

On four species of *Irura* Peckham & Peckham, 1901 (Araneae: Salticidae) collected by John and Frances Murphy from south-east Asia

Dmitri V. Logunov

The Manchester Museum,
The University of Manchester,
Oxford Road,
Manchester, M13 9PL
email: dmitri.v.logunov@manchester.ac.uk

Abstract

Four *Irura* species, including one new to science, are diagnosed and illustrated: *I. bidenticulata* Guo, Zhang & Zhu, 2011 (♂♀) from south-east China, *I. johnmurphyi* sp. n. (♂♀) from Malaysia, *I. longiochelicerca* (Peng & Yin, 1991) (♀) from China and Malaysia, and *I. onoi* (Prószyński & Deeleman-Reinhold, 2013) from Indonesia and Malaysia. A new combination is proposed: *Irura onoi* (Prószyński & Deeleman-Reinhold, 2013), ex *Stertinus*, **comb. n.** A brief discussion of the relationships between the genera *Irura* Peckham & Peckham, 1901 and *Stertinus* Simon, 1890 is also provided.

Keywords: Aranei • China • diagnoses • distribution • jumping spiders • Malaysia • Oriental Region

Introduction

The genus *Irura* Peckham & Peckham, 1901 belongs to the subtribe Simaethina (*sensu* Maddison 2015) and accounts for 16 valid species known predominantly from south-eastern regions of China (13 species, 81%; World Spider Catalog 2022). Ten *Irura* species (63%) remain known from the original descriptions and type localities only; of them, seven have been described in the latest decade (e.g. Guo, Zhang & Zhu 2011; Prószyński & Deeleman-Reinhold 2013; Wang *et al.* 2020; etc.) and are nicely illustrated and diagnosed, allowing reliable identification; see Metzner (2022) for comparative figures.

The present paper is based on the collection of SE Asian Salticidae assembled by the famous British arachnologists John Murphy (1922–2021) and Frances Murphy (1926–1995) during their eight trips to Hong Kong, Singapore, and Malaysia (see Logunov 2022 for further details). Their collection is deposited in the Manchester Museum (UK) and contains four *Irura* species which are treated in this paper.

The aims of the present paper are 1) to describe a new *Irura* species from Malaysia, 2) to illustrate and comment on three *Irura* species, of which two to date have not been known from outside their type localities, and 3) to briefly discuss the relationships between the genera *Irura* and *Stertinus* Simon, 1890.

Material and methods

A total of 17 specimens of *Irura* have been studied from the spider collection of the Manchester Museum, University of Manchester, UK (MMUE; curator: D. V. Logunov).

Digital photographs of the general appearance were made at the Manchester Museum, using an Olympus SZX16 stereo microscope with a DP27 Digital Colour Camera, and Helicon Focus 7.7.2 as the processing software. Distributional maps were produced by using the online mapping software SimpleMapp (Shorthouse 2010).

The following abbreviations are used in the text: AME = anterior median eye, ap = apical, d = dorsal, Fm = femur, Mt = metatarsus, PLE = posterior median eye, pr = prolateral, Pt = patella, rt = retrolateral, Tb = tibia, v = ventral. For the leg spination the system adopted is that used by Ono (1988). The sequence of leg podomers in measurement data is as follows: femur + patella + tibia + metatarsus + tarsus (total). All measurements are in mm. For complete reference lists see World Spider Catalog (2022).

Irura bidenticulata Guo, Zhang & Zhu, 2011 (Figs. 1–12)

Irura bidenticulata Guo, Zhang & Zhu, 2011: 89, figs. 1–10 (D♂♀).

Simaetha sp.: Wong (2016): 270 (♀ photos).

Material: CHINA: 1♂, 1♀ (MMUE, G7572.16305; Figs. 7–12), Hong Kong, Aberdeen [Country] Park [c. 22°16'N 114°10'E], 28 February–03 March 1988, J. & F. Murphy; 1♂ (MMUE, G7572.19620), Hong Kong (no exact locality), handrail nr hibiscus, 14 June 1988, S. Wrangham.

Diagnosis: This species is most similar to *Irura onoi* (Prószyński & Deeleman-Reinhold, 2013), **comb. n.** (see below, Figs. 37–44), from which the male can be separated by the much narrower, thread-like embolus (cf. Fig. 7 and fig. 124 in Prószyński & Deeleman-Reinhold 2013) and different shape of the retrolateral cymbial process (cf. Fig. 8 and fig. 126 in Prószyński & Deeleman-Reinhold 2013), and the female by the absence of a transverse ridge of the epigyne (present in *I. onoi*; cf. Figs. 9 and 42) and the markedly narrower and shorter insemination duct (cf. Figs. 10 and 44).

Based on the original illustrations by Guo, Zhang & Zhu (2011), the studied female from Hong Kong slightly differs from the paratype female in having the copulatory openings lying markedly closer to the epigastric furrow, whereas they are in the centre of the epigyne in the paratype (cf. Fig. 9 and fig. 6 in Guo, Zhang & Zhu 2011). This difference seems to reflect a variation only, as the vulvas of both females are identical (cf. Fig. 10 and fig. 7 in Guo, Zhang & Zhu 2011). The male from Hong Kong and the holotype male of *I. bidenticulata* are identical as well (cf. Figs. 7, 8 and figs. 8–10 in Guo, Zhang & Zhu 2011).

Distribution: Two localities in Hunan and Hong Kong (Fig. 28), but the species seems to be more common and occur along the south-eastern shore of China.

Description: See Guo, Zhang & Zhu (2011).



Figs. 1–6: Live photographs of *Irura bidenticulata* Guo, Zhang & Zhu, 2011 from Hong Kong. 1–3 females; 4–6 males. Courtesy of Stefan Obenauer (Hong Kong, China).

