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NATURAL BREEDING OF BARN OWLS, *Tyto alba*, AT TUNGGAL PERKASA OIL PALM PLANTATION, AIR MOLEK, RIAU, INDONESIA

D. Adidharma¹

ABSTRACT

Tyto alba is an effective predator that can be utilized to control rats, *Rattus tiomanicus* Miller, a serious pest of oil palms (Medway and Young, 1970 ; Wood, 1985, ; Duckett, 1976, 1981, 1984; Lenton, 1978, 1980a, 1980b, 1980c, 1983, 1984). Since 1995 trials on the breeding of *T.alba* using nest boxes have been developed at Tunggal Perkasa Oil Palm Plantation and have proven that (1) Breeding of *T. alba* is easily encouraged over a large area (14, 134 Ha) by the provision of suitable nest boxes as breeding site. (2) The population of *T. alba* will increase when the number of nest boxes in the estate increased and their food were sufficient. (3) Adequate management of nest boxes plays an important role on the effectiveness of *T. alba* breeding. Having recognized that breeding of *T. alba* would encourage biological control of rats over a large area of oil palms. The oil palm industry should, therefore, direct its efforts towards protecting them with suitable nesting sites which will ensure their population and distribution.

Key words : Natural breeding, barn owls, rat, oil palms

INTRODUCTION

Barn owls, *Tyto alba*, commonly live in the tropics and sub-tropic which have spread outside warm climates by direct association with man (Voous, 1988).

The population growth of *T. alba* was influenced by the provision of nest site. Their natural nest sites have been found in hollow tree trunk, buildings with attics, temples, mosque, etc. However, natural nest sites were never likely to create a population of barn owls in oil palm plantations, since breeding of *T. alba* was limited by a shortage of natural nesting sites and they didn't build their nests. In 1969, the first breeding of *T. alba* was confirmed in the attic of the Manager's house on Fraser Estate, Kutai, Johor (Wells, 1972). In 1986, the Palm Oil Research Institute of Malaysia (PORIM) established an approach that *T. alba* densities could be increased substantially in mature oil palm plantation by the provision of artificial nesting sites or nest boxes (Smal, 1989).

Trials on the natural breeding of *T. alba*

were carried out at Tunggal Perkasa Oil Palm Plantation (PT. TPP), Air Molek, Pekanbaru, Riau since 1 995. The main approach of this trial was to breed *T. alba* as an effective and selective predator of rats, *Rattus tiomanicus* Miller (Medway and Young, 1970 ; Wood, 1 985, Duckett, 1976, 1981, 1984; Lenton, 1 978, 1 980a, 1980b, 1980c, 1983, 1984) at Tunggal Perkasa Oil Palm Plantation.

METHODS

The trial was carried out in 14,134 Ha of matured oil palms, at PT. TPP, Air Molek, Pekanbaru, Riau. PT. TPP was selected as a trial area since it previously had a history of fairly high rat population and regular baiting had been carried on a regular six monthly basis in the area.

Initially, six pairs of adult *T. alba* were taken from Indonesian Oil Palm Research Institute (IOPRI), Medan and they area introduced into six nest boxes. The nest boxes utilized in

¹ Bogor Agricultural University

trial was originally designed by Lenton (1980 b) with some modification on its pole and sites (see App. 1).

The nest boxes were placed at a density of one box to every 30 Ha, situated in shade of tree canopy. The entrance door should face down the interrow to make *T. alba* have a clear flight line. Any fronds interfering with the box, should be pruned as this will help to keep any predator away. In setting the box the floor must be dead level otherwise the eggs will roll into one corner and the adult will not be able to incubate them. A light layer of fibrous material placed on the floor of the box initially will help to prevent such eggs movement.

In order that *T. alba* may adapt to new nest boxes, they were put in the nest boxes for seven days and released them on the 8th day. Four rats would be supplied in every nest box as their daily food source.

The observation was carried out monthly to know the population growth of *T. alba* to study the biology and morphology of *T. alba*.

RESULTS

Biology

Tyto alba occupied their nest boxes in 3-4 months after they were released or leaving the nest. The owls formed monogamous pairs in the early age (8 - 12 months) and they have two or three clutches in one year.

The number of eggs laid in nest boxes varies from two to eleven, according to food availability and incubation period was 28 - 30 days. The eggs hatched asynchronously, so that the age of chicks may differ by about three weeks. The older chicks got the greater share of food that brought in by the adults. The owls fledged at eight or nine weeks, and they were fed by the parents for about one week after fledging.

