



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(6): 1335-1337
© 2023 TPI

www.thepharmajournal.com

Received: 05-03-2023

Accepted: 15-04-2023

J Ramkumar

Assistant Professor, Department of Agriculture, College & Research Institute, TNAU, Chettinad, Tamil Nadu, India

B Venudevan

Assistant Professor, ICAR-KVK, TNAU, Aruppukottai, Virudhunagar, Tamil Nadu, India

S Arokiamary

Associate Professor, AEC&RI, TNAU, Kumulur, Tamil Nadu, India

P Arunkumar

Scientist, DAMU Scheme, ICAR-KVK, TNAU, Dharmapuri, Tamil Nadu, India

Important pests of barnyard millet and its weather correlation at Virudhunagar district

J Ramkumar, B Venudevan, S Arokiamary and P Arunkumar

Abstract

The present experiment was conducted at ICAR-Krishi Vigyan Kendra, Aruppukottai during 2020-21. In fixed plot survey, the aphid damage was noticed from 42 to 51 standard weeks ranging from 1.6 to 16.0 percent. The percent dead heart damage was recorded from 43-49 standard weeks ranged between 0.8 – 9.6%. The mean no. of coccinellids and spiders per plant observed from 42-49 and 46-49 standard weeks respectively. The population of aphids was positively correlated with minimum temperature and negatively correlated with evening Relative humidity. Dead heart due to stem borer was positively correlated with rainfall ($r=0.56$). The population of coccinellid was negatively correlated with morning and evening RH and positively correlated with maximum temperature, minimum temperature and rainfall. Spider was positively correlated with rainfall ($r=0.646$). In Roving survey, the percent aphid damage and dead heart recorded at Mallangkinaru village was 15-20% and 7-13% respectively, whereas it was 12-17% and 8-10% at Tharumathupatti village and in Kovilankulam village it was >10% and 6-12%.

Keywords: Barnyard millet, aphids, pink stem borer, minimum temperature, maximum temperature

Introduction

In recent years, millions of people living in arid and semi-arid tropical areas in Asia and Africa depend on millets as a food source (Singh & Arora, 1972 and Maloles *et al.*, 2011). Among the minor millets, Barnyard millet (*Echinochloa* species) is highly drought tolerant crop cultivated mainly for both grain and fodder purposes. It contains protein, carbohydrate, fiber, iron and zinc. It is grown in many countries like India, China, Japan, Malaysia, East Indies, Africa and United States of America (Nagaraja *et al.*, 2007) [4]. In India, the crop is cultivated on a lesser scale in Bihar, Tamil Nadu, Maharashtra and Madhya Pradesh. Despite its agronomic benefits and its high nutritive content, the barnyard millets is still considered as a poor man's food. The crop is known to cope up with abiotic and biotic stresses, nevertheless, under vulnerable conditions some of the minor insects became major and cause heavy losses and can damage the entire crop (Kumar, 2016) [2]. Hence, to record the major insect pests damaging the barnyard millet crop at Virudhunagar district, the present survey (fixed plot and roving survey) was undertaken at ICAR-Krishi Vigyan Kendra, Aruppukottai during 2021-22. The pest incidence and its correlation with weather parameters also recorded.

Materials and Methods

For fixed plot survey, the barnyard millet variety CO (kv) 2 was raised with the spacing of 30 x 10 cm at KVK farm during rabi 2020. The standard agronomic practices were followed except the insecticidal spray to maintain optimum plant growth and population. The insect pest damaging barnyard millet was recorded from 42nd standard week to harvest. Observations on percent aphid damage and dead heart were recorded. The correlation of pest incidence with weather parameters also studied during entire cropping period. Similarly, natural enemy incidence also recorded.

For roving survey, major barnyard millet growing Villages viz., Mallangkinaru (Kariyapatti block), Tharumathupatti and Kovilankulam (Aruppukottai block) were covered and observation was taken once in 15 days in a month. The correlation analysis was done using the weather parameters and 'r' value was arrived.

Corresponding Author:

J Ramkumar

Assistant Professor, Department of Agriculture, College & Research Institute, TNAU, Chettinad, Tamil Nadu, India

Results and Discussion

In fixed plot survey, the aphid damage was noticed from 42 to 51 standard weeks ranging from 1.6 to 16.0 percent with the peak incidence at 48th standard week. Similarly, the percent dead heart damage due to pink stem borer was recorded from 43-49 standard weeks (maximum incidence at 45th and 46th standard week) ranged between 0.8 – 9.6%. The mean no. of coccinellids and spiders per plant observed from 42-49 and 46-49 standard weeks respectively (Table 1). Similarly, Kamakshi *et al.*, 2021 [1] recorded 14.5% leaf damage caused by the sucking insect in barnyard millet with was almost on par with present findings.

The population of aphids was positively correlated with

minimum temperature and negatively correlated with evening Relative humidity. Dead heart due to stem borer was positively correlated with rainfall (r=0.56). The population of coccinellid was negatively correlated with morning and evening RH and positively correlated with maximum temperature, minimum temperature and rainfall. Spider was positively correlated with rainfall (r=0.646) (Table 2).

In Roving survey, the percent aphid damage and dead heart recorded at Mallangkinaru village was 15-20% and 7-13% respectively, whereas it was 12-17% and 8-10% at Tharumathupatti village and in Kovilankulam village it was >10% and 6-12% (Table 3).

