

## **A review of six linyphiid spiders described from China by Dr E. Schenkel (Araneae: Linyphiidae)**

Lihong TU <sup>1</sup>, Shuqiang LI <sup>1\*</sup> & Christine ROLLARD <sup>2</sup>

<sup>1</sup> Institute of Zoology, Chinese Academy of Sciences, Beijing 100080, China.

<sup>2</sup> Muséum National d'Histoire Naturelle, Département Systématique & Evolution, USM 0602, Section Zoologie (Arthropodes), 61 rue Buffon, CP 53, 75005 Paris, France.

**A review of six linyphiid spiders described from China by Dr E. Schenkel (Araneae: Linyphiidae).** - According to Platnick's catalogue (2004) seven of the sixteen linyphiid spiders described from China by Dr E. Schenkel have not been re-examined since their original descriptions. This paper gives new information about them, except for *Lepthyphantes kansuensis* Schenkel, 1936, the type material of which could not be located. *Erigone amdoensis* Schenkel, 1963 and *E. changchunensis* Zhu & Wen, 1980 are herein regarded as junior synonyms of *E. sinensis* Schenkel, 1936. A new genus, *Denisiphantes*, is erected for *Lepthyphantes denisi* Schenkel, 1963. *Lepthyphantes bonneti* Schenkel, 1963, which was transferred to *Incestophantes* Tanasevitch, 1992 by Saaristo & Tanasevitch (2000), is here transferred to *Tchatkalophantes* Tanasevitch, 2001, and *Lepthyphantes riyueshanensis* Zhu & Li, 1983 is placed in its synonymy. Furthermore, *Tmeticus yunnanensis* Schenkel, 1963 is regarded as a junior synonym of *Hylyphantes graminicola* (Sundevall, 1830), while *Perimonoides potanini* Schenkel, 1963 is regarded as a nomen dubium. Besides *Hylyphantes graminicola*, all remaining valid species treated in this paper are redescribed and illustrated.

**Keywords:** Araneae - taxonomy - Linyphiidae - China - E. Schenkel.

## **INTRODUCTION**

Dr Ehrenfried Schenkel, the former curator of the Natural History Museum of Basel, was a well-known arachnologist. In his lifetime, he described several hundreds of new spider species (Schenkel, 1930a, 1930b, 1936, 1938a, 1938b, 1939, 1944, 1953, 1963). This includes nearly one hundred linyphiid spiders of which, according to Platnick's catalogue (2004), 41 are still valid.

Sixteen of Schenkel's still valid linyphiids were based on material collected in China. Six of them have been studied again by Tanasevitch (1989), viz. *Gongylidioides griseolineatus* (Schenkel, 1936), *Lepthyphantes cultellifer* Schenkel, 1936, *L. erigonoides* Schenkel, 1936, *L. hummeli* Schenkel, 1936, *Linyphia triangularoides*

\* All correspondence should be addressed to Shuqiang Li, e-mail: lisq@ioz.ac.cn



Schenkel, 1936 and *Stemonyphantes griseus* (Schenkel, 1936), two by Helsdingen (1969), viz. *Nerienne angulifera* (Schenkel, 1953) and *N. cavaleriei* (Schenkel, 1963), and one, *Gnathonarium cambridgei* Schenkel, 1963, by Tu & Li (2004). Thus seven species remained not re-examined since their original description.

Except for *Lepthyphantes kansuensis* Schenkel, 1936, the type material of which could not be located (Dr Torbjörn Kronestedt, pers. comm.), these six species are reviewed in the present paper.

## METHODS

Specimens were examined and measured under an SZ11-Olympus stereomicroscope. Left palps of males and epigyna of females were illustrated after they were dissected and detached from the spider body; vulvae were cleared in boiling KOH solution. For examination of genital structures under a compound microscope, genital organs were immersed in 75% alcohol; embolic divisions and vulvae were mounted in Hoyer's Solution. All illustrations were made under an Olympus BX41 compound microscope by using a drawing tube.

Each species is provided only with references to original descriptions, new synonyms or otherwise important papers; for more references see Platnick's catalogue (Platnick, 2004). Updated information on the distribution of these species in China is presented at provincial level. The names of localities and distribution data are given according to current Chinese standard (see Peng, Li & Rollard, 2003).

The material used in this study is deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS), in the Jilin University, Changchun, China (JLU, formerly called Norman Bethune University of Medical Sciences), in the Muséum d'histoire naturelle, Genève, Switzerland (MHNG), in the Muséum National d'Histoire Naturelle, Paris, France (MNHN), in the Naturhistorisches Museum Basel, Switzerland (NMB), and in the Swedish Museum of Natural History (SMNH).

Chaetotaxy is given in a formula, e.g., Ti I: 2-1-1-1. This stands for: Tibia I has two dorsal, one pro-, one retro-lateral, and one ventral spine (the apical spines are here-with disregarded). Leg measurements are given in the following sequence: Total (femur, patella + tibia, metatarsus, tarsus). All measurements are in millimetres. Terminology for somatic morphology and genital structures is after Hormiga (2002) and Saaristo & Tanasevitch (2000). Abbreviations used are as follows:

*Somatic morphology*: AER- anterior eye row; ALE- anterior lateral eye; AME- anterior median eye; AME-ALE- distance between AME and ALE; AME-AME- distance between AMEs; AMER- radius of AME; PER- posterior eye row; PLE- posterior lateral eye; PME- posterior median eye; PMEd- diameter of PME; PME-PLE- distance between PME and PLE; PME-PME- distance between PMEs; PMER- radius of PME.

*Male palp*: ARP- anterior radical process; ATA- anterior terminal apophysis; E- embolus; EM- embolic membrane; EP- embolus proper; LC- lamella characteristica; M- membrane; P- paracymbium; PCA- proximal cymbial apophysis; PH- pit hook on supratégulum; PRP- posterior radical process; PT- protégulum; PTA- posterior terminal apophysis; R- radix; T- tegulum; TA- terminal apophysis; TCT- tibial central teeth; TH- thumb of embolus.



*Epigyne*: DP- dorsal plate; EG- entrance groove; FG- fertilization groove; PMP- posterior median plate; PS- pseudoscape; S- spermatheca; ST- stretcher.

## TAXONOMY

### *Erigone sinensis* Schenkel, 1936

Figs 1-10

*Erigone sinensis* Schenkel, 1936: 61, f. 19; Tanasevitch, 1989: 170, f. 220.

*Erigone amdoensis* Schenkel, 1963: 109, f. 64a-d. **Syn. n.**

*Erigone changchunensis* Zhu & Wen, 1980: 18, f. 1A-D; Song, 1987: 147, f. 107. **Syn. n.**

*Erigone longipalpis* Sha, in Li & Tao, 1994: 220 (misidentification).

