

Aquatic Coleoptera and Hemiptera taken at light in some Asian countries with a note on *Sphaerodema* (Hemiptera - Belostomatidae)

C. H. FERNANDO,
Zoology Department, University of Singapore

Introduction

Aquatic insects are relatively common at artificial lights and are often taken in light traps operated for catching other insects. They are however seldom recorded. These records are however of importance in understanding their distribution and abundance. Aquatic Coleoptera and Hemiptera are of importance in fisheries because some of them are predators on small fish whilst others serve as food for fishes of all sizes. Some like the Corixidae are of special interest because they can utilize the bottom ooze which is abundant especially in small habitats. Fernando (1961a) gave a comprehensive bibliography of records at light. In the present paper a number of records are given from various parts of Asia, where in the past records were very few. They are based on collections made by the author and also on material in the Zoological Survey of India, Calcutta. Amongst specimens sent for study by the Bernice P. Bishop Museum, Honolulu, were a few specimens which had been recorded at light.

Whilst many of the species have been taken at light before (Fernando 1961a, 1961b, in press A) the occurrence of *Sphaerodema* spp. is interesting. Fernando (1960, in press B) has stated that they do not fly to any extent. It appears from the present records that flight is more widespread in this genus than hitherto believed.

Species recorded

The following species were recorded at light in Ceylon. At Nugegoda a lampshade was examined in January, 1962, and contained many species namely *Microvelia longicornis* Bueno, *Micronecta quadristrigata* Breddin, *M. flavens* Wrobt, **M. punctinotum* Chen, *M. siva* (Kirk.), *M. fascioclavus* Chen, *Anisops nivea* (Fabr.), *Enochrus esuriens* (Walk.), *Paracymus evanescens* Sharp, *Berosus pulchellus* MacL., *Canthydrus lactabiles* Walk., *Hydrocoptus subvittatus* Motsch., *Guignotus inconstans* (Reg.), *Laccophilus chinensis inefficiens* Walk., *L. ceylonicus* Walk., *Hydrovatus confertus* Sharp, *Scirtes* sp., and *Cyphon* sp. All these species are common in the paddy fields in the vicinity. During a stay at Polonnarawa from 28.2.62-6.3.62 aquatic species were collected every night. The most common were *Micronecta* spp. The following species were identified: *Hydrometra greeni* Kirk., *Microvelia longicornis*, *Limnogonus nitidus* (Mayr), *Micronecta quadristrigata*, *M. parshadana*, Hutch., **M. albifrons* Motsch,

* The nomenclature of these two species is under review.

M. siva, *M. scutellaris* (Stal), *Anisops batillifons* Lundb., †*Sphaerodema rusticum* (F.). *Enochrus esuriens*, *Berosus indicus* Motsch., *B. pulchellus*, *Helochares densus* Sharp, *H. anchoralis* Sharp, *Amphiops gibbus* Ill., *Guignotus inconstans*, *Laccophilus chinensis inefficens*, *L. ceylonicus*, *Hydrovatus confertus*, *Hydrovatus* sp. At Ambalantota on 24.3.62 *Limnogonus parvulus* (Stal), *Micronecta quadristrigata*, *M. thyesta* Dist, *Regimbartia attenuata* Fabr. and *Berosus indicus* were collected at a lamp, and at Wirawila on 26.3.62. *Micronecta quadristrigata* and *M. thyesta* were taken under similar circumstances. At Ratnapura a lampshade examined had the following species namely *Microvelia longicornis*, *Micronecta punctata* Fieb., *Canthydrus luctuosus* Aube, *Hydrocoptus subvittatus*, *Laccophilus chinensis inefficens* and *Cercyon* sp.

In the Zoological Survey of India collection of aquatic Hemiptera and Coleoptera a number of species had been taken at light all of them from Calcutta. They were *Mesovelia orientalis* Kirk., *Corixa affinis* Dist., *Plea liturata* Fieb., *P. frontalis* Fieb., *Micronecta quadristrigata*, *M. scutellaris*, *Lethocerus indicus* Lep. and Serv., *Haliphus maculipennis* Schaum., *Helochares crenatus* Rég. and *Guignotus antennatus* Rég.

Amongst material sent for study from the Bernice P. Bishop Museum, Honolulu, a few specimens had been captured at light. They were *Sphaerodema rusticum* from Dak Song Djiring and M'Drak near Ban Methust, Vietnam and Bau District, Sarawak and *Copelatus* sp. from New Britain and New Caledonia.

Two light-trap catches from Kahang, Johore, Malaya made by Mr. J. R. Pippet in May and June, 1962, had many aquatic species of which the following were identified. *Sphaerodema molestum* (Duf.), *Paracymus evanescens*, *Amphiops pedestris* Sharp, *Regimbartia attenuata*, *Berosus indicus*, *Helochares abnormalis* Sharp, *H. taprobanicus* Sharp, *H. anchoralis*, *Helochares* sp., *Sternolophus rufipes* Fabr., *Hydrocoptus bosschae* Rég., *Canthydrus ritsemæ* Rég., *Uvarus genitalis* Sharp, *Guignotus inconstans*, *G. japonicus* (Sharp), *Hydrovatus confertus*, *H. bonvoulouiri* Sharp, *Laccophilus rufulus* Rég., *Copelatus tenebrosus* Rég., *Hydraticus vittatus* Fabr., *H. fabricii* MacL., *Orectocheilus productus* Rég., *Scirtes holosericeus* Champ. and *Eubrianax* sp.

