



SURVEY FOR BLAST AND SEEDLING BLIGHT DISEASES OF FINGER MILLET IN ANDHRA PRADESH

P. SWAMY*, P. ARUNASRI, T. M. HEMALATHA, K. DEVAKI AND K. VEMANA

Department of Plant Pathology, ANGRAU-S.V. Agricultural College, Tirupati-517 502.

Date of Receipt: 10-10-2025

ABSTRACT

Date of Acceptance: 16-02-2026

A comprehensive roving survey was conducted during the *kharif* 2024 and *rabi* 2024–2025 seasons across seven districts of Andhra Pradesh to assess the severity of blast and seedling blight diseases in finger millet. The survey revealed that blast disease (mean PDI of Blast with 41.1%) was more prevalent and severe compared to seedling blight (mean PDI of Seedling blight with 18.7%). The highest blast incidence during *kharif* 2024 was recorded in YSR Kadapa district with a mean PDI of 63.2 per cent, followed by Satya Sai (61.0%) and Vizianagaram (55.0%). In *rabi* 2024–2025, Satya Sai district showed the highest mean PDI of 52.7 per cent, while Chittoor and Nandyal districts exhibited lower infection levels. Seedling blight incidence was comparatively lower, with a maximum mean PDI of 26 per cent in Satya Sai during *kharif* 2024 and 36 per cent in YSR Kadapa during *rabi* 2024–2025. A comparative analysis indicated that disease severity was higher during the *kharif* season, likely due to favourable environmental conditions. The findings underscore blast as the more dominant and damaging disease in finger millet, necessitating targeted disease management strategies.

KEYWORDS: Finger millet, blast, seedling blight, survey, Andhra Pradesh.

INTRODUCTION

Finger millet (*Eleusine coracana* Gaertn. L.) is a cereal crop cultivated primarily for food in parts of Africa and South Asia, especially in India across states such as Uttar Pradesh, Bihar, Tamil Nadu, Karnataka, and Andhra Pradesh. Finger millet is a major crop in the arid and semi-arid regions of developing countries across Asia and Africa (Ceasar *et al.*, 2018; Krishna *et al.*, 2020).

Among all cereals and millets, finger millet contains the highest levels of calcium (344 mg per 100 g) and potassium (408 mg per 100 g). It also provides more dietary fiber, minerals, and sulfur-containing amino acids than white rice, which is currently the major staple food in India (Shobana *et al.*, 2013). Finger millet is also a rich source of essential amino acids such as arginine, lysine, methionine, and lecithin. These compounds play vital roles in promoting health, including acting as precursors for nitric oxide synthesis and aiding in the stimulation and release of growth hormone (Pragya, 2012). Leaf blast symptoms caused by *Pyricularia grisea* typically appear as elongated, diamond-shaped lesions with gray or whitish centers and brown to reddish-brown margins (Acharya *et al.*, 2019). In severe cases, the portion of the panicle above the infected neck turns dark brown to black, often resulting in the complete death of the plant.

Brown spot, also known as seedling blight or leaf blight, caused by *Helminthosporium nodulosum* (Berk and Curt.), is the second most severe and widely distributed disease of finger millet after blast. The characteristic symptom on the leaf lamina is the appearance of brown to dark brown spots. In finger millet, *Helminthosporium* infects nursery seedlings or very young plants, attacking the coleoptile, collar or first leaves, causing rapidly spreading lesions that lead to wilting, drying and collapse of seedlings. The pathogen primarily infects leaves either from the upper surface or in the region between the leaf and the leaf sheath. Infection occurs through stomata, epidermal cells, or more commonly *via* certain epidermal outgrowths.

In the past few years, the production of finger millet has faced significant constraints due to blast and seedling blight diseases in the Vizianagaram and Rayalaseema districts of Andhra Pradesh. A survey was conducted to determine the severity of blast and seedling blight diseases.

MATERIAL AND METHODS

To assess the prevalence of blast and seedling blight diseases in finger millet, a roving survey was undertaken in one mandal was selected for each district and two villages were randomly selected across the districts of Vizianagaram, Tirupati, Sri Sathya Sai, Chittoor,

*Corresponding author, E-mail: swamypalli2002@gmail.com

Table 1. Finger millet Leaf blast Standard Evaluation System (SES)(Nagaraja *et al.*, 2007)

Score	Description
1	Small, brown, pinhead size specks without sporulating centre
2	Small (1-2mm) roundish to elongated, necrotic grey spots with a distinct brown margin covering up to 5% leaf area
3	Typical blast lesions (≥ 3 mm) with sporulating center, covering 6-10% of the leaf area
4	Blast lesions covering 11-20 % leaf area
5	Blast lesions covering 21-30 % leaf area
6	Blast lesions covering 31-40 % leaf area
7	Blast lesions covering 41-50 % leaf area
8	Blast lesions covering 51-75 % leaf area
9	Blast lesions covering >75 % leaf area & plant death

Table 2. Scale used for screening the varieties against brown spot (Nagaraja *et al.* 2007)

Grade	Percentage leaf area affected
0	No infection.
1	Pinhead spots less than 1% leaf area affected.
2	Pinhead spots 5-10% leaf area affected.
3	Typical brown spots with grey centre 5-25% leaf area affected.
4	25-50% leaf area affected.
5	Large brown spots with grey centre more than 50% leaf area affected.

