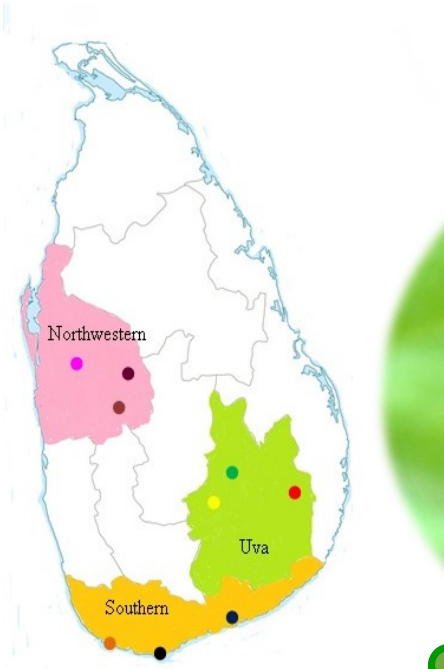
RESEARCH ARTICLE

First record of the firefly genus *Curtos* (Motschulsky) and the species *C. costipennis* (Gorham) (Coleoptera: Lampyridae: Luciolinae) from Sri Lanka

W.M.C.D. Wijekoon and H.C.E. Wegiriya



- **Firefly genus *Curtos* and the species *C. costipennis* recorded for the first time from Sri Lanka.**

They are common in terrestrial habitats in Uva, Southern and Northwestern Provinces of Sri Lanka

Highlights

- 17 species of fireflies from genus, *Curtos* are known from Southeast Asian countries.
- However, this is the first record of firefly Genus, *Curtos* and *C. costipennis* from Sri Lanka.
- *Curtos costipennis* is re-described from males and females.
- *Curtos costipennis* was recorded in Uva, Southern and Northwestern Provinces.

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RESEARCH ARTICLE

First record of the firefly genus *Curtos* (Motschulsky) and the species *C. costipennis* (Gorham) (Coleoptera: Lampyridae: Luciolinae) from Sri Lanka

W.M.C.D. Wijekoon* **and H.C.E. Wegiriya**

Department of Zoology, Faculty of Science, University of Ruhuna, Sri Lanka

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Abstract: Seventeen species (17) of firefly genus *Curtos* Motschulsky have been recorded from South East Asia whereas there were no previous records from Sri Lanka. A first record of the genus *Curtos* Motschulsky in Sri Lanka and a re-description of males and females of *C. costipennis* Gorham are presented including light patterns and areas of incidence in Sri Lanka with indications of habitat types.

Keywords: *Curtos*, *C. costipennis*, Firefly, Sri Lanka.

INTRODUCTION

In the 18th century, large numbers of insects were described and recorded from Sri Lanka by European naturalists (Wijesekara and Wijesinghe, 2003), including specimens of the Family Lampyridae, the fireflies. Since many of these early collectors are of European origin, the major part of their specimen collection was taken to Europe where they were lodged in European museums (Ballantyne, 2012). A small fraction of the collection is deposited in the National Museum, Colombo, Sri Lanka (Wijekoon *et al*. 2016). Most of fireflies that were described by Europeans, like Ernest Olivier, Maurice Pic and Victor Motschulsky and the type specimens were also deposited in the European collections (Ballantyne, 2012). The reference firefly collection in the National Museum, Colombo contains a list of 27 lampyrid species. However, most of the lodged specimens are not in the repository, and the available firefly specimens are not in good condition for proper taxonomic investigation (Wijekoon *et al*. 2016). Hence, the only way of identifying the collected firefly specimens are through the literature, or as a last resort, visiting the European museums and examining the type specimens, though the latter was not plausible due to financial constraints. Here, we report the firefly genus *Curtos* Motschulsky and the species *C. costipennis* Gorham from Sri Lanka for the first time. Males and females were re-described with notes on their ecological remarks.

MATERIALS AND METHODS

Collection of specimens

Surveys were carried out from January 2010 to January 2012, covering all nine provinces of Sri Lanka, *viz.,* Uva, Sabaragamuwa, Southern, Western, Central, Eastern, Northern, North Western, and North central.

