

FIRST RECORD OF THE GENUS *Leptophion* Cameron (Hymenoptera: Ichneumonidae: Ophioninae) FROM VIETNAM

Pham Thi Nhi*, Khuat Dang Long, Cao Thi Kim Thu, Cao Thi Quynh Nga, Hoang Vu Tru, Pham Van Phu, Le My Hanh

Institute of Ecology and Biological Resources, VAST

Received 30 November 2020, accepted 15 March 2021

ABSTRACT

The genus *Leptophion* is recorded for the first time from Vietnam, including new records of three species, viz. *L. giganteus* Shimizu & Watanabe, *L. maculipennis* (Cameron) and *L. radiatus* (Uchida), for the country. The comparative morphological and pictorial characters of Vietnamese specimens were given. In addition, variations and in-country distribution of newly recorded species were also provided.

Keywords: Ichneumonoidea, new records, parasitoids, taxonomy, wasps.

Citation: Pham Thi Nhi, Khuat Dang Long, Cao Thi Kim Thu, Cao Thi Quynh Nga, Hoang Vu Tru, Pham Van Phu, Le My Hanh, 2021. First record of the genus *Leptophion* Cameron (Hymenoptera: Ichneumonidae: Ophioninae) from Vietnam. *Academia Journal of Biology*, 43(1): 29–37. <https://doi.org/10.15625/2615-9023/15716>

*Corresponding author email: ptnhi2@yahoo.com

©2021 Vietnam Academy of Science and Technology (VAST)

INTRODUCTION

Ophioninae Shuckard, 1840 is one of the largest ichneumonid subfamilies with more than 1,100 recognized species in 33 genera all over the world (Gauld & Mitchell, 1981; Yu et al., 2016; Shimizu et al., 2016; Shaw & Voogd, 2019). They are solitary koinobiont endoparasitoids of Lepidoptera larvae and have nocturnal behavior (Gauld & Mitchell, 1981; Broad & Shaw, 2016). Despite being one of the most species-rich group, the Ophioninae has been poorly studied in Vietnam. Up to the present, only 25 species of three genera, viz. *Dicamptus* Szépligeti, 1905, *Dictyonotus* Kriechbaumer, 1894 and *Enicospilus* Stephens, 1835, have been known from the country (Gauld & Mitchell, 1981; Shimizu & Konishi, 2016; Vas, 2017; Pham & Long, 2016; Pham et al., 2020).

The genus *Leptophion* Cameron, 1901 comprises 33 currently recognized species, of which the most species richness was found in the Australasian region (21 species), followed by the Oriental region (14 species) (Shimizu et al., 2016; Yu et al., 2016). Whereas there are only few species occur in the Oceanic region (three species) and the Palaearctic region (one species), none has been known from the Afrotropical, the Nearctic and the Neotropical regions. Within the Oriental region, representatives of *Leptophion* were reported from Brunei, China, India, Indonesia, Malaysia, Myanmar, Nepal, Sri

Lanka, Taiwan and Thailand, however, this genus has not been recorded in Vietnam so far (Gauld & Mitchell, 1981; Yu et al., 2016). Based on a new collection of ichneumonids from Vietnam, we herein record the genus *Leptophion* for the first time from the country, with three included species. It is one among our efforts to study the diversity of Ichneumonidae in general and of Ophioninae in particular from the country.

MATERIALS AND METHODS

Specimens examined in this study were collected from 2004–2020 mainly by light traps and a lesser degree by sweep nets. All the specimens are deposited in the collection of Department of Insect Systematics, Institute of Ecology and Biological Resources (IEBR), Ha Noi, Vietnam. Other collections refer to in this paper are the Natural History Museum, London, UK (NHMUK), Laboratory of Systematics Entomology of Hokkaido University, Sapporo, Japan (SEHU) and Taiwan Agricultural Research Institute Council of Agriculture, Taichung, Taiwan (TARI).

