



Status and distribution of dry root rot of pigeonpea in major pigeonpea growing Districts of North Eastern Karnataka, India

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Abstract

Pigeonpea (*Cajanus cajan* (L.) Millsp.) is an important pulse crop cultivated extensively in North Eastern Karnataka. However, dry root rot caused by *Rhizoctonia bataticola* is one among the major constraints affecting pigeonpea production, resulting in considerable yield losses. Hence, a roving survey was conducted to assess the incidence and distribution of dry root rot in major pigeonpea growing districts of North Eastern Karnataka during 2025–26. The survey was conducted in Raichur, Kalaburagi and Bidar districts covering major pigeonpea growing taluks and villages. Results revealed considerable variation in dry root rot incidence across the surveyed locations. Among the districts, Kalaburagi recorded the maximum mean incidence of dry root rot (19.11 %), followed by Raichur (19.00 %) and Bidar (12.34 %). At the taluk level, Jevargi taluk of Kalaburagi district recorded the maximum mean incidence of 22.00 per cent, followed by Raichur taluk (20.00 %) and Kalaburagi taluk (20.00 %). Among the villages surveyed, Janiwar village of Jevargi taluk recorded the maximum dry root rot incidence of 30.00 per cent, followed by J. Venktapur of Raichur taluk (28.00 %) and Manslapur (26.00 %) and Sarjapur (26.00 %). The incidence varied considerably among the surveyed locations, with comparatively lesser incidence recorded in several villages. The survey results revealed marked spatial variation in the incidence and distribution of dry root rot across the major pigeonpea growing areas of North Eastern Karnataka.

Keywords: Disease incidence, dry root rot, pigeonpea, roving survey

Introduction

Pigeonpea (*Cajanus cajan* (L.) Millsp.; $2n = 2x = 22$) is an important grain legume belonging to the family Fabaceae and is widely cultivated in tropical and subtropical regions. India is considered the primary centre of origin of pigeonpea due to its rich genetic diversity and occurrence of wild relatives. The crop is predominantly cultivated during the *Kharif* season and is well adapted to rainfed agroecosystems owing to its deep root system and drought tolerance (Joshi *et al.*, 2001; Saxena *et al.*, 2010) [3, 10]. Karnataka is one of the major pigeonpea-growing states in India, with cultivation concentrated mainly in the northern districts, including Kalaburagi, Vijayapura, Raichur, Ballari, Bidar, Koppal and Bagalkot (Karthika *et al.*, 2024) [4].

However, pigeonpea production is severely affected by several biotic and abiotic factors. Among the major diseases, dry root rot caused by *Rhizoctonia bataticola* (Taub.) Butler, with *Macrophomina phaseolina* (Tassi) Goid. as its pycnidial stage, is an important soil-borne disease-causing considerable yield loss. The pathogen has a wide host range and survives in soil for several years as microsclerotia, making disease management difficult. The disease is particularly important in rainfed and moisture stressed environments and is widely distributed across major pigeonpea-growing regions of India (Dhingra and Sinclair, 1978; Kaur *et al.*, 2012) [2, 5]. The disease is generally severe during the flowering and maturity stages. Initial symptoms include drooping and drying of leaves, followed by extensive root rotting and destruction of lateral roots. Infected roots become brittle and exhibit bark peeling, while affected plants can be easily uprooted. The roots show reddish-brown to dark discoloration with abundant black microsclerotia on the root surface. In the advanced stages,

the roots become rotten, shredded and brittle, resulting in premature drying and death of affected plants (Maruti *et al.*, 2017; Kumari and Katoch, 2020) [7, 8].

Dry root rot is widely prevalent in North Eastern Karnataka, with considerable variation in disease incidence among pigeonpea growing districts. Maruti *et al.* (2017) [8] reported maximum incidence in Kalaburagi (24.72 %), followed by Raichur (17.79 %) and Yadgir (9.44 %), while Vamsikrishna *et al.* (2021) [11] recorded 17.00 to 30.00 per cent incidence in Raichur, Yadgir, Kalaburagi and Bidar. More recently, Kenganal *et al.* (2025) [6] reported dry root rot incidence ranging from 1.22 to 41.25 per cent in Northern Karnataka. Thus, the widespread occurrence and substantial disease incidence associated with dry root rot emphasize the need for regular assessment of its incidence and distribution. Therefore, the present study was undertaken to assess the incidence and spatial distribution of dry root rot in major pigeonpea-growing districts of North Eastern Karnataka during [6]–26.

Materials and method

A random roving survey was conducted during 2025–26 to assess the incidence of pigeonpea wilt in major pigeonpea-growing regions of North Eastern Karnataka, covering Raichur, Kalaburagi and Bidar districts. In each district, two to three taluks were selected for the survey. From each taluk, three villages were selected and two pigeonpea fields were randomly selected from each village. In each selected field, 25 plants were randomly examined for the occurrence of dry root rot and the disease incidence was recorded.

The following formula was used to calculate the incidence of wilt (Wheeler, 1969) [12]. The details of surveyed places are mentioned below.

