



Survey for the incidence of Tomato fruit rot diseases in North Eastern Karnataka

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DOI: <https://doi.org/10.66856/ijees.2026.8.4.8101>

Abstract

Tomato fruit rot diseases, associated with different fungal pathogens, are an important concern affecting fruit quality and marketability. The present investigation was undertaken to assess the incidence and distribution of tomato fruit rot symptoms in major tomato-growing areas of North Eastern Karnataka during 2025–26. An intensive roving survey was conducted in Raichur, Yadgir and Kalaburagi districts. Disease incidence was assessed based on characteristic external symptoms observed on tomato fruits and calculated using the disease incidence formula. Considerable spatial variation in disease incidence was observed across the surveyed region. The district mean incidence ranged from 9.09 to 13.52 per cent, with the maximum incidence recorded in Raichur (13.52%), followed by Yadgir (11.90%), while the minimum was recorded in Kalaburagi (9.09%). At the individual location level, disease incidence ranged from 5.23 per cent at Kadaganchi to 24.42 per cent at Main Agriculture Research Station (MARS), Raichur. Relatively higher incidence was recorded at MARS, Raichur (24.42%), Chamnal (18.56%), Naron (14.63%) and Balichakkar (14.04%). The observed variation in disease incidence may be associated with differences in prevailing environmental conditions and crop management practices. The present findings revealed the occurrence and considerable spatial variability of tomato fruit rot symptoms in North Eastern Karnataka and provide baseline information for further investigations on pathogen identification and disease management.

Keywords: Tomato, fruit rot, disease incidence, roving survey, North Eastern Karnataka

Introduction

India's tribunal system has repeatedly generated the same constitutional anxiety: bodies created to exercise judicial or quasi-judicial power have often remained administratively dependent on the executive departments whose decisions they review. The Supreme Court's tribunal jurisprudence—from S.P. Sampath Kumar and L. Tomato (*Solanum lycopersicum* L.) is one of the most important and widely cultivated crops worldwide and belongs to the family. Over 80.00 per cent of all commercially grown tomatoes are consumed as processed products such as juice, soup and ketchup (Collins *et al.*, 2022).^[2] India is among the leading producers of tomato, with a total area of 8.09 lakh hectares and production of 20.59 million tonnes in 2024-25. Karnataka is one of the major tomatoes producing states in India, ranking third nationally in terms of production of 2.23 million tonnes and productivity of 34.07 t/ha (Anon, 2025). However, tomato production and fruit quality are affected by several diseases, among which fruit rot diseases cause considerable losses by reducing fruit quality and marketability. Fruit rot diseases are associated with different fungal pathogens and may occur under field as well as post-harvest conditions. Chandra Mohana *et al.* (2022) reported fruit rot incidence of approximately 12-14 per cent in tomato fields covering 18 hectares in southern Karnataka.^[3] Tomato fruits affected by fungal pathogens exhibit symptoms such as discoloured lesions, tissue necrosis, softening and rotting which may progress under favourable environmental conditions. The symptoms vary depending on the pathogen involved and the stage of fruit development. Sajad *et al.* (2017) reported several fungi associated with

tomato fruit spoilage in Jabalpur, Madhya Pradesh, India. Among the fungi recorded, *Alternaria alternata* showed a maximum frequency of occurrence of 16.51 per cent, followed by *Alternaria solani* (12.43 %) and *Geotrichum candidum* (10.66 %). Chandra Mohana *et al.* (2022) also observed necrotic lesions covered with black fungal fruiting structures on affected tomato fruits in Karnataka. These reports indicate the importance of fungal pathogens associated with tomato fruit rot and spoilage.^[3]

Fungal fruit rot in tomato may be associated with pathogens belonging to different genera, including *Alternaria*, *Fusarium*, *Aspergillus*, *Rhizopus* and *Colletotrichum*. Their occurrence and severity may vary with climatic conditions, crop management practices and the condition of the fruits. In North Eastern Karnataka, information on the incidence and distribution of tomato fruit rot symptoms across different tomato-growing locations is important for assessing the extent of the problem. Therefore, the present investigation was undertaken to survey the incidence of tomato fruit rot diseases in selected tomato-growing areas of Raichur, Yadgir and Kalaburagi districts of North Eastern Karnataka. The survey aimed to document the incidence of fruit rot symptoms and assess variation among the locations surveyed.