Data collection was carried out from 17.30 to 22.00 of each sampling day, covering an area of 100 m^2 in each selected habitat. Adult fireflies were collected using standard size (30.5 cm/ 12 inch) insect hand net. Two sampling occasions were carried out within each six-month period and a total of eight samplings were done during the study. Total number of individuals of both male and female in each sampling occasions from each habitat was recorded.

Identification of specimens

All adults (both flying male and female) collected from selected areas were temporarily kept in transparent polythene bags. Generally, the captured individuals were identified in the field using their general morphology. Collected males and females were counted and their samples were preserved in plastic vials in 70% ethanol and brought to the laboratory for further identification and confirmation. Sex of the species was determined using the number of light segments at the ventral abdomen (male has two light segments and female has one light segment). Adult females were identified and caught when flying with males.

At the laboratory, the samples were identified using taxonomic keys including Ballantyne and Lambkin (2009), Jeng (2008), Jeng *et al.* (1998), Fu *et al.* (2012) and Ballantyne *et al*. (2019).

The permission for this study was granted from the Department of Wildlife, Sri Lanka to collect and preserve limited number of samples and the Department of National Museums, Colombo, Sri Lanka provided access to repository firefly specimens in 2010.

Abbreviations for the taxonomic characters and Depositories

TBL: Total body length; TBW: Total body width; EL: Elytral length; EW: Elytral width; MLOL: Male light organ length; MLOW: Male light organ width; PL: Pronotum length; PW: Pronotum width; AL: Antenna length;

DOZUORSL: Department of Zoology, University of Ruhuna, Sri Lanka

**Corresponding Author's Email:* chandanadammika1984@gmail.com
https://orcid.org/0000-0003-3773-2128

NHML: Natural History Museum, London

Morpho-metric measurements and examination

Specimens were air dried for 5-10 minutes, 25 male and 15 female specimens were measured using a Light microscope (Nikon-ECLIPSE-E100) (10×4) (with a ruler- micrometer calibration). Nine measurements of each specimen such as TBL, TBW, PL, PW, EL, EW, MLOL, MLOW and AL were taken for males. All measurements were converted to millimeter units. The type of antenna and, body dorsal and ventral color patterns were also observed and compared. TBL and TBW were measured for each female firefly. Genitalia of five males were dissected and both male genitalia and aedeagal sheaths were examined using procedures outlined in Ballantyne and McLean (1970); Ballantyne and Lambkin (2009), and Ballantyne *et al*. (2019). A Dino-lite camera (AM7515MT4A - Digital Microscope, 2592 x 1944/5 MPixel, 415 ... 470x, USB 2.0) was used to take photographs of firefly specimens.

Confirmation of identification of specimens

Morphology, measurements and aedeagus pattern of recorded *C. costipennis* were compared with the published taxonomic information from South East Asia (Motschulsky, 1845: 36; 1853: 51. Lacordaire, 1857: 337. Olivier, 1907: 55; 1910a: 47. McDermott, 1964: 47; 1966: 118. Chûjô & Satô 1970: 59. Jeng *et al*. 1998: 331. Fu *et al.* 2012a: 17.)

Ecological studies

Abundance of *C. costipennis* among three habitats (terrestrial grassland, cultivated and freshwater associated) in each province was compared. In addition, the color of the light emitted by both males and females and the flashing difference among sexes were observed.

RESULTS

The first record of the firefly species *Curtos costipennis* of Genus *Curtos* in Sri Lanka is presented herein. The species, *C. costipennis* was re-described based on collected specimens of fully grown adults of males and females.

***Curtos* Motschulsky 1854**

Curtos Motschulsky 1845: 36; 1853: 51. Lacordaire 1857: 337. Olivier 1907: 55; 1910a: 47. McDermott 1964: 47; 1966: 118.

