

International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2026): 5.29
IJABR 2026; SP-10(9): 1279-1282
www.biochemjournal.com
Received: 15-07-2026
Accepted: 19-08-2026

Pavankumar
Department of Plant
Pathology, Keladi Shivappa
Nayaka University of
Agricultural and Horticultural
Sciences, Shivamogga,
Karnataka, India

GN Hosagoudar
Department of Plant
Pathology, Keladi Shivappa
Nayaka University of
Agricultural and Horticultural
Sciences, Shivamogga,
Karnataka, India

B Gangadhara Naik
Department of Plant
Pathology, Keladi Shivappa
Nayaka University of
Agricultural and Horticultural
Sciences, Shivamogga,
Karnataka, India

D Thippesha
Department of Horticulture,
Keladi Shivappa Nayaka
University of Agricultural and
Horticultural Sciences,
Shivamogga, Karnataka, India

HB Narasimhamurthy
Department of Plant
Pathology, Keladi Shivappa
Nayaka University of
Agricultural and Horticultural
Sciences, Shivamogga,
Karnataka, India

Shilpa ME
Department of Agricultural
Microbiology, Keladi Shivappa
Nayaka University of
Agricultural and Horticultural
Sciences, Shivamogga,
Karnataka, India

Corresponding Author:
Pavankumar
Department of Plant
Pathology, Keladi Shivappa
Nayaka University of
Agricultural and Horticultural
Sciences, Shivamogga,
Karnataka, India

Survey and distribution of rhizome rot disease of ginger (*Zingiber officinale* rosc.) in Shivamogga district, Karnataka, India

Pavankumar, GN Hosagoudar, B Gangadhara Naik, D Thippesha, HB Narasimhamurthy and Shilpa ME

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i9Sp.9996>

Abstract

A random roving survey was conducted in different taluks and villages of Shivamogga district to assess the incidence of ginger rhizome rot during 2025-26 in Shivamogga district of Karnataka state. The disease was observed at all the surveyed locations, with disease incidence ranging from 10.10 to 11.90 per cent and an overall district mean incidence of 11.02 per cent. Among the surveyed taluks, the maximum mean disease incidence was recorded in Sagara taluk (11.50%), followed by Hosanagara (11.48%), Soraba (10.93%), Shivamogga (10.80%) and Shikaripura (10.50%). At the village level, the highest disease incidence was recorded at Iruvakkki (11.90%), followed by Maruthipura (11.80%) and Hirekasavi (11.50%), whereas the lowest incidence was recorded at Kyathinkoppa (10.10%). Variations in soil type, crop growth stage and irrigation practices were observed among the surveyed locations, with red loam, red sandy loam and sandy clay loam soils and sprinkler, drip, rainfed and combined rainfed plus sprinkler irrigation practices. Other diseases and disorders, including leaf blast, leaf spot, rhizome fly maggot damage, foliar insect damage, yellowing and calcium deficiency, were also observed during the survey.

Keywords: Roving survey, ginger rhizome rot, percent disease incidence, Shivamogga

Introduction

India, known as the 'land of spices', has occupied a prominent position in the global spice trade since time immemorial (Thomas and Sanil, 2019) [11]. Ginger (*Zingiber officinale* Rosc.), popularly known as the "golden spice of India", is an important horticultural crop belonging to the family Zingiberaceae.

In India, Karnataka is an important ginger-growing state, particularly in Hassan, Madikeri, Chikkamagaluru and Shivamogga districts. The area under ginger cultivation in India was 1,94,243 ha with a production of 23,33,000 tonnes during 2023-24, which changed to 1,93,258 ha and 22,46,292 tonnes during 2024-25. In Karnataka, the area and production increased from 21,344 ha and 2,32,839 tonnes in 2023-24 to 22,704 ha and 2,39,792 tonnes in 2024-25 (Spices Board of India, 2024, 2025) [9, 10].

Despite its economic importance, ginger production is constrained by several biotic and abiotic stresses, among which rhizome rot diseases are particularly destructive. Major pathogens associated with the disease complex include *Pythium aphanidermatum*, *Ralstonia solanacearum*, *Athelia rolfsii* and *Fusarium proliferatum* (Mahesha *et al.*, 2020) [5]. Rhizome rot has been reported from almost all ginger-growing states of India and may cause yield losses exceeding 50 per cent under favourable conditions (Joshi and Sharma, 1980) [3]. The disease complex includes soft rot, wet rot, bacterial wilt and Sclerotium rot, with their occurrence influenced by environmental and crop production conditions (Raghu, 2011) [6].