Terms and indices:

Morphological terminology follows Broad et al. (2018) and those for wings follow Shimizu (2020). Indices follow those of Gauld & Mitchell (1981) and Shimizu et al. (2016) as below:

AI	Alar Index for fore wing = length of 1m-cu&M between 2m-cu and bulla / length of 2rs-m
CI	Cubital Index for fore wing = length of CU between 1m-cu&M and 2cu-a / length of 2cu-a
DMI	Dorsal Metasomal Index = length of dorsum of T2 / length of dorsum of T3
FI	Frontal Index for head = maximum diameter of median ocellus / distance between eyes
ICI	Intercubital Index for fore wing = length of 2rs-m / length of M between 2m-cu and 2rs-m
NI	Nervellar Index for hind wing = length of CU between M and cu-a / length of cu-a
PI	Petiolar Index for T1 = distance between base of T1 and anterior margin of spiracle / distance between posterior margin of spiracle and apex of T1
SDI	Second Discoidal Index for fore wing = length of CU between 2cu-a and 2 m-cu / length of CU between M&RS and 1m-cu&M

Digital images of specimens were taken with a Leica IC80HD camera attached to Leica M80 stereomicroscope, except their wings were taken with a ILCE-500L/WAP2 digital camera attached to Leica M80 stereomicroscope.

RESULTS

Taxonomy

Genus *Leptophion* Cameron, 1901

Leptophion Cameron, 1901: 227. Type species: *Leptophion longiventris* Cameron, by monotypy.

Diagnosis. Mandibles not twisted, barely narrowed, often with a sub-basal swelling and an oblique groove on outer surface; mandibular teeth subequal or upper tooth slightly longer than lower one; clypeus more or less swollen; occipital carina complete dorsally and laterally, its lower end absent, not joining to oral carina; notauli faintly present as vestiges or completely absent; epicnemial carina present and its upper end reaching above level of lower margin of pronotum; posterior transverse carina on

mesosternum usually complete (rarely interrupted in a few Australasian species); propodeum with anterior transverse carina complete (rarely absent laterally in some species), posterior transverse carina absent, sometimes with vestiges laterally; fore wing with a glabrous area on anterior corner of discosubmarginal cell and almost always without distinct sclerite; 1m-cu&M vein on fore wing sinuous or curved, usually without ramellus; fore tibial spur without membranous flange; mid and hind trochantelli simple; hind tarsal claws with distal pectina usually projecting beyond apical tooth (Gauld & Mitchell, 1981; Shimizu et al., 2016; personal observations).

Leptophion species are most similar to members of *Dicamptus* because they share the characteristic of mandible shape, but they are lacking the sclerites in discosubmarginal cell of the fore wing (almost always absent) while one or more clearly defined sclerites always present in the latter genus. Key to Indo-Papuan genera of Ophioninae can be found in Gauld & Mitchell (1981).

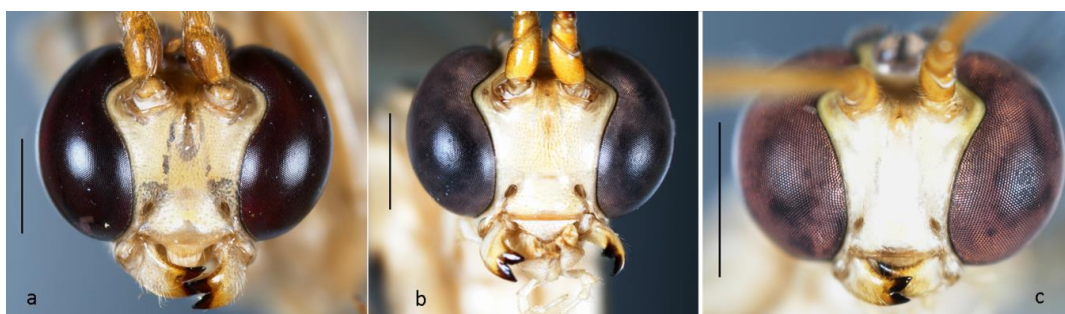


Figure 1. Head, frontal view of **a** *L. giganteus*, **b** *L. maculipennis* and **c** *L. radiatus* (scale bar 1 mm)

New country records

Leptophion giganteus Shimizu & Watanabe, 2016 (Figs 1a, 2a, 3a, 4a)

Leptophion giganteus Shimizu & Watanabe. In Shimizu, Watanabe & Maeto, 2016: 79. Holotype: ♀, Taiwan (TARI).

