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Ecofriendly management of Birds in Pearl millet

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ABSTRACT

Field experiment was conducted at AINP on VPM, PJTSAU, Hyderabad during Rabi 2023-24 to evaluate the eco-friendly bird management methods on pearl millet. Five treatments were replicated four times in RBD with MPMH 21hybrid sown at a spacing of 45x15cm in plot size 5x5m. Treatments were imposed at the milkygrain stage. Neem oil@25ml/l, Deepam oil@25ml/l Salt@25g/l, Ginger+garlic@30ml/l and were tested along with one untreated control. Among these, Salt proved to be the best as percent bird damage recorded was 27.5 followed by Deepam oil spray(37.5) as against 67.5 % in control. The highest yield of 1790kg/ha was recorded in the best treatment. Highest number of birds visiting the crop at the ripening stage were Spotted munias(25%) followed by house sparrows and Baya weaver birds to the extent of 19 to 20 percent. The diversity index shows that the bird diversity was moderate

Keywords: *pearlmillet(bajra), Birds, Management, Salt, Deepam oil, Neem oil*

INTRODUCTION

Pearl millet [*Pennisetum glaucum* (L.) is the fifth most important cereal crop in the world after rice, wheat, maize and sorghum. It is being cultivated over 30 million ha worldwide, with area of >10 million ha in Asia. It is used as a staple food for human consumption, as fodder and as feed in livestock sector. It is also used in industries such as alcohol and fuel, starch and processed food sectors. Being a climate-resilient crop, pearl millet is very important in mitigating the adverse effects of climate change facilitating income and food security among farming communities of arid regions. It shows rapid growth with least inputs, possesses high photosynthetic efficiency, inheritably good and balanced nutritional profile, and tolerance to biotic stresses. It can survive in the harshest conditions including low soil fertility, high soil pH, high soil Al saturation, low soil moisture, high temperature, high soil salinity, and scanty rainfall. Its tolerance to drought, heat and soil salinity along with its higher water use efficiency makes it a climate-smart crop. Bajra is also an important crop from a nutritional point of view. It contains about 15.6% protein, 5% fat and 67% carbohydrate. Currently, India is the leading commercial producer of pearl millet, followed by China and Nigeria[3]. During 2020-21, pearl millet was grown in 7.41 million ha with productivity of 1391 kg/ha (3rd advanced estimate of 2020-21[2]. Birds are most serious problem in the cultivation of pearl millet, which substantially reduce the yield levels if not controlled. Bird damage is severe if the crop is grown in isolated areas, off-season seed production plots, or if grown on the small area in a village. Birds readily consume Pearl millet seed off the plants in the field. Patel[5]recorded 4-9 percent seedling damage in pearl millet due to birds.

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Losses can be severe in small fields or when harvest is delayed for an extended period after maturity. Bird scares needed from sunrise to sunset from 10 days after flowering till grain harvesting for the control of bird damage. Usually, farmers protect the crop by shouting and moving around in the field or making sounds by beating a metal plate or by using an automatic phosphate gun to scare away the birds. Use of cultivars, which have long panicle bristles that restrict the bird damage to some extent[7] various bird killing techniques are used such as chemical repellent, net, spike guards, traditional methods such as shooting the birds with gunshot, making sound with help of crackers in order to scare birds[4]. All these bird management methods are less effective and cause great damage to certain threaten species and migratory bird which produce an adverse effect on conservation of biodiversity on a local, regional and global scale. Crop monitoring, early planting and timely harvesting are essential to minimize bird damage. An attempt has been made to study the eco-friendly inputs to manage the birds in pearl millet.

MATERIAL AND METHODS

Field experiment was conducted at AINP on VPM office premises, Prof Jayashankar Telangana State Agricultural University, Hyderabad during *Rabi* 2023-24 to evaluate the eco-friendly bird management methods on pearl millet. Five treatments were replicated four times in Randomised Block Design with MPMH21 hybrid sown at a spacing of 45x15cm in plots of size 5x5m.Treatments were imposed at the milky grain stage. Neem oil@25ml/l,,Deepam oil@25ml/l, Salt@25g/l, Ginger+garlic@30ml/l and were tested along with one untreated control. Data on Yield and Damage per cent(angular transformation)was recorded and subjected to statistical analysis. Data on a number of birds visiting the field was recorded in the morning and evening hours and diversity indices were calculated.