*Type material examined*. 1 ♀ (SMNH K1), holotype of *Erigone sinensis*, collected in garden and house in Drakana, Tebbu District (today's name not known), Mt. Minshan, Gansu Province, leg. D. Hummel, 30.VII.1930; 1 ♀ (MNHN AR 12749), paratype of *Erigone sinensis*; 2 ♂ 2 ♀ (NMB KATNR 2272), paratypes of *Erigone amdoensis*, Donkyr (today's name not known), Gansu Province, leg. G. N. Potanin, 14-15.IV.1886; 5 ♂ 2 ♀ (JLU, Changchun-03), paratypes of *Erigone changchunensis*, Changchun City, Jilin Province, leg. C. D. Zhu, 10.XI.1978; 1 ♀ (JLU), paratype of *Erigone changchunensis*, Chaoyang District, Changchun City, Jilin Province, leg. C. D. Zhu, 15.IV.1978.

*Additional material examined*. 3 ♂ 4 ♀ (MHNG), Fengman Forestry Center, Jinlin City, Jilin Province, leg. C. D. Zhu, 14.VIII.1984; 1 ♂ 1 ♀ (IZCAS), Dunhuang City, Gansu Province, leg. X. P. Wang, 28.VII.1988; 2 ♂ (IZCAS), Hunan Province, leg. J. C. Gao, V.1985.

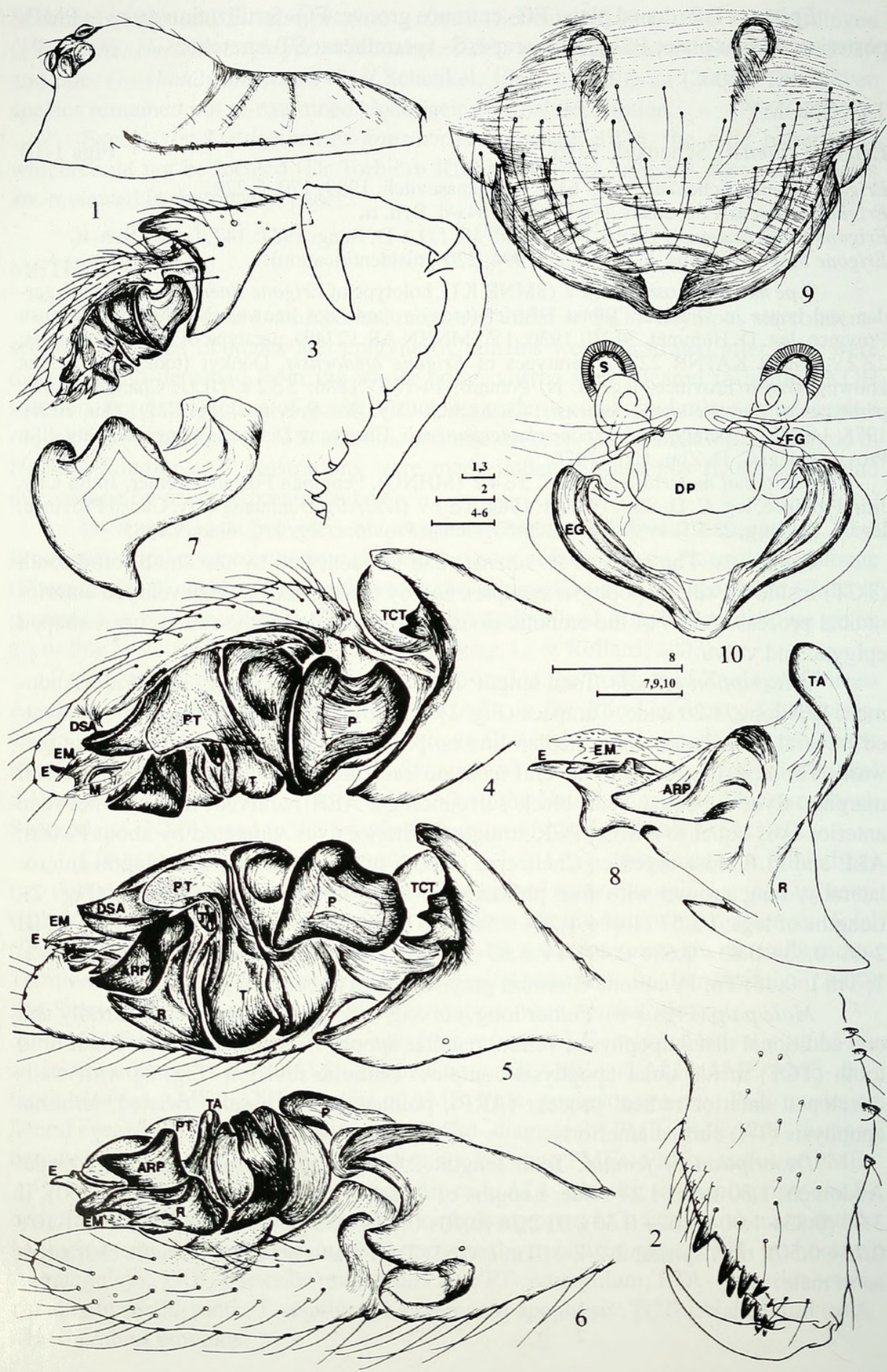
*Diagnosis*. The male of *E. sinensis* can be identified by the small, bifid tooth (TCT) inside the tibial apophysis complex and by the twisted, well-developed anterior radical process (ARP) of the embolic division; the female by the round, heart-shaped epigyne and vulva.

*Description of male*. Total length: 2.80. Carapace: 1.43 long, 1.07 wide. Abdomen: 1.67 long, 1.20 wide. Carapace (Fig. 1): Chestnut brown, cephalic portion elevated, several short hairs along median line on posterior slope. Clypeus protruding forward. Thoracic portion with several teeth on each side, narrow furrow along lateral margins. Eyes subequal, with black surroundings; AER recurved, intervals between anterior eyes equal to AMER; PER straight, posterior eyes separated by about PMED; ALE and PLE close together. Chelicerae of both sexes with warty granulation anterolaterally, fang groove with five promarginal and four retromarginal teeth (Fig. 2). Lengths of legs: I 3.57 (1.00+ 1.20+ 0.80+ 0.57), II 3.24 (0.90+ 1.07+ 0.73+ 0.53), III 2.66 (0.80+ 0.83+ 0.63+ 0.40), IV 3.60 (1.00+ 1.20+ 0.80+ 0.60); tibia spines: 2-2-2-1; Tm I: 0.45; Tm IV absent. Sternum grayish brown. Abdomen gray.

*Male palp* (Figs 3-8): Femur long, curved, with two rows of teeth ventrally and one additional distal apophysis; ventral patellar apophysis stout; tibia with small bifid tooth (TCT) inside tibial apophysis complex. Embolic division (Fig. 8) with well-developed anterior radical process (ARP), pointed at tip, basally twisted; terminal apophysis (TA) curved anteriorly.

*Description of female*. Total length: 2.60. Carapace: 1.33 long, 0.93 wide. Abdomen: 1.80 long, 1.27 wide. Lengths of legs: I 3.20 (0.90+ 1.10+ 0.70+ 0.50), II 3.00 (0.83+ 1.00+ 0.67+ 0.50), III 2.36 (0.70+ 0.73+ 0.53+ 0.40), IV 3.30 (0.97+ 1.10+ 0.73+ 0.50); tibia spines: 2-2-2-1; Tm I: 0.51; Tm IV absent. Other somatic characters as in male.