***Irura johnmurphyi* sp. n.** (Figs. 13–28)

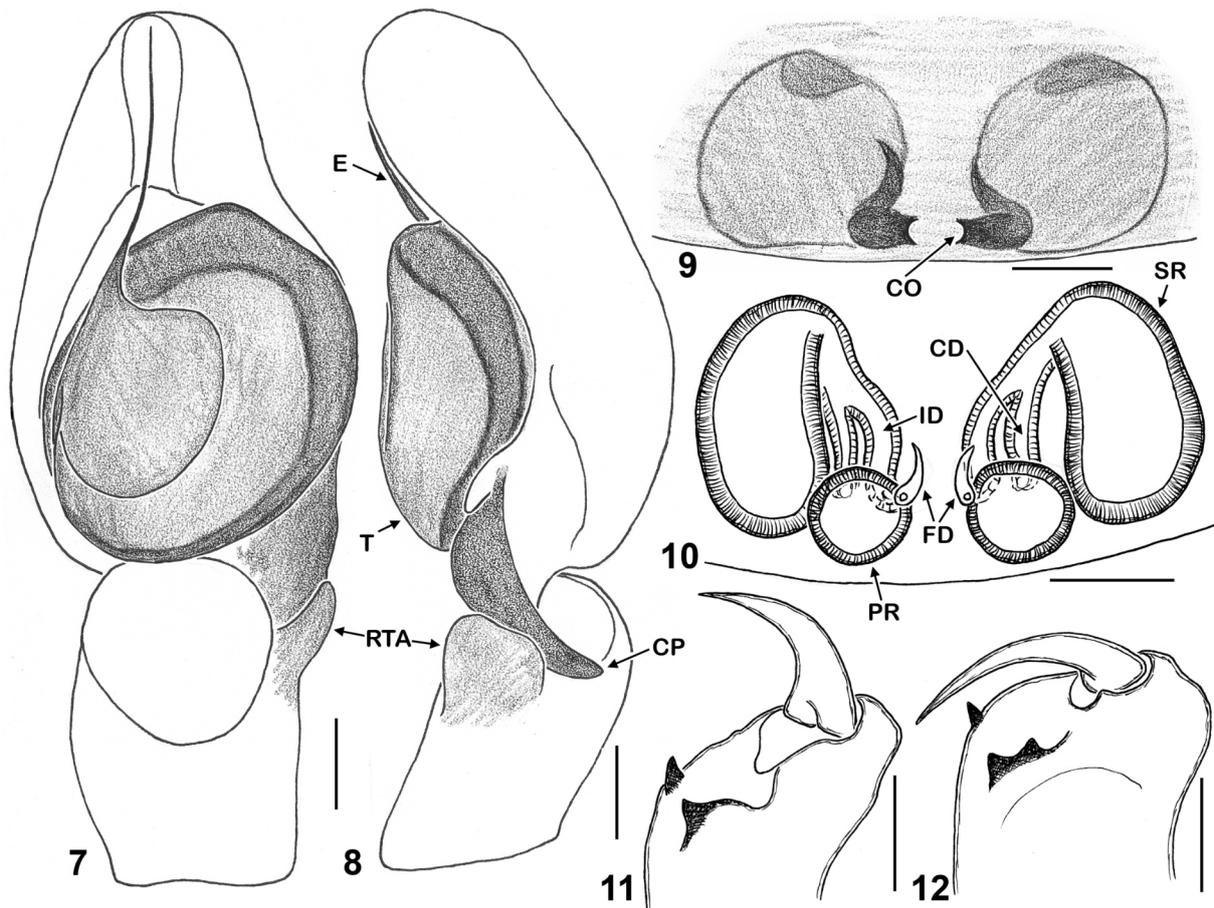
Types: Holotype ♂ (MMUE, G7572.16526; Figs. 13–16, 21–24), MALAYSIA: West Pahang, Genting [c. 3°22'N 101°47'E], H. Barlow's garden, 01–15 February 1988, J. & F. Murphy. Paratypes: 1♂, 1♀ (MMUE, G7572.16526; Figs. 17–20, 25–27), together with the holotype; 1♂, 1♀ (MMUE, G7572.21271), West Pahang, Genting [c. 3°22'N 101°47'E], 600 m, 26 November 1990, J. & F. Murphy; 1♀ (MMUE, G7572.7475), West Pahang, Genting [c. 3°22'N 101°47'E], H. Barlow's garden, 18–22 August 1979, J. & F. Murphy; 1♂ (MMUE, G7572.7640), West Pahang, Genting [c. 3°22'N 101°47'E], H. Barlow's garden, 20 August 1979, J. & F. Murphy.

Diagnosis: The new *Irura* species is close to two Chinese species, *I. longiochelicerca* (Peng & Yin, 1991) and *I. pengi* Guo, Zhang & Zhu, 2011 (the latter is known from the male), and also to the Indonesian *I. onoi*. The male of *I. johnmurphyi* sp. n. can distinguished from all three species by the wide and almost square retrolateral cymbial process (elongated and pointed in the related species; cf. Fig. 22 and fig. 16 in Guo, Zhang & Zhu, 2011, fig. 5C in Peng & Yin, 1991: sub *Kinhia* l., and fig. 126 in Prószyński & Deeleman-Reinhold, 2013: sub *Stertinus* o.) and the short and blunt retromarginal tooth of chelicerae (cf. Figs. 24 and fig. 12 in Guo, Zhang & Zhu, 2011, fig. 5E in Peng & Yin, 1991: sub *Kinhia* l., and fig. 129 in Prószyński & Deeleman-Reinhold, 2013: sub *Stertinus* o.). The female of *I. johnmurphyi* sp. n.

can distinguished from that of *I. longiochelicerca* by the two times longer epigynal pocket (cf. Figs. 26–27 and 34–36; also figs. 5H,I in Peng & Yin, 1991: sub *Kinhia* l.).

Distribution: Only the type locality (Fig. 28).