The rate of increase of a barn owl population is potentially high. Each of pair of barn owls produced four to eight offsprings per annum.

Morphology

Eyes

T. alba has large eyes which are positioned in the skull and fitted with a fast corner and lens, with an iris that has a very wide range of contraction and expansion. They can see extremely well at night and a better than human beings can in broad light (Curtis, 1952).

Hearing

T. alba has massive asymmetrical ear openings which give it very special hearing power and power of sound location (Norberg, 1977, 1978). They could catch their prey using only their hearing as an indicator (Payne, 1962). In darkness, *T. alba* can locate and kill prey as long as it makes a noise by using their ears alone.

Beak

T. alba has a reasonably powerful beak, used to tear up prey to feed its young owls.

Talons

T. alba is equipped with widely spread strong talons for gripping and kill their prey.

Plumage

T. alba has a soft velvety pile to its wing feathers which are finely fringed at the edge, so that they can slide easily with the minimum of wing movement and fly very slowly in order to scan the area thoroughly with eyes and ear.



Population growth of *T. alba*

At PT. TPP with an equalable climate and plentiful food supply, *T. alba* are found breeding throughout the year. Number of eggs laid and chicks hatch are high in May'99, January'00, August'00, April'01, August'01, December'01

and low in January'99, October.99, May'00, Nopember'00, May'01, and Nopember'01.

The population growth of *T. alba* is shown in appendix 2. The total number of adults *T. alba* increased in the period of March'97 till July'98

and tend to be level from July'98 to January'99. Futhermore, the population of *T. alba* increased gradually until July 2001.



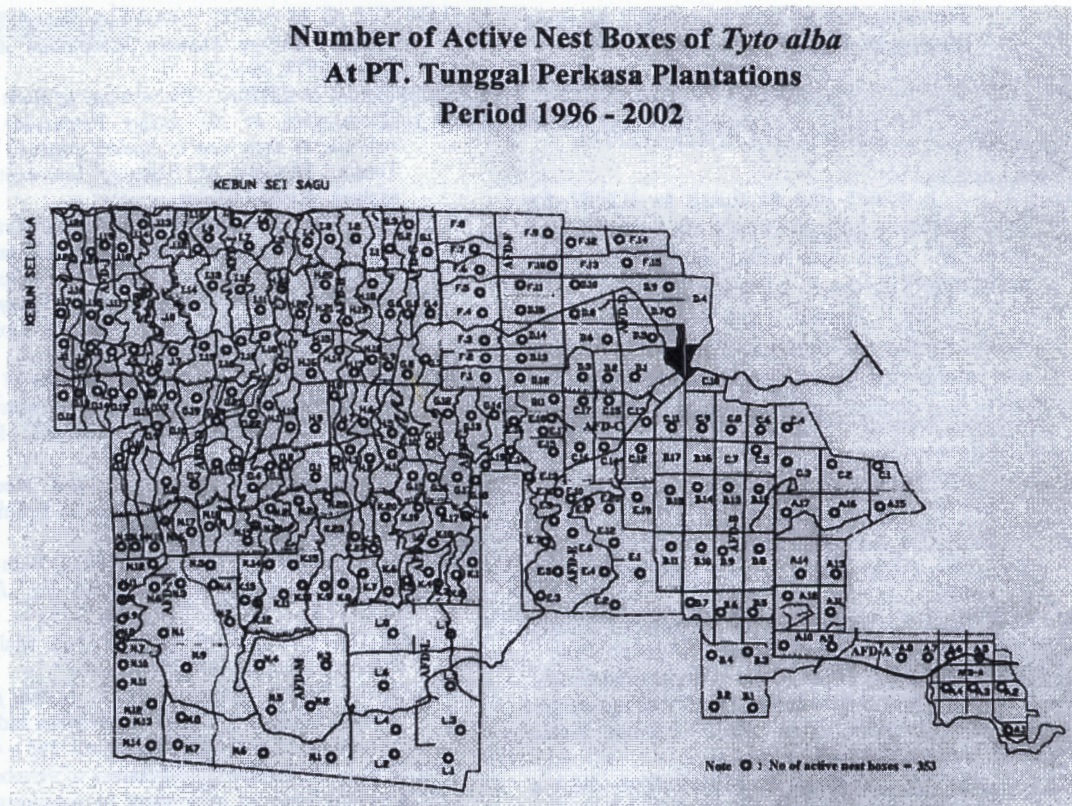


Figure 1. Map of Active Nest Boxes of *Tyto alba* at PT. Tunggal Perkasa Plantation Period 1996 - 2002

DISCUSSIONS

The successful occupation of *T. alba* at PT. TPP ecological niche was due to the tolerance to the design of nest boxes. Previous study showed that the population of *T. alba* were easily encouraged by the provision of nest boxes as breeding sites (Duckett, 1976).

