

## DIVERSITY AND DISTRIBUTION OF INSECT PESTS OF PADDY IN GOA

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### Abstract

An extensive survey and recording of the insect pests of paddy in all the districts of the state of Goa was conducted. The pests were identified and recorded for their faunal diversity, and regional and seasonal distribution patterns.

**Key Words :** Paddy insect pest diversity, distribution, Goa

### Introduction

It is estimated that half of the world's proposed eight billion people in the next 30 years will be rice eaters, most of them living in Asia. Though there are about 40,000 paddy varieties, of which India grow about 350 varieties (Prabhudesai, 1996) there are no rice breeds of worth mentioning, which is pest tolerant/pest resistant.

In Goa, more than 70% of the agricultural land is under paddy cultivation and produces about 2,01,000 Mt per year (Anonymous, 1992). The Goa farmers generally grow two crops per year viz., Kharif or sorod and rabi or Vaingani (Gune 1979). There is a great dearth for information of several aspects such as inventory of insect pests attacking the paddy in Goa, nature and extent of damage caused by these pests, seasonal variation if any, etc., Thus the present study was undertaken.

The literature (Gune 1979), reveals that the most common pests of paddy in Goa are army worms, leaf roller, grass hoppers. Nair (1986); Pradhan(1992) and Mari (1995) have recorded about 35 species as insect pests of paddy in Goa. (Table-1).

However, to achieve the objectives such as, updating the inventory of insect pests of paddy in Goa, seasonal variation etc., the present project was undertaken.

### Material and Methods

Whole state of Goa was taken as study area. Further, for convenience, in each of the two districts of the state of Goa, all the talukas were taken as study sites. Additionally, in each taluka, two places, which are several kilometers apart were taken as study sites. In each of the sites, three plots each which are atleast, 10,000 sq.Mt. dimension were subjected for monitoring. In was also taken care to see that each of the plots are sufficiently apart, so that the insects pests movement in restricted to the same plots and do not move to other plots. The sites/plots selected in different districts and talukas are represented in Table-2. Atleast two visits were paid in every month to each of the sits/plot. Thus every plot/sites was subjected for screening during pre-planting, planting, pre-harvest and post harvest period.

The insect pests observed/encountered if any, during and of the visits were collected by following regular insect collection methods as described by Ghosh (1990).

Studies on the seasonal variation with regard to insect diversity was undertaken by studying the insects during Kharif and Rabi seasons for a span of two years (1995-1997).

### Results and Discussion

Results indicate that Goa Paddy fields are

Table-1  
Insect pests of paddy in Goa as reported in literature

S.No.	Common name	Biological name
1.	Rice grass hopper	<i>Hieroglyphus banian</i>
2.	Rice grass hopper	<i>H. negrolepictus</i>
3.	White backed plant hopper	<i>Sogatella furcifera</i>
4.	Brown plant hopper	<i>Nilaparvata lugens</i>
5.	Green leaf hopper	<i>Nephotettix aps</i> <i>Nephotettix negropictus</i> <i>Nephotettix virescence</i>
6.	White rice leaf hopper	<i>Cofia spectra</i>
7.	Zig Zag leaf hopper	<i>Rica dorsalis</i>
8.	Rice blue leaf hopper	<i>Typhlocyba maculiformis</i>
9.	Rice bug	<i>Leptocorisa acuta</i>
10.	Rice mealy bug	<i>Ripersia oryzae</i>
11.	Yellow stem borer	<i>Scirpophaga incurtulus</i>
12.	Pale headed pink borer	<i>Chilo suppressalis</i>
13.	Dark headed striped borer	<i>Chilo polychrysa</i>
14.	Rice leaf folder (Leaf roller)	<i>Cnaphalocrocis medinalis</i>
15.	Pink borer	<i>Sesamia inferens</i>
16.	Paddy gall fly	<i>Orsella oryzae</i>
17.	Rice hispa	<i>Dichladispa armigera</i>
18.	--	<i>Oxya chinensis</i>
19.	--	<i>Cofona spectra</i>
20.	Rice mealy bug	<i>Brevennis rehi</i>
21.	Rice bug	<i>Tetradia histaroides</i>
22.	Paddy root weevil	<i>Echinochmus oryzae</i>
23.	Red spotted earhead bug	<i>Menida histrio</i>
24.	Rice thrips	<i>Baliothrips bifornis</i>
25.	Horned caterpillar of rice	<i>Melantrio ledeismene</i>
26.	Rice skipper	<i>Pelopida mathais</i>
27.	--	<i>Pemara naso</i>
28.	Rice case worm	<i>Nymphura depuntalis</i>
29.	Rice swarming caterpillar	<i>Spodoptera mauritia</i>
30.	Climbing cut worm	<i>Mythimna albistigma</i>
31.	Paddy semilooper	<i>Macis frugalis</i>
32.	--	<i>Hispa stugia</i>
33.	Rice leptispa	<i>Leptispa pygmaea</i>
34.	Rice stem borer	<i>Tryporyza incurtulus</i>
35.	Gundhi bug	<i>Leptocoryza oratulus</i>

