

## A Note on the Nocturnal Beetle Fauna of Lalang Island in the Straits of Malacca

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**ABSTRACT** A total of 135 specimens were sampled, comprising of 15 species from 8 families of beetles. The species were *Casnoidea* sp. (Carabidae), *Plandones* sp. (Cerambycidae), *Noserius* sp. (Cerambycidae), *Cheorane modesta* (Chrysomelidae), *Veranio discolor* (Coccinellidae), *Xanthopenthes* sp. (Elateridae), *Oxyropterus audoniwi* (Elateridae), *Anomala pallida* (Scarabeidae), *Apogonia tribicollis* (Scarabeidae), *Pachycorinus* sp. (Staphylinidae), *Amarygmus* sp. (Tenebrionidae), *Obriomaia* sp. (Tenebrionidae) and *Alphitobius diaperinus* (Tenebrionidae). All species identified are 13 first records for Lalang Island. Two species from family Scarabaeidae coded as Scara 6 and Scara 8 were unidentified.

**ABSTRAK** Sejumlah 135 specimen yang terdiri dari 15 species dan 8 famili kumbang telah di kumpulkan. *Casnoidea* sp. (Carabidae), *Plandones* sp. (Cerambycidae), *Noserius* sp. (Cerambycidae), *Cheorane modesta* (Chrysomelidae), *Veranio discolor* (Coccinellidae), *Xanthopenthes* sp. (Elateridae), *Oxyropterus audoniwi* (Elateridae), *Anomala pallida* (Scarabeidae), *Apogonia tribicollis* (Scarabeidae), *Pachycorinus* sp. (Staphylinidae), *Amarygmus* sp. (Tenebrionidae), *Obriomaia* sp. (Tenebrionidae) and *Alphitobius diaperinus* (Tenebrionidae) telah ditemui. Ini merupakan tiga belas rekod baru penemuan spesies tersebut di Pulau Lalang. Dua spesies dari keluarga Scabarabeidae yang di beri kod Scara 6 dan Scara 8 tidak dapat dikenalpasti, akan dihuraikan dalam laporan lain. Implikasi penemuan ini dibincangkan.

(beetle, island, abundance, diversity, Straits of Malacca)

### INTRODUCTION

Groombridge [1] summarized that Earth's beetle fauna contain 350,000 to 400,000 described species and 2,000,000 undescribed species with 2,300 new beetle species described annually. Beetles are able to exhibit extraordinary adaptation to different habitats and environments [2]. Wallace collected 2000 species of beetles in Sarawak, West Malaysia, from 1854 to 1856 [3]. Three hundred beetles belonging to family Chrysomelidae (leaf beetle), Cerambycidae (longhorn beetle) and Curculionidae (weevils) from Wallace's Sarawak material were described in 1850s and 1860s by Baly and Pascoe [4]. Two hundred and fifty-nine of the identified beetle species are curated in the Sarawak Museum. Some recent studies on beetle fauna in Malaysia include those by [5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16]. Lack of expertise in taxonomy of beetles and an ever-increasing biodiversity crisis are major

problems for conservation. Species, the majority of which are undescribed, are disappearing not only from rainforests but also from islands. The Straits of Malacca has a heavy traffic of ships from Thailand, Indonesia and Malaysia which sometime stop at islands along the straits for picnic or recreation. In order to conserve beetle species on islands, knowledge of their existence on islands is first required. Study of island beetle fauna in Malaysia has been reported for Langkawi Island [13], Dendang Island and Langgun Island [14] situated 50 km from the coast of Kedah state in peninsular Malaysia. Two hundred and one species was recorded from the main Langkawi Island, [1] whereas 54 species was sampled from Langgun Island and 50 species from Dendang Island [19]. The objective of this study was to provide a checklist of beetles on Lalang Island by night sampling during the expedition to the Straits of Malacca.

## MATERIALS AND METHOD

### Study Site

Lalang Island, located at N04° 02' 38" E100° 32' 35" (Figure 1), is one of the Nine Islands (Sembilan islands) archipelago of nine islands comprising Buluh Island, Lalang Island, Saga Island, Rumbia Island, Batutimbul Rosa, Nipis Island, Payong Island, Batutimbul and Agas Island. The Sembilan islands are secluded and uninhabited but are popular sites for divers and fishing anglers.

