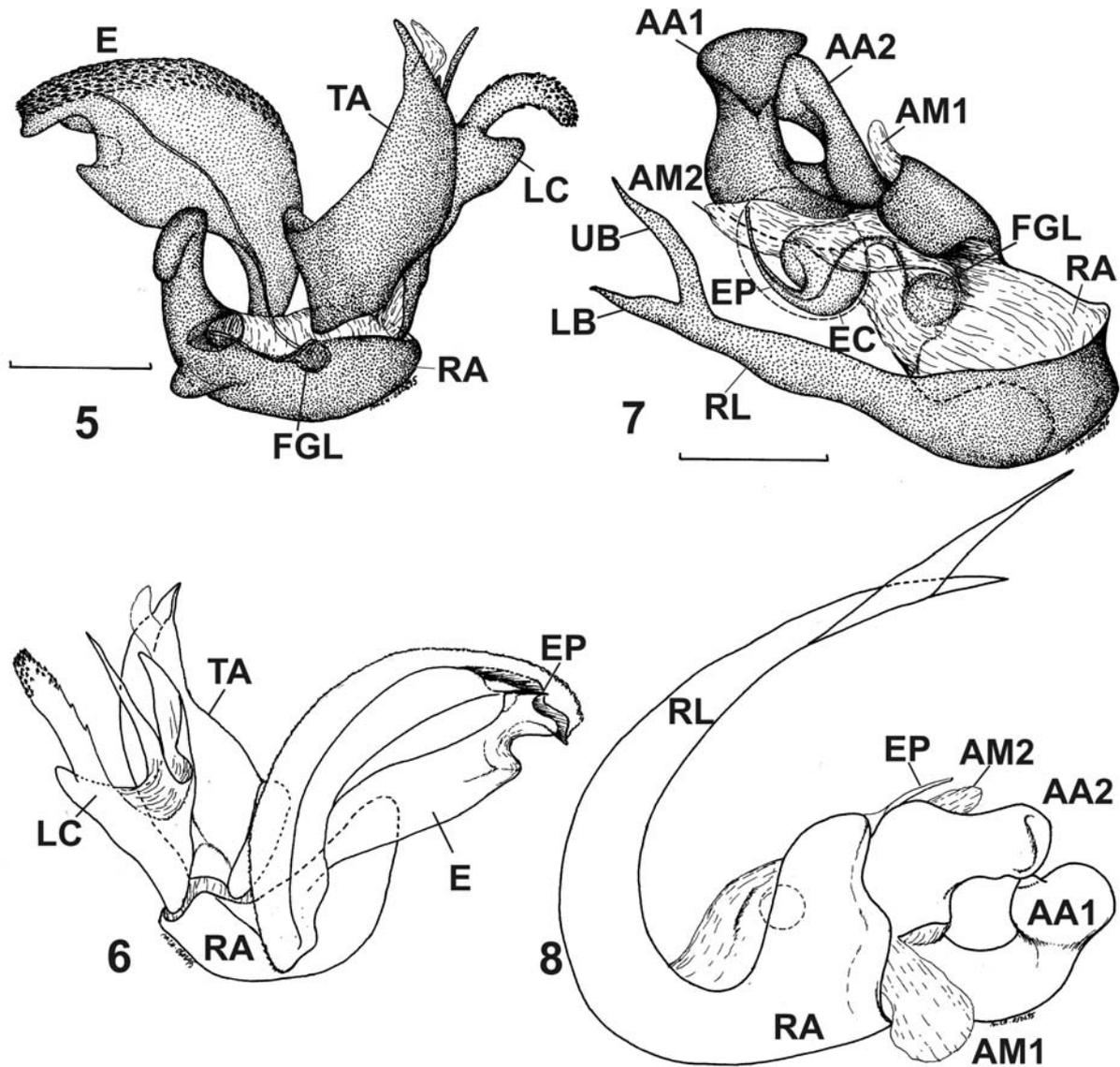
ic taxa. On the other hand, there are striking differences in the secondary genital organs between the two subfamilies. To demonstrate this situation, the genitalia of *I. keyserlingi* are compared to those of *Lephyphantes minutus* (Blackwall, 1833), a selected representative of Micronetinae (Figs 1–2, 5–6).

Already the shape of the ipaine paracymbium is very characteristic and bears no close resemblance to that of the micronetid one. The typical micronetine paracymbium is U-shaped and, due to its pocket-like depressions, more or less tubuliform [van Helsdingen, 1965:34; Saaristo, 1973a: 462]. On the other hand, the paracymbium of ipainae is L- rather than U-shaped. Its apical part is often spoon-shaped and, due to the very even surface, conspicuously shining. In the apical part of the paracymbium there is a lateral dentiform extension and a traverse ridge about its middle part.

As to the structure of the embolic division, there exist several fundamental differences between the two subfamilies. In micronetines there is a well defined radix bearing three separate elements, viz. embolus, terminal (= median) apophysis, and lamella characteristica, which are connected to the radix via articulating membranes. Ipainae apparently lack both a lamella characteristica and a terminal apophysis while the embolus is of a different type. It is also important to emphasize in this connection that the Micronetinae apparently is the only linyphiid subfamily where there is Fickert's gland inside the radix.

Both apophyses originating from the radix in *Ipa* gen.n. can be termed AA1 and AA2, because they cannot be easily homologized with LC and/or TA of Micronetinae due to their unusual position (cf. Figs 5–8), shape (presence of a lamella and other structures) and heavy sclerotization.