RESULTS

Among the treatments tested, salt@25ml/l was proved to be the best in reducing the bird damage to an extent of 27.5% followed

by Deepam oil@25ml/l in which bird damage was 37.5% as against control plot wherein 67.5% damage was recorded. All the treatments were significantly different from each other. The highest grain yield ie, 1790kg/ha was obtained in the best treatment. Lowest yield of 837.5kg/ha was recorded in the control plot. Highest number of birds visiting the crop at the ripening stage were Spotted munias. House sparrows and Baya weaver birds were also high to the extent of 19 to 20 per cent respectively. Diversity index shows that the diversity was moderate.

Shannon-Wiener Diversity index=-1.949 [<1.5=Low; 1.5 to 3.5=Moderate; >3.5=High] A diversity index is a quantitative measure that reflects how many different types of species are there in a community. Margalef's species richness index=1.415[Species richness is a measure for the total number of species in a community. Pielou's eveness index=0.2166 [Ranges between 0 to 1] Evenness expresses how evenly the individuals in a community are distributed among the different species

DISCUSSION

Reports that these products are applied on pearl millet are not available except one recommendation that NSKE5% application on panicle to save the damage from birds[1]. The extent of damage due to birds in terms of earheads was 24.01% in Kharif and 11.98% in summer under unprotected conditions in the field[6]. [5]reported that Babbler, Pigeon, Myna and crows were the highest number of birds visiting the bajra crop in Patan district, Gujarat. The house sparrow is the most common bird pest of pearl millct in arid tracts of western Rajasthan and scaring by various means is usually the only practice of control adopted by farmers in India. It is [8] believed that awned varieties and those in which anthers remain stuck to the ears for longer periods are less damaged by birds. *Pearl millet* should be harvested as early as possible to minimize losses due to *birds*. Varieties did not differ significantly in the preference by house sparrows. Maximum damage (27.01 %) was in PHB 10 and the minimum (13.08%) in PHB 14 [10]. Pearl millet hybrid MPMH-17 was found safe from bird damage at all farmers' field as it has awns on the ear head[9]

Future scope of study: It can be tested in large areas in farmers fields.

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Table1: Efficacy of treatments on bird damage and yield in pearl millet

DOS:13.12.2023 spray: 19.2.2024 DOH: 20.3.2024			
	Treatments	Mean Damage%	Yield (Kg/ha)
T1	Neem oil@25ml/l	42.5(40.66)	1394.5
T2	Deepam oil@25ml/l	37.5(37.73)	1560
T3	Salt@25ml/l	27.5(31.59)	1790
T4	Ginger+garlic@30ml/l	56.25(47.14)	980
T5	Control	67.5(55.23)	837.5
	CD	0.979	124.3

Table 2:Number of birds visiting on Bajra crop during ripening stage

S No.	Name of bird species	Total	Relative abundance(%)
1	House Sparrow	55	19
2	Spotted Munia	72	25
3	Baya Weaver	57	20
4	Common Myna	21	7
5	Common Babbler	6	2
6	Ring Dove	19	7
7	House Crow	30	11
8	Redvented Bulbul	12	4
9	Rosy pastor	13	5

REFERENCES

1. Anonymous2014 NIPHM
2. Anonymous,2022.Pearl Millet News ICAR–AICRP on Pearl Millet,Rajasthan,
3. Anonymous Rajasthan agricultural competitiveness project- Value Chain Analysis-Bajra
4. Kale M, Berit Balfors, Ulla Mörtberg, Prosun Bhattacharya and Sanjay chakane (2012) Damage to agricultural yield due to farmland birds, present repelling techniques and its impacts: an insight from the Indian perspective.Journal of Agricultural Technology. 8(1): 49-62
5. Patel KB (2010) Damage in seedling and germinating stages of pearl millet due to bird pests in patan district. J. Env. Bio-Sci; 24 (2): 227-229,
6. Patel KB(2014) Damage of pearl millet by birds J. Env. Bio-Sci; 28 (2): 257-259
7. Rai KN, Ashok S Alur, Ravinder Reddy Ch, Kalapande HV, Sanjay N Birajadar, Varaprasad Reddy KM and Rajashekhar Reddy A(2007)Pearl Millet Production Technologies for Andhra Pradesh and Maharastra. Global Theme on Crop Improvement. ICRISAT.16 pp
8. Singh M. Nl Joshi (1988) pearl millet in arid zone .CAZRI,Jodhpur
9. Singh I, M Kumar, G Singh, P Kumari, S Kumari, A Karel, SK Singh, PP Rohilla (2019). Performance of newly released pearl millet hybrid MPMH-17 for rain-fed area in Rajasthan. Indian Farming.69(05): 16–17
10. Verma SK (1984)Bird damage to pearl millet crop at jodhpur.Indian J.Plant Protn;12:57-58.