Chûjô & Sâtô 1970: 59. Jeng *et al*. 1998: 331. Chen 2003: Fu *et al.* 2012a: 17. Fu 2014: 86. Yiu 2012: 90; 2017: 90. Ballantyne *et al*, 2019: 76

Type species: *Curtos mongolicus* Motschulsky by original designation

Diagnosis: A distinct humeral carina present on each elytron; elytra with deep evenly sized and evenly spaced punctuation over surface; meta femoral comb in femora is absent, ventrite 7 is entire and not trilobed (Ballantyne andLambkin 2009); wide punctures on elytra and longitudinal humeral carina present; one of a group of Luciolinae in which the aedeagal lateral lobes are visible from beneath at the sides of the median lobe, Jeng *et al.* (1998) indicate the lateral lobe of the aedeagus are of unequal length but this feature is more widespread in the Luciolinae than first thought, and occurs in *Triangulara* Pimpasalee and many *Sclerotia* Ballantyne (Ballantyne *et al*. 2016.); differing from many other Luciolinae in that the pronotal margins are often subparallel- sided and the pronotal width is subequal to the humeral width; Females macropterous with the same elytral characteristics as the male (Ballantyne *et al*. 2019).

List of species of genus *Curtos* recorded worldwide (Ballantyne *et al.* 2019)

C. atripennis Pic, 1934; *C. acerra* Gorham, 1895 ; *C. bilineatus* Pic, 1927; *C. cerea* Gorham, 1882; *C. costata* Pic, 1929; *C. costipennis* Gorham, 1880; *C. elongatus* Jeng *et al*. 1998; *C. flaviceps* Pic, 1927; *C. flavus* Pic, 1927; *C. fulvocapitalis* Jeng *et al*.1998; *C. impolitus* Olivier, 1913; *C. mongolicus* Motsch. 1853; *C. motschulskyi* Olivier, 1905; *C. mundulus* Olivier, 1913c; *C. obscuricolor* Jeng *et al*. 1998; *C. okinawanus* Matsumura, 1918; *C. rouyeri* Pic, 1927; *C. ruficollis* Jeng *et al*.1998; *C. sauteri* Olivier, 1913; *C. variolosus* Bourgeois, 1907

Note: No species of the genus-*Curtos* has been previously recorded from Sri Lanka (Wijekoon *et al.*, 2016).

Re-description of *Curtos costipennis*

Curtos costipennis (Gorham, 1880)

Luciola costipennis Gorham, 1880: 102: Olivier 1902: 76 (checklist), 1907: 51(checklist), 1910a: 41(checklist), 1913: 272 (Taiwan): MIWA, 1931:102 (checklist): OKADA, 1931:147 (checklist): Wu, 1937:383 (checklist), McDermott 1966: 102 (checklist).

Curtos iwasakii MATSUMURA, 1918: 85: MATSUMURA, 1928: 64. (review): OKADA, 1931:138 (Japanese fauna): Chûjô & Sâtô 1970b: 62 (syn.).

Curtos costipennis Chûjô & Sâtô 1970a: 22, 1970b: 61: OHBA, 1983;29 (flash pattern): OHBA & GOTO 1993: 02 (ecology), Jeng *et al*. 1998: 331 (re-description). Fu *et al.* 2012a: 17 (Re-description genus and species).