Diagnostic characters. Fore wing without sclerite, vein 2r&Rs joining pterostigma

proximally, Second Discoidal Index (SDI) from 1.2–1.4, postero-proximal part of second subdiscal cell distinctly infumate, postero-distal corner of subbasal cell from 85–105°, postero-discal corner of second discal cell from 95–108°; hind wing with all hamuli on R1 uniform in size and shape, proximal corner of marginal cell about 45°; scutellum with lateral carina present on anterior 0.2–0.3; mesopleuron punctate.

Specimens examined. Dong Nai Province, Cat Tien National Park: 1♀ (IEBR), 8.viii.2005, Truong Xuan Lam coll.; Cao Bang Province, Phia Oac-Phia Den National Park, 1♂ (IEBR), 15.v.2010, 1600 m, light trap, Hoang Vu Tru coll.; Lao Cai Province, Sapa, Ban Khoang: 1♀ (IEBR), 4.vii.2013, light trap, Hoang Vu Tru coll.; Lao Cai Province, Hoang Lien National Park: 1♀ (IEBR), 14.v.2015, light trap, Hoang Vu Tru

coll.; 1♀ (IEBR), 24.x.2020, light trap, Pham Van Phu coll.; Kon Tum Province, Kon Plong, Mang Canh: 1♀ (IEBR), 5.vi.2019, light trap, Nguyen Van Tuan coll.; Kon Tum Province, Dak Glei: 1♂ (IEBR), 8.iii.2019, 1600–1700 m, Pham Van Phu coll.

Distribution. Previously known from Taiwan (Shimizu et al., 2016). These are the first records of this species from Vietnam.

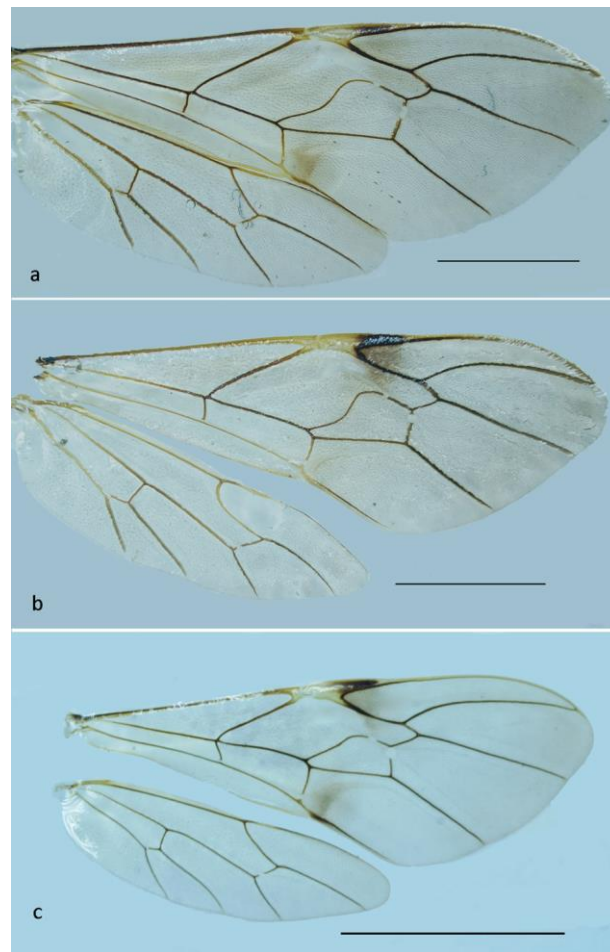


Figure 2. Wings of **a** *L. giganteus*, **b** *L. maculipennis* and **c** *L. radiatus* (scale bar 5 mm)

***Leptophion maculipennis* (Cameron, 1905)**
(Figs 1b, 2b, 3b, 4b)

Spilophion maculipennis Cameron, 1905: 125. Lectotype: ♀, Sri Lanka (NHMUK).

