UNIVERSITI PUTRA MALAYSIA

COLONIZATION AND POPULATION DYNAMIC OF WATERBIRDS IN UPPER BISA, PUTRAJAYA WETLANDS, MALAYSIA

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COLONIZATION AND POPULATION DYNAMIC OF WATERBIRDS IN UPPER BISA, PUTRAJAYA WETLANDS, MALAYSIA

By

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Chairman: Prof. Ahmad Ismail, PhD

Faculty: Science

Wetlands and its various components play important roles in most waterbirds' life stages particularly during nesting or breeding stage. The fact that waterbirds are wetland dependent species makes them a valuable indicator to the wetland ecosystem. With the continuous losses and deteriorating quality of the natural wetlands, the use of artificial habitat as a replacement to its natural counterpart is debated by many. Yet the construction of artificial wetlands has been widely carried out as a mean to rehabilitate urban water quality, landscape and also to provide new habitat for the waterbirds to utilize. Recent creation of artificial wetlands in Putrajaya has attracted several waterbirds species to colonize and nest in the area. So far, there is no research conducted on the colonization of waterbirds in artificial wetlands habitat. This opportunity was taken by the researcher to chiefly study the colonization strategies of these waterbirds. The colony is situated in Upper Bisa part of Putrajaya Wetlands ($2^{o}56´04.01´´N$ and $101^{o}42´´12.33´E$). This mixed-species colony consists of six waterbirds species which includes Purple heron (*Ardea*

purpurea), Grey heron (*Ardea cinerea*), Painted stork (*Mycteria leucocephala*), Night heron (*Nycticorax nycticorax*), Cattle egret (*Bubulcus ibis*) and Little egret (*Egretta garzetta*). They use the wetlands and its surrounding areas for roosting, foraging and nesting. The colony was studied for 18 months from July 2008 to December 2009. Focal observations aided by various equipments like binoculars, spotting scope and cameras with multiple lenses were the primary method used to gather data in this study. As for the result, the nesting waterbirds exhibited varied strategies that were related to their nesting habitat preferences. These include the strategies used during the penetration and establishment period, stratified nesting, nest space partitioning and sharing pattern which are shared by all species. In this study, Purple heron were the dominant competitors and occupied most of the nesting space in the colony area. The con-specific copying mechanism theory and the recruitment theory further explain that Purple heron had the advantages due to its early establishment period. The two critical factors that allow Purple heron to dominate the colony area are arrival time and its occupancy on many of the main foraging sites. These two factors had contributed to the large increase of nesting Purple heron in the colony and consequently attracted other waterbirds to nest in the area. In general, the increase in waterbirds number reflect the potential that these artificial wetlands possess and thus there is a need to monitor and conduct more studies on the colony to address forthcoming issues between the habitat, waterbirds and the public. Integrated management involving responsible authorities as well as support from the scientist particularly in the field of biology and its derivation is the key to initiate this.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

PENGKOLONIAN DAN POPULASI DINAMIK BURUNG AIR DI UPPER BISA, PUTRAJAYA WETLANDS, MALAYSIA

Oleh

MOHD FAID ABDUL RAHMAN

April 2012

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Tanah lembab sebagai habitat kepada burung-buring air memainkan peranan penting dalam memastikan kelangsungan hidup mereka terutama ketika musim pembiakan. Oleh kerana burung air bergantung kepada habitat ini, ia boleh menjadi bio-penunjuk yang berharga kepada ekosistem tersebut. Kehilangan serta kemusnahan tanah lembab semulajadi yang berterusan menyebabkan penggunaan habitat tiruan dilihat sebagai jalan alternatif kepada permasalahan ini walaupun keupayaannya belum terbukti. Namun begitu, pembinaan serta pembangunan habitat tiruan ini telah dijalankan terutamanya bagi memulihara kualiti air dari sungai-sungai di kawasan bandar di samping menyediakan ruang untuk hidupan liar termasuk burung air. Pembangunan habitat tanah lembab tiruan di kawasan Putrajaya baru-baru ini telah menarik beberapa jenis burung air untuk menggunakan kawasan tersebut untuk mencari makanan, berehat serta bersarang. Setakat ini, belum ada kajian yang dilakukan bagi memahami penggunaan habitat oleh burung air untuk bersarang terutama penggunaan di dalam habitat tiruan. Peluang ini digunakan untuk mengkaji

proses serta strategi pengkolonian yang digunakan beberapa burung air di kawasan terbabit. Koloni yang terletak di kawasan Upper Bisa, Putrajaya ini terdiri daripada Pucung serandau (*Ardea purpurea*), Pucung seriap (*Ardea cinerea*), Pucung kuak (*Nycticorax nycticorax*), Botak padi (*Mycteria leucocephala*) serta Bangau kecil (*Egretta garzetta*) dan Bangau kendi (*Bubulcus ibis*). Kajian terhadap koloni ini telah dijalankan selama 18 bulan menggunakan beberapa peralatan pemerhatian seperti binokular, teropong peninjau, serta kamera yang dilengkapi kanta yang pelbagai bagi tujuan meninjau dan dokumentasi. Daripada hasil kajian, burung-burung air yang bersarang menunjukkan pelbagai strategi pengkolonian yang berkait rapat dengan pemilihan habitat individu. Ini termasuk penetrasi dan pembentukan sarang, pembentukan sarang berlapis serta pembahagian dan perkongsian ruang bersarang. Dalam kajian ini, Pucung serandau telah mendominasi kawasan koloni sejak awal lagi dan ini disebabkan oleh faktor ketibaannya dan penguasaan kawasan makan. Kedua-dua faktor ini telah meningkatkan populasi Pucung serandau sekaligus menarik kedatangan burung air yang lain. Secara keseluruhan, peningkatan bilangan burung air di kawasan Tanah Lembap Putrajaya menggambarkan potensi yang ada pada habitat tersebut sebagai kawasan penting kepada hidupan liar. Pemerhatian yang berterusan bagaimanapun perlu dilakukan bagi memulihara keseimbangan habitat, burung air serta manusia disekitarnya. Kerjasama bersepadu antara pihak berwajib serta saintis terutamanya dalam bidang biologi merupakan langkah permulaan yang perlu diambil.

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I certify that an Examination Committee has met on December 2011 to conduct the final examination of Mohd Faid Abdul Rahman on his Master of Science thesis entitled "Colonization and Population Dynamics of Waterbirds in an Artificial Wetlands in Putrajaya" in accordance with Universiti Pertanian Malaysia (Higher Degree) Act 1980 and Universiti Pertanian Malaysia (Higher Degree) Regulations 1981. The Committee recommends that the student be awarded the Master of Science Degree.

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DECLARATION

I declare that the thesis is my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or any other institution.

MOHD FAID ABDUL RAHMAN

Date: 25 April 2012

TABLE OF CONTENTS