*Epigyne*: Slightly wider than long, semicircular, posteromedian edge somewhat protruding (Fig. 9). Atrium round, heart-shaped in dorsal view (Fig. 10), dorsal plate subrectangular, with slightly curved posterior margin.

*Distribution*. Russia, Kazakhstan, Mongolia, China (Gansu, Hunan, Jilin).

*Remarks*. *E. sinensis* was described by Schenkel (1936) from a single female specimen. Almost thirty years later Schenkel (1963) described another *Erigone* species from China, *E. amdoensis*, of which he had both males and females. Later Zhu & Wen (1980) described an *Erigone* species, *E. changchunensis*, which occurs in Changchun City, China. Careful examination of the types of the species listed above revealed that both *E. amdoensis* and *E. changchunensis* are junior synonyms of *E. sinensis* (**new synonymies**).

Furthermore Marusik & Koponen (2000: 61) synonymized *E. piechockii* Heimer, 1987 with *E. changchunensis*, although they did not study the type of *E. piechockii*. If their synonymization correct, *E. piechockii* would also be a junior synonym of *E. sinensis*.

### *Hylyphantes graminicola* (Sundevall, 1830)

*Linyphia graminicola* Sundevall, 1830: 26.

*Erigonidium graminicolum* Anonymous, 1977: 36, f. 1, 2A-D; Anonymous, 1980: 149, f. 80a-e; Hu, 1984: 188, f. 197.1-4; Hu & Wu, 1989: 171, f. 142.1-4; Feng, 1990: 135, f. 108.1-5; Chen & Zhang, 1991: 175, f. 173.1-4; Hu, 2001: 546, f. 366.1-4.

*Tmeticus yunnanensis* Schenkel, 1963: 113, f. 66a-b. **Syn. n.**

*Type material examined*. 1 ♀ (MNHN), type of *Tmeticus yunnanensis*, collected from Yunnan Province, 26. II. 1925. No further information on the label and in original description (Schenkel, 1963).

*Diagnosis*. The male of *H. graminicola* can be distinguished by its screw-like embolus and membranous protegulum with numerous papillae and a tail-shaped tip, and the female by having the epigyne with an oval-shaped atrium containing spiraled beginnings of the copulatory ducts.

*Description*. Well described, e.g. by Tu & Li (2003).

*Distribution*. Palearctic, Vietnam.

### *Denisiphantes* gen. n.

*Type species*. *Lepthyphantes denisi* Schenkel, 1963.

*Etymology*. The generic name is dedicated for Dr Jacques Denis due to his remarkable contribution to arachnological research.

*Species included*. Only the type species. A further species was found in the collection of the IZCAS and will be treated in a separate paper.

### FIGS 1-10

*Erigone sinensis* (Schenkel, 1936). 1, carapace of male, lateral view; 2, left chelicera of male, frontal view; 3, 4, left male palp, retrolateral view; 5, left male palp, ventral view; 6, left male palp, prolateral view; 7, paracymbium; 8, embolic division, dorsal view; 9, epigyne, ventral view; 10, vulva, dorsal view. [Scale bars: 0.1mm; drawings based on paratypes of *Erigone changchunensis* Zhu & Wen, 1980].



**Diagnosis.** The new genus is characterized by a broad, posteriorly pointed epigyne which has its dorsal side almost totally covered by an exceptionally large posterior median plate (PMP). The epigyne is devoid of any stretcher and the entrance grooves start from small dorsal pockets.

**Description.** As *Denisiphantes* is still a monotypic genus, the description is given under its type species.

**Discussion.** In general appearance the epigyne of *D. denisi* generally resembles that of *Drapetisca socialis* (Sundevall, 1832) but the latter has a small, posterior median plate and no lateral pockets (Saaristo & Tanasevitch, 2003: fig. 11). Furthermore the male palp of *D. denisi* lacks the posterodorsal cymbial horn that exists in *Drapetisca socialis*, and also the paracymbium as well as the embolic division of *D. denisi* differ from those of *Drapetisca socialis*. It seems that *Denisiphantes* is the sister genus of *Drapetisca*, and both genera belong to a group of microtines which Saaristo & Tanasevitch (2000) have called the *Bolyphantes-Poeciloneta* clade.

***Denisiphantes denisi* (Schenkel, 1963). Comb. n.**

Figs 11-25

*Lepthyphantes denisi* Schenkel, 1963: 118, f. 70a-c; Zhu & Li, 1983: 146, f. 3d-f; Hu, 2001: 503, f. 334.1-4.

**Type material examined.** 1 ♀ (MNHN, Potanin 77), holotype of *Lepthyphantes denisi*, collected at the "Kloster Tschokurtan" (today's name not known), Gansu Province, leg. G. N. Potanin, 7. IV. 1886.

**Additional material examined.** 1 ♂ 1 ♀ (IZCAS), Huangyuan County, Qinghai Province, 17.II.1987; 1 ♂ 1 ♀ (MHNG), Mt. Laoyeshan, Qinghai Province, leg. M. Wu, 6.VI.1997; 1 ♂ (IZCAS), Maixiang Forest Center, Tongren County, Qinghai Province, leg. M. Wu, 14.VI.1997; 1 ♀ (IZCAS), Mt. Beishan National Natural Forest Park, Qinghai Province, leg. M. Wu, 7.VI.1997; 1 ♀ (IZCAS), Mt. Beishan Forest Center, Qinghai Province, leg. M. Wu, 7.VI.1997; 1 ♀ (IZCAS), Tianjun County, Qinghai Province, alt. 3450m, leg. X. J. Peng, 17.XI.2001; 1 ♀ (IZCAS), Tianjun County, Qinghai Province, alt. 3370m, leg. J. Chen, 17.XI.2001.

