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A New Species of the Genus *Liphistius* (Araneae: Mesothelae) from Lampi Island, Tanintharyi Region, Southern Myanmar

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Abstract *Liphistius tanakai* Ono and Aung, sp. nov. (Araneae, Mesothelae, Liphistiidae) is described from Lampi Island belonging to the Myeik Archipelago, Tanintharyi Region (former Tenasserim), southern Myanmar. The new species belongs to the *Liphistius trang* species-group, and is closely related to *Liphistius bicoloripes* Ono, 1988 and *L. castaneus* Schwendinger, 1995, both described from Khlong Nakha Wildlife Sanctuary in Ranong Province, Thailand, which is about 100 km distant from the type locality of the new spider across the sea.
Key words: Araneae, Liphistiidae, Myanmar, Burma, Tenasserim, taxonomy.

Introduction

Primitively segmented spiders belonging to the suborder Mesothelae (Araneae) attract scientific attention for being presumed survivors from the Paleozoic era. *Liphistius* Schiöte, 1849 is the largest genus in the suborder and represents a single family, Liphistiidae, with 56 described species distributed in Southeast Asia, mainly in Thailand and Malaysia, and partly in Myanmar (Burma), Laos and Indonesia (Sumatra). Although more than 30 species of the genus are known so far from the adjacent country of Thailand (Ono, 1988a, b; Ono and Schwendinger, 1990; Schwendinger, 1995, 1996, 1998; Sivayyapram *et al.*, 2017, and others), only four recent species have been recorded from Myanmar. These are *Liphistius birmanicus* Thorell, 1897 (Carin Hill) and *L. hpruso* Aung *et al.*, 2019 (Loi Kaw District) from Kayah State, and *L. lordae* Platnick & Sedwick, 1984 (Taunggyi) and *L. pinlaung* Aung *et al.*, 2019 (Pinlaung Township) from Shan State (Thorell, 1897; Bristowe in Bristowe and Millot, 1933; Haupt, 1983; Platnick and Sedwick, 1984; Schwendinger, 1990; Ono and Aung, 2017b, 2018; Aung *et al*, 2019). The reason for this poverty of knowledge was various practical difficulties in nationwide investigation, which continued even after independence.

Recently, more stable national conditions have facilitated spider expeditions in Myanmar under a joint research project between the National Museum of Nature and Science, Japan, and the Forest Department of the Ministry of Natural Resources and Environmental Conservation, Myanmar. These expeditions were primarily in the Tanintharyi Region, a part of former Tenasserim (January, 2017), in the Myeik Archipelago (May–June, 2017), in Chin State (November–December, 2017), in Bago Region and Kayin, Kayah and Shan States (August, 2018), and in Sagaing Region and Chin State (November, 2019). Investigations resulted in new information on the taxonomy and zoogeography of this spider

group (Ono and Aung, 2017a; Ono, Htwe and Aung, 2018, 2019). The study material includes several specimens of interesting liphistiid spiders obtained from Lampi and the adjacent Bocho Islands belonging to the Myeik Archipelago, Bokepying Township, Tanintharyi Region located at the base of Malay Peninsula.

The Myeik Archipelago consists of several hundreds of islands distributed along the western coastline of the Malay Peninsula (former Tenasserim Coast) for 600 km in the Andaman Sea. These islands are geologically characterized mainly by limestone and granite, and their shore is made up of various environments such as sandy beaches, rocky headlands and mangrove swamps. This sea area has been isolated from modern civilization under the traditional lifestyle of the fishing tribe Moken, and the islands are covered with thick tropical growth, which preserves the habitat of some endangered animals (Beffasti, Galanti and Miorin, 2016).

Lampi Island is one of the beautiful islands belonging to Myeik Archipelago, and is protected as a national marine park through eliminating human intervention as much as possible. In the present paper, we report detailed results of a taxonomical study of the liphistiid spider material obtained from this preserved area.

Materials and Methods

One female and three juveniles (male unknown) were collected by H. Ono along a rivulet near the beach between Thin Aw and Michaung Aw, western side of Lampi Island, Bokepying Township, Tanintharyi Region, Myanmar, on 21-V-2017; one immature female was collected by H. Ono along a rivulet near the coastal village of Bocho Island separated from Lampi Island by a narrow strait, 18-V-2017.