Description of holotype male: Carapace 2.30 long, 2.25 wide, 1.00 high at PLE. Ocular area 1.33 long, 1.88 wide anteriorly and 2.15 wide posteriorly. Diameter of AME 0.55. Abdomen 2.40 long, 2.00 wide. Cheliceral length 0.95. Clypeus is not developed. Length of leg segments: I 1.80 + 1.35 + 1.25 + 0.85 + 0.60 (5.85); II 1.20 + 0.68 + 0.60 + 0.63 + 0.40 (3.51); III 1.00 + 0.50 + 0.48 + 0.58 + 0.35 (2.91); IV 1.15 + 0.60 + 0.63 + 0.68 + 0.38 (3.44). Leg formula: I,II,IV,III. Leg spination: I: Tb v 0-1-2ap; Mt v 2-2ap. II: Fm Tb v 1-1; Mt v 1-1ap. III: spineless. IV: Tb v 1ap. Coloration (in alcohol; Figs. 13–16). Carapace brownish red, shagreen, with black around eyes, sparsely covered with white recumbent scales (Fig. 13). Anterior margin of carapace with a row of white hairs and scales (Fig. 16). Sternum light brown. Labium and endites brown (Fig. 15). Chelicerae brownish red, promargin with a single small tooth, retromargin with a large, blunt fissidentate tooth (Fig. 24). Abdomen brownish yellow, dorsum entirely covered with orange scutum and sparsely with recumbent white scales; three pairs of conspicuous sclerotized sigillae present (Fig. 13). Book lung covers light yellow. Spinnerets yellow, tinged with brown. Legs I stronger and longer than others, brownish red. Remaining legs: coxae, trochanters and femora brownish red, remaining segments yellow, with



Figs. 7–12: *Irua bidenticulata* Guo, Zhang & Zhu, 2011 from Hong Kong, copulatory organs of male (7–8, 11) and female (9–10, 12). **7** male palp, ventral view; **8** same, retrolateral view; **9** epigyne, ventral view; **10** vulva, dorsal view; **11–12** chelicerae, ventral view. Scale bars = 0.1 mm (7–10), 0.25 mm (11–12). Abbreviations: E = embolus, CD = connecting duct of receptacles, CO = copulatory opening, CP = cymbial process, FD = fertilization duct, ID = insemination duct, PR = primary receptacle, RTA = retrolateral tibial apophysis, SR = secondary receptacle, T = tegulum.

brownish rings at distal ends of the segments. Palps yellow-brown. Palpal structure as in Figs. 21–23: tibia short (c. 2.7 times shorter than cymbium) and symmetrical in ventral view; cymbium flat and wide (length/width ratio 1.6); cymbial ledge extended, with a large, square retrolateral cymbial process; tegulum flat and round; tegular lobe absent; embolus thin, ribbon-shaped, with a large flat embolic base, its origin at about 9 o'clock.

Description of paratype female (G7572.16526): Carapace 3.05 long, 3.15 wide, 1.30 high at PLE. Ocular area 1.80 long, 2.40 wide anteriorly and 2.75 wide posteriorly. Diameter of AME 0.60. Abdomen 3.70 long, 2.70 wide. Cheliceral length 1.25. Clypeus is not developed. Length of leg segments: I 1.90 + 1.35 + 1.35 + 0.95 + 0.90 (6.45); II 1.50 + 0.90 + 0.80 + 0.85 + 0.50 (4.55); III 1.40 + 0.70 + 0.70 + 0.85 + 0.50 (4.15); IV 1.95 + 0.90 + 1.05 + 1.05 + 0.50 (5.45). Leg formula: I,IV,II,III. Leg spination: I: Fm d 2ap; Tb v 2-2-2; Mt v 2-2ap. II: Fm d 3ap; Tb v 1-1-1; Mt v 2-2ap. III and IV: spineless. Coloration (in alcohol; Figs. 17–20), as in the male but lighter (more yellow). Chelicerae with pronounced sclerotized papillae (Fig. 25). Dorsum with larger sclerotized sigilla (Fig. 18). Palps yellow. Legs I yellowish brownish. Epigyne and vulva as in Figs. 26–27: epigyne flat, with a noticeable deep epigynal pocket, on both of which there two small copulatory openings; insemi-

nation ducts short, S-shaped and poorly visible; primary spermathecae pear-shaped; secondary receptacles ovoid (1.8 times longer than wide); fertilization ducts prominent, straight.

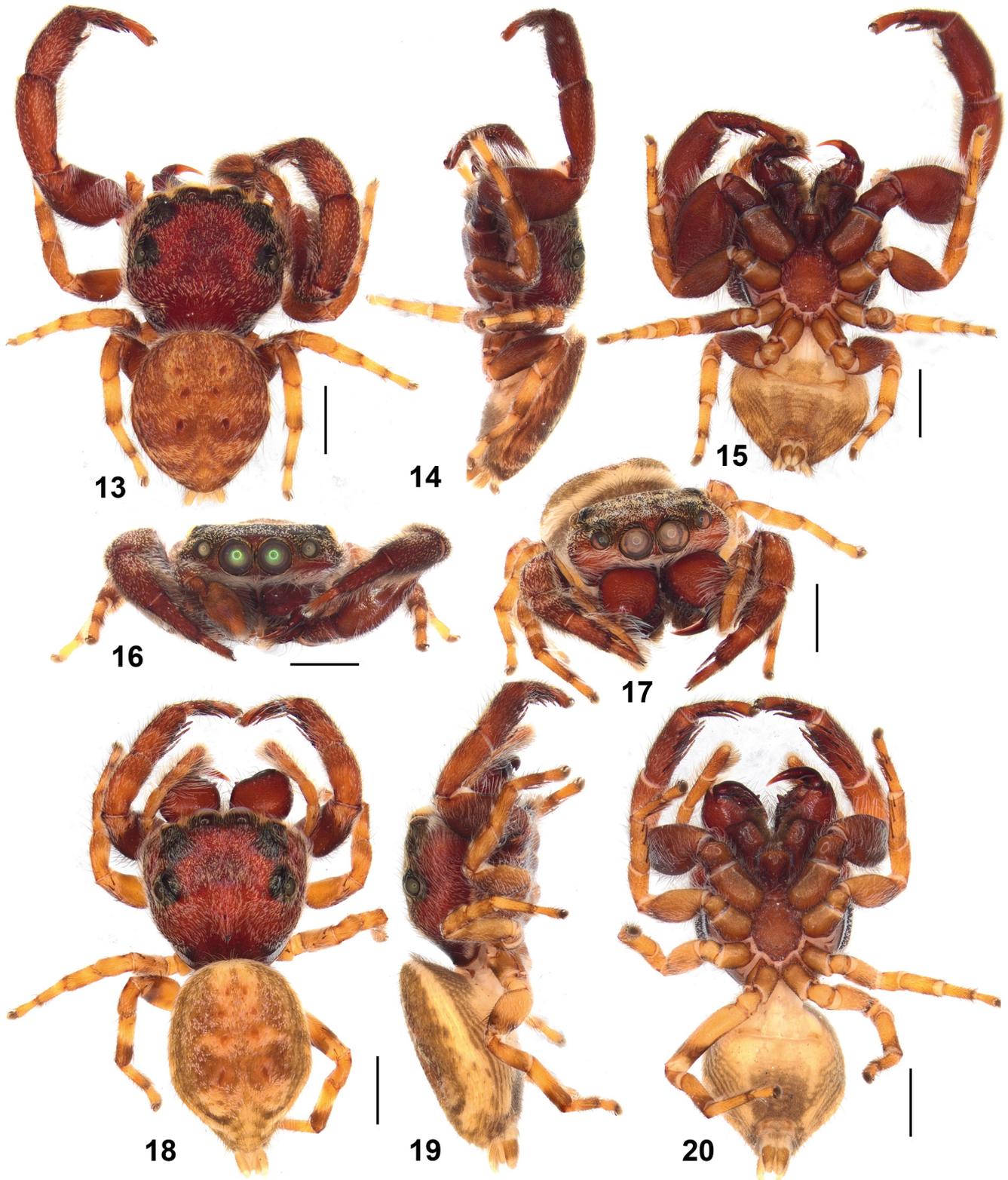
Irua longiochelicera (Peng & Yin, 1991) (Figs. 29–34)

