

Prevalence of banded leaf and sheath blight in certain minor millets cultivated in Vizianagaram district of Andhra Pradesh

C Sowmika, V Prasanna Kumari, T S S K Patro and D V Sai Ram Kumar

Department of Plant Pathology, Acharya N G Ranga Agricultural University, Agricultural College, Bapatla-522101, Andhra Pradesh, India

ABSTRACT

Small millets are climate-resilient, nutrient-rich crops traditionally grown under rainfed conditions in marginal soils. Their productivity is threatened by disease such as banded leaf and sheath blight (BLSB) caused by *Rhizoctonia solani* Kuhn. The present investigation was conducted to assess the severity and distribution of BLSB in barnyard, little, foxtail, and proso millets cultivated across different mandals of Vizianagaram district in Andhra Pradesh during Kharif, 2024. A roving survey was carried out in selected villages, and disease severity was recorded using the AICRP Small Millets 1–9 scale and per cent disease index (PDI) was calculated. Results revealed that barnyard millet exhibited the highest mean PDI (13.21%), followed by proso millet (12.49%), little millet (9.98%), and foxtail millet (9.16%). At the village level, the highest PDI (17.27%) was recorded in Relli village of Kottavalasa mandal in barnyard millet, while the lowest PDI (4.44%) was observed in Thonam village of Salur mandal in proso millet. Considerable variation in disease severity was observed across mandals, villages, and crops, indicating the influence of local agro-ecological conditions.

Keywords: Banded leaf and sheath blight, PDI, Pathogen, Rhizoctonia solani and Survey

Small millets, belonging to the family Poaceae (Graminae), are traditionally cultivated as rainfed crops on marginal and degraded soils due to their excellent adaptability and tolerance to various abiotic stresses. This group includes finger millet (*Eleusine coracana*), kodo millet (Paspalum scrobiculatum), foxtail millet (Setaria italica), little millet (Panicum sumatrense), proso millet (Panicum miliaceum), barnyard millet (Echinochloa frumentacea), and browntop millet (Urochloa ramosa). However, these nutritionally rich and climate-resilient crops are affected by several fungal, bacterial, and viral pathogens. Among them, banded leaf and sheath blight (BLSB), a soil-borne disease caused by Rhizoctonia solani Kuhn, has emerged as a major constraint in small millet cultivation. The disease has been recognized as a serious threat due to its widespread incidence and the considerable yield losses. Reported yield losses due to BLSB range from 37.4% to 61.3% in finger millet, 31.4% to 58.8% in foxtail millet, 39.8% to 63.0% in little millet, 49.3% to 57.7% in kodo millet, 52.7% to 67.2% in barnyard millet, 50.0% to 97.6% in proso millet, and 36.8% to 64.6% in browntop millet (Patro et al., 2021). The disease was first reported in finger millet from Kerala (Das and Girija, 1989), followed by barnyard millet and proso millet from Uttarakhand (Kumar and Prasad, 2010). In this context, conducting regional surveys to assess the current status of the disease becomes essential for planning location-specific disease management strategies. Therefore, the present investigation was undertaken in Vizianagaram district of Andhra Pradesh to study the severity and distribution of banded leaf and sheath blight in various minor millets grown under different agro-ecosystems.

MATERIAL AND METHODS

A roving survey was conducted during Kharif, 2024 to assess the disease severity of banded leaf and sheath blight in Vizianagaram district of Andhra Pradesh. Two mandals were selected and from each mandal two villages were selected and two fields from each village were surveyed. In each field, disease incidence was recorded in one square meter area at five different places (excluding the border rows). Alongside, the GPS coordinates, soil type, variety, type of irrigation, preceding crop and major dominant weeds in that particular field were also recorded. The

disease severity score was assessed using 1-9 scale given by AICRP Small Millets, 2022 (Table 1).