The specimens were fixed in 75% ethanol and observed and illustrated under a Leica MZ125 microscope at the Department of Zoology of the National Museum of Nature and Science, Tsukuba, with the exception of the right legs cut and fixed in absolute ethanol and sent to Dr. Xin Xu of the Hunan Normal University, Changsha, Hunan, China, for confirmation of their conspecific situation by extracting genomic DNA. To our great surprise, the result of the extraction indicated the existence of multiple species in this restricted material and there is no evidence to support a genetically conspecific situation between the female adult and the other specimens (Xu, unpublished data). Thus, the juvenile specimens from Lampi Island and the immature female from Bocho Island are omitted from the present description. The genital organ of the adult female was dissected for observation and treated in 10% potassium hydroxide solution to remove muscles.

After a careful examination of the present material and comparison with all known species from Thailand, Malaysia and Myanmar, we recognized a new species living on Lampi Island. This interesting spider will be described in detail below.

The type specimen of the new species is provisionally preserved in the arachnid collection of the Department of Zoology, National Museum of Nature and Science, Japan, and will be deposited in the Biodiversity Research Centre of Myanmar which is under construction at the site of the Forest Department, Ministry of Natural Resources and Environmental Conservation at Yezin, Nay Pyi Taw.

Taxonomy

Liphistius tanakai sp. nov.

(Figs. 1–5)

Type material. Holotype: female, along a rivulet near the beach between Thin Aw and Michaung Aw, western side of Lampi Island, Bokepying Township, Tanintharyi Region, Myanmar (location: N10°50′22.2″, E98°13′57.9″), 21-V-2017, collected by H. Ono. Male unknown.

Diagnosis: This new species belongs to the super-species of *Liphistius* (super-sp. *trang*) in the *trang* species-group proposed by Schwendinger (1998), and especially resembles *Liphistius bicoloripes* Ono, 1988 and *L. casta-*

Fig. 1. *Liphistius tanakai* Ono and Aung, sp. nov.: female, holotype, from Lampi Island, Myanmar. Body length: 14.1 mm.

neus Schwendinger, 1995, both described from Khlong Nakha Wildlife Sanctuary, Ranong Province of Thailand, about 100 km Southeast of Lampi Island (Fig. 6). *Liphistius bicoloripes* is distributed widely at the base of Malay Peninsula, while *L. castaneus* is restricted in its type area. Schwendinger (1995) reported that both the species occur together in the preserved area in Khlong Nakha also with *Liphistius schwendingeri* Ono, 1988 which belongs to the other superspecies, *Liphistius* (super-sp.) *schwendingeri*, in the same species-group. *Liphistius bicoloripes*, *castaneus* and the present new species *tanakai* have a same basic structure of female genitalia: the pore-plate is developed and large, lateral margins of the ventral rim are hardly sclerotized with a pair of antero-lateral processes, and the receptacular cluster is large, longer than wide and racemose. However, this new species is distinguished from other two species by a longer central opening, fewer single receptacles (granules) on the pore-plate, much developed antero-lateral processes on both sides of the rim, and a wider posterior stalk with parallel sides.

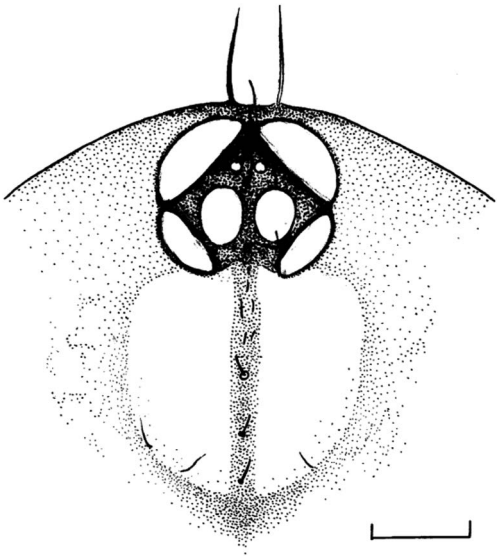

Fig. 2. *Liphistius tanakai* Ono and Aung, sp. nov.: female, holotype, eye area, dorsal view. Scale: 0.5 mm.

