

# Original Research Article

## **Seasonal Occurrence and Management of Foliar Diseases of Browntop Millet (*Brachiaria ramosa* (L.) Stapf)**

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### **ABSTRACT**

Brown top millet is an underutilized millet crop and grown in Southern Peninsular region of India. Blast as well as leaf blight diseases are frequently noticed in Browntop millet. A study was carried to find out the seasonal occurrence and management of major diseases of the crop at Centre of Excellence in Millets, Athiyandal during 2022-23 and 2023-24. The crop was sown during Second week of July every year and the blast symptom noticed from 10 days after sowing (DAS) and shows increasing trend upto 40 DAS and later shows decreasing trend till the maturity of the crop. However, the leaf blight noticed from 20 DAS and reached maximum level at 60 DAS in both years. Field experiments were conducted to study the effect of biocontrol agents and fungicides on incidence of blast as well as leaf blight in browntop millet. The results shows significant variation observed between the treatments on the disease incidences in both the years. Seed treatment with *B. subtilis* @10g/kg of seed +Foliar spray of Azoxystrobin 23% SC @ 1ml/l at 20 and 40 DAS recorded the lower incidence of blast as well as leaf blight disease incidence and produced more grain yield when compared to other treatments. These predictors, however, need further work to validate reliability.

*Keywords:* Browntop millet, blast, leaf blight, occurrence, management

### **1. INTRODUCTION**

Brown top millet (*Brachiariaramosa* (L.) Stapf), which is native to the United States, was recently introduced into India as one of the small millet crop and it is grown in Africa, Arabia, China and Australia [1]. The crop is drought hardy and heat tolerant, but can also be planted in low lying areas. The crop is cultivated especially in rainfed tracts of Karnataka and Andhra Pradesh for food purposes for economically weaker section. The crop is a hardy crop and well suited for dry land condition and matures approximately 60 days. The crop is still underutilized one in India and there are reports available on diseases of browntop millet. Blast as well as leaf blight disease is major and frequently observed [2]. The findings on management of the diseases in browntop millet at field level are not reported till now. Hence, the study was undertaken during 2022-23 and 2023-24 on the seasonal occurrence and management of the diseases.

### **2. MATERIAL AND METHODS**

#### **2.1 Survey on the occurrence of diseases of Browntop millet**

Browntop millet crop was raised during 2022-23 and 2023-24 without any plant protection measures in order to study the natural occurrence of the diseases of the crop. The

crop var GUBT2 used for this purpose and the blast as well as leaf blight disease incidence recorded from 20 days after sowing till the maturity of the crop using standard scale and per cent disease index were calculated using formula. The leaf blast incidence was recorded using standard evaluation system [3]. The score 1: Small brown specks of pinhead size without sporulating centre, 2: Small roundish to slightly elongated, necrotic grey spots, about 1–2 mm in diameter with a distinct brown margin and lesions are mostly found on the lower leaves, 3: Lesion type is the same as in scale 2, but significant numbers of lesions are on the upper leaves, 4: Typical sporulating blast lesions, 3 mm or longer, infecting less than 2% of the leaf area, 5: Typical blast lesions infection in 2–10% of the leaf area, 6: Blast lesions infecting 11–25% leaf area, 7: Blast lesions infecting 26–50% leaf area, 8: Blast lesions infecting 51–75% leaf area and 9: More than 75% leaf area affected. Per cent disease index was calculated as  $PDI (\%) = \frac{\text{sum (class frequency} \times \text{score of rating class)}}{(\text{total number of plants}) \times (\text{maximal disease index})} \times 100$ .

## **2.2 Correlation between weather factors and disease incidence of browntop millet**

The data on disease incidence and weather factors recorded in the field were subjected to analysis of correlation to study of influence of weather factors on the disease incidence. The daily weather factors viz., maximum temperature, minimum temperature, relative humidity, rainfall, sunshine hours and leaf wetness hours were taken for the study.

## **2.3 Effect of biocontrol agents and chemicals on major diseases of browntop millet**

Field trials were conducted to find out the effect of biocontrol agent and fungicides on the diseases of browntop millet at Centre of Excellence in Millets, Athiyandal, Tamil Nadu during 2022-23 and 2023-24. There were nine treatments imposed in the trials. The biocontrol agent's viz., *Bacillus subtilis* and *Trichoderma viride* were taken for the study. The crop was maintained by following necessary crop management practices. The incidence of blast and leaf blight recorded using scale 1-9 and per cent disease index were calculated using formula.

## **2.4 Statistical analysis**

The experimental data statistical analysis was carried out by adopting the standard method. The field experiment was conducted in a randomized block design with three replications. The data was analysed by analysis of variance (ANOVA) of randomized block design (RBD). Data for correlation studies from each experiment were analysed by one-way analysis of variance using IBM SPSS (v. 28.0).