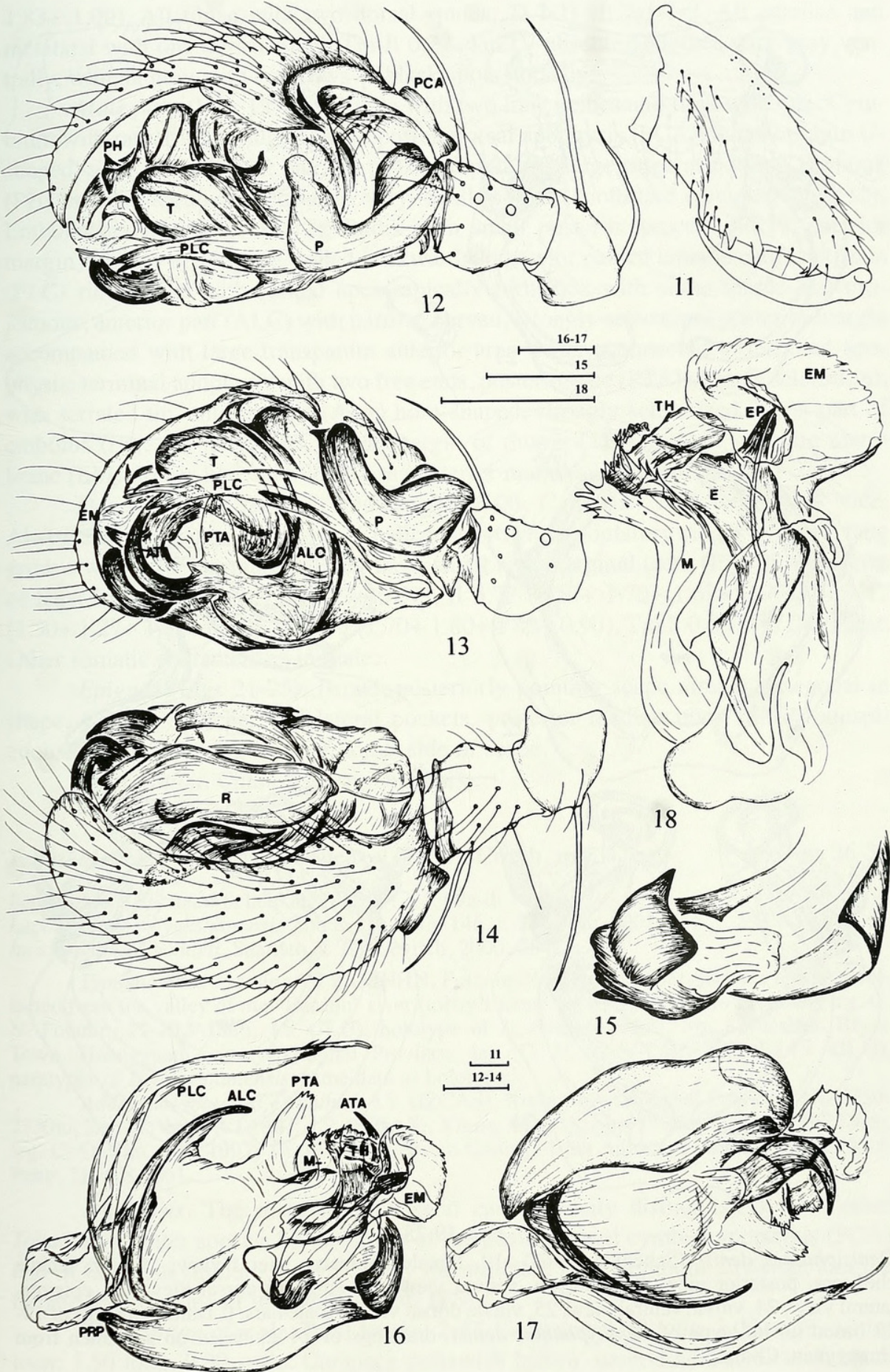
**Diagnosis.** The male of *D. denisi* can be identified by the shape of the postero-dorsal cymbial apophysis (PCA), of the paracymbium and of the structure of the embolic division; the female by the large posterior median plate (PMP) which covers most of the dorsal side of the epigyne.

**Description of male.** Total length: 3.07. Carapace: 1.53 long, 1.20 wide. Abdomen: 1.73 long, 1.27 wide. Carapace brown, without any conspicuous modification. Eyes with black surroundings; AME smaller, others subequal. AER recurved, PER straight, AMEs separated by about AMEr, AME-ALE longer, PME-PME equal to PMEr, PME-PLE longer, ALE and PLE juxtaposed. Chelicerae brown, stridulatory ridges present, fang groove with three promarginal teeth and one small retromarginal tooth close to fang base (Fig. 11). Lengths of legs: I 7.67 (1.90+ 2.50+ 1.17+ 2.10), II 6.33 (1.70+ 2.03+ 1.00+ 1.60), III 4.63 (1.30+ 1.50+ 1.10+ 0.73), IV 6.73 (1.77+ 2.13+

