INTERNATIONAL JOURNAL OF PLANT PROTECTION / VOLUME 6 | ISSUE 1 | APRIL, 2013 | 151-154

IJPP

RESEARCH ARTICLE

Impact of warblers with special reference to Indian wren-warbler, *Prinia subflava* Sykes on insect pests of ragi

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ARITCLE INFO

Received : 03.01.2013
Revised : 02.04.2013
Accepted : 13.04.2013

Key **W**ords :
Indian wren-warbler,
Prinia subflava,
Streaked fantail warbler,
Cisticola juncidis,
Prinia socialis

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ABSTRACT

Insectivorous warblers, namely, Indian wren-warbler, *Prinia subflava* Sykes (IWW), streaked fantail warbler, *Cisticola juncidis* (Franklin) (SFW) and ashy wren-warbler, *Prinia socialis* Sykes (AWW) were found to frequent ragi fields. Indian wren-warbler was the most abundant and dominant species found in ragi fields when compared to other two species. Several insect pests infest ragi crop during various stages of the crop stand. Sampling of insects in ragi fields revealed a total of 23 insect taxa. The food items consumed by theses insectivorous warblers were mostly from within the ragi field itself. Seven species of insects were consumed by the nesting warblers. The food of Indian wren-warbler consisted of mainly insects (98.44%) and spiders (1.56%). The proportion of beneficial insect was only 6.29 per cent of insect pest species. The food of streaked fantail warbler consisted of insects alone (100%).

How to view point the article : Suchithra Kumari, M.H. and Subramanya, S. (2013). Impact of warblers with special reference to Indian wren-warbler, *Prinia subflava* Sykes on insect pests of ragi. *Internat. J. Plant Protec.*, **6**(1) : 151-154.

INTRODUCTION

Finger millet (*Eleusine coracana* Gaertn.), commonly known as ragi is one of the most important dry land crops in India being cultivated mainly in states of Karnataka, Andhra Pradesh, Tamil Nadu, Orissa and Maharashtra where little or no plant protection measures are adopted by the farmers. Several insect pests infest ragi crop during various stages of growth. The major pests are pink stem borer (*Sesamia inferens* Walker), ragi white borer (*Saluris inficita* Walker), aphids (*Rhopalisiphum maidis* (Fitch)), root aphids (*Tetraneura nigriabdominalis* (Sasaki)), leaf hoppers (*Cicadulina bipunctella bipuntella* (Mats.)), weevils (*Myllocerus discolor* Boh.), black hairy caterpillar (*Estigmene lactinea* Cram.) and ear head caterpillars like *Helicoverpa armigera* Walker, *Cryptoblabes aungustipenella* (Hampson) and *Archips micaceana* (Walker) (Puttarudraiah, 1982).

Verghese and Subramanya (1985) reported that insectivorous birds do frequent ragi fields Ali and Ripley (1987) also mentioned about a large number of birds frequenting cultivated areas among which Indian wren-warbler was one of the common birds found breeding in grasslands, cultivated land and in open wasteland. A number of bird species frequent cultivated fields mainly for feeding (Subramanya, 1987). Birds are general predators and exploit prey species opportunistically (Lack, 1954). The studies carried out by Khvatova (1960) and Ponznanin (1960) showed that the birds suppress many noxious insects and by enhancing nesting conditions birds could be encouraged in agro-ecosystems. The stomachs of the birds collected included insect pests inhabitating cultivated fields and in agricultural tracts, the birds play an indispensable part in the protection of crops from insects (Mason and Lefroy, 1912).

The food of Indian wren-warbler consisted of insect pests of rice and food of streaked fantail warbler comprised of insects and spiders thus making them economically important to rice crop (Subramanya, 1987). Hence, the impact of these

insectivorous warblers with special reference to Indian wren-warbler on insect pests of ragi was studied in Gandhi Krishi Vignana Kendra (GKVK) area.

MATERIALS AND METHODS

Impact of warblers on insect pests of ragi was studied in three plots in Gandhi Krishi Vignana Kendra (GKVK) *i.e.*, Millet's scheme area (1.93 hectare), GKVK entrance (6.09 hectare) and Dryland agriculture area (8.98 hectare) from August 1999. Due to delayed monsoon the cultivation of ragi extended up to November-December.