As can be suggested, also the structure of the epigyne is quite different in the two subfamilies. Typical for the Micronetinae is a movable, S-shaped scape which is sunken into the epigynal cavity [see Saaristo & Tanasevitch, 1996:



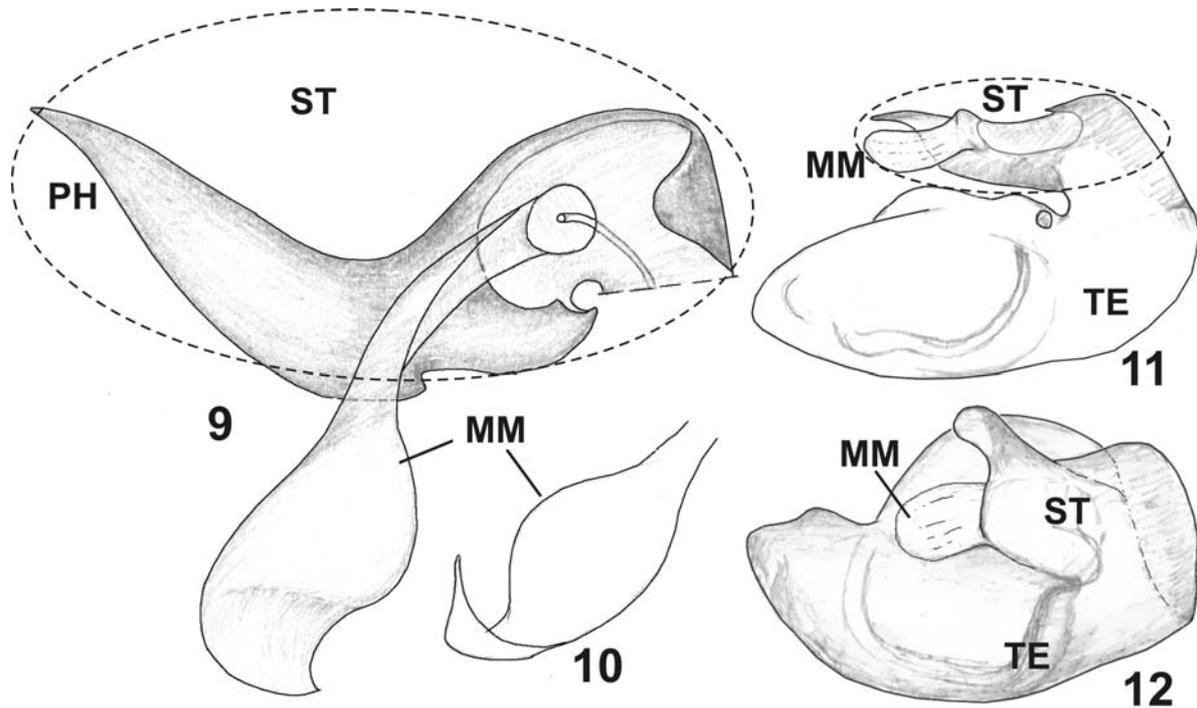
Figs 5–8. Embolic division of *Lepthyphantes minutus* (Blackwall, 1833) (5–6) and *Ipa keyserlingi* (Ausserer, 1867) (7–8): 5, 7 — ventrally; 6, 8 — dorsally. Original. Scale 0.1 mm.

Рис. 5–8. Эмболюсный отдел *Lepthyphantes minutus* (Blackwall, 1833) (5–6) и *Ipa keyserlingi* (Ausserer, 1867) (7–8): 5, 7 — снизу; 6, 8 — сверху. Оригинал. Масштаб 0,1 мм.

figs 6 & 7]; however, this basic pattern has been modified in various ways within the subfamily and the scape might have even been totally reduced. In ipaines the whole epigyne is movable because of a wrinkled extensible area at its base (EA) and the epigyne itself is partly sunken into an abdominal depression (AD) at its anterior border. The “ancestral” forms of this subfamily can be assumed to have had their epigyne bent anteriorly about its middle and thus the epigyne was divided into a dorsal and a ventral part. The ventral part can be divided into a median beam (BE) and ventral flanks (VF) while the dorsal part into dorsal flanks (DF) between which lies a posterior median plate (PMP). The fertilization grooves (FG) start from the apex of the beam,

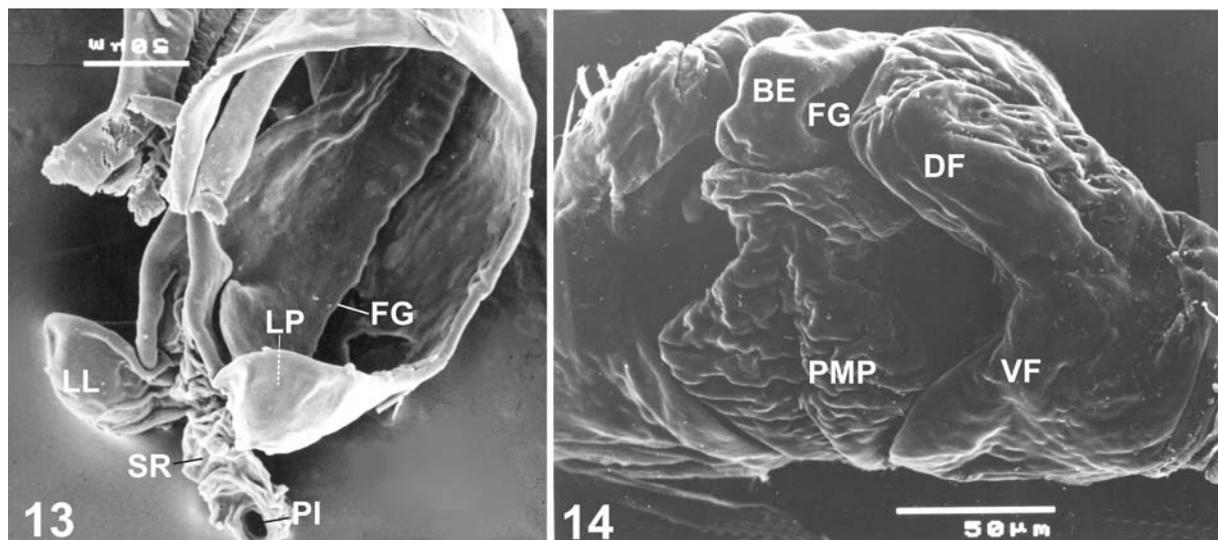
running at first anteriorly and then turning laterally, continuing inside the ventral and dorsal flanks through the wrinkled area to the vagina (Figs 14 & 15). This kind of epigyne is found in *Ipa*.