Leptophion maculipennis: Townes, Townes & Gupta, 1961: 265.

Diagnostic characters. Fore wing without sclerite, vein 2r&Rs joining pterostigma proximally, Second Discoidal Index (SDI) about 0.9, proximal corner of marginal cell distinctly infumate, postero-distal corner of subbasal cell from 78–88°, postero-discal corner of second discal cell from 88–99°;

hind wing with penultimate hamulus on R1 longer and more curved than its fellows, proximal corner of marginal cell from 90–95°; mandible with an oblique groove; scutellum with lateral carina extending to posterior 0.1–0.2; mesopleuron punctate and striate, with black marking.

Specimens examined. Thai Nguyen Province, Dinh Hoa, Phu Dinh: 1♀ (IEBR), 2.iv.2004, 100 m, Hoang Vu Tru coll.; Lao Cai Province, Sapa: 1♀ (IEBR), 8.x.2004, light trap, Nguyen Thi Thu Huong coll.; Vinh Phuc Province, Tam Dao National Park: 1♀ (IEBR), v.2013, light trap, Hoang Vu Tru coll.; Bac Can Province, Ba Be National Park: 1♀ (IEBR), 12.v.2014, Hoang Vu Tru coll.; Cao Bang Province, Phia Oac-Phia Den National Park: 2♀ (IEBR), 7.v.2013, light

trap, Hoang Vu Tru coll.; 2♀ (IEBR), 23.v.2020, Hoang Vu Tru & Pham Van Phu coll.; Tuyen Quang Province, Na Hang, Trung Phin: 2♀ (IEBR), 18.ix.2017, light trap, Pham Thi Nhi, Hoang Vu Tru & Pham Van Phu coll.; Son La Province, Copia National Park: 1♀ (IEBR), 4.ix.2016, light trap, Pham Van Phu coll.; Kon Tum Province, Dak Glei: 1♀ (IEBR), 10.iii.2019, sweep net, Pham Van Phu coll.

Distribution. Previously known widely from the Australasian region (Australia and Papua New Guinea) and the Oriental region (China, India, Indonesia, Malaysia, Nepal, Sri Lanka, Thailand and Taiwan) (Gauld & Mitchell, 1981; Shimizu et al., 2016). These are the first records of this species from Vietnam.