Kinhia longiochelicera Peng & Yin, 1991: 43, figs. 5A–K (D♂♀). See World Spider Catalog (2022) for a complete reference list.

Material: MALAYSIA: 1♀ (MMUE, G7572.6498; Figs. 30–36), Johor, Layang-Layang [c. 1°49'N 103°28'E], 100 m, garden (Corley), 21 July 1979, J. & F. Murphy.

Diagnosis: The female of *I. longiochelicera* is most similar to that of *I. yueluensis* Peng & Yin, 1991 known from SE China (Hunan and Yunnan) (see Peng & Yin, 1991: sub *Kinhia* y.), but differs in the position and shape of the epigynal pocket (cf. Fig. 34 and figs. 4G–I in Peng & Yin, 1991) and the longer and clearly visible insemination duct (Fig. 36), which is almost invisible in *I. yueluensis* (fig. 4I in Peng & Yin, 1991: sub *Kinhia* y.).

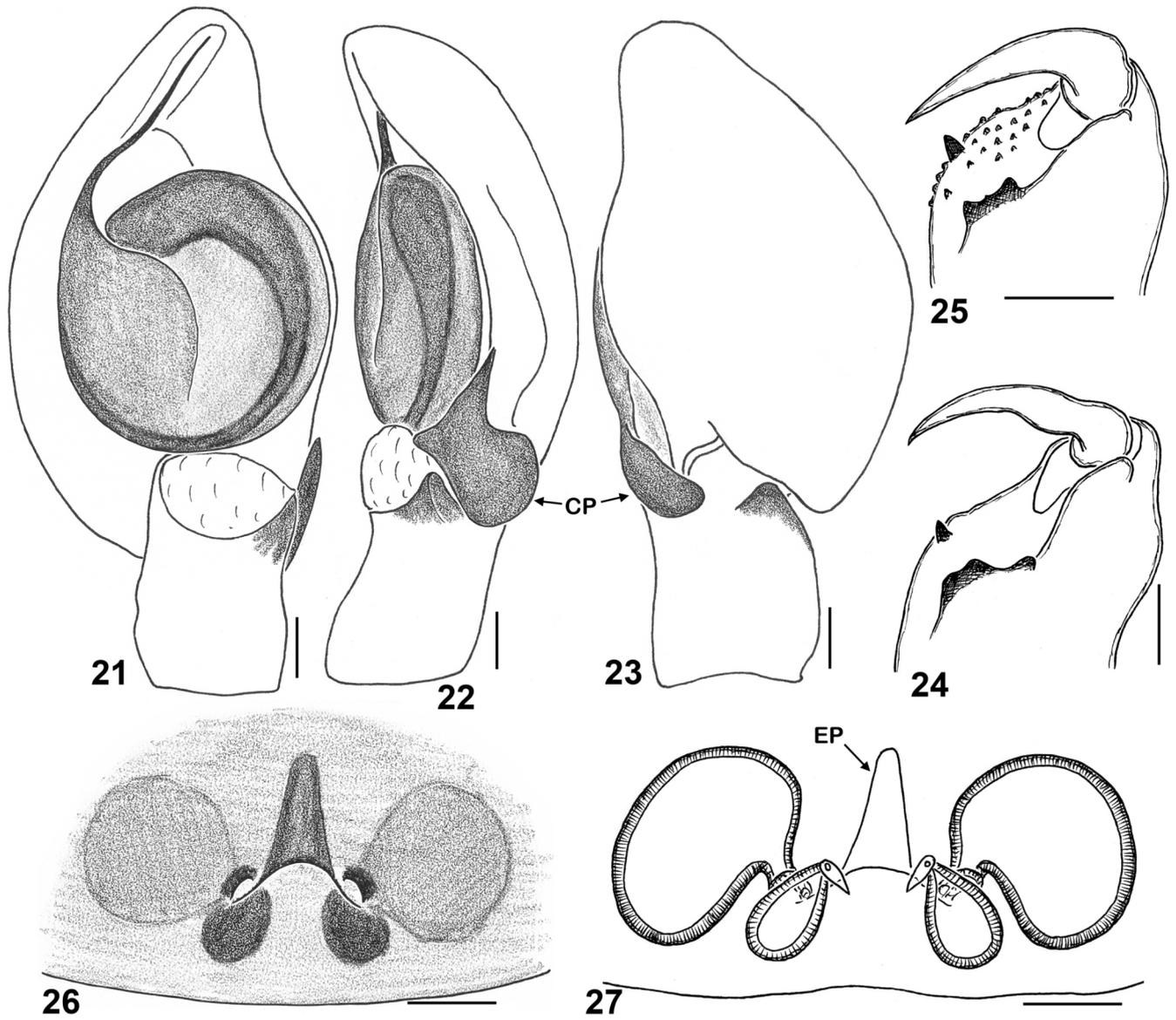
Remarks: The current identification is to be considered provisional, because the studied female has a pair of visible chitinous ledges bearing the copulatory openings and protruding from underneath of the transverse rim (arrowed in