Results and discussion

A roving survey was conducted during 2025–26 to assess the prevalence of dry root rot in major pigeonpea-growing areas of North-

Eastern Karnataka. The disease was recorded in all the surveyed districts, viz., Raichur, Kalaburagi and Bidar, with considerable variation in incidence among localities, taluks and districts (Table 1).

Table 1: Status of dry root rot in major pigeonpea growing districts of North Eastern Karnataka during 2025-26

Sl. No.	District	Taluk	Locality	Variety	Latitude	Longitude	Dry root rot	
1	Raichur	Raichur	MARS, Raichur	TS-3R	16.196433	77.320581	16.00	
			Hospete	TS-3R	16.290524	77.297474	10.00	
			Manslapur	TS-3R	16.251402	77.303658	26.00	
			J. Venktapur	TS-3R	16.273235	77.238083	28.00	
		Taluk mean						20.00
		Lingsugur	Kuppiguda	Gulyal local	16.133725	76.572509	10.00	
			Sarjapur	Kattibeeja	16.126191	76.589934	26.00	
			Chick-hesarur	TS-3R	16.123218	76.599349	18.00	
		Taluk mean						18.00
		District mean						19.00
2	Kalaburagi	Aland	Ladchincholi	GRG-811	17.481499	76.639558	14.00	
			Dhuttagaon	BSMR-736	17.460309	76.593608	18.00	
			Nimbarga	Gulyal local	17.364076	76.591451	14.00	
		Taluk mean						15.33
		Kalaburagi	Pattan	BSMR-736	17.384902	76.740958	18.00	
			ZARS, Kalaburagi	GRG-811	17.361553	76.817420	16.00	
			Kalaburagi local	Gulyal local	17.384457	76.741555	26.00	
		Taluk mean						20.00
			Janiwar	GRG-811	17.015696	76.714956	30.00	
			Jevargi	Maruti	17.012357	76.748864	14.00	
			Aurad	GRG-811	16.989424	76.770880	22.00	
		Taluk mean						22.00
		District mean						19.11
3	Bidar		Janwada	LRG-41	18.006577	77.399769	14.00	
			Markhal	LRG-41	17.986093	77.485964	18.00	
			Rajnal	Asha	18.007742	77.403619	6.00	
		Taluk mean						12.67
			Ameerabad	LRG-41	17.868128	77.284995	12.00	
			Hallikhed	Asha	17.863358	77.279864	10.00	
			Humnabad	GRG-811	17.868139	77.284806	14.00	
		Taluk mean						12.00
		District mean						12.34

Among the different villages surveyed, dry root rot incidence ranged from 6.00 to 30.00 per cent. The maximum dry root rot incidence was recorded in Janiwar village of Jevargi taluk (30.00 %), whereas the minimum incidence was recorded in Rajnal village of Bidar taluk (6.00 %).

Taluk-wise distribution of dry root rot revealed that the incidence ranged from 12.00 to 22.00 per cent (Fig. 1). The maximum incidence was recorded in Jevargi taluk (22.00 %), while the minimum incidence was recorded in Humnabad taluk (12.00 %).

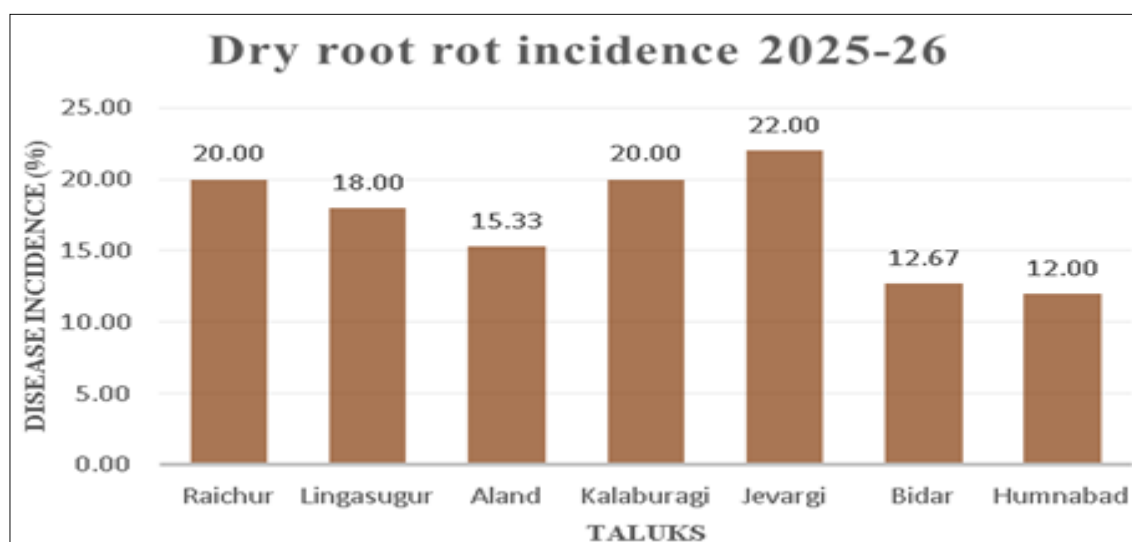


Fig 1: Prevalence of wilt incidence in major pigeonpea growing districts of North Eastern Karnataka

The district-wise distribution of dry root rot in North-Eastern Karnataka revealed that the incidence ranged from 12.34 to 19.11 per cent. The maximum incidence was recorded in Kalaburagi district (19.11 %), whereas the minimum incidence was recorded in Bidar district (12.34 %).