Table 1: Survey on incidence of major insect pests in barnyard Millet (Fixed plot survey)

Month	Standard week	Aphid Damage (%)	Stem borer damage (% dead heart)	Natural enemies observed		
				Coccinellids	Spiders	Others
15 Oct - 21 Oct	42	10.4	-	1.4	-	-
22 Oct - 28 Oct	43	13.6	4.0	2.8	-	-
29 Oct - 04 Nov	44	14.4	7.2	3	-	-
05 Nov - 11 Nov	45	14.2	8.0	2.4	-	-
12 Nov - 18 Nov	46	14.4	9.6	2.4	1.0	-
19 Nov - 25 Nov	47	12	6.4	2	0	-
26 Nov - 02 Dec	48	16	4.0	0.6	2.0	-
03 Dec - 09 Dec	49	11.2	0.8	1.2	1.0	-
10 Dec - 16 Dec	50	5.6	-	-	-	-
17 Dec - 23 Dec	51	1.6	-	-	-	-
24 Dec - 31 Dec	52	-	-	-	-	-
01 Jan - 07 Jan	1	-	-	-	-	-
08 Jan - 14 Jan	2	-	-	-	-	-
15 Jan - 21 Jan	3	-	-	-	-	-
22 Jan - 28 Jan	4	-	-	-	-	-

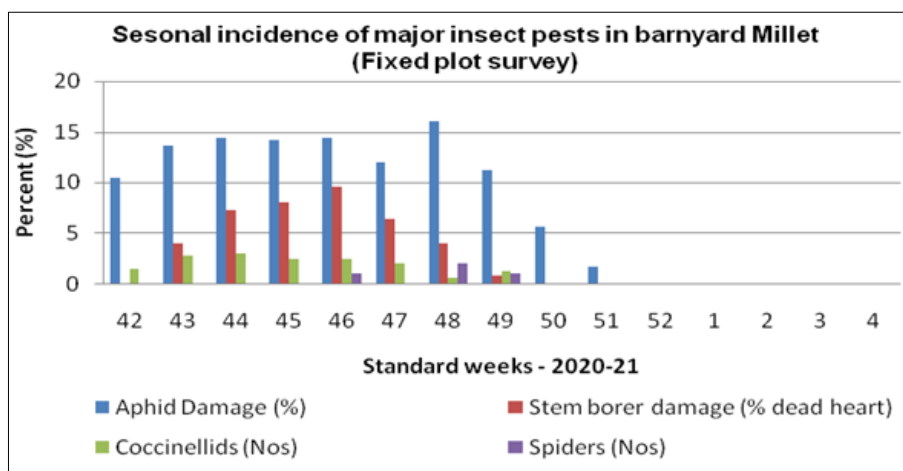


Fig 1: Survey on incidence of major insect pests in barnyard Millet (Fixed plot survey)

Table 2: Correlation of weather parameters on the population of major insect pests in Barnyard millet

Weather parameters	Correlation (r value)			
	Aphids	Stem borer	Natural enemies	
			Coccinellids	Spiders
Max. temp	0.387 NS	0.101 NS	0.543*	0.127 NS
Min. temp	0.578*	0.227 NS	0.590*	0.140 NS
Morning RH	0.049 NS	0.115 NS	-0.069 NS	0.115 NS
Evening RH	-0.108 NS	0.276 NS	-0.074 NS	0.260 NS
Rainfall	0.449 NS	0.562*	0.656*	0.646*

Regression Equation

Aphids: $Y = 227.48 - 11.373(TMAX) + 12.96 (TMIN) - 0.77(Mor. RH) + 1.50 (Eve. RH) + 0.06(RAIN)$

Stem borer

$Y = 293.04 - 11.25(TMAX) + 9.50 (TMIN) - 1.29(Mor. RH) - 0.94 (Eve. RH) + 0.07(RAIN)$

Coccinellids: $Y = -15.51 - 0.12(TMAX) + 0.344 (TMIN) - 0.01 (Mor. RH) + 0.10(Eve. RH) + 0.004(RAIN)$

Table 3: Infestation of major insect pests in barnyard millet during 2020-21 in Virudhunagar District (Roving survey)

Month	Village	Block	Insect pest observed
November I fortnight (Standard week 45)	Mallangkinaru	Kariyapatti	Aphid damage: 15-20% Dead heart: 7-13%
November II fortnight (Standard week 47)	Tharumathupatti	Aruppukottai	Aphid damage: 12-17% Dead heart: 8-10%
December I fortnight (Standard week 50)	Kovilangulam	Aruppukottai	Aphid damage: >10% Dead heart: 6-12%

Conclusion

Among the insect pest infesting barnyard millet, aphids and stem borer incidence was recorded both in fixed and roving plot survey at Virudhunagar District. The natural enemy incidence *viz.*, coccinellids and spiders also coincide with peak occurrence time of insect damaging the crop. Hence, natural suppression of the pest is possible whenever we avoid the indiscriminate use of pesticide on the crop.

References

1. Kamakshi N, Pullaibai P, Surekha Devi V, Sharma ASR, Padmalatha Y. Seasonal incidence and estimation of yield losses due to insect pest in small millets at scarce rain fall zone of Andhra Pradesh. *Journal of Entomology and Zoology Studies*. 2021;9(2):464-467.
2. Kumar B. Status of small millets diseases in Uttarakhand. *Int. J of Plant Protection*. 2016;9(01):256-263.
3. Maloles JR, Berg K, Ragupathy S, Nirmala BC, Althaf KA, Palanisamy VC. The fine scale ethnotaxa classification of millets in Southern India. *Journal of Ethno biology*. 2011;31(2):262-287.
4. Nagaraja A, Kumar J, Jain AK, Narasimhudu Y, Raghuchander T, Kumar B, *et al.* Compendium of Small Millets Diseases. Project Coordination Cell, All India Coordinated Small Millets Improvement Project, UAS, GKVK Campus, Bangalore. 2007, 80.
5. Singh HB, Arora RK. *Digitaria* sp.- A Minor Millet of the Khasi Hills, India. *Economic Botany*. 1972;26:376-380.