After one and a half days at Jarak Island in the Straits of Malacca, the first destination of the Scientific Expedition to the Seas of Malaysia (SESMA), the MV Reef Challenger anchored at 3.00 pm at Lalang Island (Figure 1) one of the archipelago of Nine Islands on 6 June 2004.

### Beetle Collection

The materials to be used for light trapping were transported to the island in the daytime in a dinghy. After a survey of the area, it was decided that the

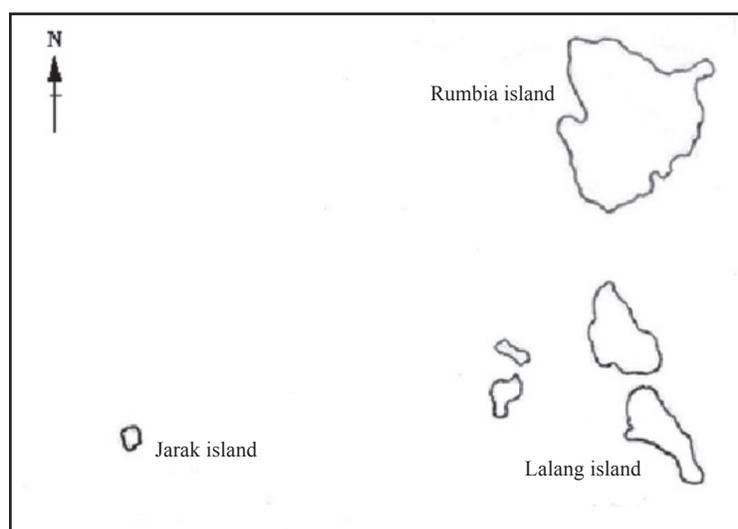


Figure 1. Lalang Island among the Sembilan islands.

beetle fauna of the island will be sampled by light trap. Many insects are attracted to light and the method was found to be the most productive method of collecting beetles at night [19]. Past studies [12, 13, 14, 15, 17] showed that light trapping is an efficient method for collecting beetles as compared to net sweeping, Malaise trap and pitfall trap.

Beetles were collected for 4 hours during the night on 6 June 2004 using a trap made from white mosquito netting. The mosquito netting of dimension 180 cm X 180 cm X 195 cm was tied amongst the trunks of trees that grew on a highland slope, located 30 m from the shore of Lalang Island (Figure 2). A 160 watt mercury bulb was hung below the centre of the net. The entrance flaps of the net were flipped to the left and right sides of the net to allow attracted insects to enter. The light bulb was powered by a generator, Model Honda EU10i (AC 220 V;

Frequency 50 Hz, rated output 900 V Ampere max output 1000 VA; DC 12V, Current 8 Amp) which operated from 2000 to 2400 h. Beetles landed on and in the net were manually picked up and placed in a killing jar containing ethyl acetate. Small-sized beetles were sucked in using an aspirator and insects were placed in the killing jar. The specimens were then preserved in 70% ethanol in scintillation vials for transportation to the laboratory at University Malaya. In the laboratory, the specimens were pinned, dried at 40° C before they were labelled and kept in insect boxes.

### Beetle identification

All insects sampled were identified to the family and species levels using the identification keys provided by [18, 19, 20]. Identification of samples was authenticated by reference to specimens preserved in the Malaysian Department of Agriculture, Kuala

Lumpur, Museum of Sarawak and the Natural History Museum, London. Unidentified species were given a code.

### RESULTS AND DISCUSSION

Being the first beetle assemblage ever found on Lalang Island, all recorded beetles are first records (Table 1).

Amongst beetle specimens sampled at Lalang Island, the most diverse and speciose beetle family collected at Lalang Island was the darkling beetle family Tenebrionidae. White [19] wrote that little is known of the adult habits; most are often collected on flowers and foliage. Most adults are nocturnal but some are active at daytime [19].

The most abundant beetle at Lalang Island was the scarab beetle family Scarabaeidae. These beetles live under bark, on rotten wood, on fungi or burrows of mammals. The larvae feed on rotten wood, dry carrion, skins, with termites; feed on dung or live in dung balls; and feed on pollen and sap. Larvae of some species live in soil, feed on roots, eat leaves and fruits, whereas some larvae and adults live in nest. All specimens caught at Lalang Island are shown in Figure 2.