Details of the food eaten by the warblers were recorded by making direct field observations on the number and identifying the type of insects by using 10 x 50 binoculars from a close range. In addition, an emetic analysis by using antimony potassium tartarate was used to obtain the food from the nestlings based on the method designated by Prys-Jones *et al.* (1974). The emetic was administered by means of a one ml syringe and a thin flexible plastic tubing with the bird held in an upright position, the tube was inserted into the mouth and gently pushed down the oesophagous. The dose used was 0.2 ml for the nestlings of 10 days old.

The entire possible range of insects found within the study plots during the ragi crop growth period was determined by sampling insect populations. Ten sweep net samples of 20 samples at weekly intervals were used to obtain insect samples. From the data thus, obtained, the densities of economically important insect species were worked out. The insects collected by both the methods of sampling were released into the field after taking the counts.

RESULTS AND DISCUSSION

Sampling of insects in ragi fields revealed a total of 23 insect taxa. Out of these, four taxa *i.e.*, cocinellid beetle, leafhoppers, *Mylloceros* weevils and short horned grasshopper were found to occur during the entire cropping period. The insect taxa that were found to be abundant were leafhoppers, aphids, coccinellids, *Mylloceros* weevils and *Nezara viridula* nymphs (Appendix I).

The insect taxa that were found during the nesting season included coccinellid beetles, leaf hoppers, weevils, long horned grasshoppers, short horned grasshoppers, lygaeid bugs, *N. viridula*, coreid bugs and reduviid bugs and immatures of leafhopper, long horned grasshopper, coccinellid beetle and *N. viridula*. The total number of insect taxa occurring was high during tillering stage, ear head emergence and grain filling stages. During these stages of crop, the nesting activity was more due to the abundance of insects in ragi fields indicating positive correlation between the abundance of insects and nesting activity of warblers.

The food items consumed by these insectivorous warblers were mostly from within the ragi field itself. During the later stages of the crop, seven species of insects were consumed by the nesting warblers. These insect species were noticeably larger in size and soft bodied. Indian wren-warbler and streaked fantail warbler were observed to be purely insectivorous. The different food items brought to the nest by the parents in each species are presented in Table 1. The food of Indian wren-warbler consisted of mainly insects (98.44%) and spiders (1.56%). Most of the food items brought to the nest were insect pest of ragi and the beneficial insects brought to the nest included coccinellid beetle, preying mantid and spiders. The proportion of beneficial insect was only 6.29 per cent as compared to 93.71 per cent of insect pest species (Table 1). The insect diet of IWW included *Helicoverpa armigera* (79.36%), coccinellids (3.17%), *Plusia signata* larvae (7.94%), pentatomid bug (4.76%), preying mantid (3.17%) and *N. viridula* (1.58%).

The food of streaked fantail warbler consisted of insects alone (100%). The insect diet of this species included *Helicoverpa armigera* larvae (50 per cent) and noctuiid moth (50 per cent). Similar observations were made by Verghese and Subramanya (1985) and Subramanya (1987) where in major portion of the insect food of Indian wren-warbler and streaked fantail warbler was mainly made up of lepidopteran and orthopteran prey.

Despite the use of emetic antimony potassium tartarate

Table 1 : Different food items brought to the nest by warblers

Food items	Status	Mean field abundance		Indian wren-warbler		Streaked fantail warbler	
		Sweep net	Fixed 1 m^2 plot	No. consumed	%	No. consumed	%
Helicoverpa larvae	Pest	-	12.3	50	79.36	1	50
Coccinellid beetle	Beneficial	13.2	23.7	2	3.17	-	-
Plusia signata larvae	Pest	1	6.2	5	7.94	-	-
Pentatomid bug	Pest	0.5	0.9	3	4.76	-	-
Preying mantid	Beneficial	0.2	-	2	3.17	-	-
Nezara viridula	Pest	8.1	9.9	1	1.58	-	-
Noctuiid moth	Pest	-	-	-	-	1	50
Spider	Beneficial	-	-	1	1.56	-	-

for obtaining food samples from 14 nestlings, the gut contents could not be obtained since these nestlings did not regurgitate the gut content. As a consequence, supporting data on the diet of the nesting species could not be obtained.

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