

Screening of *finger millet* varieties against major insect pests at Odisha

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ABSTRACT

An experiment was conducted to study the insect pest population in finger millet crop and presence of beneficial insects at the Centre for Pulse Research, Berhampur, OUAT, Odisha under All India Coordinated Small Millet Improvement Project during Kharif, 2013 which included 32 number of Initial Varietal Trials entries and one local check. The results indicated that the infestation due to grasshoppers ranged from 0 to 4.6%, due to aphids ranged from 0 to 7.4% and infestation of panicles varied from 1.4% to 12.4%, and due to stem borer infestation the percentage of 'Dead Heart' was noted 0 to 20.1% in different entries. Among different types of naturally available beneficial fauna in ragi, the spiders and coccinellids are predominant one.

Keywords : Coccinellids, dead heart, finger millet

Finger millet popularly known as 'Ragi' is the most popular one among the small millet group (Finger millet, Kodo millet, Foxtail millet, Barnyard millet, Proso millet and Little millet). It is the crop of antiquity and known for their suitability to dry lands, hill and tribal agriculture. Its unique nutritional properties particularly high fibre content, quality protein, mineral compositions contribute significantly to nutritional security. They require small quantity of water, mature early and are well suited for cultivation under adverse conditions. The resilience exhibited by this crop is helpful in their adjustment to different ecological situations and make them ideal crop for climate change and contingency planting. They are emerging as important crop for developing functional foods for the expanding diabetic and obese populations of India. The productivity of finger millet in India is 1396 kg ha⁻¹. Next to rice, finger millet is the 2nd important food crop of the state occupying around 169.22 thousand hectare with a production of 151.42 thousand tones and productivity of 895 kg ha⁻¹. In India a long series of studies to improve the use of minor millets among very poor farmers has multiple beneficial impacts on yield, income, profit, nutritional value (Adhikary *et. al.*, 2013). Apart from these qualities, this crop is an ecological niche of many beneficial organisms. Finger millet as such does not need any specific plant protection measure.

The insect pest population in finger millet crop and the presence of beneficial insects was evaluated at the Centre for Pulse Research (CPR), Berhampur, OUAT, Odisha under All India Coordinated Small Millet Improvement Project (AICSMIP) during Kharif, 2013. The experiment included 32(Thirty two) number of Initial Varietal Trials (IVT) entries and one local check.

Short communication

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It was replicated thrice in RCBD design. Seedlings of 25 days old were transplanted on 5th September, 2013. Recommended dose of fertilisers @ 40:20:20 kg N, P₂O₅ and K₂O ha⁻¹ were provided and no plant protection chemicals were given to ensure the natural biodiversity of insects.

The observations taken on percentage plants and leaves damaged due to grasshoppers at 30-35 DAS, due to stem borer infestation (% dead heart) at 45 DAS and the percentage plants and panicles infestation by aphids was taken at 30-35 DAS. The population of spiders and ladybird beetle per meter square was also counted. Reaction of finger millet varieties to stem borer and caterpillar insect pests was studied by Dhamdhare, *et. al.*(1988).

The plants infested due to grasshoppers ranged from 0 to 4.6% in different entries and the percentage of leaves affected per plant ranged from 0 to 18.5% in different tested genotypes. Due to aphids, the infestation of plant ranged from 0 to 7.4% and the infestation of panicles varied from 1.4% to 12.4% respectively. The percentage 'Dead Heart' due to stem borer attack ranged between 0 to 20.1%. The varieties named IGRFM 08-4, VL 352, GPU 88, TNEC 1234, KMR 344, DHFM V 10-2-1, GK 1, VL 376, GPU 89, PPR 1040, GK2 recorded lower incidence of infestation (<5%) by major insect pests.

Among the different types of naturally available beneficial fauna in ragi, the presence of spiders and coccinellids are predominance. Insecticides are not recommended for control of aphids as the predators of Coccinellidae and Syrphidae family are very active in the field (Jagdish *et. al.*, 2008). Up to 5.3 numbers of spiders m⁻² were observed among the entries. The fingers of ragi provide a perfect niche for breeding and shelter to these spiders who take vital role in natural insect pest

Table1:Incidence of insect pests in finger millet entries of IVT at Berhampur (Odisha) during 2013-14