On the other hand, the epigyne of *Wubanoides* represents a highly advanced form by having lost the median beam while the ventral and dorsal flanks have merged together and the whole epigyne now points posteriorly. In addition, the wrinkled area at the base of the epigyne is much more developed (Figs 18–21). The epigyne of *Wubanoides* is easily derived from that of *I. spasskyi* (Fig. 27) by the upper part being bent to point posteriorly in horizontal position.



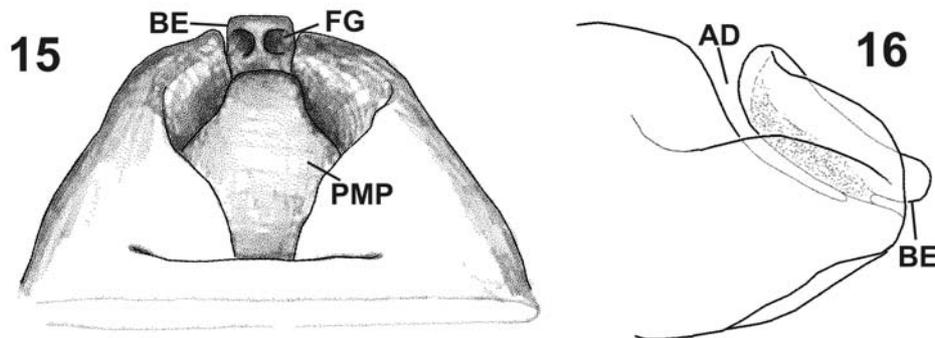
Figs 9–12. Suprategulum and median membrane of *Lephyphantes minutus* (Blackwall, 1833) (9–10) and *Ipa keyserlingi* (Ausserer, 1867) (11–12): 9, 11 — dorsally; 10, 12 — laterally. Original.

Рис. 9–12. Супратегулюм и медиальная мембрана *Lephyphantes minutus* (Blackwall, 1833) (9–10) и *Ipa keyserlingi* (Ausserer, 1867) (11–12): 9, 11 — сверху; 10, 12 — сбоку. Оригинал.



Figs 13–14. Distal part of scapus of *Lephyphantes minutus* (Blackwall, 1833) (13), ventrolateral view, and epigyne of *Ipa keyserlingi* (Ausserer, 1867) (14), obliquely dorsally. Original.

Рис. 13–14. Дистальная часть скапуса *Lephyphantes minutus* (Blackwall, 1833) (13), одновременно снизу и сбоку и эпигина *Ipa keyserlingi* (Ausserer, 1867) (14), сверху. Оригинал.



Figs. 15–16. Epigyne of *Ipa keyserlingi* (Ausserer, 1867), dorsally (15) and dextrolaterally (16). Original.
 Рис. 15–16. Эпигина *Ipa keyserlingi* (Ausserer, 1867), сверху (15) и сбоку (16). Оригинал.

One important difference between the structure of the Micronetinae epigyne and that of Ipainae is that in the former the fertilization grooves always start from a more or less complicated bursa copulatrix while their starting points are unmodified in Ipainae.

Finally it should be mentioned that the structure of the embolus clearly corresponds to that of the epigyne in both subfamilies. Thus, when in copula, the Micronetinae embolus follows the contours of the scape, its tip being inserted inside the lateral pockets while the embolus proper is pressed into the bursa copulatrix [see van Helsdingen, 1965: figs 13 & 14]. On the other hand, the embolus proper of Ipainae is long and whip-like, apparently being thrust as a whole into the fertilization groove; so there is no need in special structures like bursae copulatrix at the beginning of the grooves.

It is apparent from the above that it is virtually impossible to homologize only very few elements in the secondary genital organs of the new subfamily with those of any other of the six known subfamilial taxa of Linyphiidae, viz. Dubiaraneinae, Erigoninae, Linyphiinae, Micronetinae, Mynogleninae and Stemonyphantinae. The number of subfamilies in Linyphiidae still seems to be too low. For example, the male palp of *Taranucnus* Simon, 1884 (the type species: *Linyphia setosa* O. Pickard-Cambridge, 1863) or *Linyphantes* Chamberlin et Ivie, 1942 (the type species: *Linyphia ephedra* Chamberlin et Ivie, 1933) are very different from those in *Linyphia* Latreille, 1804.

It is worth mentioning that some of the genera of Ipainae have never been treated as micronetines (*Epigytholus*, *Solenysa*, *Uralophantes*). *Epibellowia* and *Wubanoides* have not been considered as members of Micronetinae in the latest survey of the genera [Saaristo & Tanasevitch, 1996]. Former five genera have recently been listed in Linyphiinae [Tanasevitch, 2007]. *Metalephyphantes* was earlier [Saaristo & Tanasevitch, 1996] regarded as Micronetinae, because the structure of its male palp had not been studied at that time. Similarly, earlier any supraspecific name suggested for the *keyserlingi*-group remained in *Lepthyphantes*, thus within Micronetinae.

Summarizing all available evidence, it seems that (1) the radical lamella, (2) the shape of the paracymbium (?), (3) a filiform embolus and (4) a movable epigyne (not in all genera) are possible synapomorphies of the subfamily, whereas (1) and (4) are likely autapomorphies of the entire family.

Ipa gen.n.

Type species: *Linyphia keyserlingi* Ausserer, 1867.

