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NEW APPROACH TO STUDY OF CROP PRODUCT IN PEARL-MILLET BY BIRD PEST IN PATAN DISTRICT

¹K.B.PATEL, ²M.M.PATEL AND ²R.N.PATEL

¹DEPT. OF BIOLOGY, SHETH M.N.SCIENCE COLLEGE, PATAN

²DEPT. OF CHEMISTRY, SHETH M.N.SCIENCE COLLEGE, PATAN

kbpatel1970@gmail.com

ABSTRACT:

Pearl millet *Pennisetum typhoides* is the main important cereals heavily depredated by birds. Seeds of these crops are exposed and so attract several bird species during the entire Period of seed setting to harvesting stage and so suffer heavy losses. About 36 species are reported in pearl-millet crop at different stages during morning and evening hours. In the study area, total 141 species belong to 96 genera belong to 42 families are recorded and 86 species are reported to depredate on various agricultural crops. Various crop protection methods usually employed in the cultivators field's for birds *viz.* are beating empty tins, using scare crows, tying Polythene bags on the poles and using sound producing crackers. However, these methods are not reputed to bring permanent relief for the farmer and there for, a safe and economic method must be sought to reduce the damage. During the research work, field experiments were conducted during two consecutive seasons *viz.* Kharif and summer of 2004-2006 at the Hansapur village in the Patan district. During summer and kharif seasons of 2004-06, under assigned methods are applied for bird damages :

(i) Reflective ribbon, (ii) Scare crow and (iii) Control.

Percentage of avoidable losses in grain yield of Pearl-millet crop due to pest complex after various treatments were worked out on the basis of pooled results of grain yield by using formula suggested by Khosla (1977).

KEY WORDS: *Approach, Crop Product, Pearl-Millet, Bird Pest, Patan District.*

INTRODUCTION :

Pearl millet is main crop of the Patan district of Gujarat state. It is grown in two seasons *viz.* Kharif and summer. This research was conducted during 2004 and 2006 at Hansapur village of Patan district. Two varieties *viz.* Usha-23 and Pioneer of Pearl millet were sown for study purpose. The farmers cultivating pearl-millet are poor and depend mainly on these crops for food and fodder. Generally these crops suffer minimum or undamaged insect pests. During

the grain formation. Stage to harvesting stage however, a lot of birds are attracted to these crops and so suffer heavy losses. During this research work, various birds found feeding on these crops were observed with the help of field binoculars. Various crop protection methods usually employed in the cultivators fields for birds viz. are beating empty tin, using scare crows, tying polythene bags on the poles and using sound producing – crackers. However these methods are not reputed to bring permanent relief for the farmer and there for, a safe and economic method must be sought to reduce the damage. Survey for the bird pests of Pearl-millet crop and needs protection treatment of damage in cultivators field was conducted during 2004-2006 at Patan district.

STUDY AREA :

Patan district is located in Northern part of the state. It is located $23^{\circ} 41'$ to $23^{\circ} 55'$ North latitude and $71^{\circ} 31'$ to $72^{\circ} 20'$ east longitude. The survey on bird fauna was conducted in 7 talukas and 2 sites in each taluka have been selected for the study purpose and large number of bird species were noticed observation for the bird fauna infesting millet crop nature and extent of damage by the bird pests was carried out in the experimental plots of the Hansapur village at Patan district during summer and Kharif seasons of 2004-06.

MATERIAL AND METHODS :

The field having crop of Pearl-millet was randomly selected from each site. Birds were identified and counted using binocular twice in day during the crop season. The observations were recorded for hour duration and made during morning and evening hours. Birds were identified as per the descriptions of Ali and Replay (1983, 1987). In April 2005, fourteen villages in Patan district which is a major belt for this crop were surveyed. The varieties grown in these areas were Usha-23, MH-179 and pioneer of bajara. To estimate the amount of crop loss from each of the above Three plot, an area of each plot was 6.00 mt x 5.00mt

Method of recording observations:

- Number of earheads damaged were counted and recorded at the time of tillering stage.
- Number of earheads damaged by birds and insects were sorted out from the total earheads nipped from a plot were counted and reported.
- Yield of grain the earheads damaged by birds and insects were separated then sundried and threshed. The grains were cleaned and weighted separately and recorded. Also undamaged earheads were sundried and threshed; the cleaned grains were weighted and recorded separately.