Type locality: Foochow (Fuzhow), Fujian Prov, Southeastern China

Specimens examined: SRI LANKA. Collector is WIJEKOON,(2010- 2015), 12♂♂, 05♀♀, Southern Province, Galle (6°3′0″ N, 80°13′0″ E, 1 m) (07.III.2010, 16.X.2011, 13.II.2012, 08.VII.2013, 06.III.2014, 12.II.2014, 02.V.2015); 10♂♂, 05♀♀, Matara (5°57′0″ N, 80°33′0″ E, 02m) (07.V.2010, 26.VIII.2011, 09.III.2012, 24.VI.2013, 03.V.2014, 16.XI.2014, 12.IV.2015); 01♂, 01♀, Hambanthota (6° 7′ 28″ N, 81° 7′ 21″ E, 01m) (07.V.2010, 26.VIII.2011); 11♂♂, 07♀♀, Uva Province, Bandarawela (6°50′0″ N, 80°59′0″ E, 1220m) (24.VI.2010, 10.I.2011, 6.V.2012, 10.VI.2013, 18.II.2014, 02.VII.2015, 18.X.2015); 10♂♂, 01♀, Wellawaya (6°44’0” N, 81°6’0” E, 1220m) (10.II.2010, 15.V.2011, 16.IV.2012, 12.VII.2013, 18. VI.2015, 08.XI.2015); 01♂, 01♀, Welimada (6°54′ 04″ N, 80°55′ 22″ E, 1134m) (25.X.2015); 05♂♂, 02♀♀ North Western Province, Kuliyapitiya (7°28′14″ N, 80°2′44″ E, 33 m) (26.V.2010, 15.VII.2011, 11.V.2012, 14.III.2014, 13.III.2015); 02♂♂, 01♀, Kurunegala (7°26′4″ N,

Table 1: Measurements of male and female specimens of *Curtos costipennis* (in mm).

Species	Number measured	TBL	TBW	PL	PW	EL	EW	MLOL	MLOW	AL
C. costipennis (♂)	25	8-9	3-4	2-3	3-4	6-7	3-4	1-2	1-2	2-3
				TBL					TBW	
C. costipennis (♀)	15			10-11					4-5	

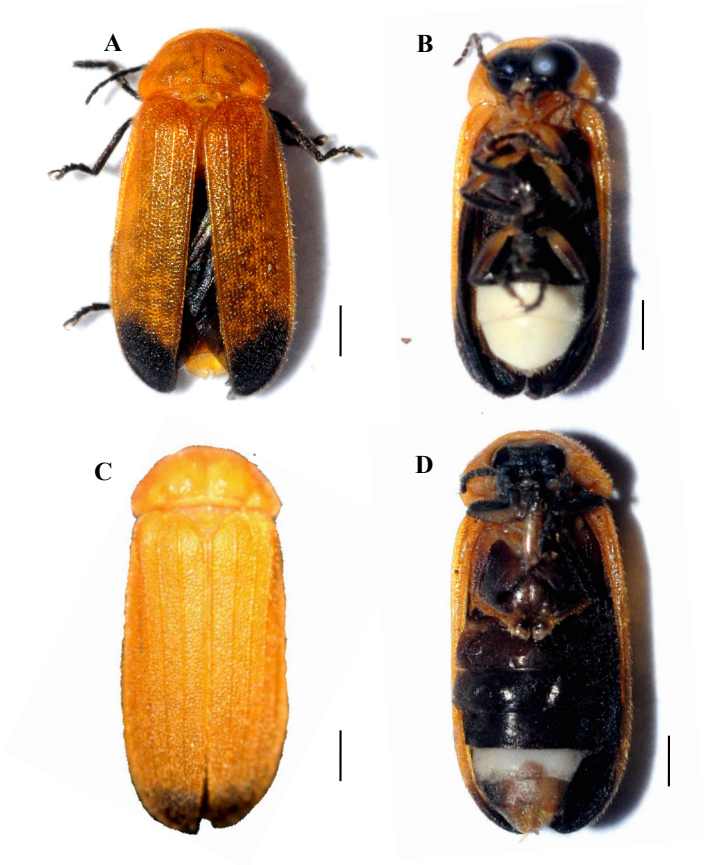

Figure 1: *Curtos costipennis*. A, B male; C, D female (A, C dorsal view; B, D ventral view) (Scale bar= 1mm).

80°13′17″ E, 54 m) (19.I.2010, 21.VI.2012, 07.XI.2013); 01♂, 01♀, Narammala, (7°26′4″ N, 80°13′17″ E, 54 m) (19.II.2010, 01.V.2012) DOZUORSL.

Ten males and 10 females were measured, of which 5 males dissected.

Diagnosis: Male; *C. costipennis* has dorsum orange to dark yellow color except the elytra apex black. Light organs in ventrites 6 & 7 are milky white. Abdominal ventrites anterior to the light organs are black.