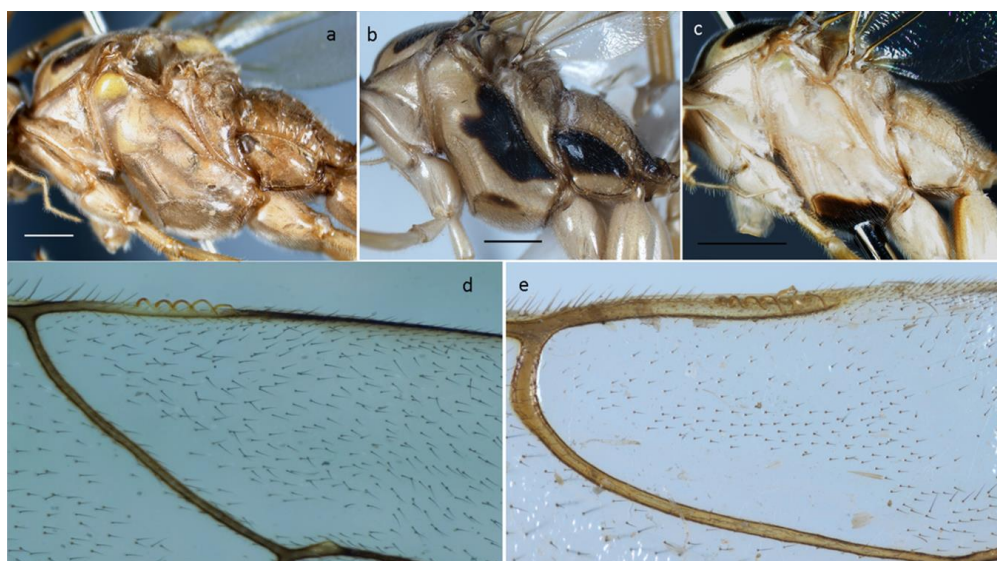


Figure 3. Mesopleuron of **a** *L. giganteus*, **b** *L. maculipennis*, **c** *L. radiatus*, and Proximal corner of marginal cell and hamuli on hind wing of **d** *L. giganteus*, and **e** *L. maculipennis* (scale bar 1 mm)

***Leptophion radiatus* (Uchida, 1956) (Figs 1c, 2c, 3c, 4c)**

Spilophion radiatus Uchida, 1956: 18. Holotype: ♀, Taiwan (SEHU).

Leptophion radiatus: Townes, Townes & Gupta, 1961: 306.

Diagnostic characters. Fore wing without sclerite, vein 2r&Rs joining

pterostigma proximally, Second Discoidal Index (SDI) about 0.9, postero-proximal part of second subdiscal cell distinctly infumate, postero-distal corner of subbasal cell about 62°, postero-discal corner of second discal cell about 80°; hind wing with all hamuli on R1 uniform in size and shape, proximal corner of marginal cell about 45°; scutellum with lateral carina present on

anterior 0.2–0.3; mesopleuron punctate; mesosternum black.

Specimen examined. Kon Tum Province, Kon Plong, Mang Canh: 1♂ (IEBR), 5.vi.2019, light trap, Nguyen Van Tuan coll.

Distribution. Previously known from India, Laos, Malaysia, Nepal and Taiwan (Gauld & Mitchell, 1981; Shimizu et al., 2016). It is the first record of this species from Vietnam.

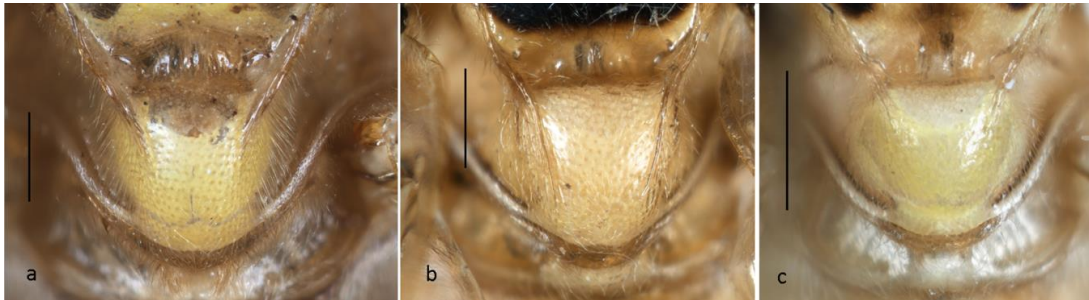


Figure 4. Dorsal view of scutellum of **a** *L. giganteus*, **b** *L. maculipennis*, and **c** *L. radiatus* (scale bar 0.5 mm)



Figure 5. Distribution map of *Leptophion* species in Vietnam: 1. *L. giganteus*; 2. *L. maculipennis*; 3. *L. radiatus*

Table 1. Morphological comparison of *Leptophion* species recorded from Vietnam and other localities