- Bird observation : Birds present in each plot were observed at different stage viz. milk, dough, maturity stage and harvesting stage recorded in each plot.
- Bird pest management during summer and kharif seasons of 2004-2006, following treatments were evaluated.
 - i) Reflective Ribbon
 - ii) Scare crow
 - iii) Control

RESULTS AND DISCUSSION :

For the birds causing damage to Pearl-millet crop at different stages of its growth, survey was conducted in 7 taluka and 2 sites in each talukas have been selected for the study purpose and large numbers of bird species were noticed. Bird pests at tiller stage and assessment of loss observation for the bird Fauna infesting Bajara crop, nature and extent of damage by the bird pests was carried out in the experimental plots of the Hansapur village at Patan District during summer and Kharif 2004-2006, under unscarred conditions (where no bird scaring was employed). The damage by bird pests to the Bajara crop is assessed by taking counts of the healthy and damaged tillers at the time of harvest. Experiment trials conducted Kharif and summer 2004-2006 at Hansapur village. showed that under protected with reflective ribbon, protected with scare crow and control.

Table 1:Percentage of Damage to Pearl-millet earheads during Kharif 2005-2006.

Variety	Assessment of damage to Pearl-millet tillerstage treatments	Plot Size (in mt.)	No. of earheads			Percentage of damaged
			Healthy	damaged		
				Bird	Insect	
Pioneer	Reflective ribbon	6.00 x 5.00	589	70	21	10.29
Pioneer	Scare crow	6.00 x 5.00	516	101	54	15.05
Pioneer	Control	6.00 x 5.00	454	199	22	29.48

Table 2:Percentage loss in Pearl-millet yield during Kharif 2005-2006.

Assessment of damage to Pearl-millet tillerstage treatments	Plot Size (in mt.)	Grain yield Plot/Treat Kgs	Percentage of avoidable loss in yield of grains
Reflective ribbon	6.00 x 5.00	5.65	8.87
Scare crow	6.00 x 5.00	4.79	22.74
Control	6.00 x 5.00	5.19	16.29

Table 3:Percentage of Damage to Pearl-millet earheads during Summer 2004-2005.

Variety	Assessment of damage to Pearl-millet tillerstage treatments	Plot Size (in mt.)	No. of earheads			Percentage of damaged
			Healthy	damaged		
				Bird	Insect	
Pioneer	Reflective ribbon	6.00 x 5.00	934	67	29	8.50
Pioneer	Scare crow	6.00 x 5.00	850	97	91	9.34
Pioneer	Control	6.00 x 5.00	864	135	34	13.09

Table 4:Percentage loss in Pearl-millet yield during summer 2004-2005.

Assessment of damage to Pearl-millet tillerstage treatments	Plot Size (in mt.)	Grain yield Plot/Treat Kgs	Percentage of avoidable loss in yield of grains
Reflective ribbon	6.00 x 5.00	6.21	20.08
Scare crow	6.00 x 5.00	6.62	14.80
Control	6.00 x 5.00	5.47	29.60

(where no bird scaring was employed) conditions the birds’s damage to earheads could go to 8.50 to 10.29% in reflective ribbon plots as compared with 9.34 to 15.05% in plot with scare crow and compared with 13.9 to 29.48 %in plot with control. The losses in grains yield per plot/ treatment kgs. gram in these three treatments worked out to 5.65 to 6.21 kgs. and 4.79 to 6.62 kgs. and 5.19 to 5.47 kgs. respectively. Percentage of avoidable loss in yield of grains in these three treatments worked out to 8.87 to 20.08% and 14.80 to 22.74% and 16.29 to 29.60% respectively. The percentage of earheads damaged due to birds differed significantly and as such minimum bird damage was found in the treatments of reflective ribbon followed by scare crow. Highest bird damage was found in control plot. The grain yield was significantly higher in plots covered with reflective ribbon. Yield loss varied in different pearl millet crop and between the seasons which may be due to the variation in bird population as well as insect pests.

Table 5:Birds visiting pearl-millet crop at different stages during morning and evening hours.

