

SIGNIFICANT QUALITY OF FRAGMENTED FORESTS IN OIL PALM PLANTATIONS: LESSON FROM THE ASSEMBLAGE STRUCTURE OF FROGS (Amphibia: Anura)

RAMLAH ZAINUDIN^{*}; ELVY QUATRIN DEKA^{*}; MUHAMMAD FADZIL AMRAM^{*}; SHARIZATTY MOHD RAIS^{*}; NUR AMIRAH SUNGIF^{*}; MARLY MATLEEN AUGUSTINE AGOH^{*}; NOORAINA ATIRA ALAUDIN^{*}; MOHAMAD AMIRUL AZMI and JAYASILAN MOHD-AZLAN^{*}

ABSTRACT

Being known as a good environmental indicator, the anuran is an ideal animal model for investigating the quality of High Conservation Value (HCV) areas (fragmented forests) in maintaining or enhancing biodiversity values in an oil palm plantation. Using non-metric multidimensional scaling (NMDS) frogs from forest fragments and oil palm were investigated and compared, to identify species assemblages and guild. Our findings showed that species diversity differed significantly between High Corrections Values and the plantation areas. The High Corrections Values showed highest percentage of species endemism, and species of conservation importance in the areas. The NMDS analysis further suggests that the anuran assemblages at the oil palm plantation were disjunctive as the HCV areas provide isolated assemblages to the anuran species, different from that of the plantations. The number of species was found to be significantly influenced by water temperature, turbidity, salinity, and level of dissolved oxygen. Overall, the HCV areas supports high species diversity, including endemic and near threatened species compared to the plantation areas. Hence, these HCV areas are functioning and should be maintained as high priority areas for faunal conservation in an oil palm plantation.

Keywords: frog assemblages, HCV areas, oil palm plantation, endemic species, environmental indicator.

Date received: 30 August 2016; **Sent for revision:** 22 March 2017; **Received in final form:** 30 July 2018; **Accepted:** 14 October 2019.

INTRODUCTION

Bornean amphibians are highly endemic that occupies a wide variety of habitats, from lowland dipterocarp forest to sub-montane forest. They are very sensitive to their environment and water quality in particular and thus, can serve as good environmental indicators. Negative changes in water quality have known to cause a higher rate of tadpole fatality and

deformation. Berry *et al.* (2010) revealed that logging has adverse effect on amphibian's abundance. Thus, the anuran is an ideal model for investigating the effectiveness of High Conservation Value (HCV) areas in maintaining or enhancing biodiversity values.

HCV areas refer to forest areas with high ecological or social values that need to be maintained or enhanced (Jennings *et al.*, 2003; Sanath, 2008). Specifically, according to Jennings *et al.* (2003), HCV areas are forests that have significant concentrations of biodiversity values, and contain viable populations of species existence, as well as rare, threatened or endangered ecosystems.

* Department of Zoology, Faculty of Resource Science and Technology, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia.
E-mail: zramlah@unimas.my