Only three species recorded from Lalang Island were also caught in light traps at main Langkawi

Island. *Casnoidea* sp. (family Carabidae) was caught at Lubok Semilang, whereas many species from genus *Anomala* (Scarabaeidae) were sampled at Burau Bay, Lubok Semilang and Telaga Tujoh [13] of main Langkawi Island. The click beetle *Oxyropterus audoniwi* (family Elateridae) was also found at Telaga Tujoh [13]. *Oxyropterus audoniwi* has been reported to feed on the sap of Bignoniaceae and Leguminosae plant species. This beetle species is usually found hiding in joints of large branches of trees usually above 6 m from the ground [18]. Two species of cerambycids *Plandones* sp. and *Noserius* sp. recorded at Lalang Island were collected in 1854 by Wallace in Sarawak, Malaysia.

The leaf beetle *Cheorane modesta* and the tenebrionid *Alphitobius diaperinus* were also recorded at Gunung Angsi forest reserve in the state of Negeri Sembilan, Peninsular Malaysia [17]. The scarabid beetle *Anomala pallida*, the carabid *Casnoidea* sp., and the tenebrionid *Amarygmus* sp., were also sampled from the forest at Tasek Kenyir [15] the man-made lake situated in Terengganu state. Two tenebrionid species *Amarygmus* sp. and *Alphitobius diaperinus* collected at Lalang Island were also sampled from the forests at south western Endau Rompin, Johor [11]. Thus, five species of beetles found at Lalang Island have also been collected in the mainland reserved forests of Peninsular Malaysia.

**Table 1.** Beetle fauna found during the SESMA expedition are all new records for Lalang Island.

Beetle Family	Common name	Species	No. of specimens
Carabidae	Ground beetle	<i>Casnoidea spp</i> Laporte (1834)	33
Cerambycidae	Longhorn beetle	<i>Plandones spp</i> Pascoe (1869)	1
Cerambycidae	Longhorn beetle	<i>Noserius spp</i> Pascoe (1869)	47
Chrysomelidae	Leaf beetle	<i>Cheorane modesta</i>	2
Coccinellidae	Ladybird beetle	<i>Veranio discolor</i> Fabricius (1798)	2
Elateridae	Click beetle	<i>Xanthopenthes spp</i>	1
Elateridae	Click beetle	<i>Oxyropterus audoniwi</i> Hope (1842)	6
Scarabaeidae	Scarab beetle	<i>Anomala pallida</i> Fabricius (1775)	24
Scarabaeidae	Scarab beetle	Scara 6	1
Scarabaeidae	Scarab beetle	<i>Apogonia tricoloris</i> Burmeister (1855)	1
Scarabaeidae	Scarab beetle	Scara 8	1
Staphylinidae	Rove beetle	<i>Pachycorinus spp</i>	1
Tenebrionidae	Darkling beetle	<i>Amarygmus spp</i> Dalman (1823)	1
Tenebrionidae	Darkling beetle	<i>Obriomaia spp</i> Gebien (1927)	7
Tenebrionidae	Darkling beetle	<i>Alphitobius diaperinus</i> Panzer (1797)	7