Discussion

Many of the species recorded in the present paper have been taken at light before (Fernando 1961a, 1961b, in press A). They include species belonging to the following hemipteran families Velidae, Mesovelidae, Hydrometridae, Corixidae, Notonectidae, Belostomatidae, Pleiidae and Gerridae (Hemiptera). The families not represented are Nepidae, Naucoridae and Hebridae. Members of the former two families do not usually fly although Fernando (1961a) recorded a nepid at light in Malaya and nepids and a naucorid in an isolated habitat (in press C).

The occurrence of *Sphaerodema* sp. is interesting. Fernando (1960) stated that members of the genus probably colonize habitats by swimming along temporary connections established during rains. Subsequently *Sphaerodema molestum* was recorded at light (Fernando 1961b) and Fernando (in press B) stated that the members of this genus were being selected for non-flying individuals and that they had lost their ability to fly recently. In the present records *Sphaerodema rusticum* and *S.*

† The name *Diplonychnus* has been advocated by Lauch and Menke (1961).

molestum have been recorded at light in Ceylon, Malaya, Borneo and Vietnam indicating that flight is more prevalent than hitherto believed. However they are not as common at light as many other Hemiptera and they are not usually found in isolated habitats. It is possible that there are flying and non-flying individuals. This may be due to degeneration of wings and wing muscles as recorded in aquatic Hemiptera by Poisson (1921a, 1921b, 1924) and Hungerford (1948) and in the Coleoptera by Jackson (1956). Non-morphological features like behaviour may be involved too. A study of the morphology of wing muscles in a large number of individuals from different localities will probably prove interesting.

Amongst the Coleoptera all the well known families are represented namely Haliplidae, Hydrophilidae, Dytiscidae and Gyrinidae besides Helodidae and Psephanidae.

From the frequent occurrence of aquatic Coleoptera and Hemiptera at lights in tropical Asia it appears that flight is a more common phenomenon than in temperate regions. The paucity of records in the former region is due to a lack of work on these insects. In temperate regions on the other hand light traps are in common use in some parts and the occurrence of aquatic species is less likely to go unrecorded. If this is true then the relative abundance of flying aquatic species in countries like Ceylon can perhaps be attributed to the greater instability of small bodies of water.

The abundance of flying species results in the rapid colonization of habitats. The occurrence of some species in fish hatcheries is undesirable. To this category belong the back-swimmers. *Anisops* spp. and *Enithares* spp., the giant water bug *Lethocerus indicus*, the larger dytiscids (*Cybister confusus*, *C. tripunctatus*) and the large hydrophilids (*Hydrophilus* spp.). On the other hand the Corixidae, most hydrophilids and the small dytiscids are herbivorous and enhance the food supply for fishes.

Acknowledgments

Some of this material was collected during a fresh water fisheries survey in Ceylon sponsored by the Fisheries Department and supported by F. A. O. I wish also to thank the authorities of the Zoological Survey India, Bernice P. Bishop Museum, Honolulu, and Mr. J. R. Pippet of Kahang, Malaya, for material.

References

- FERNANDO, C. H., 1960—Colonization of freshwater habitats with special reference to aquatic insects. Cent. Bicent. Congr. Singapore (1958) 182-186.
- 1961a —Aquatic insects taken at light in Ceylon with a discussion and bibliography of references to aquatic insects at light. Ceylon J. Sci. (Bio. Sci.) 4, 45-54.
- 1961b —Notes on aquatic insects caught at light in Malaya, with a discussion of their distribution and dispersal. Bull. Nat. Mus. Singapore 30, 19-31.
- in press A—Records of aquatic insects caught at light in Kahang, Johore. Bull. Nat. Mus., Singapore.
- in press B—The distribution of aquatic insects in South East Asia with special reference to their dispersal. Bull. Nat. Mus., Singapore.
- in press C—Notes on aquatic insects colonizing an isolated pond in Mawai, Johore. Bull. Nat. Mus., Singapore.

HUNGERFORD, H. B., 1948—The Corixidae of the Western Hemisphere. *Kans. Univ. Sci. Bull.* 23, 1-827.

JACKSON, D. J., 1956—The capacity for flight of certain water beetles and its bearing on their origin in the Western Scottish Isles. *Proc. Linn. Soc. Lond.* 167, 76-96.

LAUCH, D. R. and MENKE, A. S., 1961—The higher classification of the Belostomatidae (Hemiptera). *Ann. ent. Soc. Amer.* 54, 644-657.

POISSON, R., 1921a—Recherche sur le déterminisme de la perte de la faculté du vol chez les Hemipteres aquatiques. *C. R. Acad. Sci. Paris* 172, 1322-1324.

——— 1921b—Brachypterisme et apterisme dans le genre *Gerris*. *C. R. Acad. Sci. Paris* 173, 947-950.

——— 1924—Contribution à l'étude des Hemipteres aquatiques. *Bull. Biol.* 58, 49-305.