Sr. No	Bird species	Germination		Tillering		Milky		Dough		Grain maturity		Harvesting	
		K	S	K	S	K	S	K	S	K	S	K	S
1.	Cattle Egret	27	19	-	-	-	-	-	-	-	-	90	76
2.	Black Ibis	7	-	-	-	-	-	-	-	-	-	30	17
3.	Black Headed Ibis	13	-	-	-	-	-	-	-	-	-	-	-

4.	Indian Peafowl	16	12	-	-	1	-	-	-	-	-	-	-
5.	Grey Francolin	31	21	11	10	-	-	-	-	-	-	-	-
6.	Red Wattled Lapwing	20	16	14	6	-	-	-	-	-	-	21	25
7.	Blue Rock Pigeon	29	39	-	-	-	-	-	-	-	-	74	120
8.	Eurasian Collared Dove	22	20	-	-	-	-	-	-	-	-	25	75
9.	House Sparrow	12	13	-	-	77	50	23	20	60	59	32	66
10.	Red Collared Dove	17	10	-	-	-	-	-	-	-	-	30	85
11.	Spotted Dove	6	3	-	-	-	-	-	-	-	-	-	-
12.	Laughing Dove	19	25	-	-	-	-	-	-	-	-	73	16
13.	Crow Pheasant	7	6	6	7	-	-	-	-	-	-	-	-
14.	Black Drongo	17	18	-	19	21	18	24	22	56	52	38	60
15.	Common Myna	25	26	21	9	24	26	19	20	73	56	94	136
16.	Bank Myna	53	55	28	13	25	20	18	16	76	50	98	109
17.	House Crow	62	35	19	12	14	13	17	22	74	48	58	40
18.	Yellow-eyed Babbler	26	15	48	26	48	44	35	34	107	55	84	95
19.	Common Babbler	70	-	35	50	22	27	25	33	86	75	61	70
20.	Large Grey Babbler	4	4	-	-	-	-	-	-	-	-	-	-
21.	Jungle Babbler	2	1	-	-	-	-	-	-	-	-	-	-
22.	Indian Robin	4	3	7	4	-	-	-	-	-	-	-	-
23.	White Wagtail	8	5	-	-	-	-	-	-	-	-	-	-
24.	Tailor Bird	-	-	10	21	-	-	-	-	-	-	-	-
25.	White-eared Bulbul	-	-	9	12	28	22	37	24	29	39	12	23
26.	Red-vented Bulbul	-	-	23	26	55	37	51	40	58	42	28	37
27.	GreenBee-eater	-	-	33	15	-	-	-	-	-	-	-	-
28.	Baya Weaver	-	-	-	-	13 8	10 0	80	75	131	143	41	25
29.	Munia	-	-	-	-	13 9	13 0	140	12 8	216	137	46	36
30.	Rose-ringed Parakeet	-	-	-	-	19 3	16 8	170	16 5	313	241	63	38

31.	Purple Sunbird	-	-	-	-	14	10	-	-	-	-	-	-
32.	Asian Koel	-	-	-	-	8	3	-	-	-	-	-	-
33.	Black-headed Bunting	-	-	-	-	-	-	-	-	34	-	-	-
34.	Red-headed Bunting)	-	-	39	-	-	-	-	-	18	-	-	-
35.	Brahminy Starling	-	-	-	-	-	-	-	-	26	-	-	-
36.	Rosy Starling	-	-	-	-	-	-	-	-	61	-	-	-
Total		497	346	303	230	807	668	639	599	1418	997	998	1149

In the study area, total 141 species belong to 96 genera belong to 42 families are recorded and 86 species are reported to depredate on various agricultural crops. During the grain ripening stage. The bird pests attack the pearl-millet crop and remove the maturing grains from the earheads, with their beak, leaving the glumes intact. The birds visiting Pearl-millet crop during various stages was recorded during morning and evening hours and each species of birds was worked out separately (Table:5). Perusal of results revealed that in all 36 species of birds visited Pearl-millet crop during various stages. Among germination stage, maximum species of Bank Myna (108) and minimum species of Black Ibis (7). During tillering stage maximum species of Common Babbler (85) and minimum species of Indian robin (11). During milky stage maximum species of Rose ringed parakeet (361) and minimum species of Indian Peafowl (1). In dough stage maximum species of Rose ringed parakeet (335) and minimum species of Common Myna (39). During grain maturity stage maximum species of Rose ringed parakeet (554) and minimum species of Red headed Bunting (18). in harvesting stage maximum species of common myna, Bank myna and Yellow eye Babbler (230) and minimum species of White eared Bulbul (35).

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