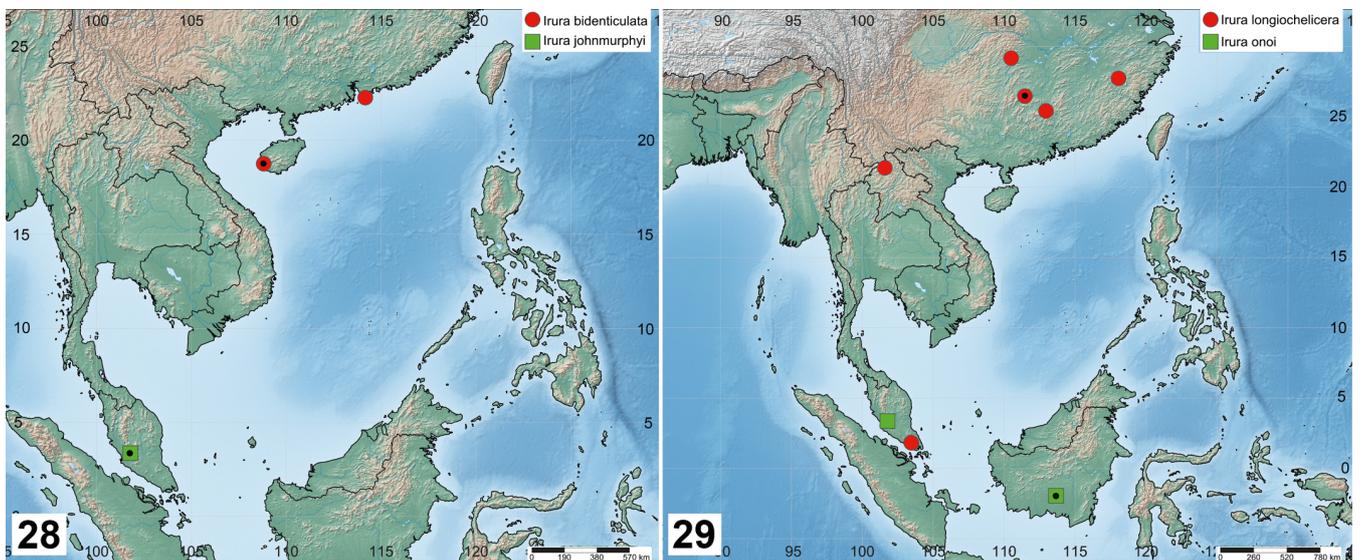
Figs. 13–20: *Irura johnmurphyi* sp. n., holotype male (13–16), paratype female (17–20). **13, 18** habitus, dorsal view; **14, 19** same, lateral view; **15, 20** same, ventral view; **16–17** same, frontal view. Scale bars = 1 mm.

Fig. 34; not shown in *I. longiochelicerca*, cf. fig. 5G in Peng & Yin, 1991: sub *Kinhia l*). However, the conformation of the vulva in the Malay and Chinese females is indistinguishable (cf. Figs. 35, 36 and fig. 5H,I in Peng & Yin, 1991: sub *Kinhia l*). A male from Malaysia is required to verify the present identification.

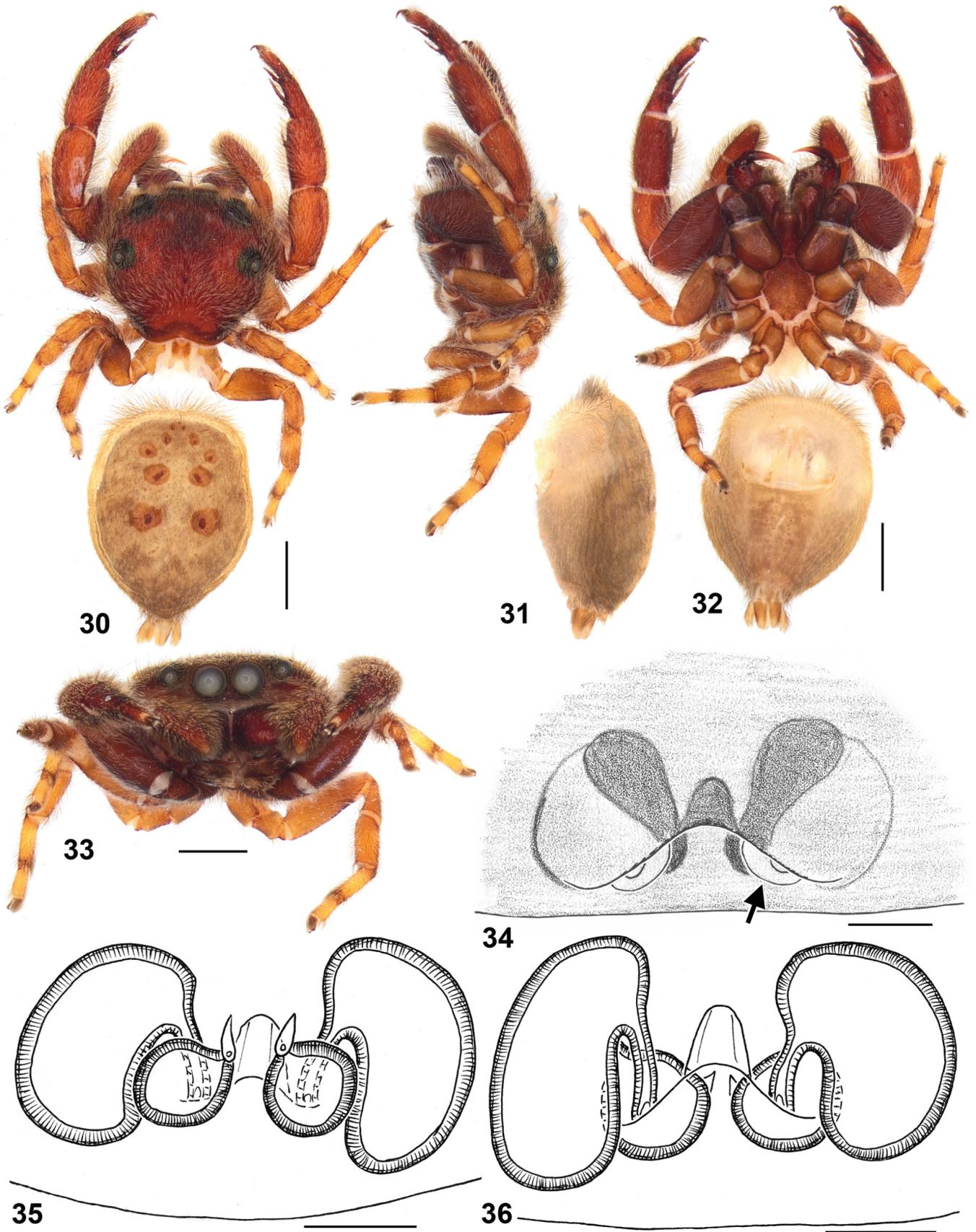
Yet, there is one more poorly documented species, *Irura pygaea* (Thorell, 1891), described from a single female and to date known from the type locality: Penang in Malaysia (Thorell 1891: sub *Euophrys p.*; Workman & Workman, 1892: sub *Euophrys p.*; Norma-Rashid & Li 2009). The species remains known from the poor illustrations by Workman & Workman (1892: plate 6, sub *Euophrys p.*) only.



