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AQUATIC AND SEMI-AQUATIC BUGS**Jongkar Grinang**

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ABSTRACT

Twenty-two species of aquatic and semi-aquatic bugs were recorded from the limestone streams in Bau. Another seven orders of aquatic and semi-aquatic insects comprising 23 families were also collected in this study.

Keywords: aquatic and semi-aquatic bugs, Hemiptera

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INTRODUCTION

Insects are the major group of living things comprising more than 56% of the total organisms in the world. Although the great majority of insects are terrestrial, a number of them are aquatic, occurring almost entirely in fresh water. Out of 28 orders (see Borror *et al.*, 1986), five insect orders (Ephemeroptera, Plecoptera, Trichoptera, Megaloptera and Odonata) are entirely aquatic, and seven others (Hemiptera, Coleoptera, Diptera, Lepidoptera, Neuroptera, Hymenoptera and Orthoptera) contain families or genera that are primarily aquatic (see McCafferty, 1981; Edmondson, 1992). Aquatic insects comprise less than 3% of all insects known (Cheng, 1985) and represent the major group of freshwater macro-invertebrates (Ward, 1992). About 1,400 species of aquatic insects are well adapted to salt waters (Cheng, 1985).

Aquatic and semi-aquatic bugs are among the commonest groups of aquatic insects. They occupy a wide range of aquatic habitats including temporary water bodies such as filled-water tree holes, pitcher plants and bromeliad plants (Kovac and Yang, 2000). About 59 genera of aquatic and semi-aquatic bugs have been described from Borneo (see Polhemus and Polhemus, 1990). There is no detailed record on the aquatic insects of Sarawak as not many studies have been carried out. Consequently, some recent collections remained not identified to species level. For example,

several collections of aquatic insects by the researchers of Universiti Malaysia Sarawak are not identified to species level due to limited taxonomic references (see Abang *et al.*, 1995; Mohd. Long and Abang, 1998).

This paper records the aquatic and semi-aquatic bugs found in the Bau Limestone Area. The other group of aquatic and semi-aquatic insects is also listed to show the diversity of aquatic insects in the area.

MATERIALS AND METHODS

Three limestone streams in Bau were intensively surveyed. The streams are located at the foothills of Gunung Tongga, Gunung Batu Payong and Gunung Podam. A few specimens were also collected from the streams at Gunung Meraja, Gunung Kawa, Gunung Ropih, Gunung Aup, Gunung Poing, Gunung Stulang, Gunung Apin, Gunung Tabai and Gunung Pambor during the aquatic fauna collection activities.

The streams surveyed are first order streams; most of them are narrow and shallow with sandy, gravel, rocky or mixed bottom substrates. The streams are from slow to fast flowing, shaded in undisturbed areas or opened near to settlement areas. Intensive collections were conducted at three streams namely Gunung Tongga, Gunung Batu Payong and Gunung Podam on 16 April 2002 during the Aquatic Resources (Collection, Curation and Identification) Workshop Training. Insects were collected using a small mesh size of scoop-net. Random collections were also conducted during the aquatic fauna collection activities at Gunung Meraja, Gunung Kawa, Gunung Ropih, Gunung Aup, Gunung Poing, Gunung Stulang, Gunung Apin, Gunung Tabai and Gunung Pambor. Specimens collected were brought back to the laboratory for sorting and identification. The insects were preserved in 75% ethanol, labeled and deposited at the Sarawak Biodiversity Centre.

RESULTS

Sixteen species of aquatic and semi-aquatic bugs were identified to species level while six consisting of nymphs were identified to genus level. Besides the bugs, seven orders of aquatic and semi-aquatic insects comprising 23 families were also collected in this study.

The following is the list of aquatic and semi-aquatic bugs collected. The numbers in brackets after the year indicate the number of specimens if more than one specimen were collected.