Description: Female (holotype). Prosoma: Carapace yellowish brown, with dark grey or blackish indistinct markings, a file of short pointed hairs running over ocular mound and in the middle of the round white area behind the eyes (Fig. 2), sternum light yellowish brown,

narrow, much longer than wide, chelicerae robust with 11 (left) or 12 (right) teeth with variable size on promargin of fang furrow, legs with distinct black rings (Fig. 1). Opisthosoma light yellowish brown, with nine dark brown tergites arranged with narrow spaces, the fourth tergite the largest, eight spinnerets present.

Measurements (in mm): Body length 14.1, carapace length 5.68, carapace width 5.00, opisthosoma length 7.15, opisthosoma width 5.67; palp [total length (femur + patella + tibia + tarsus)]: 10.19 (3.68 + 1.79 + 2.41 + 2.31), legs [total length (femur + patella + tibia + metatarsus + tar sus] : leg I 12.33 (4.04 + 2.10 + 2.52 + 2.36 + 1.31), leg II 12.61 (4.10 + 2.10 + 2.63 + 2.52 + 1.26), leg III 14.29 (4.10 + 2.10 + 3.57 + 3.15 + 1.37), leg IV 18.49 (5.89 + 2.31 + 3.78 + 4.41 + 2.10). Approximate size of eyes and their distances are shown in Fig. 2.

Female genitalia (Figs. 3–5): The genital field (Fig. 3) with many strong hairs standing in different directions, without a pair of depressions on the lateral sides. The pore-plate round, slightly wider than long, with many single receptacles (granules) and a large and long opening to the racemose receptacular cluster, the sclerotized rim with a pair of antero-lateral processes large and developed, posterior stalk a wide square with parallel sides (Figs. 4–5).

Distribution. At present, known only in the Lampi Marine National Park, southern Myanmar (Fig. 6).

Etymology. Dedicated to Dr. Nobuyuki Tanaka, the leader of the study project and the

