UNIVERSITI PUTRA MALAYSIA

AN ECOLOGICAL STUDY OF RED JUNGLEFOWL (Gallus gallus spadiceus) IN AGRICULTURE AREAS

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AN ECOLOGICAL STUDY OF RED JUNGLEFOWL (*Gallus gallus spadiceus*) IN AGRICULTURE AREAS

By

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/	Per
ANOVA	Analysis of Variance
cm	Centimetre
DF	Degree of Freedom
DMRT	Duncan Multiple Range Test
g	Gram
hr	hour
km^2	Kilometre square
Male I	Radio-transmitter attached Male I
Male II	Radio-transmitter attached Male II
Male III	Radio-transmitter attached Male III
Female	Radio-transmitter attached Female
Male IV	First male whose roosting behaviour observed in orchard area
Male V	Second male whose roosting behaviour observed in orchard area
MCP	Minimum convex polygon
mm	Millimetre
m	Metre
min	Minutes
MS	Mean Square
SS	Sum of Square
Smallholders land	Area of local people adjacent to Sungai Sedu Estate
SE	Standard error
UPM	Universiti Putra Malaysia

Abstract of dissertation presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy.

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Chairman: **Mohamed Zakaria Hussin, Ph.D.**

Faculty: **Forestry**

A two-year study on the ecology of Red Junglefowl (*Gallus gallus spadiceus*) was conducted in five selected agriculture areas in the state of Selangor. In the first year (from August 1995 to July 1996), the study was done in three areas viz. rubber plantation, 22-year old oil palm plantation and orchard area at Universiti Putra Malaysia. In the second year (from August 1996 to July 1997), another two areas viz. 4-year and 8-year old oil palm plantations at Sungai Sedu Estate, Selangor were selected.

Red Junglefowl density was estimated by transect survey. The densities in 4-year, 8-year and 22-year old oil palm plantations, orchard area and rubber plantation were 84.22/km^2, 27.80/km^2, 21.43/km^2, 15.66/km^2 and 6.06/km^2 respectively. Male and female ratio was 1:1.25. The abundance of arthropods did not seem to affect the density of Red Junglefowl.

Four Red Junglefowls were radio tagged in oil palm plantation to observe the home range size and movement. The Red Junglefowl tracking was made by triangulation technique. The daily and monthly home range of male was larger than that of female and also the total daily movement of male was larger than female. The

maximum home range size of male and female were 312.50 ha and 49.07 ha respectively.

The study on breeding ecology showed that generally, one male was observed with a single female and rarely with two to four females. A total of 95 nests were observed during the entire period of study. The Red Junglefowl breeds throughout the year with a peak in December 1996. The mean clutch size was 4.08 eggs. The incubation period in captivity was approximately 19.5 days. The hatching percentage of eggs in nature was 99% whereas, the rate of desertion of nests was 80%. The predators of eggs and chicks in the agriculture areas were stray dogs, snakes, monitor lizards and big carnivorous birds.

Foraging ecology of Red Junglefowls shows that they fed in open areas early in the morning and evening and the rest of the day they fed under trees. They are opportunistic feeders and ate a variety of animal and plant components. The male Red Junglefowl consumed oil palm fruit more than the female whereas the female consumed more animal materials than the male.

Roosting ecology shows that the Red Junglefowl preferred horizontal branch/frond for roosting at night and changed branches and trees from time to time. The roosting height varied between 5 to 9 m in orchard area and 4 to 12 m in oil palm plantations. Red Junglefowl departed about 3 minutes earlier before sunrise and roosted about 6 minutes before sunset.

The male Red Junglefowl crowed for finding or attracting a mate and for announcing or protecting its territory. The crowing frequency was high when a non-territorial male entered the territory of a territorial male. Alarm calls were given by both sexes when there was a danger especially when predators were nearby.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah.

KAJIAN EKOLOGI AYAM (*Gallus gallus spadiceus*) HUTAN DI DALAM KAWASAN PERTANIAN

Oleh

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Satu kajian selama dua tahun telah diadakan ke atas ekologi ayam hutan (*Gallus gallus spadiceus*) di lima buah kawasan pertanian terpilih di Negeri Selangor. Pada tahun pertama (dari Ogos 1995 hingga Julai 1996) kajian telah dijalankan di tiga kawasan iaitu kawasan ladang getah, kawasan ladang kelapa sawit yang berusia 22 tahun dan kawasan dusun (kebun buah-buahan) di Universiti Putra Malaysia. Manakala pada tahun yang kedua pula (dari Ogos 1996 hingga Julai 1997), kajian dijalankan di dua kawasan ladang kelapa sawit yang berusia 4 tahun dan 8 tahun yang terletak di kawasan Estet Sungai Sedu, Selangor.