Entry No.	Entry name	Grasshopper incidence at 30 - 35 DAS		Aphid incidence		Stem borer incidence	No. of predatorsm ⁻²	
		Affected plants (%)	Infested leaves (%)	Affected plants at 45 DAS (%)	Affected panicles (%)	Dead head (%)	Spiders	Lady bird beetles
1	KRI 013-11	3.8(2.07)	8.7(3.03)	7.4(2.81)	12.4	0(0.71)	2.31(6.7)	5.7
2	VR 990	3.9(2.10)	10.5(3.32)	1.8(1.52)	5.6	0(0.71)	1.0(1.22)	1.3
3	GPU 91	1.7(1.48)	6.7(2.68)	7.3(2.79)	11.2	0(0.71)	3.7(2.05)	5.3
4	BR 45	0(0.71)	0(0.71)	3.6(2.02)	8.5	1.8(1.52)	4.3(2.19)	3.3
5	IGRFM 08-4	0(0.71)	0(0.71)	0(0.71)	2.3	2.5(1.73)	2.7(1.79)	2.3
6	VL352	0(0.71)	0(0.71)	0(0.71)	1.6	0(0.71)	1.3(1.34)	1.0
7	KRI 013-18	2.3(1.67)	8.4(2.98)	3.4(1.97)	8.1	2.4(1.70)	4.0(2.12)	4.3
8	GPU88	0(0.71)	0(0.71)	0(0.71)	1.4	0(0.71)	2.7(1.79)	0.7
9	BR 90	2.8(1.82)	9.6(3.18)	2.5(1.73)	6.7	1.8(1.52)	3.0(1.87)	3.7
10	TNEC1234	1.5(1.41)	7.5(2.83)	0(0.71)	2.0	0(0.71)	4.3(2.19)	1.3
11	KMR344	4.2(2.17)	15.8(4.04)	0(0.71)	1.8	0(0.71)	0(0.71)	0.7
12	DHFMV10-2-1	1.7(1.48)	9.4(3.15)	0(0.71)	1.5	0(0.71)	2.7(1.79)	0.3
13	GK1	0(0.71)	0(0.71)	1.8(1.52)	2.8	1.6(1.45)	3.0(1.87)	1.3
14	VL376	2.8(1.82)	7.6(2.85)	0(0.71)	2.1	0(0.71)	1.3(1.34)	1.0
15	GPU92	0(0.71)	0(0.71)	1.6(1.45)	6.9	0(0.71)	0(0.71)	4.7
16	GPU67	1.6(1.45)	6.5(2.65)	0(0.71)	1.9	0(0.71)	2.3(1.67)	0.7
17	TNEC1256	0(0.71)	0(0.71)	1.5(1.41)	6.4	10.2(3.27)	4.3(2.19)	4.6
18	PPR 1044	0(0.71)	0(0.71)	2.0(1.58)	6.7	4.7(2.28)	0(0.71)	5.0
19	OEB265	2.9(1.84)	8.6(3.02)	2.8(1.82)	7.6	3.4(1.97)	3.0(1.87)	2.0
20	KMR316	0(0.71)	0(0.71)	0(0.71)	2.8	6.5(2.65)	1.3(1.34)	1.3
21	GPU89	0(0.71)	0(0.71)	0(0.71)	2.3	1.6(1.45)	0(0.71)	2.3
22	VL384	1.6(1.45)	6.4(2.63)	1.5(1.41)	5.7	0(0.71)	2.3(1.67)	4.0
23	GPU45	4.6(2.25)	18.5(4.36)	0(0.71)	2.1	0(0.71)	5.3(2.410)	2.0
24	PPR1040	0(0.71)	0(0.71)	0(0.71)	1.8	0(0.71)	0(0.71)	0.3
25	GPU90	0(0.71)	0(0.71)	3.2(1.92)	7.6	1.8(1.52)	2.7(1.79)	4.7
26	GK2	2.7(1.79)	7.0(2.74)	0(0.71)	2.4	0(0.71)	1.3(1.34)	3.0
27	WN259	0(0.71)	0(0.71)	3.7(2.05)	10.2	0(0.71)	1.7(1.48)	6.7
28	KMR228	0(0.71)	0(0.71)	0(0.71)	2.4	5.7(2.49)	0(0.71)	1.3
29	VR708	1.5(1.41)	5.8(2.51)	1.8(1.52)	9.4	2.6(1.76)	4.0(2.12)	5.7
30	DHFMV78-3-1	0(0.71)	0(0.71)	0(0.71)	2.7	5.3(2.41)	0(0.71)	2.0
31	GPU93	0(0.71)	0(0.71)	2.5(1.73)	9.8	20.1(4.54)	2.3(1.67)	7.3
32	KOPN939	1.9(1.55)	6.4(2.63)	1.6(1.45)	7.6	0(0.71)	2.7(1.79)	5.3
33	Bhairabi (Local Check)	1.4(1.38)	7.8(2.88)	1.9(1.55)	6.5	0(0.71)	1.7(1.48)	4.3
LSD(0.05)		0.02	0.02	0.02	0.18	0.02	0.02	0.17

management. The coccinellids (Lady bird beetle) are abundantly found in ragi ranging up to 7.3 numbers m⁻² which prevents and check the aphid population by predated on aphids in both nymphal and adult stage and provides perfect balance of nature. The adults in captivity as well as in field searched each plant thoroughly for aphids before moving on to the next (Nath *et.al.*, 1976). Many other populations of parasitoids and predators were found in the ragi ecosystem which indicates that the crop apart from its resilience to climate also provides a perfect ecosystem and niche for natural beneficial organisms where the damaging insect pests are controlled naturally and therefore needs no external plant protection measures.

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