



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(11): 2145-2147
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www.thepharmajournal.com
Received: 19-08-2022
Accepted: 21-09-2022

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Prevalence of rhizome rot complex of ginger in major ginger growing parts of Karnataka

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Abstract

Zingiber officinale Rosc. is commonly known as Ginger. Rhizome rot complex of ginger is one of the most destructive diseases of ginger and responsible for significant crop damage. Among the surveyed taluks, the maximum mean disease incidence of 35.99 percent was recorded in Sirsi taluk of Uttara Kannada district and the minimum mean disease incidence of 21.50 percent was observed in Byadagi taluk of Haveri district. A roving survey was conducted during kharif – 2021 to assess the disease incidence of rhizome rot complex of ginger in major ginger growing parts of Karnataka, viz., Haveri, Shivamogga and Uttara Kannada districts. Among the surveyed taluks, the maximum mean disease incidence of 35.99 percent was recorded in Sirsi taluk of Uttara Kannada district and the minimum mean disease incidence of 21.50 percent was observed in Byadagi taluk of Haveri district. Among the surveyed districts, the maximum mean disease incidence was observed in Uttara Kannada district of 31.62 percent followed by Shivamogga district with 28.81 percent and the minimum mean disease incidence was observed in Haveri district of 25.45 percent. Improper planting material selection, poor drainage of fields, monocropping, lack of crop rotation, indiscriminate use of fertilizers and lack of knowledge on managing the disease could be the reasons for higher occurrence of rhizome rot complex in ginger growing parts of Karnataka.

Keywords: Rhizome rot complex, ginger, survey, disease incidence

Introduction

Ginger (*Zingiber officinale* Rosc.) is an important tropical spice crop belonging to the family *Zingiberaceae*. It is an herbaceous perennial spice crop with a pseudo stem and rolled base of leaves about one-meter-tall bearing narrow leaf blades. The inflorescence bears flowers with pale yellow petals with purple edges that arise directly from the rhizome on separate shoots. The rhizomes are used as a spice. It's an economically important cash crop grown for its aromatic underground rhizomes, which are used as a spice. Ginger was marketed in various forms like dry ginger, bleached dry ginger, ginger powder, candy, squash, flakes and ginger oil etc. India is the leading producer of ginger in the world. During 2017–18, the country produced 3,85,330 tonnes of spice from an area of 1,07,540 hectares with a productivity of 3.58 tonnes/hectare. Ginger is cultivated in most of the states in India (Anon, 2018) [2].

Premature wilting in ginger resulting in cent percent crop loss in Kerala as reported by Sambasivam and Girija (2005) [7]. The rhizome rot disease is complex, and the organisms associated vary with crop growth stages under varied geographical areas. Clear cut diagnosis of the disease in a given location and involvement of one or more pathogens is most essential to plan location specific effective integrated management measures. Rhizome rot complex disease of ginger has potentiality to cause yield loss up to 90 percent and it is caused either by a single pathogen or association of fungi, bacterium and plant parasitic nematode (Nirmal *et al.*, 1992) [5].

In Karnataka, ginger is planted in the month of May–June as rainfed crop immediately after the pre-monsoon showers. It starts sprouting in June and tillering continues until in the late in the season. High soil moisture and optimum temperature (25-30 °C) prevailing throughout the growing season. Moreover, young tissues of the host which *Pythium* prefers to infect are also readily available and the pathogen spreads through soil water by means of zoospores, hyphal fragments and infected planting materials (Sarma, 1994) [4].

The pathogen associated with rhizome rot complex disease of ginger in Karnataka includes *Pythium aphanidermatum* (soft rot), *Ralstonia solanacearum* (E. F. Smith) Yabuuchi *et al.*, 1995 [10] (bacterial wilt), *Fusarium solani* (yellows), *Sclerotium rolfsii* (Sclerotium rot) and *Meloidogyne incognita* (root knot) as reported by Anand (2014) [1].

Rhizome rot complex of ginger is considered as a serious problem in major ginger growing parts of Karnataka. Therefore, the present study was carried out to know the prevalence of rhizome rot complex of ginger in major ginger growing parts of Karnataka.

Material and methods

A roving survey was conducted to know the status of the disease in major ginger growing parts of Karnataka, viz., Haveri, Shivamogga and Uttara Kannada districts during *kharif* – 2021. During the survey, the observation of rhizome rot complex incidence was recorded, and infected plant and soil samples were collected. The list of different places selected for the survey is furnished in the table below. Plants showing symptoms along with rhizosphere soil were collected during the survey and subjected for isolation of pathogen. The disease incidence in the fields was assessed with the formula given by Wheeler, 1969^[9].

$$\text{Percent disease incidence (PDI)} = \frac{\text{Total number of infected plants}}{\text{Total number of plants examined}} \times 100$$

Results

A roving survey was conducted during *kharif* – 2021 to assess the disease incidence of rhizome rot complex of ginger in major ginger growing parts of Karnataka, viz., Haveri, Shivamogga and Uttara Kannada districts. The percent disease incidence recorded during the survey.

