ABSTRACT

This study aimed to determine the water quality and biodiversity of macroinvertebrate and fish in peat ecosystems related to different types of disturbance in Betong, Sarawak, Malaysia. Samplings were conducted from October 2011 to August 2013 at undisturbed peat swamp forest (Maludam National Park, MLM), disturbed peat swamp forest (Tanjung Baru Forest, TGB) and oil palm plantation on peatland (Durafarm Oil Palm Plantation, DMF). Water quality parameters (except NO_2^--N) were significantly different ($p \leq 0.05$) among the MLM, TGB and DFM. MLM and TGB were characterised by having higher TKN, NH_3-N and COD. MLM was mainly influenced by the nutrient input from the decomposition of organic matter whereas TGB was mainly influenced by the occurrence of tidal event from the downstream of Sungai Maludam. Meanwhile, DFM was characterised by having higher water temperature, turbidity, TSS, conductivity, chlorophyll-*a*, PO_4^{3-}, TP, pH and BOD_5, indicating the effect of agricultural activities from oil palm plantation. Macroinvertebrate are more diverse in DFM with 40 species from 20 families and 7 orders. Meanwhile, MLM and TGB recorded the same composition, each comprised of 33 species from 18 families and 8 orders. Higher species of macroinvertebrates in DFM might be attributed to the lower canopy cover as compared to MLM and TGB. Fish composition varied across peat ecosystems whereby species were diverse in MLM (24 species from 10 families), followed by TGB (19 species from 10 families) and DFM (16 species from 8 families). Hardy species, *Anabas testudineus* dominates the DFM whereas *Trigonopoma pauciperforatum* dominates the MLM and TGB, suggesting that there could be species replacement during the conversion process of peat swamp forest into oil palm

plantation. The findings of this study indicate that the oil palm plantations on peatland are affecting water quality and its aquatic fauna.

Keywords: fish, macroinvertebrates, water quality, peat swamp, oil palm plantation

Kualiti Air and Kepelbagaian Makroinvertebrata dan Ikan di Ekosistem Tanah Gambut Yang Berbeza di Betong, Sarawak, Malaysia

ABSTRAK

Kajian ini bertujuan untuk menentukan kualiti air dan kepelbagaian fauna akuatik di ekosistem tanah gambut yang berbeza di Betong, Sarawak, Malaysia. Pengumpulan data telah dijalankan dari Oktober 2011 sehingga Ogos 2013 di hutan paya gambut yang tidak terganggu (Taman Negara Maludam, MLM), hutan paya gambut yang terganggu (Hutan Tanjung Baru, TGB) dan ladang kelapa sawit di kawasan tanah gambut (Ladang Kelapa Sawit Durafarm, DMF). Parameter kualiti air (kecuali NO_2^--N) adalah berbeza secara signifikan ($p \leq 0.05$) antara MLM, TGB dan DFM. MLM dan TGB dicirikan dengan mempunyai kepekatan TKN, NH_3-N dan COD yang lebih tinggi. Kualiti air di MLM dipengaruhi oleh input nutrien yang terhasil daripada penguraian bahan organik manakala TGB dipengaruhi oleh kejadian pasang surut dari hilir Sungai Maludam. Kualiti air di DFM dicirikan dengan suhu, kekeruhan, TSS, kekonduksian, klorofil-a, PO_4^{3-}, *TP, pH dan* BOD_5 *yang lebih tinggi berbanding MLM dan TGB, menunjukkan kesan aktiviti pertanian dari ladang kelapa sawit. Makroinvertebrata adalah lebih pelbagai di DFM dengan 40 spesies daripada 20 famili dan 7 order. Sementara itu, MLM dan TGB mencatatkan komposisi makroinvertebrata yang sama iaitu 33 spesies daripada 18 famili dan 8 order. Spesies makroinvertebrata yang lebih tinggi di DFM mungkin dipengaruhi oleh kurangnya kawasan rendang berbanding dengan MLM dan TGB. Komposisi ikan berbeza di antara ekosistem gambut di mana spesies adalah pelbagai di MLM (24 spesies daripada 10 famili), diikuti oleh TGB (19 spesies daripada 10 famili) dan DFM (16 spesies daripada 8 famili). Spesies yang tahan lasak iaitu* Anabas testudineus *adalah dominan di DFM manakala* Trigonopoma

pauciperforatum *adalah dominan MLM dan TGB, menunjukkan bahawa terdapat penggantian spesies semasa hutan paya gambut ditukar kepada ladang kelapa sawit. Hasil kajian ini menunjukkan bahawa ladang kelapa sawit di tanah gambut menjejaskan kualiti air dan komposisi fauna akuatik.*

Kata kunci: *ikan, makroinvertebrata, kualiti air, paya gambut, ladang kelapa sawit*