Shivamogga is an important ginger-growing district of Karnataka, where variations in soil type, crop growth stage, irrigation and other field conditions may influence rhizome rot development. However, information on the current incidence and distribution of the disease across ginger-growing locations of the district is limited. Therefore, the present study was undertaken to assess the incidence and distribution of ginger rhizome rot across different taluks and villages of Shivamogga district and to document the associated field conditions.

Materials and Methods

A random roving survey was conducted in the ginger growing areas of Shivamogga district viz., Sagara, Shivamogga, Soraba, Hosanagara and Shikaripura taluks for the incidence of ginger rhizome rot during 2025-26. During the survey, ginger plants showing the typical symptoms of rhizome rot were collected in polythene covers from the field. The collected samples were brought to the laboratory and utilized for further studies.

Disease incidence (DI) was calculated by using the following formula given by Wheeler (1969) ^[12].

Per cent Disease Incidence (PDI) = (Number of plants infected / Total number of plants observed) × 100

Results

A survey revealed that the disease incidence ranged from 10.10 to 11.90 per cent, with an overall district mean incidence of 11.02 per cent (Table 1). Among the surveyed taluks, the highest mean disease incidence was recorded in Sagara (11.50%), followed by Hosanagara (11.48%), Soraba (10.93%), Shivamogga (10.80%) and Shikaripura (10.50%). In Soraba taluk, disease incidence ranged from 10.40 per cent at Chikkasavi to 11.50 per cent at Hirekasavi, with a taluk mean of 10.93 per cent. In Sagara taluk, the incidence ranged from 11.10 to 11.90 per cent, with the highest incidence recorded at Iruvakki (11.90%) and a taluk mean of 11.50 per cent. In Shivamogga taluk, disease incidence varied from 10.30 per cent at Kumsi to 11.20 per cent at Tuppur and Sominakoppa, with a taluk mean of 10.80 per cent.

In Hosanagara taluk, the incidence ranged from 11.20 per cent at Seegekoppa to 11.80 per cent at Maruthipura, with a taluk mean of 11.48 per cent. In Shikaripura taluk, disease incidence ranged from 10.10 per cent at Kyathinkoppa to 11.00 per cent at Beeranakere, with a taluk mean of 10.50 per cent. Overall, the highest village-level incidence was recorded at Iruvakki (11.90%), whereas the lowest was recorded at Kyathinkoppa (10.10%) (Table 1).

The distribution of ginger rhizome rot incidence in relation to soil type is presented in Table 2. Among the surveyed fields, red loam soils accounted for the highest number of field observations (10), followed by red sandy loam (9 observations) and sandy clay loam (2 observations).

The disease incidence in red loam soils ranged from 10.30 to 11.90 per cent, whereas in red sandy loam soils it ranged from 10.10 to 11.80 per cent. In sandy clay loam soils, the incidence ranged from 10.70 to 11.40 per cent. Thus, disease incidence was recorded across all three soil types included in the survey, with overlapping incidence ranges among the soil categories (Table 2).

Discussion: The survey revealed that ginger rhizome rot occurred at all surveyed locations in Shivamogga district,

with incidence ranging from 10.1 to 11.9 per cent and a district mean of 11.02 per cent, indicating its widespread establishment in the ginger-growing areas. Sagara recorded the highest taluk mean incidence (11.50%), while Shikaripura recorded the lowest (10.50%); Iruvakki and Kyathinkoppa recorded the highest (11.90%) and lowest (10.10%) village-level incidence, respectively. The incidence recorded in the present study was comparatively lower than earlier reports from Karnataka and other ginger-growing regions, where incidence reached 37-60 per cent (Ekka *et al.*, 2009 ^[1]; Raghu, 2011 ^[6]; Mahesha *et al.*, 2020 ^[5]; Kumar *et al.*, 2022 ^[4]).

The lower incidence of rhizome rot recorded in the present survey may be attributed partly to intensive fungicidal management of foliar diseases, which could have exerted an incidental suppressive effect on susceptible components of the rhizome-rot complex. Earlier studies have reported that fungicides such as carbendazim + mancozeb and metalaxyl + mancozeb are effective in reducing rhizome rot, particularly that caused by *Pythium* spp. (Singh, 2011) ^[8]. Consequently, repeated application of fungicides for the management of leaf blast and leaf spot diseases may have provided additional protection against soil- and rhizome-associated fungal pathogens. However, the relatively low incidence observed may also reflect limitations in field-based symptom assessment. Rhizome rot commonly produces above-ground symptoms such as yellowing, wilting and drying of leaves, which can closely resemble or overlap with symptoms of severe foliar diseases. This symptom overlap is particularly important because ginger rhizome rot is a disease complex involving several soil- and rhizome-associated pathogens, and visible foliar symptoms may not always accurately indicate the infection status of the underground rhizome.