Female; *C. costipennis* dorsal and ventral color identical to the male except the light organ occurs only in ventrite 7.

Description - Male (Figures 1A & B)

General morphology: Body dorsum is brownish orange, with elytral apices black (black patch- 1- 2 mm) TBL: 8-9 mm, TBW: 3-4 mm, each elytra has three fine Interstitial lines, EL: 6-7 mm, EW: 3-4.

Head: - Head depressed moderately, 11 antennal segments present, filiform antennae, AL: 2-3 mm.

Thorax: Thorax black color ventrally, mesocutellum brownish orange, femur dark brown, entire tibia, tarsus and claws of legs are black. PL: 2-3 mm, PW: 3-4 mm

Abdomen: Abdominal ventrites 2-5 black, ventrites 6-7 wholly occupied by milky white light organs. ventrite 7 bears nearly posterior pointed light organ and which covered by transparent, tergite 8. tergites are black, MLOL: 1-2 mm, MLOW: 1-2 mm.

Aedeagus (Figure 2A); trilobed structure, two lateral lobes visible at the sides of median lobe, the lateral lobes are of unequal length, median lobe is stout, apices of each lobe has a distinct hooked like structure (length 0.35 mm, width 0.2 mm).

Aedeagal sheath (Figure 2B); it enfolds the aedeagus, anterior part of sheath sternite is widest at tergite

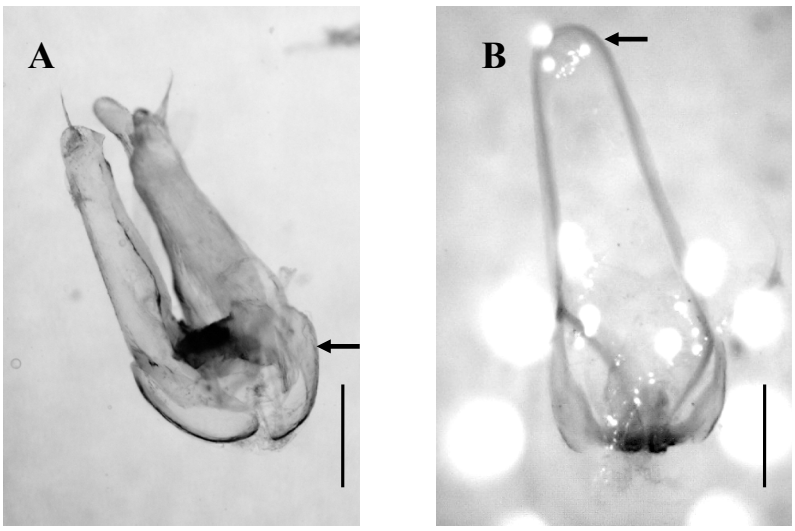

Figure 2: *Curtos costipennis*. A: aedeagus (dorsal view), B: aedeagal sheath (ventral view) (anterior end by the arrow head) (Scale bar = 0.1mm).

