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Diversity of Freshwater Fish in Fragmented Forest of Wilmar Oil Palm Plantation, Miri, Sarawak

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ABSTRACT

The study was conducted in the river system located at Wilmar oil palm plantation in Miri, Sarawak. The objective of the study is to determine the fish species diversity and composition in the streams and rivers in the oil palm plantations. Fish were sampled using a variety of fishing methods, including, scoop nets, cast net, and gill nets of different mesh sizes (1.0, 1.5, 2.0, 2.5, 3.75 and 4.0 cm) from 2 to 7 of February 2014. A total of 326 individual fish including 32 species of native fishes and one species of non-native fish from 19 genera, seven families and five orders were collected from seven locations. The cyprinid fish represented 62.20% of the total fish caught and was found in all the rivers surveyed. About six endemic species in Borneo such as *Barbonymus collingwoodii, Barbodes banksi, Barbodes sealei, Hampala bimaculata Nematabramis borneensis* and *Nematabramis everetti* were identified. However, only one species from families Bagridae, Balitoridae, Clariidae, and Hemiramphidae was sampled from the study sites. The higher fish species composition found in streams and rivers of the oil palm plantation landscapes could be attributed to the conservation of some areas of the plantation as high conservation value forest (HCVF) status, which have provided suitable habitat for fish species within the plantation aquatic environments.

Keywords: *Barbonymus collingwoodii,* cyprinidae, endemic, native, oil palm plantation

INTRODUCTION

In Malaysia, 86% of all deforestation was attributed from oil palm development in the period from 1995–2000. Rapid expansion of oil palm planting has been seen in Sabah and Sarawak in the last decade (Rautner, 2005). Although the expansion of oil palm is significantly influenced by the economic development in many tropical countries (Sheil *et al.*, 2009; Vijay *et al.*, 2016), the conversion of forests to oil palm has been correlated to biodiversity lost and this has replaced the species composition of both terrestrial and aquatic fauna (Fayle *et al*., 2010; Wilcove & Koh, 2010; Wilcove *et al.,* 2013; Giam *et al*., 2015; Razak *et al.,* 2020). The establishment of oil palm plantations can threaten critical habitats such as floodplain rivers due to soil erosion, pesticide and fertilizer that flow into the rivers (Koh & Wilcove, 2008; Erik & Sheil, 2013; Schrier-Uijl *et al*., 2013).

There are many scientific studies on species diversity and composition such as on invertebrate communities (Chung *et al*., 2000; Koh, 2008), bird faunas (Aratrakorn *et al*., 2006; Najera & Simonetti, 2010; Kelvin *et al*., 2016; Razak *et al*., 2020), mammals (Azlan & Sharma, 2006; Jennings & Veron, 2011; López-Ricaurte *et al*., 2017) in oil palm plantations. However, only a few studies on the aquatic fauna such as fish in the oil palm plantation (Giam *et al.,* 2015; Ohee, *et al.*, 2016; Dosi *et al*., 2019; Nasir *et al*., 2020). Despite great fish diversity documented for various freshwater habitats in Borneo (Ng *et al*., 2017; Khairul Adha *et al*, 2018), the scientific studies that address freshwater fish diversity such in oil palm in Sarawak are still limited.

According to Giam *et al*. (2015) streams within forested riparian reserves in oil-palm plantations supported habitats for aquatic fauna such as