At PT. TPP with an equalable climate, the number of eggs laid by *T. alba* tends to be lower in rainy season than dry season (Table 1, App 2). It might be related to the number of rats which is lower in rainy season than dry season. There is some evidence of a trend to lower population of rats arround about March to May (Wood, 1976).

At PT. TPP, the increase in distribution of *T. alba* was related to the translocation of nest boxes into oil palm areas (Figure 3.) *T. alba* appear to become very much attached to nesting site. Thus, once a breeding nucleus is

established in an area, they will take up permanent sites and continue to breed.

CONCLUSIONS

Trials on the breeding of *Tyto alba* using nest boxes carried out at Tunggal Perkasa Oil Palm Plantation, Air Molek, Pekanbaru, Riau has shown that :

1. Breeding of *T. alba* is easily encouraged over a large area (14,134 Ha) by the provision of suitable nest boxes as breeding site.
2. Adequate management of nest boxes plays an important role on the effectiveness of *T.alba*. breeding.
3. The population of *T.alba* will increase when the number of nest boxes in the estate increased and their food were sufficient.

4. Translocation of nest boxes will increase the distribution of *T. alba* at PT. TPP

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Appendix 2

Tabel 1. Population Growth of *Tyto alba* at PT. Tunggal Perkasa Plantation
Period 1996 - 2002

Period	No. of adults	No. of eggs	No. of offsprings	No of adults and offspring
Nov'96	13	0	0	13
March'96	44	0	11	55
Sept'97	114	29	20	134
Nov'97	148	48	29	177
Dec'97	172	54	11	183
May'98	222	22	8	230
July'98	222	22	87	309
Sept'98	234	5	33	267
Oct'98	240	5	31	271
Nov'98	222	27	46	268
Dec'98	238	14	50	288
Jan'99	238	14	80	318
Feb'99	176	111	106	282
March'99	224	121	74	298
Apr'99	274	112	60	334
May'99	260	317	99	359
June'99	438	231	177	615
July'99	492	280	180	672
August'99	502	234	220	722
Sept'99	488	184	268	756
Oct'99	496	53	196	692
Nov'99	548	84	96	644
Dec'99	588	213	92	680
Jan'00	616	307	138	754
Feb'00	624	215	170	794
March'00	614	213	178	792
Apr'00	616	183	123	739
May'00	624	44	34	658
June'00	612	182	97	709
July'00	656	161	84	740
August'00	690	206	124	814
Sept'00	700	206	167	867
Oct'00	698	145	147	845
Nov'00	696	78	178	874
Dec'00	704	89	61	765
Jan'01	708	129	41	749
Feb'01	726	156	80	806
March'01	728	153	128	856
Apr'01	748	194	152	900
May'01	760	105	207	967
June'01	774	183	153	927
July'01	812	181	152	964
August'01	790	204	185	975
Sept'01	790	103	186	976
Oct'01	790	78	121	911
Nov'01	802	61	65	867
Dec'01	814	169	54	868
Jan'02	818	169	71	889
Feb'02	800	121	134	934
March'02	816	152	138	954
Apr'02	816	128	117	933
May'02	816	85	96	912

Appendix 3

**TOTAL RAIN - FALL (mm) AND RAIN - DAYS
PT TUNGGAL PERKASA PLANTATIONS
P E R I O D : 1 9 9 9 - 2 0 0 2**

MONTH	Y E A R							
	1999		2000		2001		2002	
	Rain days	Rain fall (mm)	Rain days	Rain fall (mm)	Rain days	Rain fall (mm)	Rain days	Rain fall (mm)
January	18	262	7	124	12	266	14	171
February	11	181	7	85	14	111	4	12
March	18	281	6	134	11	190	7	112
April	7	130	12	310	13	317	10	101
May	10	121	7	161	10	147	9	246
June	6	104	5	147	5	136		
July	4	109	4	63	6	77		
August	7	117	5	85	5	118		
September	12	183	5	89	13	199		
October	17	327	6	132	15	128		
November	5	133	14	271	15	414		
December	8	264	10	302	8	285		



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