Thus, severe leaf-blast or leaf-spot symptoms may have obscured early or mild rhizome-rot symptoms during field observations, potentially resulting in an underestimation of disease incidence. Therefore, the comparatively lower rhizome-rot incidence recorded in the present survey may represent a combination of actual disease suppression associated with fungicidal management and possible underestimation arising from the overlapping expression of foliar and rhizome-rot symptoms.

The relationship between soil type and disease incidence was also examined, with red loam soils accounting for the largest number of field observations, followed by red sandy loam and sandy clay loam soils. Disease incidence ranged from 10.30 to 11.90 per cent in red loam, 10.10 to 11.80 per cent in red sandy loam and 10.70 to 11.40 per cent in sandy clay loam soils, the ranges overlapping considerably among the three soil types. Poorly drained, moisture-retentive soils tend to favour the soil-borne pathogens associated with the rhizome rot complex as reported by Singh (2011) ^[8].

Table 1: Survey for the incidence of ginger rhizome rot in Shivamogga district during 2025-26

Taluk Name	Village Name	Soil type	Irrigation	Other pests/diseases/disorders observed	Disease incidence (%)
Soraba	Chikkasavi	Red sandy loam	Sprinkler	Leaf blast	10.40
	Kasambi	Red loam	Rainfed	Leaf blast, rhizome fly maggots	10.90
	Hirekasavi	Red loam	Rainfed	Leaf blast, leaf spot	11.50
Taluk Mean					10.93
Sagara	Badanakoppa	Red loam	Rainfed +	Leaf blast, leaf spot	11.10

			Sprinkler		
	Nedaravalli	Sandy clay loam	Sprinkler	Leaf blast	11.40
	Iruvakk	Red loam soil	Sprinkler	Leaf blast, leaf spot	11.90
	Kannur Sarkari	Red loam	Drip + Sprinkler	Leaf blast	11.60
Taluk Mean					11.50
Shivamogga	Kumsi	Red loam	Sprinkler	Leaf blast, rhizome fly maggots	10.30
	Kunchenahalli Kelagina Thanda	Sandy clay loam	Drip	Leaf blast	10.70
	Navule	Red loam	Rainfed + Sprinkler	Leaf blast, rhizome fly maggots	10.90
	Alkuni	Red sandy loam	Sprinkler	Leaf blast	10.50
	Tuppur	Red loam	Drip + Sprinkler	Leaf blast, rhizome fly maggot	11.20
	Sominakoppa	Red sandy loam	Drip	Leaf blast	11.20
Taluk Mean					10.80
Hosanagara	Seegekoppa	Red sandy loam	Rainfed + Sprinkler	Leaf blast, foliar insect damage	11.20
	Maruthipura	Red sandy loam	Sprinkler	Leaf blast, yellowing	11.80
	Punajae	Red sandy loam	Rainfed + Sprinkler	Leaf blast	11.40
	Masagalli	Red sandy loam	Sprinkler	Leaf blast, Ca deficiency	11.50
Taluk Mean					11.48
Shikaripura	Kyathinkoppa	Red sandy loam	Drip + Sprinkler	Leaf blast	10.10
	Machagondanahalli	Red loam	Sprinkler	Leaf blast	10.50
	Beeranakere	Red loam	Rainfed + Sprinkler	Leaf blast, rhizome fly maggots	11.00
	Bidarahalli	Red sandy loam	Drip	Leaf blast	10.40
Taluk Mean					10.50
District Mean					11.02

Table 2: Distribution of ginger rhizome rot disease incidence across soil types

Sl.No	Soil types	No. of field observations	Disease incidence range (%)
1	Red loam	10	10.30 -11.90
2	Red sandy loam	9	10.10 -11.80
3	Sandy clay loam	2	10.70 -11.40

