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PRELIMINARY CHECKLIST OF BEETLES ASSEMBLAGES (ORDER: COLEOPTERA) FROM LIMESTONE FORESTS IN SOUTHERN SARAWAK, MALAYSIA

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ABSTRACT

Beetles are becoming important subjects of ecological interest for conservation studies due to their high biodiversity and distribution, despite rapid urbanisation and deforestation activities. This study initiates to present a preliminary checklist of beetles from limestone forests in Southern Sarawak, Malaysia which included four selected localities within Bau and Padawan districts, namely, Mount Serumbu (Bau), Fairy Cave Nature Reserve (Bau), Raya Cave (Padawan) and Temurang Cave (Padawan). Each sampling trip was conducted for five consecutive days, using both active and passive methods. As a result, a total of 786 individuals representing 191 species (56 confirmed species and 135 morphospecies) from 81 genera under 57 subfamilies and 23 families were successfully recorded. Overall, the most speciose family was represented by Carabidae (39 species; 20.42%), followed by Scarabaeidae (32 species; 16.75%), Chrysomelidae (29 species; 15.18%), and Tenebrionidae (22 species; 11.52%), respectively. Meanwhile, Carabidae was the most abundant family (175 individuals; 22.26%), followed by Scarabaeidae (126 individuals; 16.03%), Chrysomelidae (124 individuals; 15.78%), and Tenebrionidae (116 individuals; 16.03%), respectively. In general, *Triplatoma macleayi* (Erotylidae) was the most abundant species with a total of 56 individuals (7.12%), followed by *Amarygus* sp. 1 (Tenebrionidae) with 39 individuals (4.96%). To conclude, this study is hopefully beneficial to document the diversity and abundance of beetles within limestone areas and useful to the local authority in identifying potential hotspot area(s) for biodiversity conservation and effective management practice. However, it is recommended that future studies should include other limestone forests, covering areas in the central and northern regions of Sarawak.

Keywords: Species assemblages, diversity, coleopterans, cave, insect

ABSTRAK

Kumbang menjadi subjek berkepentingan ekologi terutamanya dalam kajian pemuliharaan kerana kepelbagaian biologi dan taburannya yang tinggi, walaupun dikelilingi oleh kegiatan pembandaran dan penebangan hutan. Kajian ini membentangkan senarai semak awal kumbang dari hutan batu kapur di Sarawak Selatan, Malaysia yang merangkumi empat kawasan dalam daerah Bau dan Padawan, iaitu Gunung Serumbu (Bau), Rizab Semulajadi Gua Pari-Pari (Bau), Gua Raya (Padawan) dan Gua Temurang (Padawan). Setiap aktiviti persampelan dijalankan selama lima hari berturut-turut, menggunakan kedua-dua kaedah aktif dan pasif. Hasilnya, sebanyak 786 individu mewakili 191 spesies (56 spesies ditentu-sah dan 135 spesies morfo) daripada 57 subfamili dan 23 famili berjaya direkodkan. Secara keseluruhan, famili dengan spesies yang paling banyak diwakili oleh Carabidae (39 spesies; 20.42%), diikuti oleh Scarabaeidae (32 spesies; 16.75%), Chrysomelidae (29 spesies; 15.18%) dan Tenebrionidae (22 spesies; 11.52%). Di samping itu, Carabidae merupakan famili paling dominan (175 individu; 22.26%), diikuti oleh Scarabaeidae (126 individu; 16.03%), Chrysomelidae (124 individu; 15.78%) dan Tenebrionidae (116 individu; 16.03%). Secara umumnya, *Triplatoma macleayi* (Erotylidae) merupakan spesies yang paling banyak direkodkan dengan 56 individu (7.12%), diikuti oleh *Amarygus* sp.1 (Tenebrionidae) dengan 39 individu (4.96%). Kesimpulannya, kajian ini diharap dapat menyumbang kepada dokumentasi kepelbagaian dan kelimpahan kumbang di kawasan batu kapur dan berguna kepada pihak berkuasa tempatan dalam mengenalpasti kawasan khas yang berpotensi untuk pemuliharaan kepelbagaian biologi dan amalan pengurusan yang efektif. Adalah dicadangkan agar kajian pada masa hadapan turut merangkumi kawasan hutan batu kapur di kawasan tengah dan utara Sarawak.

Kata kunci: Himpunan spesies, kepelbagaian, kumbang, gua, serangga

INTRODUCTION

Over-exploitation and deforestation due to globalisation were never a fresh topic within the fast-phasing world. Species checklists were increasing the efficiency and benefits of biodiversity conservation activities to overcome the consequences of over-exploitation. With species checklists, an inventory of species from certain localities within certain durations can be determined along with localities' environmental conditions including several factors like type of vegetation, temperature, soil pH value, humidity, air movement and light intensity. These factors might affect the biodiversity there and the latest species checklist. Therefore, a species checklist is important for biologists and managers to decide on biodiversity conservation action steps (Biodiversity Philippines 2022). According to Chargualaf and Salas (2022), a limestone forest is a forest consisting of limestone with the presence of flora and fauna with shallow and neutral to mildly alkaline soil surface. According to World Wildlife Fund Malaysia (2018), there was an estimated 26,000 ha of forested limestone areas mostly concentrated in northern Peninsular Malaysia, whereas in Sabah and Sarawak, the limestone forests were around 50,000 ha.

Beetles from the order Coleoptera (Class: Insecta) were estimated to be around 400,000 species, representing two-fifths of all insect species and one-fourths of all known animal life forms worldwide, while new species are still being discovered to date (Bouchard et al. 2017). Beetles are winged insects which have a complete metamorphosis process. According to Sane (2003), insect wings were one of the main contributors to their evolutionary success, helping them to evade predators, food seeking and colonisation of new habitats. Elytra, which are hardened wing-cases originating from their forewings are distinguishing beetles from other insect orders and are believed to be one of the most essential and central to the evolutionary