Per cent disease index (PDI) was calculated based on disease severity data from the formula given by Wheeler (1969).

$$PDI = \frac{\text{Sum of all disease ratings}}{\text{Total no of disease ratings} \times \text{Max disease grade}} \times 100$$

RESULTS AND DISCUSSION

Per cent disease index (PDI) among the crops surveyed, ranged from 9.16 to 13.21% which is considerable in causing yield losses. The highest PDI was recorded in barnyard millet with mean PDI of 13.21% followed by proso millet with mean PDI of 12.49% and the lowest PDI was recorded in foxtail millet with mean PDI of 9.16%.

In Barnyard millet, BLSB severity varied significantly among the mandals surveyed. The highest PDI was recorded in Kottavalasa mandal (14.74%) while the lowest PDI was recorded in Denkada mandal (11.67%). Among the villages surveyed, the highest PDI was recorded in Relli village of Kottavalasa mandal (17.27%) and the lowest PDI (8.89%) was recorded in Chollangipeta village of Denkada mandal (Table 2).

In Little millet, the highest PDI was recorded in Gumma lakshmipuram mandal (10.54%) while the lowest PDI was recorded in Kottavalasa mandal (9.44%). Among the villages surveyed, the highest PDI was recorded in Kondavada village of Gumma lakshmipuram mandal (12.19%) and the lowest PDI

was recorded in Ramalingapuram village of kottavalasa mandal (7.78%) (Table 3).

In Foxtail millet, the highest PDI was recorded in S. Kota mandal (9.44%) while the lowest PDI was recorded in Jami mandal (8.89%). Among the villages surveyed, the highest PDI was recorded in Timidi village of S. Kota mandal (12.22%) and the lowest PDI was recorded in Boddavara village of S. Kota mandal (6.66%) (Table 4).

In Proso millet, the highest PDI was recorded in Kottavalasa mandal (13.33%) while the lowest PDI was recorded in Salur mandal (11.66%). Among the villages surveyed, the highest PDI was recorded in Gollapalem village of Kottavalasa mandal (16.67%) and the lowest PDI was recorded in Thonam village of Salur mandal (7.78%) (Table 5).

CONCLUSION

The survey results clearly indicate that banded leaf and sheath blight (BLSB) caused by *Rhizoctonia solani* is present across all the minor millets studied in Vizianagaram district, with varying degrees of severity. Among the four crops, barnyard millet exhibited the highest mean PDI (13.21%), suggesting greater susceptibility, while foxtail millet showed the lowest mean PDI (9.16%), indicating comparatively better resistance. Significant variation in disease severity was also observed across different mandals and villages, highlighting the localized influence of environmental conditions and agronomic practices. These findings emphasize the need for targeted disease management strategies and the selection of resistant cultivars to minimize yield losses in the affected regions.

Table 1: Disease severity scale for banded leaf and sheath blight in millets

Score	Description
1	<1% Plant area covered by lesion
2	1-5% Plant area covered by lesion
3	6-10% Plant area covered by lesion
4	11-20% Plant area covered by lesion
5	21-30% Plant area covered by lesion
6	31-40% Plant area covered by lesion
7	41-50% Plant area covered by lesion
8	51-75% Plant area covered by lesion
9	>75% Plant area covered by lesion

Table 3. Banded leaf and sheath blight severity in Little millet in Vizianagaram district of Andhra Pradesh during Kharif, 2024

Major pre dominant weeds		Dactyloctenium, Echinochloa,	Cyperus, Digera arvensis, Commelina				
Preceding	Fallow	Fallow	Green gram &	Green gram & Blackgram			
Type of Irrigation	Rainfed	Rainfed	Rainfed	Rainfed			
Variety	BL 6	Peddasa	BL 6	BL 6			
Soil	Sandy loam	Sandy	Sandy loam	Sandy loam			
PDI (%) District mean			86. 6.				
PDI (%) Mandal mean		10.54		9.44			
PDI (%) Village mean	8.89	12.19	11.11	7.78			
PDI (%) Sample mean	6.67	15.50		4.44			
GPS coordinates	19.061919N 83.658363E 19.061886N 83.658454E	19.008854N 83.632502E 19.007959N 83.633646E	17.900547N 83.223224E 17.900821N 83.228059E	17.918905N 83.130082E 17.918849N 83.130336E			
Village	Dummangi	Kondavada	Relli	Ramalinga puram			
Mandal	Gummalaks	nmipuram	Kottavalasa				
District		Vizianagaram					

