

Abstract

Fireflies (Coleoptera; Lampyridae) are one of the fascinating insect groups in Sri Lanka. However, there is a large gap of knowledge in systematics of Sri Lankan fireflies due to lack of studies on this largely nocturnal group. The present study was carried out to investigate the systematics and selected ecological aspects of nocturnal and diurnal fireflies in Sri Lanka. Initially a revision of systematics of repository firefly specimens at the Department of National Museums, Colombo was conducted. Then a field survey was carried out to study the systematics and some ecological aspects of firefly species which were collected from selected habitats in nine Provinces of Sri Lanka.

Totally, 1214 dry-mounted repository firefly specimens at the Department of National Museums, Colombo were examined at low power of Stereo-microscope. The genus or species of these repository fireflies was confirmed using their external morphological features. The previous classification of repository specimens was revised using the currently valid taxonomic information of fireflies. Field studies on nocturnal species were conducted from 6.00 p.m. to 10.00 p.m. in selected Terrestrial grasslands, Fresh water associated lands and Paddy fields in each Province of Sri Lanka from January 2010 to January 2012. Diurnal species of fireflies in selected terrestrial grasslands in each Province of Sri Lanka were surveyed from January to December 2011. In field surveys adult fireflies were collected from selected 100m² area in each habitat using a standard (30.5 cm/ 12 inch) insect hand net. Immature stages such as eggs, larvae and apterous females were also collected using forceps within the selected area. Collected individuals were identified and compared with records in South-east Asia and described using their external morphological characters, morpho-metric measurements and internal sex organ patterns. Species richness, relative abundance and Shannon-Wiener diversity Index were estimated.

According to the classification used in early 1900, repository specimens identified as fireflies at the Department of National Museums, Colombo have been classified into 63 species in 27 genera of 4 families. In this study by comparing their morphological characters with currently revised systematics it was revealed that there are 61 species of nocturnal and diurnal species belonged to 29 genera in 4 families. Among them, 27 species belonged to family Lampyridae including two diurnal species.

Using the recent revisions on systematics of Lampyrid fireflies, some firefly species previously belonged to Subfamily Luciolinae were reallocated into two new genera namely *Abscondita* and *Asymmetricata*. Further, four species of *Luciola* were revised and amended as two species in genus *Abscondita*. In addition, *Luciola intricata* was assigned to the subdivision of *Luciola praeusta* complex and *L. cingulata* was assigned to the subdivision of *Luciola substriata* complex. *Harmatelia* spp. was assigned to new Subfamily Ototretadrilinae-Ototretinae complex. *Lamprophorus* spp. was revised to the genus *Lamprigera*. Finally the systematics of 15 species was revised to new genus / species and the systematics of other 48 species were unchanged and remained as earlier.

In field survey, 9 species of Subfamily Luciolinae, 3 species of Subfamily Lampyrinae, 2 species of Subfamily Ototretadrilinae- Ototretinae, were recorded from the studied habitats in nine Provinces of Sri Lanka. Present study indicates that Luciolinae fireflies are the common Lampyrids in Sri Lanka. During the study on diurnal fireflies 1 species of genus *Cautires* and 7 species of genus *Cantheris* were recorded and they are also considered as morpho-species of diurnal fireflies.

The recorded nine species of Luciolinae were belonged to 4 genera namely *Abscondita* (3spp.), *Luciola* (4 spp.), *Asymmetricata* (1sp) and *Curtos* (1sp). Among the recorded Lampyrinae, 2 species were belonged to the genus *Diaphanes* and 1 species was belonged to the genus *Lamprigera*. In the present study *Curtos* fireflies are recorded for the first time in Sri Lanka. Both *Abscondita perplexa* and *Asymmetricata humeralis* were found from the habitats in all Provinces of Sri Lanka. *Luciola cingulata* was the common firefly species in fresh water associated lands in this study. The other 8 species of Luciolinae and 3 species of Lampyrinae were common at selected grassland habitats in Sri Lanka.

According to the findings of present study, Uva Province had the highest species richness and the Shannon-Wiener diversity index for Luciolinae and grassland habitats had the highest diversity index for Luciolinae. Lack of information on diurnal species recorded in this study emphasizes the need of further investigations on their systematics, abundance and diversity.

Key words: Fireflies, Sri Lanka, Systematics