## **3. RESULTS AND DISCUSSION**

The study was undertaken to assess the level of disease incidence in browntop millet at CEM, Athiyandal under North East Region of Tamil Nadu. The disease incidence was recorded during 2022-23 and 2023-24 and presented in Table 1. The results revealed that blast symptom noticed from 10 DAS and shows increasing trend upto 40 DAS and later shows decreasing trend till the maturity of the crop. However, the leaf blight noticed from 20 DAS and reached maximum level at 60 DAS in both years [4] reported that *H.setariae* causing leaf spot on browntop millet and so far there is no advance works on the pathogen has been taken. First occurrence of leaf blight caused by *Bipolarissetariae* on browntop millet in Peninsular India and the molecular characterization [5]. Reports also available on prevalence of leaf blast in Uttarakhand region [6]. Correlation between weather variables and disease incidence also carried out to find out influence of weathers on disease incidence and the results presented in Table 2. The results indicated that only minimum temperature and rainfall influences the both diseases incidences in the crop. Negative correlation observed between minimum temperature and disease incidence and positive correlation observed between rainfall and disease incidence. Earlier, weather parameters viz., average minimum



1	T1: Seed treatment with <i>Bacillus subtilis</i> @10g/kg of seed	1.62	10.21	14.32	0.85	8.25	17.32	1125.0	1.74
2	T2: Seed treatment with <i>Trichoderma viride</i> @ 4g/ kg of seed	2.05	15.32	17.64	0.61	11.62	24.32	1025.3	1.59
3	T3: T1+ foliar spray of <i>B. subtilis</i> at 1g/lit at 20 and 40 DAS	1.57	6.20	10.02	0.49	6.02	14.32	1195.2	1.83
4	T4: T1+ Foliar spray of Azoxystrobin 23% SC @ 1ml/l at 20 and 40 DAS	1.81	2.68	4.12	0.73	3.68	7.24	1205.0	1.84
5	T5: T1+ Foliar spray of Propiconazole 25 % EC @ 1ml/l at 20 and 40 DAS	1.62	2.02	3.08	0.68	3.20	6.25	1241.0	1.90
6	T6: T2 + Foliar spray of Propiconazole 25 % EC @ 1ml/l at 20 and 40 DAS	1.65	3.06	4.63	0.59	4.12	8.62	1185.6	1.81
7	T7: T2 + Foliar spray of Azoxystrobin 23% SC @ 1ml/l at 20 and 40 DAS	1.94	2.84	4.31	0.81	5.02	11.32	1174.5	1.79
8	T8: Foliar spray of Mancozeb 75 % WP @ 2.5g/L at 20 and 40 DAS	3.25	4.25	6.12	0.64	5.21	12.61	1162.3	1.80
9	T9: Control CD (0.05% level)	3.61 0.15	18.32 0.85	22.15 0.91	0.81 0.024	12.52 0.87	28.96 1.05	985.0 32.5	1.55

Mean of three replications.

**Table 4. Effect of biocontrol agents and fungicides on blast and leaf blight of browntop millet during 2023-24**

Sl. No	Treatments	Blast incidence (PDI)			Leaf blight (PDI)			Yield (kg/ha)	B:C ratio
		15 DAS	30 DAS	45 DAS	15 DAS	30 DAS	45 DAS		
1	T1: Seed treatment with <i>Bacillus subtilis</i> @10g/kg of seed	1.21	11.3	15.2	0.34	10.4	19.3	1025.62	1.59
2	T2: Seed treatment with <i>Trichoderma viride</i> @ 4g/ kg of seed	2.08	13.6	18.3	0.42	13.6	25.1	984.5	1.53

3	T3: T1+ foliar spray of <i>B. subtilis</i> at 1g/lit at 20 and 40 DAS	1.41	5.05	11.2 6	0.61	8.24	15.2 7	1145.3	1.75
4	T4: T1+ Foliar spray of Azoxystrobin 23% SC @ 1ml/l at 20 and 40 DAS	1.25	1.93	4.01	0.48	4.62	7.02	1189.6	1.82
5	T5: T1+ Foliar spray of Propiconazole 25 % EC @ 1ml/l at 20 and 40 DAS	1.30	2.04	4.63	0.52	5.17	8.32	1175.0	1.80
6	T6: T2 + Foliar spray of Propiconazole 25 % EC @ 1ml/l at 20 and 40 DAS	1.62	2.68	5.27	0.61	6.31	8.67	1085.3	1.66
7	T7: T2 + Foliar spray of Azoxystrobin 23% SC @ 1ml/l at 20 and 40 DAS	2.01	3.06	5.30	0.47	7.02	8.49	1052.5	1.61
8	T8: Foliar spray of Mancozeb 75 % WP @ 2.5g/L at 20 and 40 DAS	2.60	4.92	7.02	0.53	8.32	13.0 8	1046.3	1.62
9	T9: Control	4.02	14.6 2	22.6 7	0.71	15.2 3	27.6 2	915.0	1.44
	CD (0.05% level)	0.19	0.74	0.86	0.01 8	1.08	1.04	36.4	

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#### 4. CONCLUSION

It is concluded that both blast and leaf blight noticed in browntop millet and blast symptom noticed from 10 DAS and shows increasing trend upto 40 DAS and later shows decreasing trend till the maturity of the crop. However, the leaf blight noticed from 20 DAS and reached maximum level at 60 DAS in both years. The seed treatment with *B. subtilis* @10g/kg of seed +foliar spray of Azoxystrobin 23% SC @ 1ml/l at 20 and 40 DAS is effective in managing the two major diseases in browntop millet under field condition.

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