Table 4. Banded leaf and sheath blight severity in Foxtail millet in Vizianagaram district of Andhra Pradesh during kharif, 2024

Major pre dominant weeds						Dactyloctenium,	Ecninochioa,	Cyperus, Digera	Commoling				,												
Preceding	Greenoram	Greengram, Blackgram, Greengram, Blackgram							C. Land	dinaming															
Type of Irrigation		Rainfed			Dointed	Nailled			Deinfod	Namion		Rainfed													
Variety		SiA 3156			0:A 2156	0C1C VIC			G: A 2005	CONC AIC			G: A 2005	CONC AIC											
Soil type		Sandy	IOaIII		Sandy	loam	_		Sandy	loam			Sandy	loam											
PDI (%) District mean						_	_			_	9 16	7.10													
PDI (%) Mandal mean					08 8	0.07			9.44																
PDI (%) Village mean		7.77			10.00				12.22				99'9												
PDI (%) Sample mean	11.11	11.11		8.89		11.11		13.33		8.89		4.44													
GPS coordinates	18.020423N 83.299442E 18.019686N 83.298662E			17.992787N	83.242649E	17.992431N	83.242133E	18.0784N	83.16408E	18.07707N	83.169072E	18.170029N	83.123453E	18.170861N	83.126933E										
Village		Annamrajupeta				Annamrajupeta										Alamanda				I IIII I				Boddavara	
Mandal		-	Jami								S. Kota														
District							17:	v izialiagaralli																	

Table 5. Banded leaf and sheath blight severity in Proso millet in Vizianagaram district of Andhra Pradesh during kharif, 2024

				PINT	Iud	IUd	IUA					Wajor nre
District name	Mandal name	Village name	GPS coordinates	<u>e</u>	(%) Village	(%) Mandal	(%) District	Soil type	Variety	Type of Irrigation	Preceding crop	dominant weeds
				mean	mean	mean	mean					
			17.9056047N	,,,,,								Dactylocteniu,
	•	Gollalapalem	83.1551035E	77.77				Compley	TNAU	Doinfad	Doi	Echinochloa,
		·	17.9063931N	11 11	16.67			Sallay	202	Namiled	Dajra	Cyperus,
	Kottavalasa		83.1549014E	11.11	10.01			IOalli				Digera
	1 ,		17.9293745N	00 0		13.33						arvensis,
		Dolloottom	83.2052503E	8.89	10.0			Sandy	TNAU	Deinfad	Define	Commetina
_	-	Banganam	17.9294000N	11 11	10.0			loam	202	Kamied	bajra	
	•		83.2053154E	11.11			12 40					
			18.6039222N	12 23			(+:71					
	-	Vysemslyssetti	83.1247286E	13.33	17 77			Sandy	TNPm	Doinfod	Foxtail	
		Nurukutu	18.603927N	<i>.,,,,,</i>	1/./1			loam	230	Namied	millet	
	•		83.124734E	77.77		11 66						
	Colii		18.648539N	13 3		11.00						
	Salui		83.132241E	0.0/	22 2			Sandy	TNPm	Deinfad	Foxtail	
	•	Thonam	18.649235N	4.44	נכינ			loam	230	Kalilled	millet	
			83.131143E									

LITERATURE CITED

Das L and Girija V K 1989. Sheath blight of ragi. Current Science 58:681–682.

Kumar B and Prasad D 2010. A new record on banded sheath blight disease of proso millet from mid hills of Uttarakhand, India. *Journal of Mycology and Plant Pathology*. 40(3): 331-333.

Patro TSSK, Palanna KB, as, IK, Saralamma S, Raveendra H, Laxmi Rawat, Savita Ekka, Rajesh M, Prahlad Netam, Rajashekara H and Jain A K Plant Pathology Annual Progress Report: AICRP Small Millets Kharif 2020-21. All India Coordinated Research Project on Small Millets, Bengaluru. 36.

AICRP Small Millets 2022. Plant Pathology Annual Progress Report. 34.

Received on 10.04.2025 and Accepted on 15.05.2025