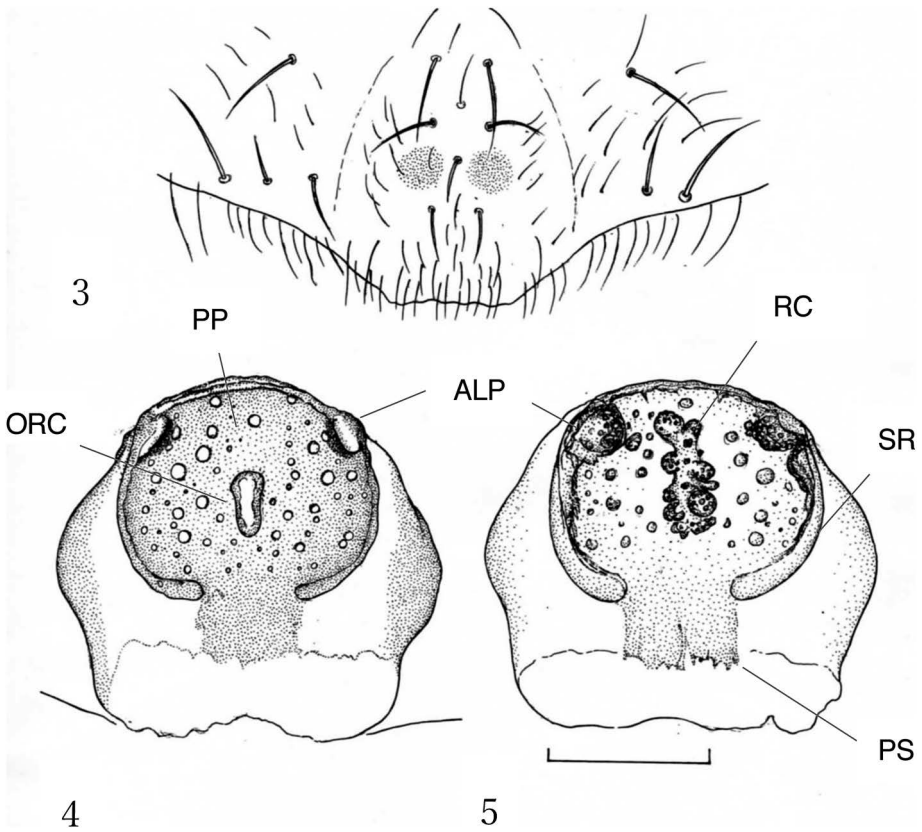

Fig. 3–5. *Liphistius tanakai* Ono and Aung, sp. nov.: female, holotype. 3. Genital field, ventral view. 4. Inner organ of genitalia, dorsal view. 5. Same, ventral view. Abbreviations: ALP, antelo-lateral process of rim, ORC, opening to receptacular cluster, PP, pore-plate (with receptacles), PS, posterior stalk, RC, receptacular cluster SR, sclerotized rim. Scale: 0.4 mm.