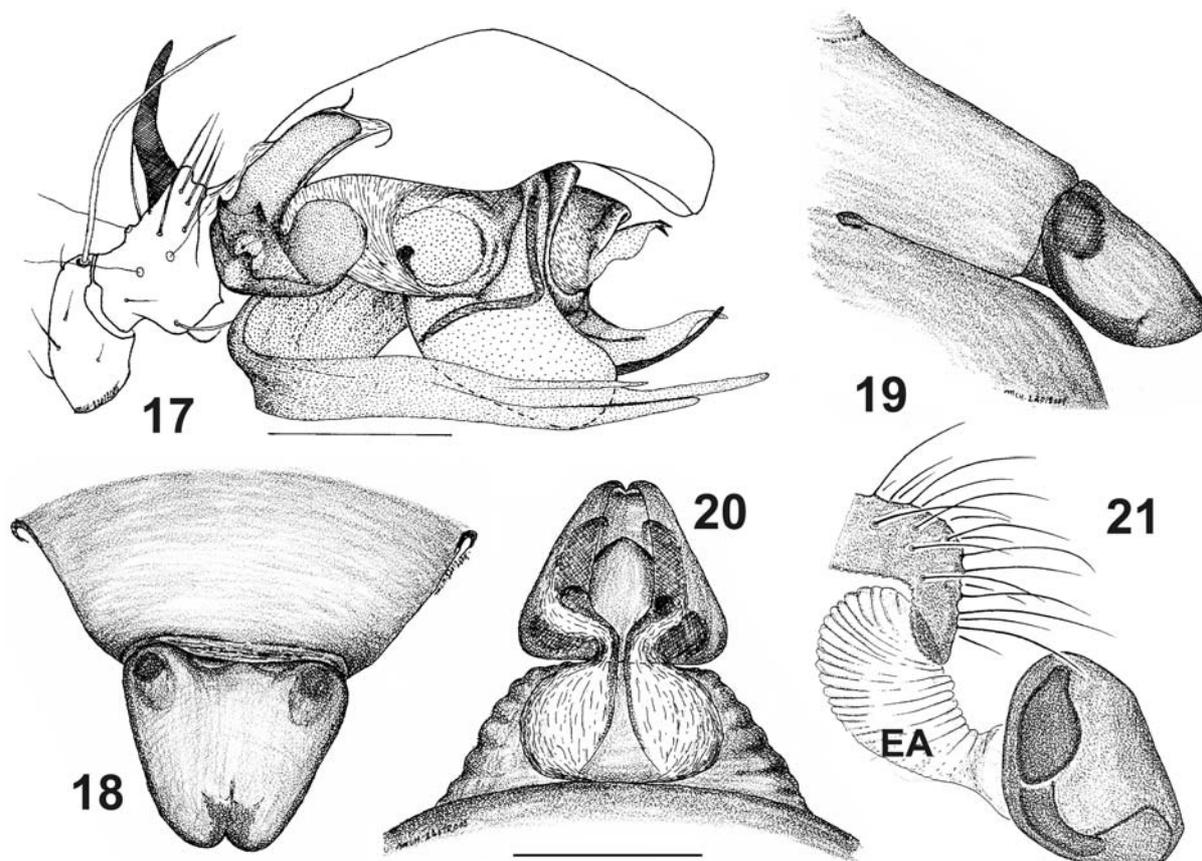
SPECIES INCLUDED. *I. keyserlingi* (Ausserer, 1867), comb.n., *I. terrenus* (L. Koch, 1879), comb.n. = *I. quadrimaculatus* (Kulczyński, 1898), syn.n., comb.n., *I. spasskyi* (Tanasevitch, 1986), comb.n. and *I. pepticus* (Tanasevitch, 1988), comb.n.

DIAGNOSIS. The new genus is most easily defined according to the secondary genital organs. For the sake of comparison, the corresponding figures have also been presented for *Lepthyphantes minutus* (Figs 1, 2, 5, 6, 9, 13) and *Ipa keyserlingi* (Figs 3, 4, 7, 8, 11, 12, 14–16, 22, 23). *Ipa* males are most easily recognized by two heavily sclerotized elements, anterior apophyses 1 and 2, both arising from the anterior edge of a short radix and touching each other apically in lateral view. Further the posterior part of the radix is drawn into a long radical lamella. The female epigyne is characterized by a more or less well-developed wrinkled basal area; the whole epigyne is more or less movable due to this structure. The entrances to the grooves start from each side of the apical part of an elongated scape-like median extension or beam which itself lies between anteriorly pointing side flanks.

Species of the new genus are also characterized by very dark coloration, even the secondary genital organs are so densely suffused with black that it is hard to observe their different parts. Except for the pale yellow legs, the animals show black, metallic shining bodies; on the dorsal side of the abdomen there are a varying number of pale grey areas of chevrons, transverse or ovoid patches which include snow white guanine patches.

TAXONOMIC POSITION. Millidge [1984] discussed the subfamilies of the Linyphiidae. In this context he pointed out that the oldest available subfamilial name for the group of genera that also includes *Lepthyphantes* is Micronetinae Hull, 1920. He also synonymized Lepthyphantinae Saaristo, 1973 with Micronetinae. However, the correct author and date for this name is Wiehle, 1956. There are a few more junior synonyms of Micronetinae but they will be discussed in a later paper.

According to the structure of the secondary genitalia, *Ipa* gen.n. cannot be placed into Micronetinae [Saaristo 1973a; Millidge 1984]. In fact, it is difficult at present to assign it to any formally delimited suprageneric group of Linyphiidae. This shows that the subfamilial division of the



Figs 17–21. *Wubanooides uralensis* (Pakhorukov, 1981), right male palp retrolaterally (17), epigyne ventrally (18), sinistrolaterally (19), dorsally (20), and treated with KOH sinistrolaterally (21). Original and after Tanasevitch [1996] (Fig. 21). Scale 0.2 mm.

Рис. 17–21. *Wubanooides uralensis* (Pakhorukov, 1981), правая пальпа самца ретролатерально (17), эпигина снизу (18), сбоку (19), сверху (20) и после мацерации в КОН сбоку (21). Оригинал и по Tanasevitch [1996] (Рис. 21). Масштаб 0,2 мм.

Linyphiidae is still unsatisfactory and new subfamilies or tribes will be created in the future.