Characters	<i>L. giganteus</i>		<i>L. maculipennis</i>			<i>L. radiatus</i>		
	Vietnam	Taiwan (Shimizu et al., 2016)	Vietnam	Taiwan (Shimizu et al., 2016)	Others (Gauld & Mitchell, 1981)	Vietnam	Taiwan (Shimizu et al., 2016)	Others (Gauld & Mitchell, 1981)
20 th flagellomere (long:wide)	2.0–2.5		1.9–2.3		1.9–2.1	2.2		2.4–2.7
Length of fore wing (mm)	♀: 17–21 ♂: 12–15	♀: 17–21	♀: 17–20	♀: 15–17	15–17	♀: 11.7	♀: 14.5–15	13–15
Postero-discal corner of second discal cell on fore wing (degree)	95–108	105–110	88–99	95		80	85	
Proximal corner of marginal cell on hind wing (degree)	45	45	90–95	95	90–95	50	45	45
AI	1.0–1.4	1.1–1.4	1.1–1.3	1.0–1.4	1.3–1.65	0.9	0.8–0.9	0.85–1.0
CI	0.3–0.4	0.2–0.3	0.3–0.4	0.2–0.4	0.2–0.25	0.2	0.2–0.3	0.15–0.25
DMI	1.1–1.3	1.2–1.3	1.1–1.3	1.1–1.3		1.2	1.1–1.2	
FI	0.6–0.7	0.6–0.7	0.5–0.6	0.5–0.7		0.6	0.7	
ICI	0.9–1.2	0.9–1.0	0.7–1.0	0.7–0.9	0.65–0.75	0.6	0.5–0.7	0.59–0.65
NI	1.3–1.7	1.5–1.7	1.0–1.4	1.1–1.2	1.0–1.2	1.3	1.1–1.5	1.4–1.6
PI	2.3–2.6	2.3–2.6	2.5–2.7	2.1–2.5		2.4	2.3–2.6	
SDI	1.2–1.4	1.1–1.2	0.9	0.7–0.9	0.85–0.95	0.9	0.9–1.0	0.85–0.95

DISCUSSION

Although type specimens of *Leptophion giganteus*, *L. maculipennis* and *L. radiatus* have not been examined by us, the Vietnamese specimens agreed well with descriptions and illustrations of these species by Gauld & Mitchell (1981) and Shimizu et al. (2016). Our new findings showed that the species composition of *Leptophion* in Vietnam is more or less similar to that of Taiwan. Additionally, *L. maculipennis* is a widespread species from the Australasian region to the Oriental region, *L. radiatus* is known from India, Malaysia, Nepal and Taiwan, whereas *L. giganteus* is also recorded from Taiwan and Vietnam. Since the latter species was described recently (Shimizu et al., 2016), further studies is required to elucidate the actual distribution of this species. Compared with *Leptophion* specimens from other localities, populations from Vietnam revealed some morphological variations (Table 1). The most noticeable variation is the fore wing length of female specimens. The fore wing length of female specimens of *L. giganteus* from Vietnam is equal to that of Taiwanese specimens, however, *L. maculipennis* from Taiwan with the longer fore wing, i.e. 17–20 mm vs. 15–17 mm in specimens of *L. maculipennis* collected from Vietnam and to the contrary, *L. radiatus* found Taiwan with the shorter fore wing, i.e. 11.7 mm vs. 14.5–15 mm in specimens of the same species collected from different localities in Vietnam. The Second Discoidal Index for fore wing (SDI) of the Vietnamese *L. giganteus* varies from 1.2–1.4, somewhat greater than that in Taiwanese specimens (1.1–1.2). The Petiolar Index for T1 (PI) of the Vietnamese *L. maculipennis* (2.5–2.7) is longer than that of Taiwanese specimens. The Nervellar Index for hind wing (NI) of the Vietnam *L. radiatus* (1.3) and the ratio between the length and width of 20th flagellomere (2.2) are both smaller than those of other localities (see Gauld & Mitchell, 1981) (1.4–1.6 and 2.4–2.7, respectively). The Alar Index for fore wing (AI) of *L. maculipennis* between Vietnamese and

Taiwanese specimens (1.0–1.4) is slightly smaller than data recorded from other localities (1.3–1.65) by Gauld & Mitchell (1981).