Figs. 21–27: *Irura johnmurphyi* sp. n., holotype male (2–24) and paratype female (25–27), copulatory organs. **21** male palp, ventral view; **22** same, retrolateral view; **23** same, rear view; **24–25** chelicerae, ventral view; **26** epygine, ventral view; **27** vulva, dorsal view. Scale bars = 0.1 mm (21–23, 26–27), 0.25 mm (24–25). Abbreviations: CP = cymbial process, EP = epigynal pocket.



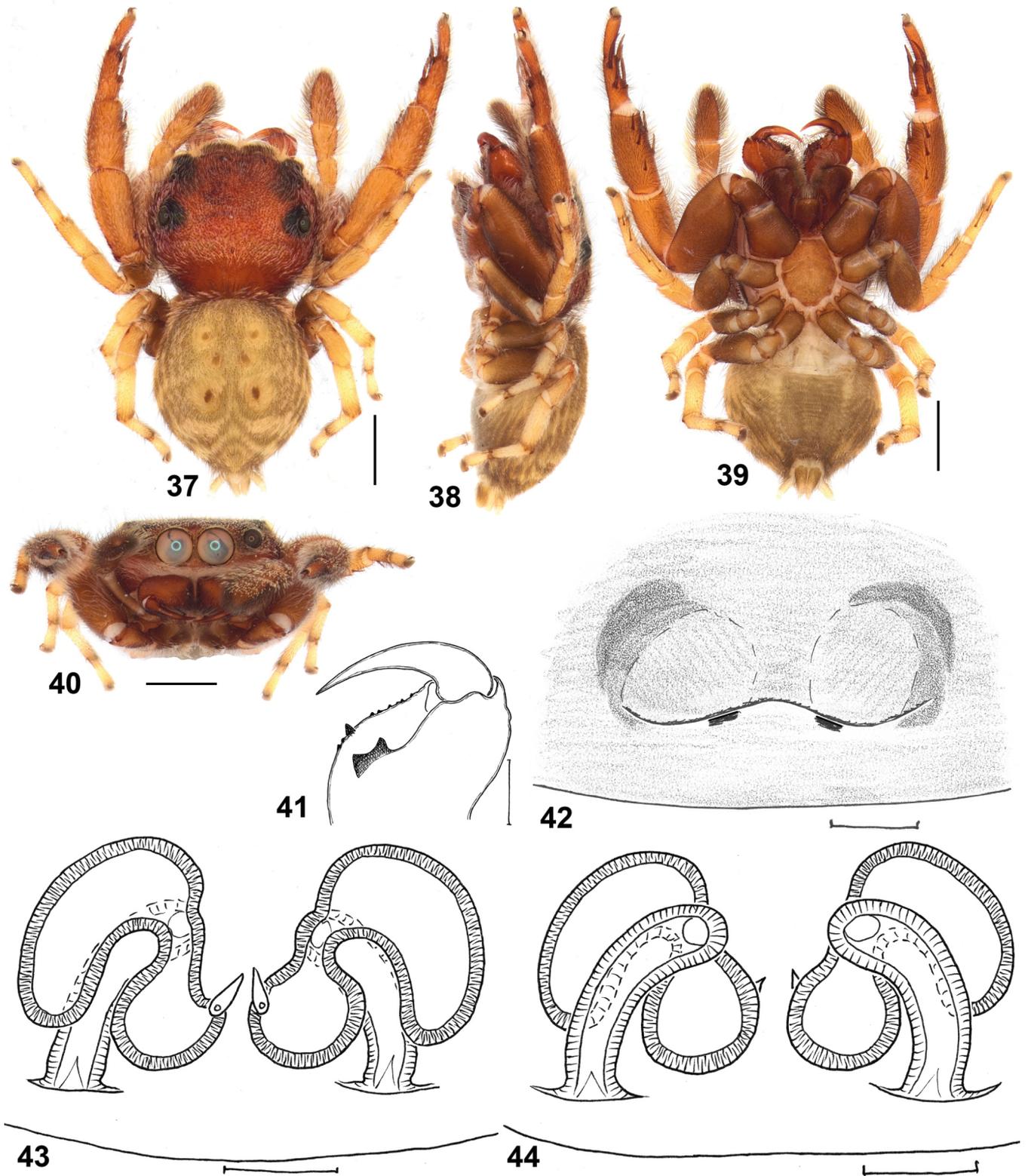
Figs. 28–29. Collecting localities of the four *Irura* species studied in the present paper. Black dots depict type localities.



Figs. 30–36: *Irura longiochelicerca* (Peng & Yin, 1991), female from Malaysia, habitus and copulatory organs. **30** carapace and abdomen, dorsal view; **31** same, lateral view; **32** same, ventral view; **33** carapace, frontal view; **34** epigyne, ventral view; **35** vulva, dorsal view; **36** same, ventral view. Scale bars = 0.1 mm (34–36), 1 mm (30–33).

