

# STUDIES ON THE AVIAN PESTS OF RICE (*ORYZA SATIVA*) IN GOA

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GOA, has diverse landscapes with lots of agricultural activities. Farming is the major occupation of people of Goa. Paddy (*Oryza sativa*), is a major food crop of the state. It is cultivated in more than 667% of the area used for food crops in this state. Generally, two crops, namely 'kharif' and 'rabi' crops of paddy are grown in a year. Rice is grown in an area of around 55,514 hectares in the state, around 41, 000 hectares during kharif and remaining during rabi. The annual yield of paddy of the state is around 1,92,104 tons.

Further, the state is bestowed with rich and diverse avifauna. Birds are important components of our ecosystem and play a major role in maintaining a natural balance in the food chain, in nature. The dual role of birds in agriculture is very well known (Ali, 1949, 1971). Although a majority of them have one or another beneficial role in the ecosystem, a considerable number of them have been identified and reported as pests of agriculture and are known to cause significant loss in the yield of various crops.

Studies carried out so far in various parts of India revealed that many species of birds form an important group of vertebrate pests of paddy (Mehrotra and Bhatnagar, 1979; Anonymous, 1990, 1992, 1997; Shyama, 1994, 1997). Birds such as Indian Baya or Weaver birds (*Ploceus philippinus*) and House Sparrows (*Passer domesticus*) damage paddy at the nursery stage and from the milky to harvest stage. Apart from this, Common Mynas (*Acridotheres tristis*)

damage paddy during the nursery stage and the Roseringed Parakeets during the milky stage to the harvest stage (Anonymous, 1992). Dhindsa and Toor (1980) have reported about the damage of the rice grains (41%) in nurseries by the weaver birds and sparrows in Punjab and its control methods. Further, they found that rice was the principal food type in the guts of three species of weaver birds of *Ploceus* species, in Punjab (Dhindsa and Toor, 1990). Parasharya *et al.* (1986) have reported a loss of around 26% during the ripening stage of paddy by various bird pests. Chandrappa and Krishnappa (1993) have reported that Jungle Crows (*Corvus macrorhynsus*) remove the seedlings of paddy immediately after transplanting, as a playful behaviour and this has resulted in a considerable loss of paddy yield in Karnataka. Spotted Doves (*Streptopelia chinensis*) and Roseringed Parakeets (*Psittacula krameri*) were found feeding on the paddy grains at the nursery stage, whereas, Streaked Weaver birds (*Ploceus manyar*) were found to feed on paddy during the milky stage in Trissur in Kerala (Anonymous, 1977).

However, no authentic detailed scientific information are available about the influence of avifauna on the productivity of paddy in Goa. This fact has encouraged the author to carryout the present work. Various species of bird pests affecting different stages of growth of paddy was studied. Further, the nature and extent of damage were studied and analysed.

## MATERIALS AND METHODS

Survey was conducted in Goa to know the varieties of damage caused to paddy crop by bird pests. Further, farmers were interviewed to know the nature and extent of bird menace they face in their paddy field and the extent of damage thereby incurred in their paddy yield. Paddy fields located at three different places (i.e. 1. Taleigao, 2. Santa cruz and 3. Merces) have been selected and the activities of birds in these areas were observed from dawn to dusk during the period of paddy cultivation. Observations were done during various stages of the growth of the plants from sowing and seedling stage to the harvest stage, through the nursery and milky stages. Varieties and number of the bird pests feeding on the paddy crop during these various stages of growth have been observed, identified and recorded. Birds were identified as per the descriptions of Ali & Ripley (1983; 1987).

**Studies on crop loss** - To estimate the amount of crop loss, from each of the above three sites, an area of 10 X 20 meters (centrally located) was selected. Each of these areas were divided into two equal halves. One half of this was covered and the crop was protected by a fishnet (hole size of 10 X 10) throughout the paddy cultivation, whereas the other half was left open and was available to the birds for predation. The amount of paddy harvested from the area covered by net was considered as the 'control value' and the paddy harvested from the neighbouring uncovered area was considered as 'experimental value'. Estimation of the crop loss in each site was done by employing the following two methods:

**Site - yield studies** : Total crop yield from the protected and unprotected areas of the same site was noted and analyzed.

**Panicle - yield studies** : Hundred panicles were collected at random from each of the protected and unprotected areas. The total number of grains present in each panicle and the total number of grain stalks present in each panicle were noted down. Number of the grains lost from each panicle is calculated using the following equation -

Grains lost = Total grain-stalks - Total grains present

Student's 't' test was employed to know the significance of each of the values of the data collected.

The above work was supplemented with the studies on the breeding biology and the gut content analysis of the nestlings of the Indian Bayas.

## RESULTS AND DISCUSSION

The varieties of birds that were found to damage the paddy crop in Goa are listed in

Table 1 : List of bird-pests of Paddy (*Oryza sativa*) in Goa

Sl. No.	Common name	Scientific name
1. (517)*	Blue Rock Pigeons	<i>Columba livia</i>
2. (550)	Reseringed Parakeet	<i>Psittacula krameri</i>
3. (1009)	Jungle Myna	<i>Acridotheres fuscus</i>
4. (1938)	House Sparrow	<i>Passer domesticus</i>
5. (1957)	Indian Baya	<i>Ploceus philippinus</i>
6. (1933)	Whitethroated Munia	<i>Lonchura striata</i>
7. (1978)	Blackthroated Munia	<i>Lonchura malacca</i>

\* = The numbers given in the parenthesis indicate the Sl.No. of the species as given Ali and Ripley (1987).

