6. SUMMARY

The present work entitled “STUDIES ON SELECTED BIRDS OF AGRO-ECOSYSTEM IN AND AROUND MAYILADUTHURAI, NAGAPATTINUM DISTRICT, SOUTHERN INDIA” was carried out in and around Mayiladuthurai. Data for this work was collected from agricultural lands containing paddy, pulses, groundnut, cotton and sugarcane during 2004-2006.

This work was aimed at the studying the population of birds in an agro environment, prey availability, food and feeding habits, time activity pattern and breeding biology of selected birds in the agro environment.

Population studies revealed the occurrence of 64 species of birds belonging to 30 families and 13 orders. Of these 64 species, 26 were omnivores, 21 insectivores, 13 carnivores, 2 each granivores and frugivores.

Diversity of birds was studied in the paddy fields in two seasons viz., ‘Samba’ and ‘Kuruvai’ and the cultivation stages of paddy included...
ploughed lands, nursery lands, transplanted lands, tillering stage, ripe grain stage, harvested and post harvested lands. Highest bird diversity was recorded in the ripe grain stage and lowest in the transplanted lands of Samba season. However, Kuruvai season exhibited highest bird diversity values in nursery lands and lowest in ripe grain stage of 2004-2005. At the same time the second year of study period (2005-2006) had different results. ANOVA revealed significant differences in the diversity of birds between various stages of cultivations ($p<0.05$).

An attempt was also made to estimate the frequency and percent use of different food items by different bird species in the paddy fields. The results indicated that the birds of agro ecosystem feed on paddy grains, insects, crabs, fishes and frogs. Twenty five species of birds were monitored in paddy fields and their percent use of various food items cited above could be discussed which in this gave a clue as to their foraging habits.

In the case of pulse crop highest bird diversities were recorded at harvest stages and lowest in seedling stages and there existed no significant differences in different cultivation stages of pulses during 2004-2006 ($p>0.05$).
With regard to ground nut cultivation, highest bird diversities could be recorded in post harvested lands during 2005-2006 and lowest in fruiting stages during 2004-2005. ANOVA revealed significant variation between years ($p<0.05$).

With respect to banana cultivation, the diversity values of birds were more or less similar among the various stages crop and ANOVA revealed no significant variations in the different stages of banana crop ($p>0.05$).

Amidst cotton cultivation, the diversity of birds was highest in the harvest stages both the years and lowest in the flowering stages of 2005 - 2006. The annual variations were not significant ($p>0.05$).

Regarding sugarcane cultivation, highest avian diversity could be recorded in harvest stage and lowest in the nursery lands during 2004-2005. However, during 2005-2006, highest diversity values were in ploughed lands and lowest in matured stages of crops. ANOVA revealed significant yearly variations ($p<0.05$).

A study was also made to estimate the availability of prey (insect) categories in three habitats viz., agricultural lands, river banks and amidst
human habitations. The analysis indicated the occurrence of insects belonging to the order Orthoptera, Coleoptera, Hymenoptera, Hemiptera, Lepidoptera, Diptera and Odonata. Seasonal variations in the availability of prey categories were not significant ($p>0.05$) in the agricultural lands. However, the seasonal variations in the availability of prey categories were significant in river banks and human habitations.

Black Drongo and Indian Roller represented the food and feeding habits of the birds of agro environment. A total of 320 pellets of Drongo were analyzed to know their morphometric features such as length, width and weight. The pellets of Drongo had 4611 prey remains belonging to seven insect orders. Further, the analysis indicated that coleopterans were the most common prey items in the diet of Drongo. The analysis of Ivlev’s electivity index indicated that the food preference of Drongo was Coleopterans > Hemipterans = Hymenopterans > Dipterans > Orthopterans > Lepidopterans = Odonata in that order of descendence.

With respect to Indian Roller 310 regurgitated pellets were analyzed for their morphometric studies. Further, that analysis revealed the occurrence of 4203 insect prey remains. Among the insects, Coleopterans were the most dominant prey remains. Ivlev’s electivity index revealed that
the Roller preferred Coleopterans > Hemipteras > Hymenopterans = Dipterans > Lepidopterans > Orthoptera > Odonates in that order.

