

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

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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).

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

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

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