The dry root rot incidence recorded in the present investigation was compared with earlier reports to understand the temporal and spatial variation in disease occurrence. Maruti *et al.* (2017) ^[8] reported relatively higher disease incidence during their survey conducted in October–November 2015 in the major pigeonpea-growing districts of North-Eastern Karnataka. The mean incidence was highest in Kalaburagi (24.72 %), followed by Raichur (17.79 %) and Yadgir (9.44%), with an overall incidence ranging from 5.00 to 37.50 per cent across the surveyed locations. Similarly, Bindhu *et al.* (2021) ^[1] recorded considerable variation in dry root rot incidence during their surveys from 2017–18 to 2019–20. During 2017 ^[8]–18, the incidence ranged from 1.00 to 17.20 per cent, with the maximum incidence at Sultanpura of Raichur, while during 2018–19 it ranged from 3.00 to 28.00 per cent, again with the maximum at Sultanpura. During 2019–20, the maximum incidence of 17.50 per cent was recorded at Hirapur of Kalaburagi. The three-year mean incidence was maximum in Kalaburagi (7.50 %) and minimum in Bidar (2.66 %). Vamsikrishna *et al.* (2021) ^[11] also reported substantial spatial variation during *Kharif* 2018, with mean incidence being highest in Kalaburagi (24.20%), followed by Raichur (20.62 %), Bidar (9.50 %) and Yadgir (9.14 %). Across their surveyed locations, the incidence ranged from 1.00 to 37.00 per cent, with the maximum incidence recorded at Telekuni of Aland taluk in Kalaburagi.

The occurrence of dry root rot has also been reported from other pigeonpea-growing regions of Karnataka. Medikurthi *et al.* (2024) ^[9] recorded disease incidence ranging from 0 to 25.00 per cent in their survey of pigeonpea-growing areas of Doddaballapura, Bengaluru, with the maximum incidence of 25.00 per cent at Neralaghatta and Gundasandra. More recently, Kenganal *et al.* (2025) ^[6] reported considerable spatial variation in the incidence of major pigeonpea diseases across the major pigeonpea-growing districts of Northern Karnataka during *Kharif* 2023 and 2024. The variation observed among different studies may be attributed to differences in agro-climatic conditions, soil moisture, temperature, cropping practices, varietal susceptibility and disease-conducive environments prevailing during different seasons and locations. The present findings, therefore, further demonstrate the marked spatial and temporal variability in the occurrence of dry root rot in pigeonpea-growing regions.

In comparison, the present investigation recorded dry root rot incidence ranging from 12.00 to 22.00 per cent at the taluk level, with the maximum incidence in Jevargi (22.00 %) and minimum in Humnabad (12.00 %). At the district level, the incidence ranged from 12.34 to 19.11 per cent, with the maximum incidence recorded in Kalaburagi (19.11%) and the minimum in Bidar (12.34 %). The incidence recorded in the present study was lesser than the district-level incidence reported by Maruti *et al.* (2017) ^[8] and Vamsikrishna *et al.* (2021) ^[11] in Kalaburagi, but maximum than the three-year mean reported by Bindhu *et al.* (2021) ^[1]. Such differences may be attributed to variation

in survey years, locations, environmental conditions and disease-favouring factors.

The variation in dry root rot incidence among locations may be associated with differences in temperature, soil moisture, agro-climatic conditions, cropping practices, cropping systems and varietal susceptibility. Maruti *et al.* (2017) ^[8] observed that prolonged dry spells, high temperature and monocropping enhanced disease development in North-Eastern Karnataka. Medikurthi *et al.* (2024) ^[9] also emphasized that dry root rot is favoured by moisture stress and high temperature, while the pathogen can persist in soil through sclerotia.

In the present investigation, comparatively greater susceptibility was observed in local cultivars such as Gulyal local and Kattibeeja, whereas relatively lesser incidence was recorded in Asha and TS-3R, particularly under irrigated conditions. Continuous monocropping of pigeonpea may also favour the persistence and build-up of soil-borne inoculum in fields with a history of repeated pigeonpea cultivation. The survey was conducted during the post-flowering and pod-filling stages, when dry root rot symptoms were distinctly expressed, facilitating reliable assessment of disease incidence under field conditions.

Conclusion

Overall, the present survey confirmed the continued prevalence of dry root rot in the major pigeonpea-growing areas of North-Eastern Karnataka. The differences in incidence compared with earlier reports demonstrate considerable temporal and spatial variation in disease occurrence, which may be associated with differences in environmental conditions, particularly soil moisture and temperature, along with cropping practices and varietal composition across locations.

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