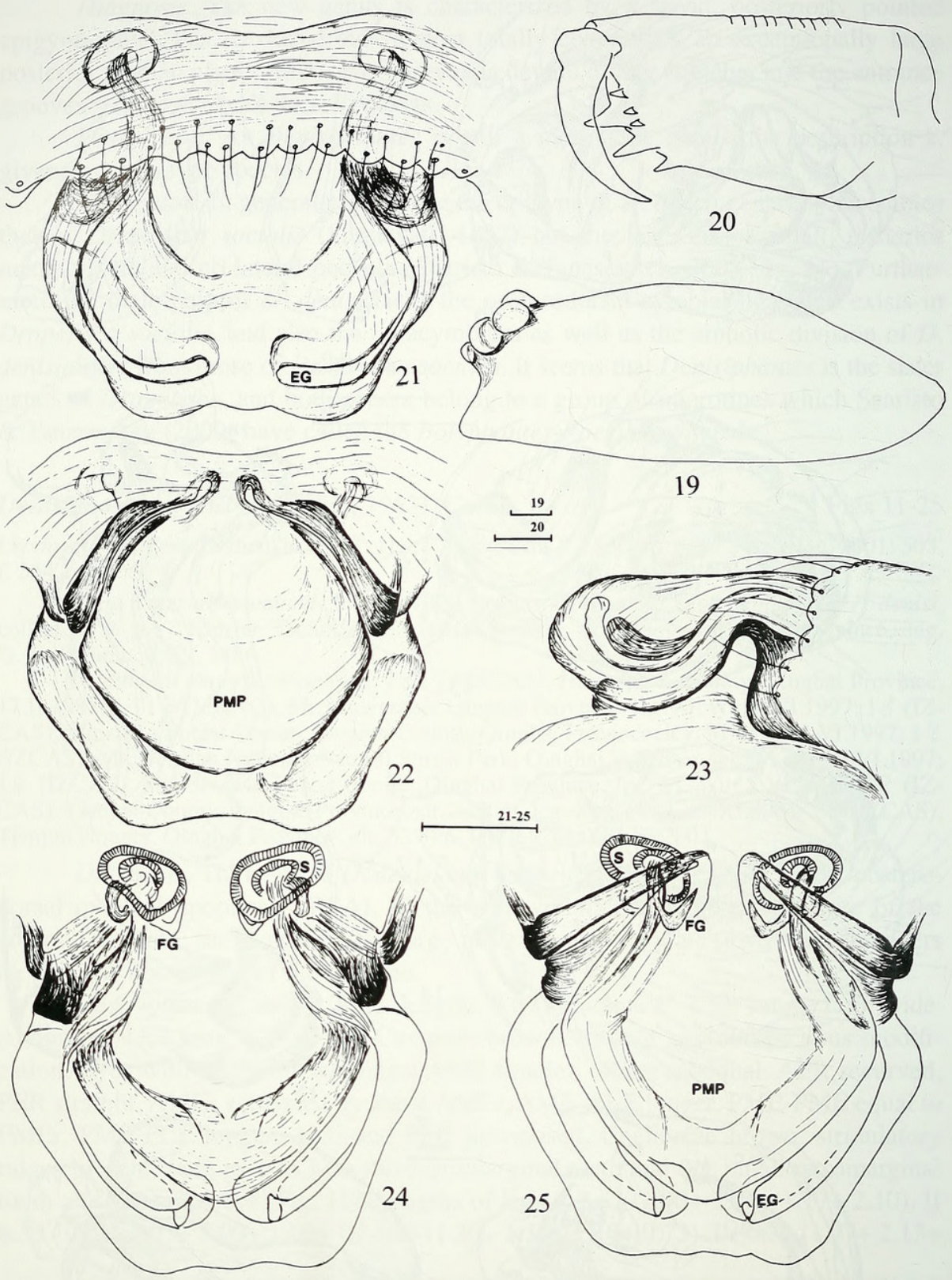
FIGS 11-18

*Denisiphantes denisi* (Schenkel, 1963). 11, left male chelicera, frontal view; 12, left male palp, retrolateral view; 13, left male palp, ventral view; 14, left male palp, prolateral view; 15, distal part of supratégulum, ventral view; 16, embolic division, ventral view; 17, embolic division, dorsal view; 18, embolus, ventral view. [Scale bars: 0.1mm; drawings based on specimen from Huangyuan, China].









FIGS 19-25

*Denisiphantes denisi* (Schenkel, 1963). 19, female carapace, lateral view; 20, left female chelicera, posterior view; 21, epigyne, ventral view; 22, epigyne, dorsal view; 23, epigyne, lateral view; 24, vulva, ventral view; 25, vulva, dorsal view. [Scale bars: 0.1mm; drawings of 19-23 based on holotype of *Lepthyphantes denisi*, drawings of 24-25 based on specimen from Huangyuan, China.].



1.83+ 1.00). All tibiae with two dorsal spines; Ti I-Ti II: 2-1-1-2. All patellae and metatarsi with one dorsal spine. Tm I: 0.22. Tm IV absent. Abdomen dark gray ventrally, whitish gray with two rows of black spots dorsally.

*Male palp* (Figs 12-18): Patella with two long spines and tibia with one. Cymbium with rather long, ridge-shaped posterodorsal apophysis (PCA). Paracymbium U-shaped, with several short hairs in proximal part and large ridge at bottom. Pit hook (PH) on supratégulum reduced to very small, pointed tooth-like elevation (Fig. 15). Embolic division (Figs 16-17): Radix with small posterior process (PRP), anterior margin strongly sclerotized, rolled backwards; posterior part of lamella characteristica (PLC) ribbon-like with forked apex, apically furnished with some thread-like projections, anterior part (ALC) with narrow, curved, strongly sclerotized posterior margin accompanied with large transparent anterior area widely connected to terminal apophysis; terminal apophysis with two free ends, posterior one (PTA) slightly sclerotized, with serrated tip, anterior one (ATA) horn-shaped, strongly sclerotized. Basal part of embolus (Fig. 18) trunk-like, apical margin of thumb (TH) serrated, embolic membrane (EM) flower-like, additional basiposterior membrane (M) gracile.

*Description of female*. Total length: 3.00. Carapace: 1.37 long, 1.03 wide. Abdomen: 1.87 long, 1.20 wide. Chelicerae brown, stridulatory ridges present, fang groove with three promarginal and three small retromarginal teeth (Fig. 20). Lengths of legs: I 6.17 (1.70+ 1.97+ 1.53+ 0.97), II 5.77 (1.50+ 1.70+ 1.67+ 0.90), III 4.17 (1.30+ 1.27+ 1.00+ 0.60), IV 5.83 (1.70+ 1.80+ 1.43+ 0.90). Tm I: 0.23. Tm IV absent. Other somatic characters as in male.

*Epigyne* (Figs 21-25): Broad, posteriorly pointing scape almost hexagonal in shape, without stretcher and lateral pockets, posterior median plate (PMP) conspicuously large, covering most of dorsal side of scape.

*Distribution*. China (Gansu, Qinghai).

***Tchatkalophantes bonneti* (Schenkel, 1963). Comb. n.**

Figs 26-39

*Lepthyphantes bonneti* Schenkel, 1963: 117, f. 69a-d.

*Lepthyphantes riyueshanensis* Zhu & Li, 1983: 146, f. 2a-d; Hu, 2001: 510, f. 339.1-5. **Syn. n.**

*Incestophantes bonneti*, Saaristo & Tanasevitch, 2000: 264.

*Type material examined*. 1 ♀ (MNHN, Potanin 36), type of *Lepthyphantes bonneti*, collected from the valley of the "Bardun" river (today's name not known), Gansu Province, leg. G. N. Potanin, 19-20.V.1886; 1 ♀ (JLU), holotype of *L. riyueshanensis*, Mt. Riyueshan, Riyue Town, Huangyuan County, Qinghai Province, leg. C. D. Zhu, 7.III.1982; 1 ♂ 1 ♀ (JLU), paratypes of *L. riyueshanensis*, same data as holotype.

*Additional material examined*. 1 ♀ (IZCAS), Xining City, Qinghai Province, alt. 2250-2330m, leg. M. Wu, 3.VI.1997; 1 ♀ (IZCAS), Xining City, Qinghai Province, alt. 2250-2330m, leg. C. D. Zhu, 3.VI.1997; 1 ♀ (MHNG), Basoi County, Tibet Autonomous Region, leg. X. J. Peng, 21.VIII.2001.

*Diagnosis*. The male of *T. bonneti* can be easily distinguished from other *Tchatkalophantes* species by the shape of the posterodorsal cymbial apophysis (PCA) and of the paracymbium, as well as by the structure of the embolic division, and the female by the shape of its pseudoscapus (PS).

*Description of male*. Total length: 2.47. Carapace: 1.30 long, 1.00 wide. Abdomen: 1.50 long, 0.90 wide. Carapace yellowish brown, unmodified. Eyes with black



surroundings; AME smallest, others subequal. AER recurved, PER straight, AMEs separated by about AMEr, AME-ALE longer, PME-PME equal to PMEr, PME-PLE longer, ALE and PLE juxtaposed. Chelicerae brown, stridulatory ridges present, fang groove with three promarginal tooth and one small retromarginal teeth close to fang base (Fig. 26). Lengths of legs: I 5.56 (1.43+ 1.80+ 1.33+ 1.00), II 5.43 (1.47+ 1.83+ 1.23+ 0.90), III 3.90 (1.03+ 1.27+ 1.00+ 0.60), IV 5.33 (1.50+ 1.73+ 1.33+ 0.73). All tibiae with two dorsal spines; Ti I-Ti II: 2-1-1-1. All patellae and all metatarsi with one dorsal spine. Tm I: 0.24. Tm IV absent. Abdomen dark gray ventrally, whitish gray with two rows of black spots dorsally.