Based on these figures, the female *I. pygaea* seems to possess a transverse epigynal rim with a deep epigynal pocket

resembling that of the female studied here. However, the colour figure presented by the Workmans shows the female



Figs. 37–44: *Irura onoi* (Prószyński & Deeleman-Reinhold, 2013), female from Malaysia, habitus and copulatory organs. **37** body, dorsal view; **38** same, lateral view; **39** same, ventral view; **40** carapace, frontal view; **41** chelicera, ventral view **42** epigyne, ventral view; **43** vulva, dorsal view; **44** same, ventral view. Scale bars = 0.1 mm (42–44), 0.25 mm (41), 1 mm (37–40).

with all legs having numerous brown rings, which are absent from our female (Figs. 30–33). Besides, according to the Workmans (1892), *I. pygaea* has a small bump at the rear end of the thorax, which is absent from *I. longiochelicera*. In his description, Thorell (1891: 135–137) referred

to two females of this species, of which one was studied and described by him, while another remained with Thomas Workman. Whether both females are indeed conspecific remain to be studied. The holotype female of *I. pygaea* has not been re-examined yet.

Distribution: South and south-east China to the south of Malay Peninsula (Fig. 29).

Description: See Peng & Yin (1991: sub *Kinhia l.*).

***Irura onoi* (Prószyński & Deeleman-Reinhold, 2013), comb. n.** (Figs. 29, 37–44)

Stertinus onoi Prószyński & Deeleman-Reinhold, 2013: 141, figs. 123–129 (D♂♀).

See World Spider Catalog (2022) for a complete reference list.

Material: MALAYSIA: 3♀ (MMUE, G7572.15973; Figs. 37–44), West Pahang, Genting [c. 3°22'N 101°47'E], 600 m, secondary jungle, 26 November 1990, J. & F. Murphy.

Diagnosis: This species is most similar to *I. bidenticulata* (see above, Figs. 9–10), from which the female can be easily distinguished by the presence of transverse ridge of the epigyne under with copulatory openings are hidden (absent in *I. bidenticulata*; cf. Figs. 9 and 42) and the markedly thicker and longer insemination duct (cf. Figs. 10 and 44). The males of both species are easily distinguishable by the much thicker embolus in *I. onoi* (cf. Fig. 7 and fig. 124 in Prószyński & Deeleman-Reinhold 2013) and different shapes of the retrolateral cymbial process (cf. Fig. 8 and fig. 126 in Prószyński & Deeleman-Reinhold 2013).

Remarks: The species was identified based on the paper by Prószyński & Deeleman-Reinhold (2013: sub *Stertinus o.*). The species has a characteristic and easily recognisable vulva, with a wide insemination ducts bent towards each other (Fig. 44); each insemination duct is attached to the short duct connecting the round primary receptacle to the bean-shaped secondary receptacle (Fig. 43; cf. fig. 128 in Prószyński & Deeleman-Reinhold 2013). The species has been transferred to *Irura*, based on the vulva conformation described above and the presence of the well-developed retrolateral cymbial process in the male palp (see figs. 125, 126 in Prószyński & Deeleman-Reinhold 2013); both characters are diagnostic of *Irura*. Therefore, a new combination is proposed here; for details of a relationship between *Irura* and *Stertinus* see below under Discussion.

Distribution: Two localities in Indonesia and Malaysia (Fig. 29). The species record from Malaysia is the first one from outside of its type locality.

Description: See Prószyński & Deeleman-Reinhold (2013: sub *Stertinus o.*).

Discussion

The genera *Irura* (type species: *Irura pulchra* Peckham & Peckham, 1901) and *Stertinus* (type species: *Stertinus denticheles* Simon, 1890) belong to the subtribe Simaethina in the tribe Vicirini, together with another 11 genera (Madison 2015). These are wide bodied and rather flat jumping spiders resembling beetles (e.g. Figs. 1–6, 13–20; see also Metzner 2022) and occur in SE Asia. Both genera are poorly understood, with their type species remaining unrevised. *I.*

pulchra was described and poorly illustrated by Peckham & Peckham (1901: Plate II, fig. 3) from a single female from Sri Lanka. The holotype female was also illustrated by Prószyński (1984: 154), who provided a sketch of its epigyne but not the vulva. Yet, from the latter figure, it is clear that *I. pulchra* has a two-chambered vulva as all other species currently assigned to the genus. *S. denticheles* remains known from the original, non-illustrated description by Simon (1890) based on a single male from Mariana Island. The only illustration of its holotype male was later provided by Simon (1903: fig. 989), who figured the retromarginal tooth on its chelicerae only, which is not enough to diagnose the species.

The problem is that modern authors continue to describe new species both in *Irura* and in *Stertinus* which led to confusion. Reasoning from published descriptions and figures, many newly described species can be equally easily assigned to either of the two genera; see Metzner (2022) for comparative illustrations. For instance, in the conformation of copulatory organs, *Stertinus fanjingensis* Wang, Mi, Irfan & Peng, 2020 from China (Guizhou) and *S. kumadai* Logunov, Ikeda & Ono, 1997 from east China (Hubei) and Japan are very similar to *I. johnmurphyi* sp. n. (cf. Figs. 21–27 and figs. 2–3 in Wang *et al.* 2020), just differing in the less well-developed retrolateral cymbial process in the male palp. At the same time, the epigyne and vulva of *S. fanjingensis* and *I. johnmurphyi* sp. n. are almost identical.

Key definition characters of both genera are also similar: carapace wider than long and flat, clypeus not developed, PME closer to AME than to PLE, flattened palpal tarsi, first legs thickened, three pairs of conspicuous sclerotized sigillae on dorsum, poor leg spination, presence of retrolateral cymbial process in the male palp, two-chambered vulva, and insemination ducts being attached to the short ducts connecting the primary and secondary receptacles; see Metzner (2022) for comparative illustrations. Therefore, there is little or no doubt that the majority of species currently assigned to *Irura* and *Stertinus* are congeneric, except for those (e.g. *Stertinus cyprius* Merian, 1911 or *S. magnificus* Merian, 1911 with strongly modified male chelicerae) that may prove to belong to *Simaetha* Thorell, 1881. Many species of the last genus, including the generotype, are characterized by the elongated and thickened male chelicerae bearing strong and elaborated retromarginal teeth (e.g. figs. 1D,E, 3D, 5B in Żabka 1994; see also Metzner 2022).