Material and methods

An intensive roving survey was carried out to assess the incidence and to understand present status of fruit rot diseases on tomato under field conditions in different tomato growing areas of North Eastern Karnataka viz., Raichur, Yadgir and Kalaburagi during 2025-26. Diseases

incidence was assessed based on the external symptoms of disease on tomato fruits.

In each field, 50 plants were selected and tomato fruits showing characteristic symptoms of fruit rot or diseased fruits out of total number of fruits observed were counted, further per cent disease incidence was calculated as per the formula mentioned below (Mayee and Datar ,1986).

$$\text{Disease incidence (\%)} = \frac{\text{Number of diseased fruits observed}}{\text{Total number of fruits observed}} \times 100$$

Result and discussion

A roving survey was conducted in major tomato-growing areas of North Eastern Karnataka to assess the incidence of tomato fruit rot symptoms. The survey covered three districts, viz., Raichur, Yadgir and Kalaburagi, encompassing six taluks, namely Raichur, Lingasugur, Yadgir, Shahapur, Aland and Jewargi. Two locations were surveyed in each taluk, and diseased tomato fruits exhibiting characteristic rot symptoms were observed and recorded. The details of the surveyed districts, taluks, villages, geographical coordinates, varieties/hybrids and disease incidence are presented in Table 1 and Fig.1.

Table 1: Survey and collection of diseased fruit samples from selected districts of Northern Eastern Karnataka

Districts	Taluks	Villages	Latitude	Longitude	Variety/Hybrid	Disease incidence (%)
Raichur	Raichur	Main Agriculture Research Station (MARS)	16.196173	77.317685	Ryna	24.42
		Chandra Banda	16.226125	77.411458	Kaveri local	9.10
	Taluk mean incidence					16.76
	Lingasugur	Khairwadgi	16.06357	76.374345	Baaho (To 3141)	11.06
		Advibhavi	16.061215	76.410857	Local	9.50
	Taluk mean incidence					10.28
	District mean incidence					13.52
Yadgir	Yadgir	Balichakkar	16.678567	77.261893	Saho (T0 3251)	14.04
		Gundhalli	16.719216	76.963668	Saho (T0 3251)	7.81
	Taluk mean incidence					10.92
	Shahapur	Mallabad	16.727302	76.655268	Kaveri 143	7.22
		Chamnal	16.702559	76.649935	Local	18.56
	Taluk mean incidence					12.89
	District mean incidence					11.90
Kalaburagi	Aland	Kadaganchi	17.439421	76.67876	Champion (PHS-6040)	5.23
		Narona	17.523927	76.720541	Ambareesh	14.63
	Taluk mean incidence					9.93
	Jewargi	Aralagundagi	16.938191	76.494670	Saahith (PHS-34)	7.31
		Nelogi	17.038927	76.615305	Saho (T0 3251)	9.19
	Taluk mean incidence					8.25
	District mean incidence					9.09



Fig 1: Diseased fruits of tomato observed during the survey

Considerable variation in disease incidence was observed among the surveyed locations. The district mean incidence was maximum in Raichur (13.52 %), followed by Yadgir (11.90 %) and Kalaburagi (9.09 %). Among the individual locations, the maximum disease incidence of 24.42 per cent was recorded at Main Agriculture Research Station (MARS), Raichur, followed by Chamnal village of Shahapur taluk (18.56 %) and Narona village of Aland taluk (14.63 %). The minimum incidence of 5.23 per cent was recorded at Kadaganchi village of Aland taluk, Kalaburagi

district. Overall, the incidence across the 12 surveyed locations ranged from 5.23 to 24.42 per cent indicating considerable spatial variation in the occurrence of tomato fruit rot symptoms.