*Male palp* (Figs 27-33): Patella and tibia each with one long dorsal spine. Cymbium with two posterodorsal apophysis (PCA) furnished with many denticles scatted along margin between them. Paracymbium U-shaped, with several short hairs in wide proximal part, apical part narrow, with bifurcated tip. Fan-shaped outgrowth present at base of suprategular pit hook (PH). Embolic division (Figs 31-32) with strongly sclerotized radix equipped with pointed posterior apophysis (PRP) and blunt anterior apophysis (ARP). Lamella characteristica (LC) large, S-shaped in ventral view, equipped with triangular basidorsal tooth, apically divided into two branches with some thread-like projections between them. Terminal apophysis (TA) stout, with thumb-like process and several apical teeth. Basal part of embolus (E) trunk-like, (Fig. 33) with large branch, thumb (TH) with pointed apex. Embolic membrane (EM) large, transparent, flower-shaped.

*Description of female.* Total length: 3.27. Carapace: 1.40 long, 0.90 wide. Abdomen: 1.93 long, 1.27 wide. Chelicerae brown, stridulatory ridges present, fang groove with three promarginal and three small retromarginal teeth (Fig. 34). Lengths of legs: I 4.94 (1.30+ 1.57+ 1.20+ 0.87), III 3.51 (1.07+ 1.07+ 0.87+ 0.50), IV 4.77 (1.30+ 1.47+ 1.20+ 0.80). Length of leg II unknown. Tm I: 0.22. Tm IV absent. Other somatic characters as in male.

*Epigyne* (Figs 35-39): Epigynal cavity open, lateral walls strongly reduced. Scape with anteriorly widened proximal part bearing short "pseudoscapus" (PS) pointing posteriorly, with small anterior notch exposing tip of stretcher (ST) and pit; both median and distal part of scape reduced, lobes totally missing; starting points of entrance grooves (EG) far from apex of scape.

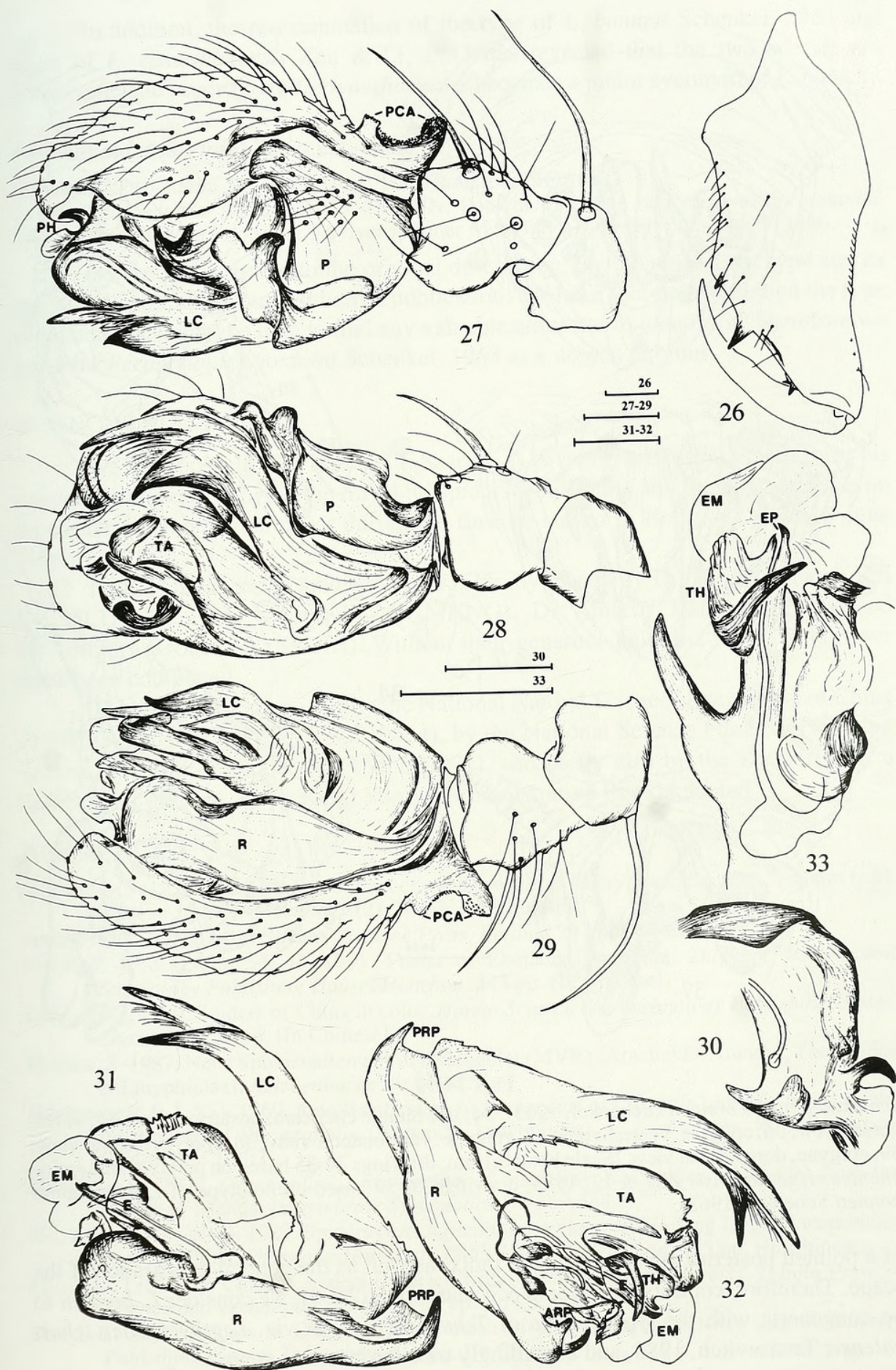
*Distribution.* China (Gansu, Qinghai).

*Remarks.* *L. bonneti* was transferred to *Incestophantes* Tanasevitch, 1992 by Saaristo & Tanasevitch (2000). This decision was obviously based on published figures only. Our study of the secondary genital organs of *L. bonneti* has revealed that the structure of its male palp as well as female epigyne has a similar general composition as in the genus *Tchatkalophantes* Tanasevitch, 2001. Especially typical is the existence