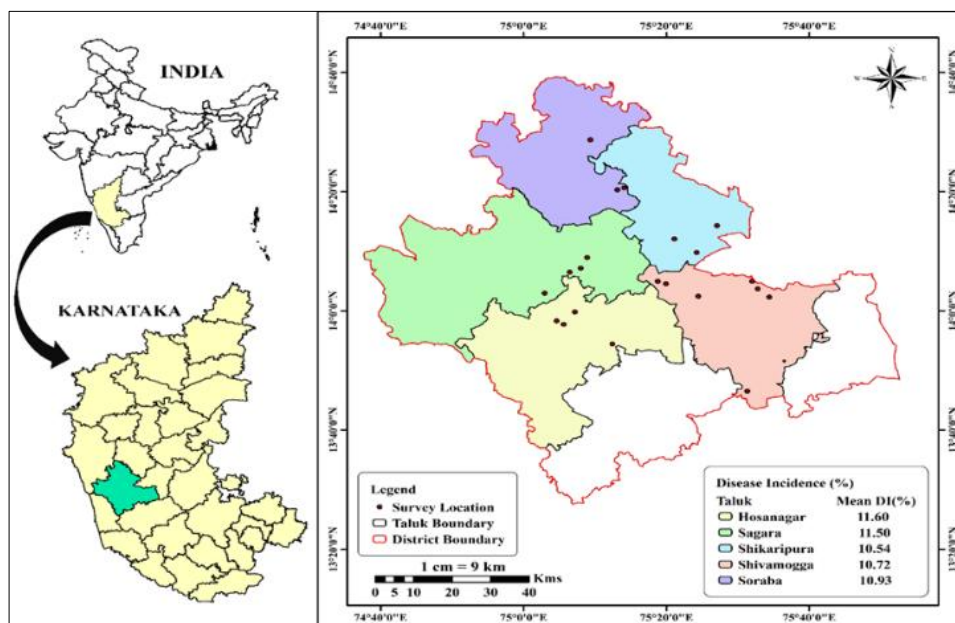
**Fig 1:** Surveyed locations of ginger rhizome rot in Shivamogga district



Fig 2: Symptoms of ginger rhizome rot diseases observed in ginger fields of Shivamogga district

External and internal symptoms of rhizome rot, including discoloration, tissue decay and rotting of ginger rhizomes



B. 1) Water soaked lesion on pseudo stem 2) Yellowing and lodging of plants 3) Wilted Plant

Conclusion

The random roving survey conducted during 2025-26 established that ginger rhizome rot was present across all surveyed locations in Shivamogga district, with disease incidence ranging from 10.1 to 11.9 per cent and a district mean of 11.02 per cent. The comparatively lower incidence observed in the present study may reflect disease suppression associated with intensive management practices as well as possible underestimation of early or mild rhizome-rot symptoms under severe foliar disease conditions and incidental effect of fungicides on soil borne pathogens taken to control leaf blast as in case of current investigation.

Acknowledgments

The work has been undertaken as part of the of M.Sc. research programme in Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, College of Agriculture, Navile, Shivamogga, I'm thankful to My seniors, Friends and advisory committee for their support during M.Sc. degree programme..

References

- Ekka S, Prasad SM, Sharma RB. Occurrence and relative dominance of pathogens in rhizome rot of ginger at Ranchi. *Indian Phytopathol.* 2009;62(4):505-508.
- FAOSTAT. Crops and livestock products - ginger. Rome: Food and Agriculture Organization of the United Nations; 2023.
- Joshi LK, Sharma ND. Diseases of ginger and turmeric. In: Nair MK, Premkumar T, Ravindran PN, Sharma YR, editors. *Proceedings of the National Seminar on Ginger and Turmeric*. Kasaragod: Central Plantation Crops Research Institute; 1980. p. 104-119.
- Kumar MKT, Ravikumar MR, Lokesh BK, Ganpathi T. Prevalence of rhizome rot complex in major ginger growing regions of Karnataka. *Karnataka J Agric Sci.* 2022;36(1):50-52.
- Mahesha HS, Ravikumar MR, Suryanarayana V, Prabhu ST, Jagadeesh BR. Status of ginger rhizome rot complex disease in major growing tracts of Karnataka. *Int J Ecol Environ Sci.* 2020;2(4):769-774.
- Raghu S. Studies on management of rhizome rot of ginger (*Zingiber officinale* Rosc.) with special reference to *Ralstonia solanacearum* (E. F. Smith) Yabuuchi *et al.* [MSc thesis]. Dharwad: University of Agricultural Sciences; 2011.
- Sankar M, Sujatha V, Varghese A, Davis F. Efficacy of fungicides, bioagents and organic amendments against rhizome rot diseases of ginger. *Indian Phytopathol.* 2016;69:397-400.
- Singh AK. Management of rhizome rot caused by *Pythium*, *Fusarium* and *Ralstonia* spp. in ginger (*Zingiber officinale*) under natural field conditions. *Indian J Agric Sci.* 2011;81(3):268-270.
- Spices Board of India. Major spice - state-wise area and production, 2023-24. Kochi: Spices Board, Ministry of Commerce and Industry, Government of India; 2024.
- Spices Board of India. Major spice - state-wise area and production, 2024-25. Kochi: Spices Board, Ministry of Commerce and Industry, Government of India; 2025.
- Thomas L, Sanil PC. Competitiveness in spice export trade from India: a review. *J Spices Aromat Crops.* 2019;28(1):1-19.
- Wheeler BEJ. An introduction to plant diseases. London: John Wiley and Sons; 1969.