Table 1.

Blue Rock Pigeons (*Columba livia*) were found to be the major bird pests of paddy during the sowing and the seedling stage. This may be first report of these birds acting as pests of paddy at this stage of its cultivation. As reported from several places in India, Indian baya or Weaver bird (*Ploceus philippinus*) was also found to be the major bird pest of paddy in Goa from its milky stage to harvest stage. Further, House sparrows (*Passer domesticus*), Munias (*Lonchura stята and Lonchura malacca*), Roseringed parakeets (*Psittacula kramerii*) and Jungle Mynas (*Acridotheres fuscus*) were found to be the other bird pests of paddy in Goa, which are of lesser importance. They were found to damage different stages of paddy, mainly depending upon the availability of other alternative food.

The average crop loss of paddy incurred by

Table 2 : Paddy crop loss by bird-pests in Goa as per the Site-yield studies

Site	% loss in 100 sq.m. of field		
	Kharif crop	Rabi crop	Average
Taleigao	20.3*	28.6*	24.5*
Santa Cruz	23.4*	32.3*	27.9*
Mrces	25.3*	36.5*	30.9*
<b>Average</b>	<b>23.0*</b>	<b>32.5*</b>	<b>27.8*</b>

\* = Significant at 0.1% level.

Table 3 : Paddy crop loss by bird-pests in Goa as per the Panicle-yield studies

Site	% loss in 100 sq.m. of field		
	Kharif crop	Rabi crop	Average
Taleigao	22.3*	27.6*	25.0*
Santa Cruz	24.3*	29.9*	27.5*
Mrces	27.4*	34.7*	31.1*
<b>Average</b>	<b>24.7*</b>	<b>30.7*</b>	<b>27.9*</b>

\* = Significant at 0.1% level.

bird pests in different sites in Goa, as per the site-yield studies, is given in table 2, whereas the average crop loss of paddy incurred by bird pests in different sites in Goa, as per the panicle-yield studies, is given in Table 3.

These observations indicate that the damage to paddy during rabi crop is more than during the Kharif crop. This may be because of the lesser area under paddy cultivation during this season. In the present study, the reliability of panicle-yield studies employed here for the estimation of crop loss was assessed and confirmed by comparing its data with that of the site-yield studies. The results permit us to conclude that the method of panicle-yield studies can be employed for such studies, because of its simplicity and easy working. All the above values were found to be significant even at 0.1% level. Hence, it can be concluded that a very severe damage to paddy crop is done by bird pests in Goa. This in turn demands the appropriate 'bird-pest management programmes' to be launched in the state to overcome this problem.

Indian bayas were found to start their breeding activities in Goa in the months of May - June. They were found to build their nests in the vicinity of their feeding paddy fields, on the fronds of nearby coconut trees or nearby telephone wires etc. The males were found to build their nests and thereby to attract the females for mating purpose. Three to four eggs/nestlings were found in each nest. The breeding activities go on upto the month of October to November. The nestlings of Bayas were found to be fed by their parents with various arthropods, mainly the insects, either larvae or adults. Several aspects of breeding ecology of Indian weaver birds have been described by various authors (Ali, 1931; Ambedkar, 1958; Crook, 1960, 1963; Davis, 1971, 1974;

Dhindsa, 1986; Dhindsa & Toor, 1994), Many of our present observations, in general, agree with these reports.

### SUMMARY

Various "birds" act as severe pests of paddy, in the country. Although, paddy, *Oryza sativa*, is a major crop in Goa and the state hosts diverse groups of avifauna there are no authentic detailed scientific information available about the contribution of avifauna towards the productivity of paddy in this state. Above facts have encouraged the author to carry out the present work. The varieties of bird pests affecting the different stages of growth of paddy in Goa has been surveyed and studied. The nature of damage was studied. Further, the crop loss of paddy due to bird pests in Goa is estimated using site-yield studies and panicle-yield studies. Indian Baya or Weaver bird (*Ploceus philippinus*) was found to be the major bird pest of paddy in the state, feeding on the grains of paddy, starting from the milky stage upto the mature/harvest stage. Further, the paddy grains were found to be fed during the sowing to the nursery stage by many species of birds, the Blue Rock Pigeon (*Columba livia*) being the major bird pest at this stage. Roseringed parakeet (*Psittacula krameri*), Jungle myna (*Acridotheres fuscus*), House Sparrow (*Passer domesticus*), Whitebacked Munia (*Lonchura striata*) and Blackheaded Munia (*Lonchura malacca*) were found to be the other less important bird pests of paddy in Goa. These bird pests have incurred a considerable crop loss (27.85%) of paddy in the state. Breeding biology of Indian baya was studied. They start their breeding activities in May-June. Nests are built by males near the paddy fields attached to the fronds of nearby

coconut trees, nearby telephone wires etc. In an average, 3-4 eggs/nestlings were found in each nest. The breeding activities go on up to the month of October to November. The nestlings of Bayas were found to be fed by their parents with various arthropods, mainly the insects, either the larvae or adults.

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[ Received for publication on 18th June, 1997 ]

[ Revised MSS on 28th July, 1997 ]