In 2000, John Murphy suspected that the genera *Ligurra* Simon, 1903, *Simaetha*, and *Stertinus* are very close and could even be synonymous (Murphy & Murphy 2000: 312). Although the synonymy of *Ligurra* and *Simaetha* is, indeed, worth considering, and may prove to be correct, *Stertinus* differs from both in having a longer, ribbon-like embolus with a well-pronounced embolic base (short, beak-shaped embolus, without clearly marked embolic base those two genera), and usually, but not always, long insemination ducts (never long in those two genera). Hence, despite belonging to the same subtribe Simaethina, in my opinion, *Stertinus* is distinct from *Ligurra* and *Simaetha*.

To sum up, the genera *Irura* and *Stertinius* are very close and likely to be synonymous; if so, the name *Stertinius* has priority over *Irura*. However, this assumption cannot be verified until the male palp of the type species of *Stertinius* (*S. denticelalis*, see above) is re-examined and properly illustrated, and its belonging to the Sимаethina is finally proven.

Acknowledgements

I wish to express my warmest thanks to Stefan Obenauer (Hong Kong, China) for allowing me to use some of his excellent live photos of *Irura bidenticulata* (Figs. 1–6) and two anonymous referees for constructive comments on the manuscript.

References

- GUO, J. Y., ZHANG, F. & ZHU, M. S. 2011: Two new species of the genus *Irura* Peckham & Peckham, 1901 (Araneae: Salticidae) from Hainan Island, China. *Acta Arachnologica* **60**: 89–91.
- LOGUNOV, D. V. 2022: John Alan Murphy (1922–2021) and his contribution to arachnology. *Arachnology* **19**: 77–103.
- LOGUNOV, D. V., IKEDA, H. & ONO, H. 1997: Jumping spiders of the genera *Harmochirus*, *Bianor* and *Stertinius* (Araneae, Salticidae) from Japan. *Bulletin of the National Museum of Nature and Science Tokyo (A)* **23**: 1–16.
- MADDISON, W. P. 2015: A phylogenetic classification of jumping spiders (Araneae: Salticidae). *Journal of Arachnology* **43**: 231–292.
- MERIAN, P. 1911: Die Spinnenfauna von Celebes. Beiträge zur Tiergeographie im Indoaustralischen Archipel. *Zoologische Jahrbücher, Abteilung für Systematik, Geographie und Biologie der Tiere* **31**: 165–354.
- METZNER, H. 2022: *Jumping spiders (Arachnida: Araneae: Salticidae) of the world*, online at <https://www.jumping-spiders.com>
- MURPHY, F. & MURPHY, J. 2000: *An introduction to the spiders of South East Asia with notes on all the genera*. Kuala Lumpur: Malaysian Nature Society.
- NORMA-RASHID, Y. & LI, D. 2009: A checklist of spiders (Arachnida: Araneae) from Peninsular Malaysia inclusive of twenty new records. *Raffles Bulletin of Zoology* **57**: 305–322.
- ONO, H. 1988: *A revisional study of the spider family Thomisidae (Arachnida, Araneae) of Japan*. Tokyo: National Science Museum.
- PECKHAM, G. W. & PECKHAM, E. G. 1901: *Pellenes* and some other genera of the family Attidae. *Bulletin of the Wisconsin Natural History Society (N.S.)* **1**: 195–233.
- PENG, X. J. & YIN, C. M. 1991: Five new species of the genus *Kinhia* from China (Araneae: Salticidae). *Acta Zootaxonomica Sinica* **16**: 35–47.
- PRÓSZYŃSKI, J. 1984: Atlas rysunków diagnostycznych mniej znanych Salticidae (Araneae). *Zeszyty Naukowe Wyższej Szkoły Rolniczo-Produkcyjnej w Siedlcach* **2**: 1–177.
- PRÓSZYŃSKI, J. & DEELEMANN-REINHOLD, C. L. 2013: Description of some Salticidae (Araneae) from the Malay Archipelago. III. Salticidae of Borneo, with comments on adjacent territories. *Arthropoda Selecta* **22**: 113–144.
- SIMON, E. 1890: Études arachnologiques. 22e Mémoire. XXXVI. Arachnides recueillis aux îles Mariannes par M. A. Marche. *Annales de la Société Entomologique de France, série 6* **10**: 131–136.
- SIMON, E. 1903: *Histoire naturelle des araignées. Deuxième édition, tome second*. Paris: Roret: 669–1080.
- SHORTHOUSE, D. P. 2010: *SimpleMappr, an online tool to produce publication-quality point maps*, online at <http://www.simplemappr.net>
- THORELL, T. 1881: Studi sui Ragni Malesi e Papuani. III. Ragni dell'Austro Malesia e del Capo York, conservati nel Museo civico di storia naturale di Genova. *Annali del Museo Civico di Storia Naturale di Genova* **17**: 1–720.
- THORELL, T. 1891: Spindlar från Nikobarerna och andra delar af södra Asien. *Kongliga Svenska Vetenskaps-Akademiens Handlingar* **24**: 1–149.
- WANG, C., MI, X. Q., IRFAN, M. & PENG, X. J. 2020: On two species of the spider genus *Stertinius* Simon, 1890 from China (Araneae: Salticidae). *Zootaxa* **4786**: 295–300.
- WONG, D. 2016: *A guide to the spiders of Hong Kong*. Hong Kong: Society of Hong Kong Nature Explorers.
- WORKMAN, T. & WORKMAN, M. E. 1892: *Malaysian spiders*. Belfast: T. Workman.
- WORLD SPIDER CATALOG 2022: *World spider catalog, version 23.0*. Bern: Natural History Museum, online at <http://wsc.nmbe.ch>
- ŽABKA, M. 1994: Salticidae (Arachnida: Araneae) of Oriental, Australian and Pacific regions, X. Genus *Simaetha* Thorell. *Records of the Western Australian Museum* **16**: 499–534.