Y.S.R. Kadapa, Ananthapuram, and Nandyala of Andhra Pradesh.

Ten representative leaves from one plant were selected from each field and evaluated using a 1–9 rating scale for blast disease (Table 1) and a 0–5 rating scale for seedling blight (Table 2). These scores were then used to calculate the percent disease index (PDI) for each surveyed field, following the method outlined by Nagaraja *et al.* (2007). Disease severity was determined based on the visible symptoms of blast and brown spot on the plants.

The per cent disease index was computed with the following formula.

Sum of all the scores

$$\text{PDI} = \frac{\text{Sum of all the scores}}{\text{Total number of scores} \times \text{Maximum score}} \times 100$$

(Total number of scores x Maximum score)

RESULTS AND DISCUSSION

Prevalence of blast in finger millet during *kharif* 2024

The results revealed considerable variation in disease PDI among the surveyed locations. The highest mean PDI was recorded in YSR Kadapa district (63.2), where the villages of Muthukur and Moillacheruvu showed very high infection levels of 67.7 per cent and 58.7 per cent, respectively. Satya Sai district followed

with a mean PDI of 61.0 per cent, as both Madakasira (64.4 %) and R. Ananthapuram (57.7%) exhibited significant disease pressure (Table 3).

Vizianagaram district reported a moderately high mean PDI of 55.0 per cent, with Kanguva (53.5%) and Tummikapalli (56.6%) showing notable infection levels. Tirupati district recorded a moderate level of disease, with a mean PDI of 49.9 per cent, ranging from 45.5 per cent in Perumallapalle to 54.4 per cent in Tirupati. In contrast, relatively lower disease incidence was observed in Ananthapuram (mean PDI of 34.4%) and Chittoor (mean PDI of 29.9%), where village-level PDIs ranged from 28.8 to 35.5 per cent. The lowest disease incidence was found in Nandyal district, which had a mean PDI of 24.4 per cent, Pandlapuram village recorded the least infection with a PDI of 20.0 per cent (Table 3).

Prevalence of blast in finger millet during *rabi* 2024-25

During *rabi* 2024-25 the highest mean PDI was recorded in Satya Sai district (52.7%), where Madakasira and R. Ananthapuram villages reported high PDIs of 59.2 and 46.3 per cent, respectively, indicating a significant blast infection. YSR Kadapa followed with a mean PDI of 50.4 per cent (Table 3), Muthukur recorded a PDI of 57.4, while Moillacheruvu had 43.5 per cent (Table 3)

In contrast, lower disease incidence was observed in Chittoor district with lowest mean PDI of 14.2 per cent,

with Puthalapattu at 17.8 per cent and Oddepalle at just 10.7 per cent, (Table 3) indicating minimal disease PDI.

A comparison of blast disease surveys from *Kharif* 2024 and *rabi* 2024–2025 in Andhra Pradesh showed that the Percent Disease Index (PDI) was higher during the *Kharif* 2024 season, with a PDI of 63.2 (table 3) recorded in YSR Kadapa district, compared to a PDI of 52.7 (table 3) in Satya Sai district during the *rabi* 2024–2025 season, likely due to more favorable conditions for disease development during *Kharif*.

Prevalence of seedling blight in finger millet during *kharif* 2024

The highest incidence was observed in the Satya Sai district, where the Madakasira and R. Ananthapuram villages exhibited a mean PDI of 26 per cent, suggesting a severe incidence. In contrast, Chittoor district (Puthalapattu mandal) recorded the lowest mean PDI of 4 per cent, indicating minimal disease index (Table 3).

Prevalence of seedling blight in finger millet during *rabi* 2024-25

The highest mean PDI of 36 per cent was reported in YSR Kadapa district (Atlur mandal), particularly in Muthukur and Moillacheruvu villages, indicating a severe outbreak of seedling blight (Table 3). In contrast, Chittoor district (Puthalapattu mandal) had the lowest mean PDI of just 10 per cent (Table 3).