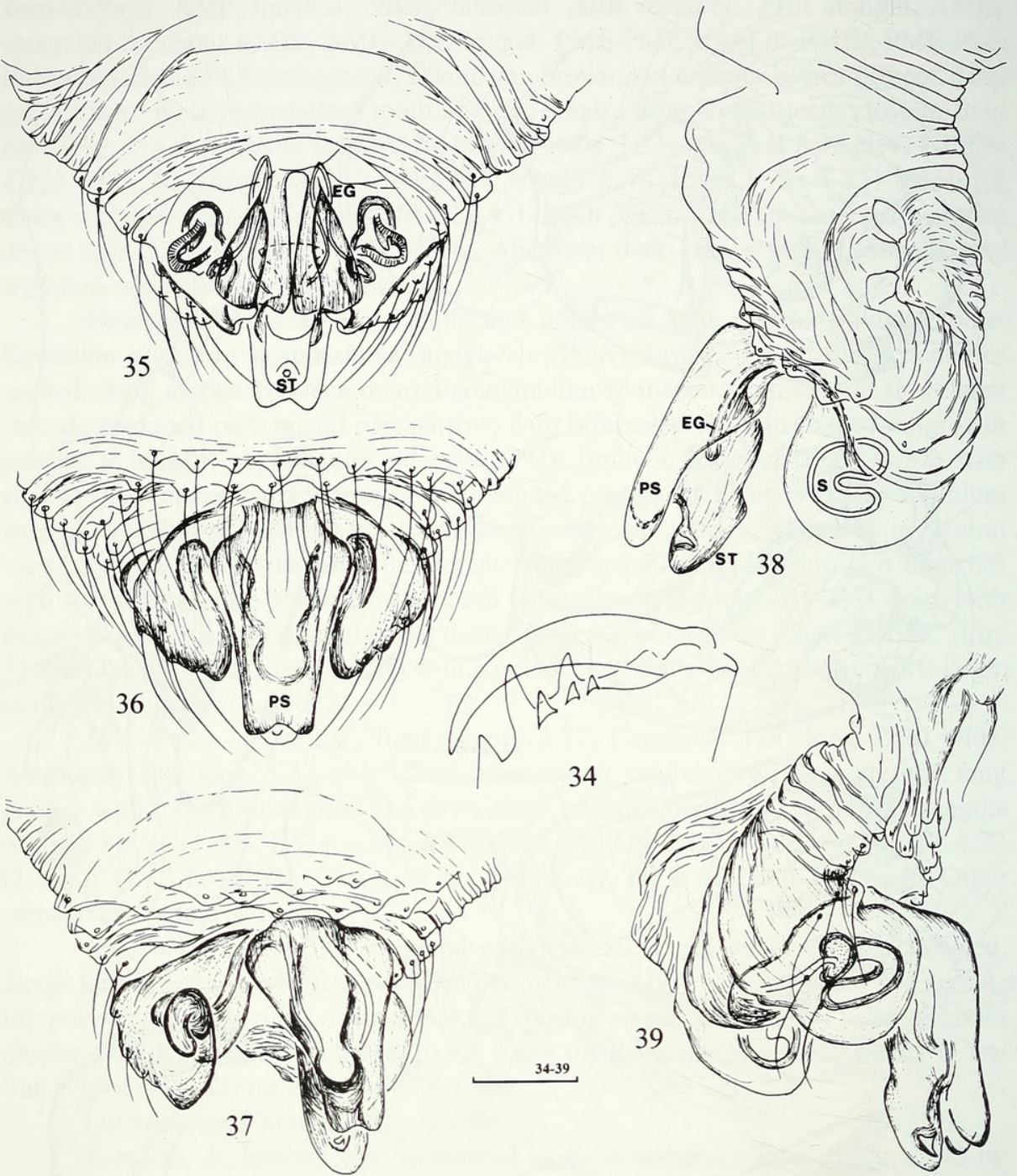
#### FIGS 26-33

*Tchatkalophantes bonneti* (Schenkel, 1963). 26, left male chelicera, frontal view; 27, left male palp, retrolateral view; 28, left male palp, ventral view; 29, left male palp, prolateral view; 30, distal part of suprategulum, ventral view; 31, embolic division, dorsal view; 32, embolic division, ventral view; 33, embolus, ventral view. [Scale bars: 0.1mm; drawings based on paratype of *Lepthyphantes riyueshanensis* Zhu & Li, 1983].









FIGS 34-39

*Tchatkalophantes bonneti* (Schenkel, 1963). 34, left female chelicera, posterior view; 35, vulva, dorsal view; 36, epigyne, ventral view; 37, epigyne, ventrolateral view; 38, epigyne, lateral view; 39, epigyne, dorsolateral view. [Scale bars: 0.1mm; drawings 34-35 based on paratype of *Lepthyphantes riyueshanensis* Zhu & Li, 1983, drawings 36-39 based on holotype of *Lepthyphantes bonneti* Schenkel, 1963].

of a pointed posterior apophysis on the radix, as well as the general appearance of the scape. Therefore, contrary to Saaristo & Tanasevitch (2000), we consider *L. bonneti* to be congeneric with the type species of *Tchatkalophantes*, viz. *Lepthyphantes tchatkalensis* Tanasevitch, 1983, and accordingly transfer it to that genus.



In addition, the re-examination of the type of *L. bonneti* Schenkel, 1963 and types of *L. riyueshanensis* Zhu & Li, 1983 has revealed that the two species are conspecific and accordingly *L. riyueshanensis* becomes a junior synonym of *L. bonneti*.

### *Perimonoides potanini* Schenkel, 1963

*Perimonoides potanini* Schenkel, 1963: 116. **Nomen dubium**

*Type material examined.* 1 ♀ (MNHN, Potanin 62), type of *Perimonoides potanini*, collected at "Batscha Rdongsug", a river in Inner Mongolia, leg. G. N. Potanin, 6. V. 1886.

*Remarks.* According to the original description, the epigyne of the type and its original illustrations were lost before publication. We have thoroughly studied the type specimen but cannot be able to find any valuable character to identify it. Therefore we consider *Perimonoides potanini* Schenkel, 1963 as a nomen dubium.

### ACKNOWLEDGEMENTS

We are grateful to Dr Michael I. Saaristo (University of Turku, Finland) for his support during our study on the linyphiid spiders from China and for his comments on an earlier version of this paper during the time he stayed in Beijing (11 May-9 June 2004).

Parts of the material studied here was kindly loaned by Drs Jiuchun Gao & Rui Fei (JLU), Dr Peter Schwendinger (MHNG), Dr Ambros Hänggi (NMB), and Dr Torbjörn Kronestedt (SMNH). Without their generous help this work could never have been completed.

This study was supported by the National Natural Sciences Foundation of China (NSFC-30270183, 30370263, 30310464), by the National Science Fund for Fostering Talents in Basic Research (NSFC-J0030092), and partly also by the Kadoorie Farm and Botanic Garden, Hong Kong Special Administrative Region, China.

### REFERENCES

- ANONYMOUS. 1977. Identification of the common species of Micryphantidae from the farm field. *Chinese Journal of Zoology* (2): 36-37. [In Chinese].
- ANONYMOUS. 1980. Farm Spiders. *Science Press, Beijing*, 247 pp. [In Chinese].
- CHEN, Z.-F. & ZHANG, Z.-H. 1991. Fauna of Zhejiang: Araneida. *Zhejiang Science and Technology Publishing House, Hanzhou*, 345 pp. [In Chinese].
- FENG, Z.-Q. 1990. Spiders of China in color. *Hunan Science and Technology Publishing House, Changsha*, 256 pp. [In Chinese].
- HEIMER, S. 1987. Neue Spinnenarten aus der Mongolei (MVR) (Arachnida, Araneae, Theridiidae et Linyphiidae). *Reichenbachia* 24: 139-151.
- HELSDINGEN, P. J. VAN 1969. A reclassification of the species of Linyphia Latreille based on the functioning of the genitalia (Araneida, Linyphiidae), I. *Zoologische Verhandelingen, Leiden* 105: 1-303.
- HORMIGA, G. 2002. *Orsonwelles*, a new genus of giant linyphiid spiders (Araneae) from the Hawaiian Islands. *Invertebrate Systematics* 16: 369-448.
- HU, J.-L. & WU, W.-G. 1989. Spiders from agricultural regions of Xinjiang Uygur Autonomous Region, China. *Shandong University Publishing House, Jinan*, 435 pp. [In Chinese].
- HU, J.-L. 1984. The Chinese spiders collected from the fields and the forests. *Tianjin Press of Science and Techniques, Tianjin*, 482 pp. [In Chinese].
- HU, J.-L. 2001. Spiders in Qinghai-Tibet Plateau of China. *Henan Science and Technology Publishing House, Zhengzhou*, 658 pp. [In Chinese].