Acknowledgements: This research was funded by the Vietnam National Foundation for Science and Technology Development (NAFOSTED) under grant number 106.05-2019.304. We thank our colleagues and friends for providing voucher specimens and assistance in the field.

REFERENCES

- Broad G. R., Shaw M. R., 2016. The British species of *Enicospilus* (Hymenoptera: Ichneumonidae: Ophioninae). *European Journal of Taxonomy*, 187: 1–31.
- Broad G. R., Shaw M. R., Fitton M. G., 2018. Handbook for the Identification of British Insects, Vol. 7, Part 12: Ichneumonid Wasps (Hymenoptera: Ichneumonidae): their Classification and Biology. Royal Entomological Society, 424 pp.
- Cameron P., 1901. On Hymenoptera collected in New Britain by Dr. Arthur Willey. *Proceedings of the Zoological Society of London*: 224–248.
- Cameron P., 1905. On the phytophagous and parasitic Hymenoptera collected by Mr. E. Green in Ceylon. *Spolia Zeylanica*, 3: 67–143.
- Gauld I. D., Mitchell P. A., 1981. The taxonomy, distribution and host preferences of Indo-Papuan parasitic wasps of the subfamily Ophioninae. Slough: Commonwealth Institute of Entomology: 611 pp.
- Pham Thi Nhi, Khuat Dang Long, 2016. A checklist of the family Ichneumonidae (Hymenoptera: Ichneumonidae) from Vietnam. *Tap chi Sinh hoc*, 38(4): 411–441.
- Pham N. T., Matsumoto R., Shimizu S., 2020. *Dicamptus Szépligeti* (Hymenoptera: Ichneumonidae: Ophioninae) from Vietnam. *Zootaxa*, 4830(2): 371–382.
- Shaw M. R., Voogd J., 2019. Notes on the biology, morphology and generic

- placement of “*Hellwigia*” *obscura* Gravenhorst (Hymenoptera: Ichneumonidae, Ophioninae). *Journal of Hymenoptera Research*, 69: 39–53.
- Shimizu S., 2020. The Nepalese species of the genus *Enicospilus* Stephens, 1835 (Hymenoptera, Ichneumonidae, Ophioninae): a preliminary revision and identification key to species. *Deutsche Entomologische Zeitschrift*, 67: 69–126.
- Shimizu S., Konishi K., 2016. New Record of the genus *Dictyonotus* Kriechbaumer, 1894 (Hymenoptera: Ichneumonidae: Ophioninae) from Vietnam. *Japanese Journal of Systematic Entomology*, 22(2): 159–160.
- Shimizu S., Watanabe K., Maeto K., 2016. Revision of the Taiwanese species of the genus *Leptophion* Cameron, 1901 (Hymenoptera: Ichneumonidae: Ophioninae), with a discussion of their phenology and distribution. *Zootaxa*, 4144: 71–88.
- Shuckard W. E., 1840. Ichneumonides. In Swainson W., Shuckard W. E. *The Cabinet Cyclopaedia: on the History and Natural Arrangement of Insects*. London: 185–187.
- Townes H., Townes M., Gupta V. K., 1961. A catalogue and reclassification of the Indo-Australian Ichneumonidae. *Memoirs of American Entomological Institute*, 1: 1–522.
- Vas Z., 2017. Data to the Vietnamese ichneumon wasp fauna with description of a new *Teleutaea* species (Hymenoptera: Ichneumonidae). *Folia Entomologica Hungarica*, 78: 101–110.
- Uchida T., 1956. Ueber die Gattung *Spilopteron* Cameron. *Insecta Matsumurana*, 20: 17–18.
- Yu D. S., van Achterberg C., Horstmann K., 2016. Taxapad 2016, Ichneumonoidea 2015. Database on flash-drive. In, Ottawa, Ontario, Canada.