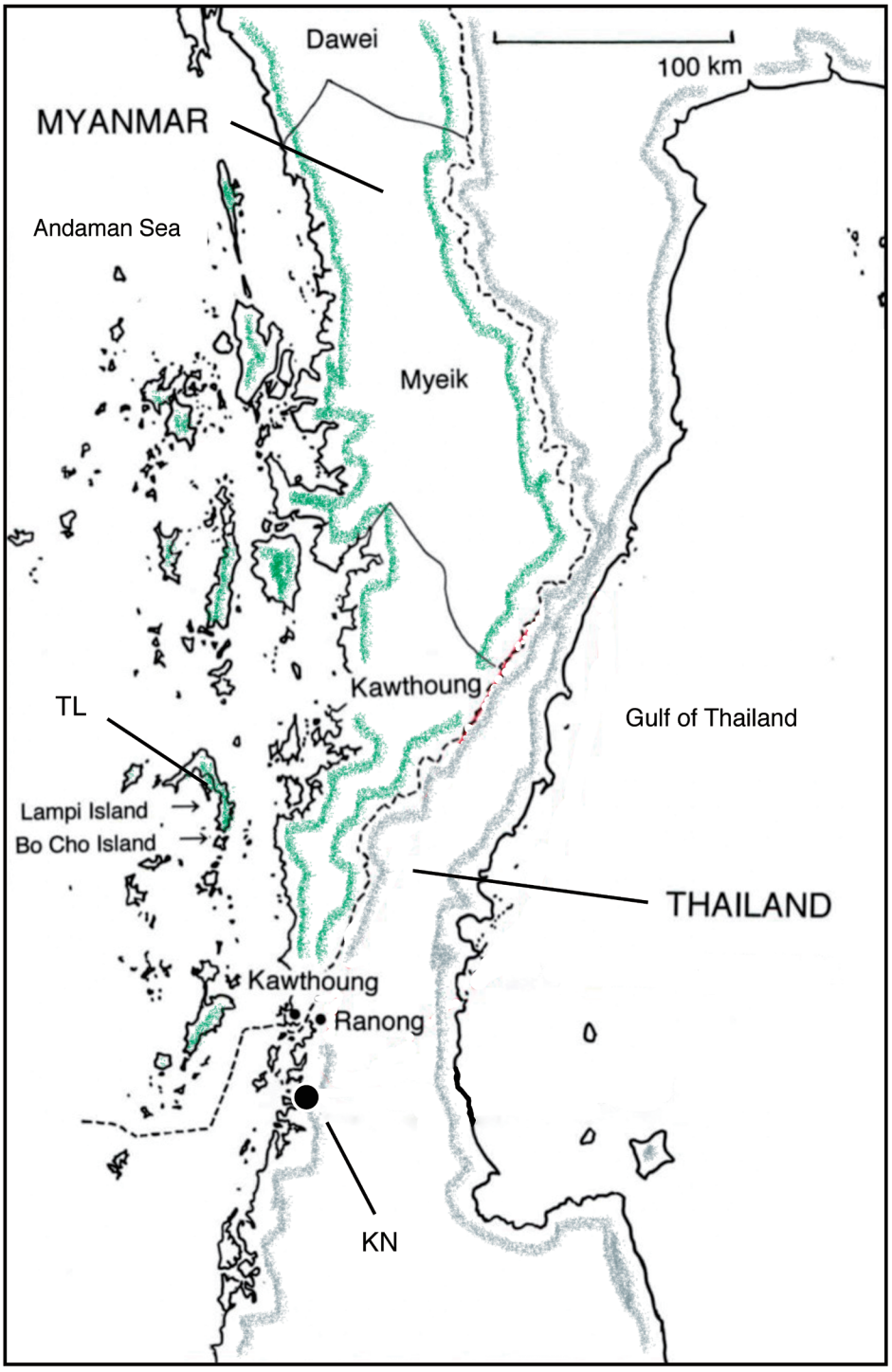

Fig. 6. Map of the Myeik Archipelago along Myeik and Kawthoung Districts of Tanintharyi Region, Myanmar. Abbreviations: **TL**, type locality of *Liphistius tanakai* Ono and Aung, sp. nov. on Lampi Island [location: N10°50′22.2″, E98°13′57.9″], **KN**, Khlong Nakha Wildlife Sanctuary in Ranong Province, Thailand, type area of *L. bicoloripes* Ono, 1988 and *L. castaneus* Schwendinger, 1995, covering 530 km^2 around N9°26′, E98°35′. The broken line indicates the border between Myanmar and Thailand.

expeditions in Myanmar, who helped collecting spiders in the field.

Remarks. The only four species hitherto known from Myanmar, *Liphistius birmanicus* Thorell, 1897, *L. lordae* Platnick and Sedwick, 1984, *L. hpruso* Aung *et al.*, 2019 and *L. pinlaung* Aung *et al.*, 2019 were described from mountainous areas of Kayah and Shan States, in central and eastern Myanmar (Burma). They have, however, little relation to the present species. In fact, the genital organ of this new species has the typical structure of those of members of the *trang* group (Schwendinger, 1998; Sivayyapram *et al*, 2017), which is a major species-group in Thailand. A sub-group of the *trang* group, *Liphistius* (super-species) *trang* [= super-species D called by Schwendinger (1998)] includes seven known species, *Liphistius trang* Platnick & Sedwick, 1984, *L. bicoloripes* Ono, 1988, *L. castaneus* Schwendinger, 1995, *L. rufipes* Schwendinger, 1995, *L. thaleban* Schwendinger, 1990, *L. niphanae* Ono, 1988, and probably *L. albipes* Schwendinger, 1995, recorded from the area between Chumpon and Yala Provinces, southern Thailand. This implies a presumable ancestral cluster of *Liphistius tanakai*, which may be one of those which would have isolated in these islands (there are more than 600 islands including islets). As was explained in the above diagnosis, the new spider is especially close to *L. bicoloripes* Ono, 1988 and *L. castaneus* Schwendinger, 1995, both described from Khlong Nakha Wildlife Sanctuary in Ranong Province about 100 km Southeast of Lampi Island. As mentioned in the explanation of the material, the result of DNA extraction indicates the existence of multiple species on the same island. This fact suggests that a major species diversity may exist in the Myeik Islands similar to that demonstrated in the liphistiid genera *Ryuthela* Haupt, 1983 and *Heptathela* Kishida, 1923 in the Ryukyu Islands and Kyushu of Japan (Xu *et al.*, 2017, 2019).

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References

Aung, K. P. P., X. Xu, W. W. Lwin, M. Z. Sang, L. Yu, H. Liu, F. Liu and D. Li 2019. Two new species of the primitively segmented spider genus *Liphistius* Schiödte, 1849 (Mesothelae, Liphistiidae) from Myanmar. Zookeys, 882: 29–39.

Beffasti, L., V. Galanti and T. Miorin 2016. Lampi Marine National Park Guidebook. 80 pp. Istituto Oikos and Forest Department, Myanmar.

Bristowe, W. S. and J. Millot 1933. The liphistiid spiders, with an appendix on their internal anatomy. Proceedings of the Zoological Society of London, 1932: 1015–1057, plates 1–6.

Haupt, J. 1983. Vergleichende Morphologie der Genitalorgane und Phylogenie der liphistiomorphen Webespinnen (Araneae: Mesothelae) I. Revision der bisher bekannten Arten. Zeitschrift für die zoologische Systematik und Evolutionsforschung, 21: 275–293.