- LI, S.-Q. & TAO, Y. 1994. A checklist of Chinese linyphiid spiders (Araneae: Linyphiidae). (pp. 219-240). In: WUNDERLICH, J. (ed.). *Beiträge zur Araneologie 4*, Verlag Jörg Wunderlich, Straubenhardt, 778 pp.
- MARUSIK, Y. M. & KOPONEN, S. 2000. New data on spiders (Aranei) from the Maritime Province, Russian Far East. *Arthropoda Selecta* 9: 55-68.
- PENG, X.-J., LI, S.-Q. & ROLLARD, C. 2003. A review of the Chinese jumping spiders studied by Dr E. Schenkel (Araneae : Salticidae). *Revue suisse de Zoologie* 110(1): 91-109.
- PLATNICK, N. I. 2004. The world spider catalog (version 5.0). *American Museum of Natural History*, online at <http://research.amnh.org/entomology/spiders/catalog81-87/index.html>.
- SAARISTO, M. I. & TANASEVITCH, A. V. 2000. Systematics of the *Bolyphantes-Poeciloneta* genus-group of the subfamily Micronetinae Hull, 1920 (Arachnida: Araneae: Linyphiidae). *Reichenbachia* 33: 255-265.
- SAARISTO, M. I. & TANASEVITCH, A. V. 2003. New taxa for some species of the genus *Lepthyphantes* Menge sensu lato (Araneae: Linyphiidae: Micronetinae). *Revue Arachnologique* 14(7): 109-128.
- SCHENKEL, E. 1930a. Spinnen vom Petzer (Riesengebirge) und Mayrhof (Tirol) gesammelt von E. Neilsen. *Entomologische Meddelelser* 17: 228-231.
- SCHENKEL, E. 1930b. Die Araneiden der Schwedischen Kamtschatka-Expedition 1920-1922. *Arkiv för Zoologi* 21(A15): 1-33.
- SCHENKEL, E. 1936. Schwedisch-chinesische wissenschaftliche Expedition nach den nord-westlichen Provinzen Chinas, unter Leitung von Dr Sven Hedin und Prof. Sü Ping-chang. Araneae gesammelt vom schwedischen Arzt der Expedition Dr David Hummel 1927-1930. *Arkiv för Zoologi* 29(A1): 1-314.
- SCHENKEL, E. 1938a. Die Arthropodenfauna von Madeira nach den Ergebnissen der Reise von Prof. Dr O. Lundblad, Juli-August 1935. *Arkiv för Zoologi* 30(A7): 1-42.
- SCHENKEL, E. 1938b. Spinnentiere von der Iberischen Halbinsel, gesammelt von Prof. Dr O. Lundblad, 1935. *Arkiv för Zoologi* 30(A24): 1-29.
- SCHENKEL, E. 1939. Beitrag zur Spinnenkunde. *Revue suisse de Zoologie* 46: 95-114.
- SCHENKEL, E. 1944. Arachnoidea aus Timor und China aus den Sammlungen des Basler Museums. *Revue suisse de Zoologie* 51: 173-206.
- SCHENKEL, E. 1953. Chinesische Arachnoidea aus dem Museum Hoangho-Peiho in Tientsin. *Boletim do Museu nacional do Rio-de-Janeiro (Nova Série, Zoologia)* 119: 1-108.
- SCHENKEL, E. 1963. Ostasiatische Spinnen aus dem Muséum d'Histoire naturelle de Paris. *Mémoires Muséum national d'histoire naturelle, Paris (Série A, Zoologie)* 25: 1-481.
- SONG, D.-X. 1987. Spiders from agricultural regions of China (Arachnida: Araneae). *Agriculture Publishing House, Beijing*, 376 pp. [In Chinese].
- SUNDEVALL, J. C. 1830 Svenska spindlarnes beskrifning. *Kongllige Svenska Vetenskaps-Akademiens Handlingar* 1829: 1-32.
- TANASEVITCH, A. V. 1983. New species of spiders of the family Linyphiidae (Aranei) from Uzbekistan. *Zoologicheskii Zhurnal* 62: 1786-1795. [In Russian].
- TANASEVITCH, A. V. 1989. The linyphiid spiders of Middle Asia (Arachnida: Araneae: Linyphiidae). *Senckenbergiana biologica* 69: 83-176.
- TANASEVITCH, A. V. 1992. New genera and species of the tribe Lepthyphantini (Aranei: Linyphiidae: Micronetinae) from Asia (with some nomenclatorial notes on linyphiids). *Arthropoda Selecta* 1(1): 39-50.
- TU, L.-H. & LI, S.-Q. 2003. A review of the spider genus *Hylyphantes* (Araneae: Linyphiidae) from China. *The Raffles Bulletin of Zoology* 51(2): 209-214.
- TU, L.-H. & LI, S.-Q. 2004. A review of the *Gnathonarium* spiders (Araneae: Linyphiidae) of China. *Revue suisse de Zoologie* 111 (4): 851-864.
- ZHU, C.-D. & LI, Z.-S. 1983. Three new species of spiders of the genus *Lepthyphantes* and description of the male spider of *L. denisi* Schenkel (Araneae: Linyphiidae). *Journal of Bethune Medical University* 9 (supplement): 144-147. [In Chinese].
- ZHU, C.-D. & WEN, Z.-G. 1980. A preliminary report of Micryphantidae (Arachnida: Araneae) from China. *Journal of Bethune Medical University* 6: 17-24. [In Chinese].





Tu, Lihong, Li, Shuqiang, and Rollard, C. 2005. "A review of six linyphiid spiders described from China by Dr E. Schenkel (Araneae: Linyphiidae)." *Revue suisse de zoologie* 112, 647–660. <https://doi.org/10.5962/bhl.part.80318>.

**View This Item Online:** <https://www.biodiversitylibrary.org/item/128490>

**DOI:** <https://doi.org/10.5962/bhl.part.80318>

**Permalink:** <https://www.biodiversitylibrary.org/partpdf/80318>

#### **Holding Institution**

Smithsonian Libraries and Archives

#### **Sponsored by**

Biodiversity Heritage Library

#### **Copyright & Reuse**

Copyright Status: In Copyright. Digitized with the permission of the rights holder

Rights Holder: Muséum d'histoire naturelle - Ville de Genève

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://www.biodiversitylibrary.org/permissions/>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.