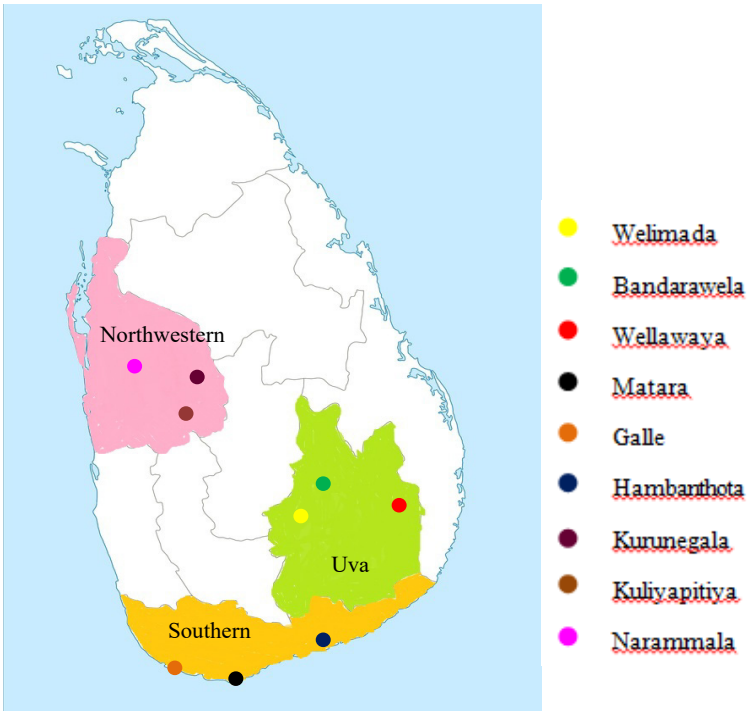

Figure 3: Recorded localities of *Curtos costipennis* from the three provinces, Northwestern, Uva and Southern, of Sri Lanka.

articulations; apically rounded, bulbous paraprocts absent, very short tergites joins to sternites at both sides and two short posterior projections can be seen (length 0.6 mm, width 0.3 mm).

Female (Figures 1C & D)

General morphology: TBL: 9-10 mm, TBW: 3-4 mm, well developed hind wings present, flying form, Body dorsal and ventral colour similar to the male, entire sternite 6 only has the light organ, end of the sternite 8 bear a ovipositor

Larvae: Not recorded during the present survey. Fu *et al*. (2012) recorded their larvae in China.

Ecological Remarks: This species is nocturnal and found mostly in open grassland habitats. They are always active in middle vegetation layers of the vegetation. Males emit green colour light when they fly, while females emit a weak green light.

Distribution:

Curtos costipennis was recorded only from three Provinces in Sri Lanka and their localities are indicated in Figure 3 and Table 2. During the preliminary study, three habitat types (grassland, paddy cultivation and fresh water associated land) were selected based on the field observations.

Of the number of fire-flies recorded from the three provinces, the highest prevalence was observed in the Southern Province (60.6%), while Uva and Northwestern Provinces recorded 31.7 and 7.7%, respectively.

Table 2: Description of localities of *Curtos costipennis* recorded in the Northwestern, Uva and Southern Provinces of Sri Lanka.

Province	Localities	Coordination of localities	Habitat type
Uva	Welimada	6° 54′ 04″ N,80° 55′ 22″ E	Freshwater associated
	Bandarawela	6° 50′ 0″ N, 80° 59′ 0″ E	Paddy cultivation
	Wellawaya	6° 44’ 0” N, 81° 6’ 0”E	Grassland
Southern	Matara	5° 57′ 0″ N, 80° 33′ 0″ E	Grassland
	Galle	6° 3′ 0″ N, 80° 13′ 0″ E	Freshwater associated
	Hambanthota	6° 7′ 28″ N, 81° 7′ 21″ E	Paddy cultivation
Northwestern	Kurunegala	7° 29′ 0″ N, 80° 22′ 0″ E	Grassland
	Kuliyapitiya	7° 28′ 14″ N, 80° 2′ 44″ E	Paddy cultivation
	Narammala	7° 26′ 4″ N, 80° 13′ 17″ E	Freshwater associated

DISCUSSION

The genus *Curtos* and the species *C. costipennis* were recorded for the first time in Sri Lanka and this paper provides a re-description of their male and female with information of their distribution. Fu *et al*. (2012) re-described the genus *Curtos* and *C. costipennis* with their male female and larva. Though we did not recorded their larval stages in the present study, Fu *et al*. (2012) described the larvae of *C. costipennis* is terrestrial habitats in China. They also assumed that the female *C. costipennis* has no flying ability. However, in the present study it was confirmed that the female *C. costipennis* is a flying form. In addition, we recorded that the flashing color of both male and female of *C. costipennis* is green.