Kepadatan ayam hutan ditentukan dengan menggunakan bancian "Transek". Taburan bilangan ayam hutan adalah lebih tinggi di kawasan ladang kelapa sawit berbanding kawasan ladang getah dan kawasan dusun. Kepadatan ayam hutan di kawasan perladangan kelapa sawit yang berumur 4 tahun, 8 tahun dan 22 tahun adalah masing-masing 84.22/km^2, 27.80/km^2 dan 21.34/km^2. Manakala Kepadatan di kawasan dusun dan kawasan ladang getah adalah masing-masing 15.66/km^2 dan 6.06/km^2. Nisbah ayam jantan dan betina pula ialah 1:1.25. Bilangan arthropod yang banyak nampak seperti tidak menjejaskan bilangan taburan ayam hutan.

Empat ekor ayam hutan telah di pasang radio transmit untuk meneliti saiz kawasan rumah dan pergerakkannya dan kerja-kerja mengesan dilakukan dengan cara pemetaan kawasan dan menggunakan rangkaian segi tiga. Kajian harian dan bulanan menunjukkan bahawa kawasan rumah ayam hutan jantan adalah lebih besar saiznya daripada ayam hutan betina. Saiz maksimum kawasan rumah ayam hutan jantan adalah 312.50 hektar dan ayam hutan betina pula adalah 49.07 hektar.

Secara amnya, kajian ekologi pembiakan menunjukkan seekor ayam hutan jantan biasa ditemui bersama dengan seekor ayam hutan betina dan jarang-jarang sekali ditemui dengan dua hingga empat ekor ayam hutan betina. Sejumlah 95 sarang telah ditemui di sepanjang tempoh kajian dijalankan. Masa bagi ayam hutan membiak ialah di sepanjang tahun dengan waktu kemuncaknya pada bulan Disember 1996. Saiz minimum sekelompok telur ialah 4.08 biji telur. Tempoh pengeraman dalam kurungan adalah lebih kurang 19.5 hari. Peratus penetasan telur dalam keadaan semula jadi ialah 99% manakala kadar peninggalan sarang adalah 80%. Pemangsa bagi dan anak ayam hutan di kawasan pertanian adalah anjing liar, ular, biawak dan burung karnivor yang besar.

Untuk ekologi pemakanan pula, ia menunjukkan bahawa ayam hutan mencari makanan pada waktu pagi dan petang di kawasan yang terbuka, tetapi pada waktu yang lain ia akan mencari makanannya di bawah pokok. Ayam hutan adalah pemakan yang boleh memakan pelbagai jenis makanan, termasuk komponen tumbuhan dan haiwan. Bagi ayam hutan jantan, mereka lebih suka makan buah kelapa sawit, berbanding dengan ayam hutan betina yang lebih gemar kepada makanan komponen haiwan.

Kajian ekologi rehat ayam hutan menunjukkan, ayam hutan gemar tidur di waktu malam pada dahan yang melintang dan juga sering bertukar dahan pokok dari

semasa ke semasa. Ketinggian tempat ayam hutan tidur adalah pelbagai di antara lima hingga sembilan meter untuk di kawasan dusun dan empat hingga 12 meter di kawasan ladang kelapa sawit. Ayam hutan akan meninggalkan kawasan tersebut tiga minit lebih awal sebelum matahari terbit dan kembali ke kawasan tidurnya enam minit sebelum matahari terbenam.

Ayam hutan jantan akan berkokok untuk memikat atau mencari pasangannya dan sebagai tanda pernyataan kawasannya atau melindungi kawasannya. Frekuensi kokokannya adalah tinggi apabila ayam hutan jantan asing memasuki kawasan teritorinya. Bunyi amaran akan dikeluarkan oleh kedua-dua ayam hutan jantan dan betina apabila ada bahaya terutama jika ada haiwan pemangsa berdekatan.

CHAPTER I

INTRODUCTION

Peninsular Malaysia has 31,598 square kilometers area of land and lies near the Equator between latitudes 1° and 7° North and longitudes 100° and 119° East. It is a part of the floristic subregion of West Malesia. This subregion also known as the Sunda subregion and is bounded in the north by the Isthmus of Kra (~10° N) and Wallace's line in the east. It includes the Malay Peninsula, Sumatra, Java and Borneo. The principal forest formation of West Malesia is lowland evergreen rain forest, often referred to as Dipterocarp forest because of large number of huge trees belonging to the family Dipterocarpaceae (Whitemore, 1984). The total area under forest was approximately 45% (Anonymous, 1996).

After the Second World War, agriculture became the most important sector in the country of which rubber was the most important crop. Large areas of virgin forests were converted over into rubber estates to meet the overseas demand for rubber. The lean time in the early eighties resulted in the decline of the demand for rubber. As a result most of rubber plantations were then converted into oil palm estates. The development of monoculture plantations in place of natural forests resulted in the disappearance of most forest-dependent wildlife but some species have managed to colonize the new environment. The colonization of these species is