ETYMOLOGY. The genus is named in the memory of my beloved father Toivo Ilmari Saaristo, whose nickname was Ipa. The gender is feminine.

Ipa keyserlingi (Ausserer, 1867), **comb.n.**

Figs 3, 4, 7, 8, 11, 12, 14–16, 22, 23.

Linyphia Keyserlingi Ausserer, 1867: 146 (♂ & ♀).

Lepthyphantes Keyserlingii, Simon, 1894: 685.

Lepthyphantes keyserlingi, Miller & Žitňanská, 1976: 85, pl. 4, f. 5–7 (♂ & ♀).

Lepthyphantes keyserlingi, Wiehle, 1956: 210, f. 350–351 (♂ & ♀).

Lepthyphantes keyserlingi, Tanasevitch, 1990: 28, pl. 11, f. 3–6. (♂ & ♀).

Lepthyphantes keyserlingi, Heimer & Nentwig, 1991: 188, f. 507.1, 507.4 (♂ & ♀).

For further references see Platnick [2007].

MATERIAL. FINLAND: Nauvo, Prostvik, 1 subad. ♂ & 2 ♀♀, 04.08.1961, leg. P.T. Lehtinen (MZT AM 1148) and Hanko, Tvärminne, 1 ♂ & 1 ♀, leg. N. Fritzen (MZT AM 1155). GERMAN-Y: Nidwalden, Kaiserstuhl, 2 ♂♂ & 2 ♀♀, leg. J. Wunderlich (MZT AM 1149). CZECHOSLOVAKIA: North Bohemia, 3 ♂♂ & 4 ♀♀, 29.04.1962, leg. J. Buchar (MZT AM 1150) and Mohelno,

1 ♂, 03.09.1971, leg. P.T. Lehtinen (MZT AM 1151). UKRAINE: Crimea, Sevastopol, Maximova Datcha canyon, 44°34.08'N 33°32.278'E, 100 m, 1 ♂ & 1 ♀, 13.03.2002, leg. Yu.M. Marusik. FRANCE: Corsica, Col de Tana, 1 ♀, 24.05.1972, leg. P.T. Lehtinen (MZT AM 1152) and Col de Sorba, 1 ♀, 23.05.1972, leg. P.T. Lehtinen (MZT AM 1153).

DIAGNOSIS. The male of *I. keyserlingi* is easily recognized by the radical lamella whose upper branch is spike-like and about half the length of a ribbon-like lower branch (Figs 3, 22). Side flanks of the epigyne diverging anteriorly with beam widest at its apex (Figs 14–16, 23).

DESCRIPTION. Cephalothorax and abdomen dark brown-blackish, abdomen silky shining with four white spots, legs yellowish. Mfl: 0.16–0.18.

DISTRIBUTION. West Palaearctic.

Ipa pepticus (Tanasevitch, 1988), **comb.n.**

Figs 28, 29.

Lepthyphantes pepticus Tanasevitch, 1988: 193, f. 33–35 (♂).

Lepthyphantes pepticus, Wunderlich, 1995: 488, f. 37–38 (♂).

MATERIAL. MONGOLIA: Omnogov Aimak, Noyon Somon, Noyon uul Mt. Range (1900 m), 43°02'N 102°06'E, 1 ♂ & 1 ♀, 30.–31.05.1997, leg. Yu.M. Marusik (ZMUM). KAZAKHSTAN: Taldy-Kurgan Area, 20 km NE of Lake Ushkole, 1 ♂ & 1 ♀,

31.07.1988, leg. Zarko, Tarabaev, Zyuzin. TURKMENISTAN, Mary Area, Kushka Distr., ca. 1.5 km NNE of Chemenibit, Kushka River valley, right bank, ca 520 m (35°28'21"N 62°24'32"E), 1 ♂, 05.04.2002, leg. A.V. Gromov (ZMUM). RUSSIA: Tuva, 7–10 km W of Ak-Tsychra (Irbitei River), 50°44'N, 93°08'E, 2 ♀♀, 14.06.1995, leg. S. Koponen (MZT AM 1155).

DIAGNOSIS. The male of *I. pepticus* is easily recognized by the radical lamella whose apical part is like a goose-head (Fig. 28). The epigyne reminds of that of *keyserlingi* but the side flanks are more or less parallel, with the beam the widest close to its apex (Fig. 29).

DESCRIPTION. The male has been well described by Tanasevitch [1986] and Wunderlich [1995]. The female is being described here for the first time. The epigyne is as in Fig. 29.

DISTRIBUTION. Mongolia, Kazakhstan, Turkmenistan and Russia: Tuva.

Ipa spasskyi (Tanasevitch, 1986), **comb.n.**
Figs 26, 27.

Lepthyphantes spasskyi Tanasevitch, 1986: 140, f. 6–16 (♂ & ♀).
MATERIAL. TURKEY: Erzincan Vill., Refahiye-W, alpine meadow and stone bed, 1 ♀, 12.09.1971, leg. P.T. Lehtinen (MZT AM 1156).

DIAGNOSIS. The male of *I. spasskyi* is easily recognized by the radical lamella whose ribbon-like upper branch is about half the length of a similarly ribbon-like lower branch (Fig. 26). Epigyne with side flanks slightly diverging posteriorly, beam elongated hexagonal, widest at its middle (Fig. 27).

DESCRIPTION. Well described by Tanasevitch [1986].

DISTRIBUTION: Kazakhstan, Ukraine, and Turkey (West and Central Palaearctic).

Ipa terrenus (L. Koch, 1879), **comb.n.**
Figs 24, 25.

Linyphia terrena L. Koch, 1879: 31, pl. 1, f. 19 (♀).
Lepthyphantes quadrimaculatus Kulczyński, 1898: 90, pl. 2, f. 63, 64 (♂), syn.n.

Lepthyphantes terrenus, Holm, 1973: 95, f. 76, 77 (♀).
Lepthyphantes quadrimaculatus, Miller & Žitňanská, 1976: 85, pl. 4, f. 1–4 (♂ & ♀).