The rhizome rot complex incidence was noticed in all the

surveyed locations or villages, with a range from 11.28 to 58.49 percent. Among the surveyed taluks, the maximum mean disease incidence of 35.99 percent was recorded in Sirsi taluk of Uttara Kannada district and the minimum mean disease incidence of 21.50 percent was observed in Byadagi taluk of Haveri district. Among the surveyed districts, the maximum mean disease incidence was observed in Uttara Kannada district of 31.62 percent followed by Shivamogga district with 28.81 percent and the minimum mean disease incidence was observed in Haveri district of 25.45 percent (Table 1 and Figure 1).

Table 1: Taluk and district wise incidence of rhizome rot complex disease of ginger

Sl. No.	District	Taluk	Percent disease incidence (PDI)
1	Haveri	Byadagi	21.5
		Hanagal	23.09
		Hirekerur	31.77
	District mean		25.45
2	Shivamogga	Hosanagara	26.43
		Shikaripura	29.37
		Shivamogga	30.63
	District mean		28.81
3	Uttara Kannada	Mundagod	33.25
		Sirsi	35.99
		Yellapura	25.61
	District mean		31.62
Grand mean		28.93	

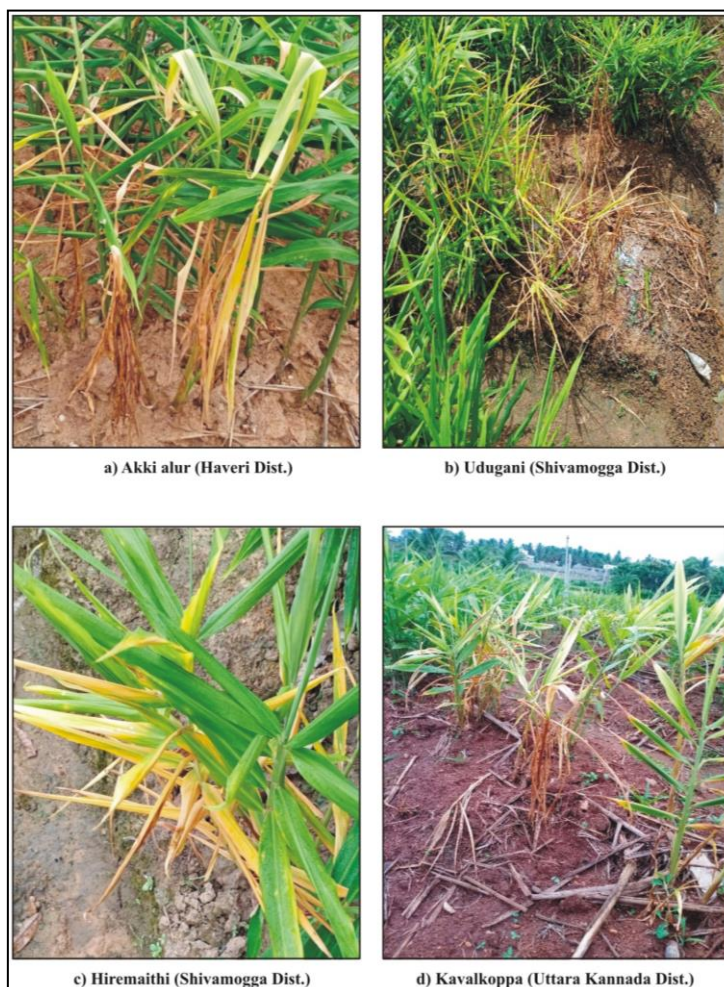


Fig 1: Incidence of rhizome rot complex disease of ginger in major ginger growing districts of Karnataka during *kharif*-2021

Discussion

These results were supported findings of Kulkarni *et al.* (2004) [3] observed that, the ginger rhizome rot incidence was observed in all the surveyed locations of northern parts of Karnataka, incidence was ranges from 2.00 to 47.28 percent and maximum incidence of disease was noticed in Korlakatta village (47.28%) of Uttara Kannada district and least incidence was recorded in Haveri district Markoppa village (2.00%) during 2004-05.

A similar of study was conducted by Ravikumar and Suryanarayan (2011) [6] in selected ginger-growing areas of Malenadu Karnataka and data revealed the severity of *Pythium* rot cum *Ralstonia* wilt complex in various areas of Sirsi taluk of Uttara Kannada (25-50%) followed by Soraba taluk of Shivamogga (0-42%).

According to Mahesha (2020) [4], the incidence of rhizome rot was noticed in all the surveyed area with range from 3.33 to 60.00 percent. The maximum incidence of rhizome rot complex disease was noticed in Uttara Kannada district (36.13%) in Kharif -2017. The mean incidence of rhizome rot of ginger was (31.00%) in Kharif -2017. Rhizome rot complex incidence varies with location to location, cultivar to cultivar, cropping pattern and weather condition. The incidence of rhizome rot complex disease is more in Kharif -2017 than due to higher rainfall and cloudy weather, which favors the disease development.

Conclusions

In conclusion, in some surveyed villages, the incidence of rhizome rot complex was higher in monoculture of ginger crop or repeated cultivation of the ginger crop as compared to the ginger crop grown immediately after the cultivation of rice or maize. In some surveyed villages, the incidence of rhizome rot complex was higher as compared to the ginger crop grown in between plantation crops. Improper planting material selection, poor drainage of fields, monocropping, lack of crop rotation, indiscriminate use of fertilizers and lack of knowledge on managing the disease could be the reasons for higher occurrence of rhizome rot complex in ginger growing parts of Karnataka.

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