Although *C. costipennis* or a species of genus *Curtos* was recorded for the first time in 2010 from Sri Lanka, they are commonly known to distribute in China, Taiwan, Indonesia and Japan (Ballantyne *et al*. 2019). In Sri Lanka, *C. costipennis* was recorded only from three provinces. Of them, *C. costipennis* was most common in the Southern Province, which belongs to the wet zone. The Northwestern Province is located in the dry zone and the lowest abundance of *C. costipennis* was noted therein. Uva Province, which is located in intermediate climatic zone, the abundance of *C. costipennis* was moderate. In field observations, *C. costipennis* was abundant in both paddy lands and grasslands of Uva and Southern Provinces. The records of genus *Curtos* and, *C. costipennis* for the first time in Sri Lanka during the present survey will be helpful to fill the void of the taxonomic dearth of the Sri Lankan fireflies to some extent.

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DECLARATION OF CONFLICT OF INTEREST

Authors would like to declare that there are no conflicts of interest.

REFERENCES

Ballantyne, L.A. and McLean, M.R. (1970). Revisional studies on the firefly genus *Pteroptyx* Olivier (Coleoptera, Lampyridae, Luciolinae, Luciolini). *Transaction of American Entomological Soc*iety **96**: 223-305.

Ballantyne, L.A and Lambkin, C. (2009). Systematics of Indo-Pacific fireflies with a redefinition of genus; Luciolinae (Coleoptera, Lampyridae) *Zootaxa*, 1997: 1-188. https://doi.org/10.11646/zootaxa.3653.1.1.

Ballantyne, L.A. (2012). Taxonomy- help or hindrance in South East Asia?, *Lampyrid*, **2**: 1-12.

Ballantyne L.A., Lambkin, C.L., Ho, J.-Z., Jusoh W.F.A., Nada, B., Nak-eiam, S., Thancharoen, Awattanachaiyingcharoen, W. and Yiu, V. (2019). The Luciolinae of S. E. Asia and the Australopacific region: a revisionary checklist (Coleoptera: Lampyridae) including description of three new genera and 13 new species, *Zootaxa* **4687**(1): 001-174. https://doi.org/10.11646/zootaxa.4687.1.1.

Chen, T.R. (2003). *The fireflies of Taiwan*. Field Image publisher, Taipei (in Chinese), 255.

Chujo, M. and Sato, M. (1970). On Japanese and Formosan species of the genus *Curtos* Motschulsky. *Memoirs of the Faculty of Education Kagawa University, Kagawa, Japan*, **192**(2): 59 - 65.

Fu, X.H., Ballantyne, L. and Lambkin, C. (2012a). *Emeia* gen. nov., a new genus of Luciolinae fireflies from China (Coleoptera:Lampyridae) with an unusual trilobite-like larva, and a redescription of the genus *Curtos* Motschulsky. *Zootaxa*, **3403**(1) 1-53. https://doi.org/10.11646/zootaxa.3403.1.1

Fu, X.H. (2014). *An illustrated handbook of Chinese fireflies*. The Commercial Press, Beijing, 167 [in Chinese]

Gorham, H.S. (1895). List of the Coleoptera in the collection

of H. E. Andrewes Esq. from India and Burma, with descriptions of new species and notes. *Annales de la Société Entomologique de Belgique*, **39**: 293-307.

Gorham, H.S. (1880). Materials for a revision of the Lampyridae. *Transactions of the Entomological Society of London*, **1880**: 83-112.

Gorham, H.S. (1882). New species of Lycidae, Lampyridae and Telephoridae from Sumatra. *Notes of the Leyden Museum*, **4**: 93-109.

Jeng, M.L. and Yang, P.S. (1998). The genus *Curtos* (Coleoptera, Lampyridae, Luciolinae) of Taiwan and Japan. *The Japanese Journal of Systematic Entomology* **4**(2), 331-347.

Jeng, M.L. (2008). Comprehensive phylogenetics, systematic and evolution of neoteny of Lampyridae (Insecta: Coleoptera). Ph.D. dissertation, University of Kansas, Lawrence, KS. Pp. 388.

Lacordaire, T. (1857). *Histoire naturelle des insectes*. *Genera des Coléoptères. Tome Quatrième*. Roret, Paris, Pp. 579. https://doi.org/10.5962/bhl.title.8864.