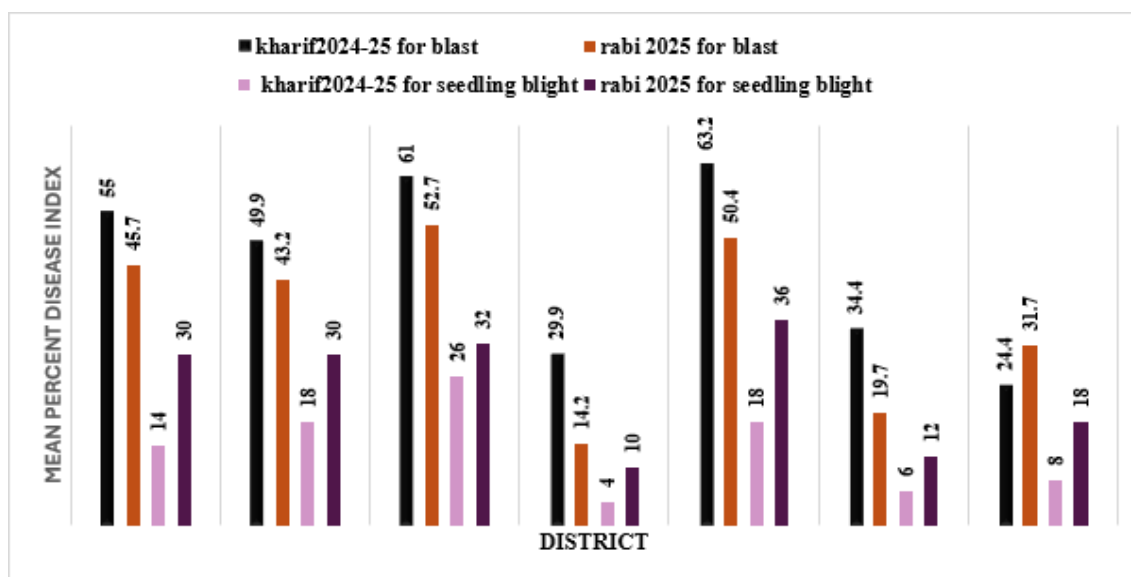


Fig 1. Survey on PDI blast and seedling blight of finger millet during *kharif* 2024-25 and *rabi* 2024-25

Table 3. Survey on PDI blast and seedling blight of finger millet during *Kharif* 2024-25 and *rabi* 2025

S. No.	District	Mandal	Village	Blast				Seedling Blight			
				<i>Kharif</i> 2024-25	Mean PDI	<i>Rabi</i> 2025	Mean PDI	<i>Kharif</i> 2024-25	Mean PDI	<i>Rabi</i> 2025	Mean PDI
1.	Vizianagaram	Gajapathinagaram	Kenguva	53.5	55.0	47.2	45.7	12	14	28	30
			Tummikapalli	56.6		44.3		16		32	
2.	Tirupati	Tirupati	Tirupati	54.4	49.9	47.6	43.2	16	18	36	30
			Perumallapalle	45.5		38.8		20		24	
3.	Satya Sai	Madakasira	Madakasira	64.4	61.0	59.2	52.7	28	26	36	32
			R. Ananthapuram	57.7		46.3		24		28	
4.	Chittoor	Puthalapattu	Puthalapattu	28.8	29.9	17.8	14.2	4	4	12	10
			Oddepalle	31.1		10.7		4		8	
5.	Y. S.R. Kadapa	Atlur	Muthukur	67.7	63.2	57.4	50.4	20	18	40	36
			Moilacheruvu	58.7		43.5		16		32	
6.	Ananthapuram	Tadipatri	Tadipatri	33.3	34.4	21.7	19.7	4	6	12	12
			Veerapuram	35.5		17.8		8		12	
7.	Nandyala	Banganapalle	Banganapalle	28.8	24.4	25.7	31.7	8	8	20	18
			Pandlapuram	20		37.8		8		16	
					45.4		36.8		13.4		24

Aravind *et al.* (2024) conducted a roving survey to gather rice samples affected by blast disease from key rice-producing regions of the Northern Telangana zone. The Percent Disease Index (PDI) showed considerable variation, ranging from 18.5 per cent in Mancherla to 79.41 per cent in Peddapalli. Likewise, disease severity fluctuated between 22.2 per cent and 85.1 per cent, reflecting the extensive and intense occurrence of blast disease in specific areas of the region. Odeph *et al.* (2020) conducted a survey on finger millet blast severity across selected counties in Kenya and reported that Busia County had the highest disease severity, with an average of 82.3 per cent, based on whole-farm observations. Bungoma and Machakos followed closely with severity levels of 67.0 per cent and 66.0 per cent, respectively, while Makueni recorded the lowest severity at 61.0 per cent.

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