relatively less infested with the insect pests. Though the records have reported about 35 common paddy pests (Table-1), during the period of investigation, only 17 pest species were recorded (Table-4). The important pests were *Hieroglyphus banian*, *H. negrolepictus*, *Sogatella furcifera*, which were found in all most all study sites.

The Salcete taluka, which accounts for maximum paddy production in the state also harbours maximum diversity of insect pests. It is evident

from Table-3, during the period of investigation, study sites in Salcets taluka exhibits the presence of 12 species of pests during Kharif and 9 species during Rabi season in Margao sites in Salcets taluka. Verna site also showed the presence of 12 insect pest species during kharif and 5 species during Rabi. While the least paddy pest species diversity was encountered in Mormugao Taluka.

Regarding seasonal variations, with regard

Table-2  
Study Sites

District/Taluka	Place	Site	Plots	
NORTH GOA	PERNEM	Pernem	A	a1,a2,a3.
		Dargalim	B	a1,a2,a3
BARDEZ		Mapusa	A	a1,a2,a3
		Tivim	B	a1,a2,a3
BICHOLIM		Bicholim	A	a1,a2,a3
		Mulgao	B	a1,a2,a3
SATARI		Volpoi	A	a1,a2,a3
		Sanvordem	B	a1,a2,a3
PONDA		Ponda	A	a1,a2,a3
		Mardol	B	a1,a2,a3
SOUTH GOA	MORMUGOÁ	Cortalim	A	a1,a2,a3
		Sancole	B	a1,a2,a3
SALCETE		Margao	A	a1,a2,a3
		Verna	B	a1,a2,a3
QUEPEM		Quepem	A	a1,a2,a3
		Bali	B	a1,a2,a3
SANGUEM		Sanguem	A	a1,a2,a3
		Rivona	B	a1,a2,a3
CANACONÁ		Chaudi	A	a1,a2, A3
		Poinglim	B	a1,a2,a3

to immense pest attack, based on Table-3, it is evident that, there is high incidence of insect pest attack during Kharif season, than during Rabi, though the number of pest species is almost same (Table-4). The present study indicates that Goa paddy has relatively less number of recorded pest species (Table-1), and only 17 pests species were encountered during the period of investigation (Table-3). The reason for this may be the fact that, though paddy is major agricultural crop in Goa, the total area under paddy cultivation is relatively small compared to other paddy growing tracts of India. Further, as most of the farmers in Goa take one or two crops only per year (Kharif and Rabi), there is a relatively large gap as non-paddy growing season, during which the pests of paddy either have to opt for a secondary host or be eliminated. As the paddy growing tracts are sufficiently separated from each other, poses problem to the movement of pests from one field to other, which may also be one of the reasons for less pest diversity and lesser insect infestation in Goa.

Table-3 indicate that Salcete taluka ac-

counts for the maximum diversity of paddy insect pests, while Mormugoa taluka accounts for minimum insect pest diversity. The reason for maximum species diversity in Salcete and minimum diversity in Mormugoa may be because of the fact that they are known to grow maximum and minimum quantity of paddy respectively. As the large area under cultivation as in Salcete provide better prospects to the insect pest, thus insect must have succeeded in diversifying well in the area of Salcete; while the negative argument holds good for Mormugoa Taluka.

Further, as the insect pest is assured of continuous food supply (as in Salcete taluka), thus improve their fitness character, leading to higher reproductive rate, leading to overall success of the species diversity.

From the present investigations, it is evident that more insect pest species diversity is observed during Kharif season than Rabi.