Lepthyphantes quadrimaculatus, Tanasevitch, 1990: 28, pl. 11, f. 1–2 (♂).

Lepthyphantes quadrimaculatus, Heimer & Nentwig, 1991: 188, f. 508.1, 508.4 (♂ & ♀).

MATERIAL. TURKEY: Hendek-Gümüşova, under Eriaceae sp., 1 subad. ♂ & 4 ♀♀, 10.09.1971, leg. P.T. Lehtinen (MZT AM 1157). RUSSIA: Siberia, 2 mls N of Krasnojarsk, 1 ♀, 08.10.1875 (SMNH, holotype of *Linyphia terrena*); Khakassia, 25 km NE of Village Askiz, slopy stony steppe, 1 ♂ & 2 ♀♀, 15.07.1990, D.V. Logunov; Tuva, Biy-Khem River, Ust'-Uyuk River mouth, 2♀, 06.1995, leg. Yu.M. Marusik.

DIAGNOSIS. The male of *I. terrenus* is easily recognized by the radical lamella whose upper branch is very small, thorn-like while the lower branch is evenly tapered apically (Fig. 24). Epigyne with strongly widened side flanks while apex of beam trilobed (Fig. 25).

DISTRIBUTION. From Europe to the Yenisei (West to Central Palaearctic).

DISCUSSION. As stated by Holm [1973], the type specimen of *Linyphia terrena* is a strongly damaged female with a shrivelled abdomen due to the earlier drying of the sample.

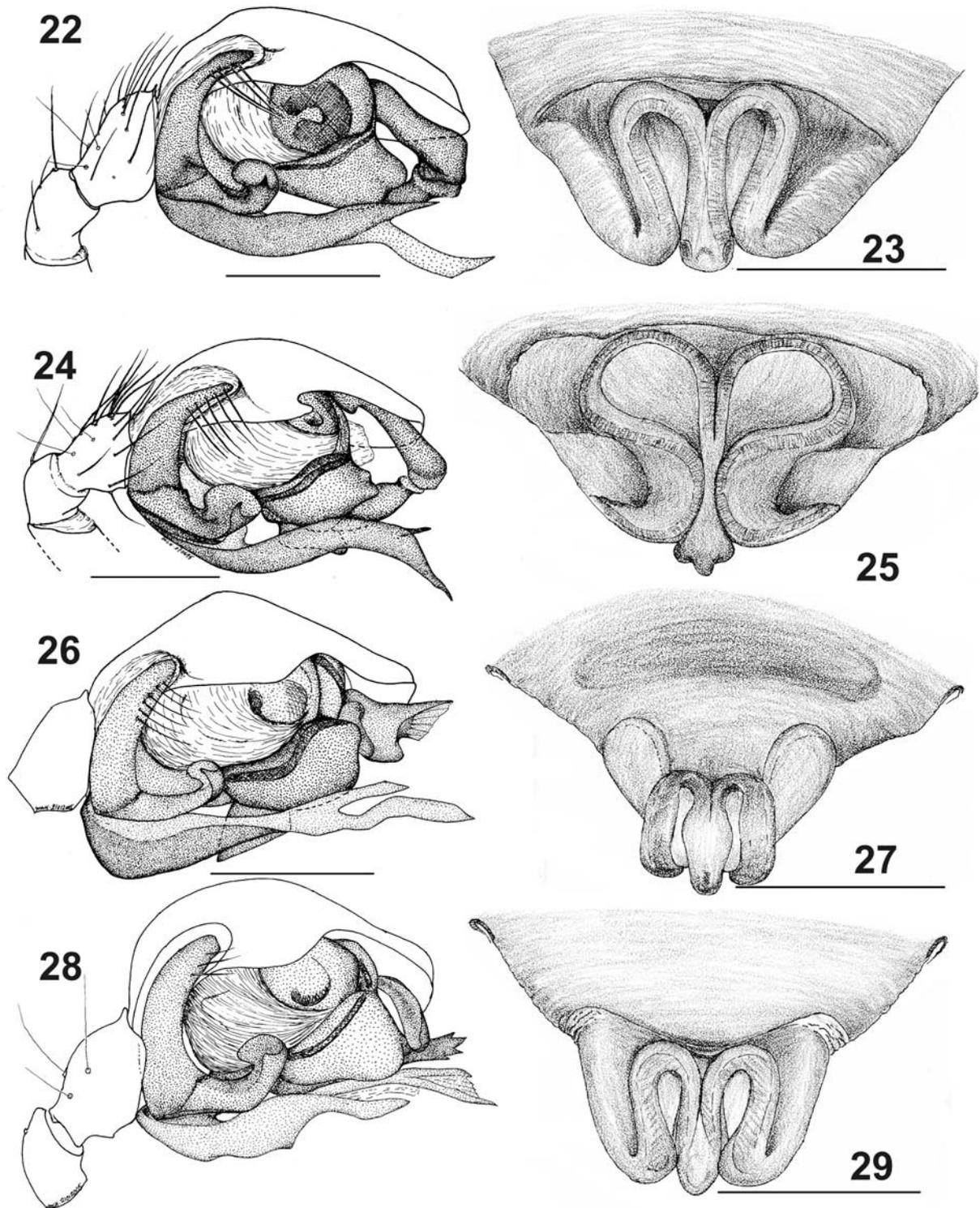
However, its careful comparison with samples of *Lepthyphantes quadrimaculatus* reveal no differences in structure of the epigyne. Therefore, *Lepthyphantes quadrimaculatus* Kulczyński, 1898 is here regarded as a junior synonym of *Linyphia terrena* L. Koch, 1879, syn.n.

In addition, the history of *L. quadrimaculatus* is somewhat complicated. Already Lessert [1910: 264] stated in a footnote that *quadrimaculatus* is only a variety of *keyserlingi* while later Simon [1929: 737] also synonymized the two species. Since then they had generally been considered as conspecific until Miller & Žitňanská [1976] were able to show that *keyserlingi* and *quadrimaculatus* are "good", different species. They also described the unknown female of the latter taxon.