In Raichur district, the survey was conducted in Raichur and Lingasugur taluks. In Raichur taluk, MARS recorded a maximum disease incidence of 24.42 per cent, whereas Chandra Banda recorded 9.10 per cent. The mean incidence for Raichur taluk was 16.76 per cent. In Lingasugur taluk, disease incidence was 11.06 per cent at Khairwadgi and

9.50 per cent at Advibhavi, resulting in a taluk mean of 10.28 per cent. The district mean incidence was 13.52 per cent.

In Yadgir district, Yadgir and Shahapur taluks were surveyed. In Yadgir taluk, Balichakkar recorded 14.04 per cent disease incidence, while Gundhalli recorded 7.81 per cent, with a reported taluk mean of 10.92 per cent. In Shahapur taluk, incidence varied from 7.22 per cent at Mallabad to 18.56 per cent at Chamnal, giving a reported taluk mean of 12.89 per cent. The district mean incidence was 11.90 per cent.

In Kalaburagi district, the survey covered Aland and Jewargi taluks. In Aland taluk, the minimum incidence of 5.23 per cent was recorded at Kadaganchi, whereas Narona recorded a maximum of 14.63 per cent. The reported taluk mean was 9.93 per cent. In Jewargi taluk, disease incidence was 7.31 per cent at Aralagundagi and 9.19 per cent at Nelogi, with a taluk mean of 8.25 per cent. The district mean incidence was 9.09 per cent, which was comparatively lower than those recorded in Raichur and Yadgir districts.

The observed variation among locations is consistent with published research showing that tomato diseases can differ substantially in incidence across geographical areas. Chandra Mohana *et al.* (2022) reported approximately 12-14 per cent incidence of *Aspergillus versicolor*-associated fruit rot in an 18 hectare tomato production area comprising approximately 62 fields in southern Karnataka. This provides a direct regional comparison with the fruit rot incidence recorded in the present survey.^[3]

Similarly, Sajad *et al.* (2017) documented several fungi associated with tomato fruit spoilage in Jabalpur, Madhya Pradesh. They reported maximum frequency of occurrence for *Alternaria alternata* (16.51 %), followed by *Alternaria solani* (12.43 %) and *Geotrichum candidum* (10.66 %).

Mehta *et al.* (2010) investigated the effect of training methods and mulching on growth, yield and fruit rot incidence in tomato, highlighting the relevance of crop production practices when assessing fruit rot occurrence. In addition, Aljabali *et al.* (2025) surveyed southern blight caused by *Sclerotium rolfsii* in 30 villages across six taluks of Mysuru district, Karnataka and reported disease incidence ranging from 10.73 to 69.64 per cent.

Zamir and Haque (2023) also reported variation in tomato early blight incidence across surveyed blocks of Aligarh district, Uttar Pradesh. Their survey recorded an overall incidence of 12.7 per cent, with values ranging from 7.5 to 24.3 per cent among the reported blocks.

Overall, the survey revealed considerable variation in tomato fruit rot incidence among the selected locations of North Eastern Karnataka. Raichur district recorded the maximum district mean incidence (13.52 %), whereas Kalaburagi recorded the minimum (9.09 %). At the individual location level, incidence ranged from 5.23 per cent at Kadaganchi to 24.42 per cent at MARS, Raichur. These findings provide baseline information on the distribution of fruit rot symptoms in the surveyed region and indicate the need for further investigations to identify the pathogens associated with the affected fruits and determine the factors contributing to variation in disease incidence.

Conclusion

The roving survey conducted in major tomato growing areas of North Eastern Karnataka revealed considerable variation in the incidence of tomato fruit rot symptoms across the

surveyed locations. Disease incidence ranged from 5.23 to 24.42 per cent, with the maximum district mean incidence recorded in Raichur (13.52 %), followed by Yadgir (11.90 %), while the minimum was recorded in Kalaburagi district (9.09 %). The variation in disease incidence may be associated with differences in prevailing environmental conditions, crop management practices and other factors influencing disease development. Overall, the findings provide baseline information on the occurrence and distribution of tomato fruit rot symptoms in the surveyed region and emphasize the importance of regular disease surveillance, pathogen identification and appropriate disease management.

Acknowledgement

We would like to thank the University of Agricultural Sciences Raichur, Karnataka, India for supporting and facilitating the study.

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