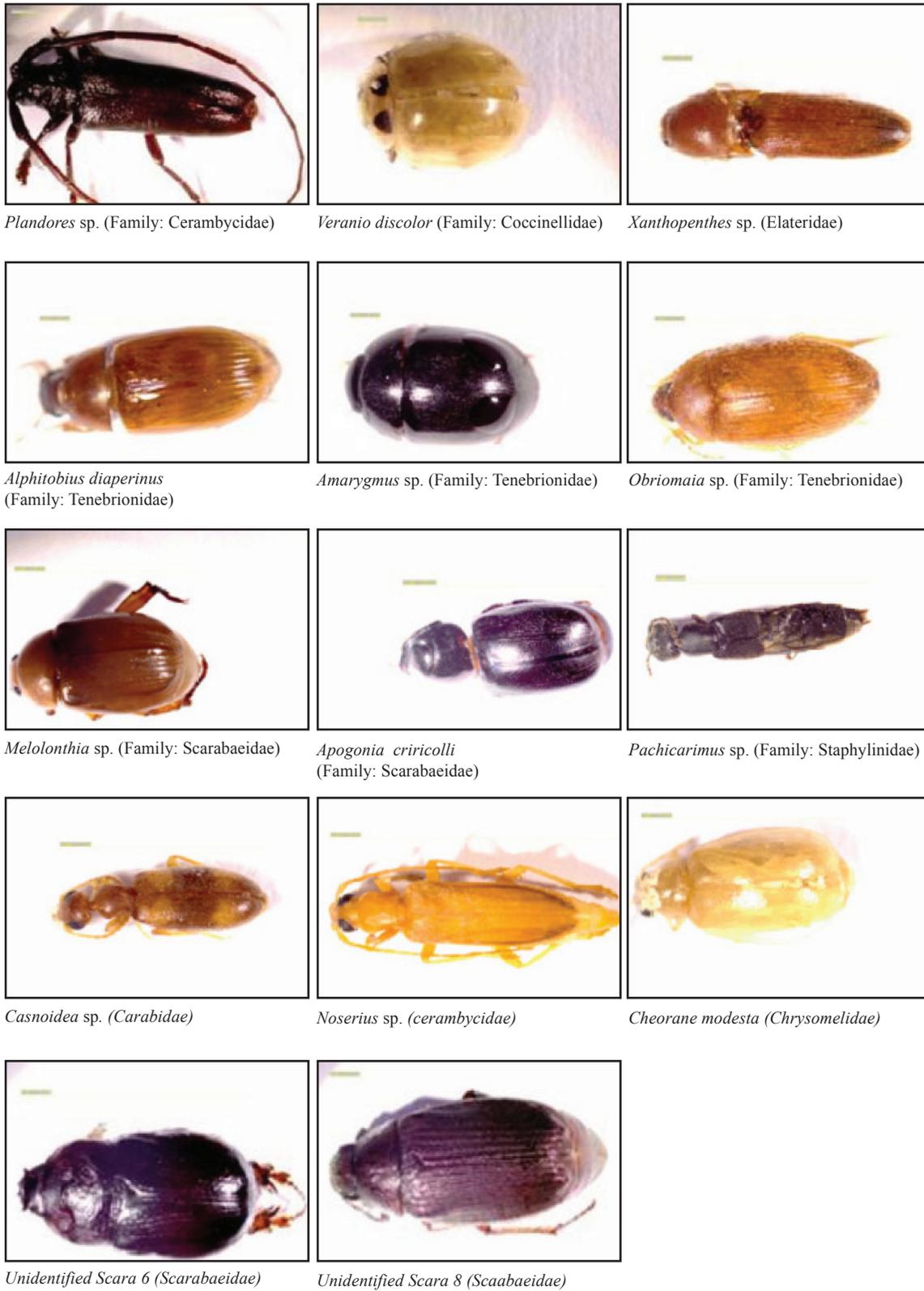


Figure 2. The beetle fauna found of Lalang Island.

Scientific voyages in the 18<sup>th</sup> and 19<sup>th</sup> centuries had studied the relationship between species number and both island size and fragmentation [21, 22], which suggested that many islands were formed de novo and organisms dispersed there from continents. Wallace [3] viewed islands as fragments of continents based on his studies of the islands of Indonesia. If an island has ever been close to, or in contact with, a source, such as a mainland landmass, it will be opened to immigration such that the biota will be similar to the source. However, in contrast, this study shows that the number of species on Lalang Island is far from similar from mainland peninsular Malaysia. Only five species found in Lalang Island have been collected in the reserved forests in Peninsular Malaysia.

Lalang Island is situated 30 km from mainland Peninsular Malaysia, the species could probably be transported by wind, or transported to the island by fishing boats that stopped at the island. Empty bottles of mineral water and some trash were found at a hut by the beach of Lalang Island which also indicate visitations by divers and sport-fishers.

Species with naturally small population sizes are also more vulnerable to habitat modification because loss of even a small area of habitat for a geographically restricted species could reduce numbers below sustainable levels [24]. Thus, it is important to conserve the natural habitat of an island to prevent extinction of island species.

Islands are well known for elevated levels of extinction [25]. Of the known extinctions of insect species since the 1600s, 10 have been on continents and 51 on islands [1]. This shows how crucial that islands in the Straits of Malacca or in Malaysian waters should be preserved. For example, the Hawaiian islands have been recorded as having lost more arthropod species than has the entire continental United States [26], and the number of species listed as endangered [27] is twice that of the highest number in any state of continental United States [28]. This study shows only 15 beetle species found in Lalang Island supporting the need for conserving Lalang Island.

Beetle species, the overwhelming majority of which are undescribed, are disappearing not only from rainforests but also from islands. Progress towards conserving these species requires knowledge of their

existence. A comprehensive checklist of the beetle on islands is needed for formulating conservation strategies. Thus, more expeditions to the Seas of Malaysia should be conducted by entomologists.

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