Insect pests, apart from making use of other cues for selecting the host plants, olfaction is very important cue for them to select the right host species (plant or animal). As the Basmati breed

**Table-3**  
Incidence of insect pests during Kharif and Rabi in Goa

Sl.No.	Taluka	Place	Insect pests* during	
			Kharif	Rabi
1.	PERNEM	Pernem Dargalim	1,3,4,15,24 1,3,4,13,16	1,3,4,24 1,2,4,13,15
2.	BARDEZ	Mapusa Tivim	1,2,3,4,13,15,24 1,2,3,4,15,24,27	2,4,13,15 1,3,4,15,24
3.	BICHOLIM	Bicholim Mulgam	1,3,4,15,17,19 2,3,4,15,17,19,24	2,4,15,17 1,3,4,17,19
4.	TISWADI	St.Cruz  Taleigao	1,2,4,11,13,24, 25,27 1,4,5,6,11,13,15	1,2,3,11,24,25 2,4,5,6,13
5.	PONDA	Ponda Mardol	2,5,6,11,13,17,24 4,5,6,11,13,17,27	2,3,4,5,13 4,6,11,24,27
6.	SATTARI	Volpoi Sanvordem	4,5,6,11,24,27,33 4,6,11,24,25,27	4,6,11,17,24 4,6,11,24
7.	MORMUGOA	Cortalim Sancole	1,3,4,25 1,3,4,27	1,3,4 1,27
8.	SALCETE	Margam  Verna	5,6,9,11,13,17,21, 24,25,27,33 1,2,4,6,9,11,13, 17,21,24,25,33	1,4,5,11,13,17, 21,24,33 1,2,4,9,11
9.	QUEPEM	Quepem Ball	1,5,6,11,13,25,33 1,3,4,5,24,25,33	1,5,6 1,5,4,33
10.	SANGUEM	Sanguem Rivona	2,4,13,15,17 2,4,13,15,17,27	2,4,13,15 2,4,13,15
11.	CANACONA	Chaudi  Polingnim	2,9,11,17,19,21, 24 2,6,9,13,17,27	1,4,9,11 2,6,9,14,17

\*Sl.No. of the pests are as indicated in Table-1

of paddy is known for its sweet scented aroma, particularly during flowering season, the most of the insect pests from nearby area will be attracted by this. Hence, there is a heavy pest load on Basmati breed of paddy which is extensively grown in Salcete Taluka may be one more reason for high pests load in that taluka.

As the secondary hosts are one of the important source of success and continuity of life in this globe, from the observations made in this programme, it is evident from Table-3, which depicts that paddy fields found in talukas such as Pernem, Sanguem and Canacona, which are known for their relatively larger area under paddy cultivation, have less insect pest load. This may be due to their closeness to forest area (West-

ern ghats). As it is well known that nearness of forests provides the insects much needed diverse vegetation, which can act as secondary/alternate host. Thus, from Table-3 we can see that seven and six insects species were recorded from Chaudi and Polingnim (Canacona taluka) and five each pests species from Pernem and Dargalim (Pednem taluka); five and seven pest species from Sanguem and Rivona (Sanguem Taluka), which are relatively nearer to moist deciduous Western ghats. The above mentioned activity of selecting secondary/alternate host by the pest is on par with the techniques of survival by any living organism. The reason for less number of insect pest diversity in Mormugoa is because of least number of

**Table-4**  
**Insect of Paddy In Goa**

Pests reported from Goa (as per literature)	35 species (Sl.No.1-35*)
Pests recorded during the project period	1,2,3,4,5,6,9,11,13,15, 17,19,21,23,24,25,27,33 Total: 17 species
Pests not recorded during project period	7,8,10,12,14,16,18,20,22,23, 26,28,29,30,31,32,34,35 Total: 18 species
Pests recorded during Kharif	1,2,3,4,5,6,9,11,13,15,17, 19,21,24,25,27,33, Total: 17 species
Pests recorded during Rabi	1,2,3,4,5,6,9,11,13,15,17, 19,24,25,27,33 Total 16 species

\*Sl. not are as mentioned in Table-1

acrage of paddy cultivation (minimum for Goa state) and also due to non-continuous type of paddy cultivation. Added to that, most of the paddy field in Mormugoa are cultivated only once a year and hardly two times in a few fields. This finding corroborates the fact that secondary/alternate host reduces pest load on and host.

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