Ono, H. 1988 a. Liphistiid spiders (Araneae, Mesothelae) of Northwest Thailand. Bulletin of the National Science Museum, Tokyo, Ser. A (Zoology), 14: 35–41.

Ono, H. 1988 b. Liphistiid spiders (Araneae, Mesothelae) of South Thailand. Bulletin of the National Science Museum, Tokyo, Ser. A (Zoology), 14: 145–150.

Ono, H. and M. M. Aung 2017a. Occurrence of a primi-

tively segmented spider (Mesothelae, Liphistiidae) on Lampi Island of the Myeik Archipelago, Tnintharyi Region, southern Myanmar. Poster presentation at the 30th European Congress of Arachnology. Nottingham, United Kingdom.

Ono, H. and M. M. Aung 2017b. Primitively segmented spiders (Mesothelae, Liphistiidae) of Myanmar. The 4th Conference of Asian Society of Arachnology and the 15th Meeting of Arachnological Society of China, Program and Abstracts, p. 31. Chongqing, China.

Ono, H. and M. M. Aung 2018. Liphistiid spiders (Araneae: Mesothelae) from Myanmar. The 5th Conference of Asian Society of Arachnology, Abstracts Booklet, p. O-19. Bangkok, Thailand.

Ono, H., D. Htwe and M. M. Aung 2018. Towards the clarification of the spider fauna of Myanmar (Arachnida, Araneae). International Symposium, Updating of Flora and Fauna of Myanmar, Programme and Abstracts, p. 24. Forest Research Institute, Myanmar and National Museum of Nature and Science, Japan.

Ono, H., D. Htwe and M. M. Aung 2019. The spider fauna of Myanmar (Arachnida, Araneae), a prologue. Abstract Book of the 21st International Congress of Arachnology, p. 108. Canterbury, New Zealand.

Ono H. and P. Schwendinger 1990. Liphistiid spiders (Araneae, Mesothelae) from central and eastern Thailand. Bulletin of the National Science Museum, Tokyo, Ser. A (Zoology), 16: 165–174.

Platnick, N. I. and W. Sedwick 1984. A revision of the spider genus *Liphistius* (Araneae, Mesothelae). American Museum Novitates, 2781: 1–31.

Schwendinger, P. J. 1990. On the spider genus *Liphistius* (Araneae: Mesothelae) in Thailand and Burma. Zoologica Scripta, 19: 331–351.

Schwendinger, P. J. 1995. New *Liphistius* species (Araneae, Mesothelae) from southern Thailand and northern Malaysia. Zoologica Scripta, 24: 143–156.

Schwendinger, P. J. 1996. New *Liphistius* species (Araneae, Mesothelae) from western and eastern Thailand. Zoologica Scripta, 25: 123–141.

Schwendinger, P. J. 1998. Five new *Liphistius* species (Araneae, Mesothelae) from Thailand. Zoologica Scripta, 27: 17–30. (Erratum of the paper in the same journal, 28: 371–377.)

Sivayyapram, V., D. R. Smith, S. Weingdow and N. Warrit 2017. A new *Liphistius* species (Mesothelae: Liphistiidae: Liphistiinae) from Thailand with notes on its natural history. Journal of Arachnology, 45: 287–295.

Thorell, T. 1897. Viaggio di Leonardo Fea in Birmania e regioni vicini. LXXIII. Secondo saggio sui Ragni birmani. Annali del Museo Civico di Storia naturale di Genova, Series 2, 17: 161–267.

Xu, X., F. Liu, H. Ono, J. Chen, M. Kuntner and D. Li 2017. Targeted sampling in Ryukyus facilitates species delimitation of the primitively segmented spider genus *Ryuthela* (Araneae: Mesothelae: Liphistiidae). Zoological Journal of the Linnean Society, 181: 867–909.

Xu, X., H. Ono, J. Chen, M. Kuntner, F. Liu and D. Li 2019. A taxonomic monograph of the liphistiid spider genus *Heptathela*, endemic to Japanese islands. Zookeys, 888: 1–50.