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References

- Ausserer A. 1867. Die Arachniden Tirols nach ihrer horizontalen und verticalen Verbreitung. I // Verhandlungen der zoologisch-botanischen Gesellschaft in Wien. Bd.17. S.137–170.
- Heimer S., Nentwig W. 1991. Spinnen Mitteleuropas: Ein Bestimmungsbuch. Berlin: Verlag Paul Parey. 543 S.
- Helsdingen P.J. van. 1965. Sexual behaviour of *Lepthyphantes leprosus* (Ohlert) (Araneida, Linyphiidae), with notes on the function of the genital organs // Zoologische Mededelingen, Leiden. Vol.41. P.15–42.
- Holm Å. 1973. On the spiders collected during the Swedish expeditions to Novaya Zemlya and Yenisey in 1875 and 1876 // Zoologica Scripta. Vol.2. P.71–110.
- Koch L. 1879. Arachniden aus Sibirien und Novaja Semlja, eingesammelt von der schwedischen Expedition im Jahre 1875 // Kongliga Svenska vetenskapsakademiens handlingar. Vol.16. P.1–136.
- Kulczyński W. 1898. Symbola ad faunam Araneorum Austriae inferioris cognoscendam // Rozprawy i sprawozdanie wydziału matematyczno-przyrodniczego. Akademia umiejętnosci v Krakowie. Vol.36. P.1–114.
- Lehtinen P.T., Saaristo M.I. 1972. *Tallusia* gen.n. (Araneae, Linyphiidae) // Annales Zoologici Fennici. Vol.9. P.265–268.
- Lessert R. de. 1910. Catalogue des invertébrés de la Suisse. Fasc. 3, Araignées. Musée d'histoire naturelle de Genève. 635 pp.
- Miller F., Žitňanská O. 1976. Einige bemerkenswerte Spinnen aus der Slowakei // Biologia (Bratislava). Vol.31. N.2. P.81–88.
- Millidge A.F. 1984. The taxonomy of the Linyphiidae, based chiefly on the epigynal and tracheal characters (Araneae: Linyphiidae) // Bulletin of the British arachnological Society. Vol.6. P.229–267.
- Platnick N.I. 2007. The world spider catalog, version 7.5. American Museum of Natural History, online at <http://research.amnh.org/entomology/spiders/catalog/index.html> (accessed 10 April 2007).
- Saaristo M.I. 1971. Revision of the genus *Maro* O. P.-Cambridge (Araneae, Linyphiidae) // Annales Zoologici Fennici. Vol.8. P.463–482.
- Saaristo M.I. 1972. Redelimitation of the genus *Oreonetides* Strand, 1901 (Araneae, Linyphiidae) based on an analysis of the genital organs // Annales Zoologici Fennici. Vol.9. P.69–74.



Figs 22–29. Right male palps (retrolaterally) and epigynes (ventrally) of *Ipa keyserlingi* (Ausserer, 1867) (22, 23), *I. terrenus* (L. Koch, 1879) (24, 25), *I. spasskyi* (Tanasevitch, 1986) (26, 27) and *I. pepticus* (Tanasevitch, 1988) (28, 29): 22, 24, 26, 28 — palp; 23, 25, 27, 29 — epigyne. Original. Scale 0.2 mm.

Рис. 22–29. Правая пальпа самца (ретролатерально) и эпигинва (снизу) *Ipa keyserlingi* (Ausserer, 1867) (22-23), *I. terrenus* (L. Koch, 1879) (24-25), *I. spasskyi* (Tanasevitch, 1986) (26-27) и *I. pepticus* (Tanasevitch, 1988) (28-29): 22, 24, 26, 28 — пальпа; 23, 25, 27, 29 — эпигина. Оригинал. Масштаб 0,2 мм.