Among the insect orders of Black Drongo pellets Coleopterans and Lepidopterans had significant differences \( (p<0.05) \) between seasons in the agricultural lands. At the same time Hemiptera and Lepidoptera revealed significant values \( (p<0.05) \) between seasons in the river banks. But only Odonata had a significant seasonal difference \( (p<0.05) \) amidst human habitations.

Coming to Indian Roller, Hemiptera, Coleoptera and Lepidoptera showed significant seasonal differences \( (p<0.05) \) in the agricultural lands. At the river banks, Hemiptera and Odonata revealed significant seasonal variation \( (p<0.05) \). Only Lepidoptera and Odonata revealed significant seasonal variations \( (p<0.05) \) amidst human habitations.

Time activity budget of three birds namely Black Drongo, Indian Roller and Common Myna were studied. The percentage of time spent on various diurnal activities such as feeding, flying scanning, resting and other activities were evaluated in three habitats viz., agricultural lands, river banks and human habitations.
A three-way ANOVA indicated that the time activity pattern of Drongo was different between habitats, season and period of a day with respect to feeding, flying, scanning, resting and other activities. Further, the time spent on feeding by Drongo was significantly influenced by the interaction between habitats and seasons.

Three-way ANOVA indicated more or less similar trends for Indian Roller. However, the time spent on scanning was significantly influenced by interaction between habitats and seasons.

ANOVA revealed more or less similar results for Drongo and Common Myna. Further, the studies on time activity pattern of the three birds indicated that there is a bimodal feeding pattern among the birds that is one peak in the early morning hours (06:00-09:00 hrs) and another feeding peak in the evening hours (15:00-18:00 hrs).

In order to have an idea about the damage caused by the birds to the agricultural crops, a comparative study was made in natural plots and enclosed plots. In general, the yielding capacity of paddy was greater in enclosed plots than natural ones. The mean difference in the yielding capacity between natural and enclosed plots of paddy varied from 7.00 to 17.50.
In the case of pulses also the yield was higher in enclosed plots than natural plots. The mean difference of yielding between two pulses was 29.50 all the overall yielding capacity was greater in enclosed plots when compared to natural ones.

A comparison of yielding capacity of cotton in natural and enclosed plots also revealed more or less similar results. The mean difference (yielding) between natural and enclosed plots was 25-50.

Nesting characters of the three bird’s viz., Black Drongo, Indian Roller and Common Myna were studied with reference to height of the tree, nest (location) height, nest weight, tree DBH, nest circumference, cup depth, distance to agricultural lands, water source, groves, road, human habitations and distance to electric line.

The mean length, width and weight of eggs of Drongo were 2.67cm, 2.03cm and 5g respectively. The clutch size ranged from 3-5, the hatching and fledging success were 82.3% and 85.7% respectively.

Nestling growth was studied with reference to body weight, body length, bill length, bill depth wing length, wing span, tarsus length and tail
length. The chicks were monitored once in 3 days and on 24th day, the chicks of Black Drongo started leaving the nest. Almost all the variables showed a linear increase corresponding to age of chicks. However, there was a drop in weight of Drongo checks on 18th day, probably due to loss of fatty materials from the body.

The mean length, width and weight of eggs of Indian Roller were 3.60cm, 2.97cm and 13.81g respectively. The clutch size varied from 3 to 4.0. The hatching success and fledging success were 64.21 and 66.6% respectively. Nestling parameters of Roller also revealed a linear relationship corresponding to age of chicks. However, there was a drop in weight of chicks at 27th day and on 30th day and by that time the young started leaving the nest.

The mean length, width and weight of Myna eggs were 3.34cm, 2.32cm and 7.71g respectively. The clutch size ranged between 3.00 and 5.00. The hatching and fledging success were 88.3% and 83.9% respectively.

A comparison of nestling parameters of Common Myna and the age of chicks indicated almost a linear relationship. However, there was a
drop in weight on 9\textsuperscript{th} day, again on 15\textsuperscript{th} day and the trend continued till fledging of the young.

The study ends up with the management recommendations for the conservation of birds of agro-environment.