Matsumura, S. (1928). Fireflies. *Using interesting insects as teaching tool*, Tokyodo, Tokyo, 39-70.

Matsumura, S. (1918). *The Fireflies of Japan*. *Kyoiku-Gaho,* **6**(3): 82-89(In Japanese).

McDermott, F. A. (1964). The taxonomy of the Lampyridae (Coleoptera). *Transactions of the American Entomological Society* **90**: 1-72.

Miwa, Y. (1931). *A systematic catalogue of Formosan coleopteran*. Department of Agriculture, Government Institute Formosa, Taipei, **55**(8): 1-359.

Motschulsky, V. (1845). La collection de coleopteres russes. *Bull. Soc. Nat. Moscou*, 18: Pp. 36.

Motschulsky, V. (1853). Lampyrides. *Etud. Ent*., **1**: 25-58. https://doi.org/10.5962/bhl.title.124602.

Ohba, N. (1983). Studies on the communication system of Japanese fireflies. *Science Report Yokosuka City Museum*, **30**: 1-62.

Ohba, N and Goto, Y. (1993). Geographical variation on the morphology and behavior of *Curtos costipennis and C. okinawana* (Coleoptera: Lampyridae) in the Southwestern Islands. *Science Reports Yokosuka City Museum*, **41**: 1-14.

Okada, Y. (1931). Notes on the scientific names of the Japanese fireflies. *Zoological Magazine, Tokyo,* **43**: 130-149. [in Japanese].

Olivier, E. (1907). Coleoptera Fam. Lampyridae. pp. 1-74 *in* Wytsman, P. (ed.). *Genera Insectorum*. Bruxelles : P. Wytsman Fasc. 53 pp. 74.

Olivier, E. (1910). Lampyridae. pp. 1-68 *in* Schenkling, S. (ed.). *Coleopterorum Catalogus auspiciis et auxilio W. Junk*. Berlin : W. Junk Pars 9 Pp.68. https://doi.org/10.1111/j.1365-2311.1910.tb01183.x

Olivier, E. (1913b). The Lampyridae of Borneo. *Sarawak Museum Journal*, **3**: 55−60.

Olivier, E. (1913c). H. Sauter's Formosa-Ausbeute. Lampyridae (Col.). *Entomologische Mittellungen*, **2**(9), 269-272.

Olivier, E. (1905). Descriptions de Lampyrides nouveaux. *Annales de la Société Entomologique de Belgique*, 49: 206-209.

Olivier, E. (1902). Catalogue des espèces de 'Luciola' et genres voisins décrits jusqu'à ce jour. *Revue Scientifique du Bourbonnais et du centre de la France*, **15**: 69-88.

Pic, M. (1934) Notes diverses, descriptions et diagnoses. *L'Échange*, *Revue Linnéenne*, L, Pp.129.

Pic, M. (1929). Coléoptères exotiques en partie nouveaux. *L'Échange, Revue Linnéenne*, 45: 4-73.

Pic, M. (1927). Malacodermes exotiques. *L'Échange*, *Revue Linnéenne*, **43**: 37-52.

Wijesekara, A. & Wijesinghe, D. P. (2003). History of insect collection and review of insect diversity in Sri Lanka. Ceylon Journal of Science **31**: 43-59.

Wijekoon, W.M.C.D., Wegiriya H.C.E. & Bogahawatte C.N.L. (2016). Systematic revision of the repository collection of Canthoroidea in the Department of National Museums, Colombo, Sri Lanka (Coleoptera: Cantharidae, Lampyridae, Lycidae, Rhagophthalmidae). *Ceylon Journal of Science*, **45**(1), 67-74. https://doi.org/10.4038/cjs.v45i1.7365 .

Wu, C. F. (1937). *Catalogus Insectorum Sinensium*, The Fan Memorial Institute of biology, Peiping (Beijing) **3:** Pp. 1312.

Yiu, V. (2012). Fireflies of Hong Kong. Popular Entomology Book Series No. 7. Hong Kong Entomological Society, Hong Kong, 96.