- Saaristo M.I. 1973a. Delimitation of the subfamily Lepthyphantinae (Araneae, Linyphiidae) according to the secondary genital organs // *Annales Zoologici Fennici*. Vol.10. P.388–391.
- Saaristo M.I. 1973b. *Birgerius* gen.n. (Araneae, Linyphiidae) // *Annales Zoologici Fennici*. Vol.10. P.450–451.
- Saaristo, M.I. 1973c. Taxonomical analysis of the type-species of *Agyseta*, *Anomalaria*, *Meioneta*, *Aprolagus* and *Syedrula* (Araneae, Linyphiidae) // *Annales Zoologici Fennici*. Vol.10. P.452–467.
- Saaristo M.I. 1974a. Taxonomical analysis of *Microneta viaria* (Blackwall, 1841), the type-species of the genus *Microneta* Menge, 1869 (Araneae, Linyphiidae) // *Annales Zoologici Fennici*. Vol.11. P.166–169.
- Saaristo M.I. 1974b. Taxonomical analysis of *Theonina cornix* (Simon, 1881), the type-species of the genus *Theonina* Simon, 1929 (Araneae, Linyphiidae) // *Annales Zoologici Fennici*. Vol.11. P.451–466.
- Saaristo M.I. 1975. On the evolution of the secondary genital organs of Lepthyphantinae (Araneae, Linyphiidae) // *Proceedings of the VI International Aracnological Congress 1974*. P.21–25.
- Saaristo M.I. 1977. Secondary genital organs in the taxonomy of Lepthyphantinae (Araneae, Linyphiidae) // *Reports from the Department of Zoology, University of Turku*. Vol.5. P.1–16
- Saaristo M.I., Marusik Yu.M. 2004. Two new petrophilous micronetine genera *Agyphantes* gen.n. and *Lidia* gen.n. (Araneae, Linyphiidae, Micronetinae) from eastern Palearctic with descriptions of two new species // *Bulletin of the British arachnological Society*. Vol.13. Part 3. P.76–82.
- Saaristo M.I., Tanasevitch A.V. 1993. Notes on the systematics of the spider genus *Lepthyphantes* Menge (Aranei Linyphiidae Micronetinae) // *Arthropoda Selecta*. Vol.2. No.2. P.55–61.
- Saaristo M.I., Tanasevitch A.V. 1995. Three new *Lepthyphantes* Menge, 1866 from Iran and Turkey (Aranei Linyphiidae) // *Arthropoda Selecta*. Vol.4. Nos 3/4. P.61–64.
- Saaristo M.I., Tanasevitch A.V. 1996. Redelimitation of the subfamily Micronetinae Hull, 1920 and the genus *Lepthyphantes* Menge, 1866 with descriptions of some new genera // *Berichte des naturwissenschaftlich-medizinischen Vereins in Innsbruck*. Bd.83. S.163–186.
- Saaristo M.I., Tanasevitch A.V. 1999. Reclassification of the *mughii*-group of the genus *Lepthyphantes* Menge, 1866 (sensu lato) (Aranei: Linyphiidae: Micronetinae) // *Berichte des naturwissenschaftlich-medizinischen Vereins in Innsbruck*. Bd.86. S.139–147.
- Saaristo M.I., Tanasevitch A.V. 2000. Systematics of the *Bolyphantes-Poecilometes* genus-group of the subfamily Micronetinae Hull, 1920 (Arachnida: Araneae: Linyphiidae) // *Reichenbachia*. Bd.33. S.255–265.
- Saaristo M.I., Tanasevitch A.V. 2001. Reclassification of the *pallidus*-, *insignis*-, and *spelaeorum*-groups of *Lepthyphantes* Menge, 1866 (sensu lato) (Arachnida: Araneae: Linyphiidae: Micronetinae) // *Reichenbachia*. Bd.34. S.5–17.
- Saaristo M.I., Tanasevitch A.V. 2002a/2003. A new micronetid spider genus from the Oriental Region (Aranei: Linyphiidae: Micronetinae) // *Arthropoda Selecta*. Vol.11. No.4. P.319–330.
- Saaristo M.I., Tanasevitch A.V. 2002b/2003. *Helsdingenia* gen.n., a new micronetid genus from Old-World tropics (Aranei: Linyphiidae: Micronetinae) // *Arthropoda Selecta*. Vol.11. No.2. P.153–158.
- Saaristo M.I., Tanasevitch A.V. 2003. New taxa for some species of the genus *Lepthyphantes* Menge sensu lato (Araneae, Linyphiidae, Micronetinae) // *Revue arachnologique*. T.14. Fasc.7. P.109–128.
- Saaristo, M.I., Wunderlich J. 1995a. *Cornicephalus jilinensis* n.sp. — a new spider genus and species from China (Araneae: Linyphiidae: Micronetinae) // *Beiträge zur Araneologie*. Bd.4. P.307–310.
- Saaristo M.I., Wunderlich J. 1995b. *Midia* — a new genus for *Lepthyphantes midas* Simon 1884 (Arachnida: Araneae: Linyphiidae) // *Ibid*. Bd.4. S.311–314.
- Simon E. 1894. *Histoire naturelle des Araignées*. Paris: Roret. T.1. No.3. P.489–760.
- Simon E. 1929. *Les Arachnides de France*. Paris: Roret. T.6. N.3. P.533–772.
- Tanasevitch A.V., Saaristo M.I. 2006. Reassessment of the Nepalese species of the genus *Lepthyphantes* Menge s.l. with description of new genera and species (Araneae, Linyphiidae, Micronetinae) // *Senckenbergiana biologica*. Bd.86. H.1. S.11–38.
- Tanasevitch A.V. 1986. New and little-known species of *Lepthyphantes* Menge 1866 from the Soviet Union (Arachnida: Araneae: Linyphiidae) // *Senckenbergiana biologica*. Bd.67. H.1/3. S.137–172.
- Tanasevitch A.V. 1988. Some new *Lepthyphantes* Menge from Mongolia and the Soviet Far East // *Folia Entomologica Hungarica*. Vol.49. P.185–196.
- Tanasevitch A.V. 1990. The spider family Linyphiidae in the fauna of the Caucasus (Arachnida, Aranei). In: Striganova B.R. (Ed.), *Fauna nazemnykh bespozvonochnykh Kavkaza*. Moscow: Nauka Publ. P.5–114 [in Russian].
- Tanasevitch A.V. 1996a. Reassessment of the spider genus *Wubanooides* Eskov, 1986 (Arachnida: Araneae: Linyphiidae) // *Reichenbachia*. Bd.31. P.123–129.
- Tanasevitch A.V. 1996b. Two new genera of the family Linyphiidae from Tuva, south Siberia, Russia (Arachnida Aranei Linyphiidae) // *Arthropoda Selecta*. Vol.4. Nos 3/4. P.65–69.
- Tanasevitch A.V. 2007. Linyphiid spiders of the world. Online at <http://www.andtan.newmail.ru/list/> (accessed 20 June 2007)
- Tu L.H., Saaristo M.I., Li S.Q. 2006. A review of Chinese micronetine species (Araneae: Linyphiidae). Part II: Seven species of *ex-Lepthyphantes* // *Animal Biology*. Vol.56. P.403–421.
- Wiehle H. 1956. *Spinnentiere oder Arachnoidea*. X. 28. Familie Linyphiidae // *Tierwelt Deutschlands*. Jg.44. S.1–337.
- Wiehle H. 1960. Der Embolus des männlichen Spinnentasters // *Verh. dtsh. zool. Ges., Bonn/Rhein*. S.457–480.
- Wunderlich J. 1985. *Lepthyphantes pseudoarciger* n. sp. und verwandte Arten der *Lepthyphantes pallidus*-Gruppe (Arachnida: Araneae: Linyphiidae) // *Senckenbergiana biologica*. Bd.66. S.115–118.
- Wunderlich J. 1995. Linyphiidae aus der Mongolei (Arachnida: Araneae) // *Beiträge zur Araneologie*. Bd.4. S.479–529.