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RESEARCH PAPER

Prevalence of rhizome rot complex in major ginger growing regions of Karnataka*

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Abstract : Rhizome rot complex is one of the most destructive and economically important diseases of ginger. In this study, a roving survey was conducted during *kharif* - 2021 to assess the disease incidence of rhizome rot complex in major ginger growing parts of Karnataka,*viz.,* Haveri, Shivamogga and UttaraKannada districts. Among the various taluk as surveyed, the maximum disease incidence (35.99%) was recorded in Sirsi taluk of Uttara Kannada district and the minimum of 21.50 per cent was observed in Byadagi taluk of Haveri district. Among the surveyed districts, the highest incidence of 31.62 per cent was observed in Uttara Kannada district followed by Shivamogga district (28.81%) and the minimum incidence was observed in Haveri district (25.45%). Further, from the survey it was revealed that, selection of improper planting material, poor drainage of fields, mono cropping, lack of crop rotation, indiscriminate use of fertilizers and lack of knowledge on managing the disease could be the possible reasons for higher occurrence of rhizome rot complex in ginger growing regions of Karnataka.

Key words: Disease incidence, Ginger, Rhizome rot complex, Survey

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 2020-21, the India produced 22,24,840 Metric Tonne of ginger from an area of 2,04,840 hectare with a 10.86 productivity of Metric Tonnes/ Hectare and in the Karnataka produced 532,0470 Metric Tonnes of ginger from an area of 45,500 hectare with a 10.86 productivity of Metric Tonne/Hectare (Anon, 2022).

Of the various biotic constraints, the rhizome rot complex is an one of the most destructive and economically important diseases of ginger (Wubshet, 2018). Premature wilting in ginger resulting in cent per cent crop loss in Kerala as reported by Sambasivam and Girija (2005). 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 per cent and it is caused either by a single pathogen or association of fungi, bacterium and plant parasitic nematode (Nirmal *et al.,*1992).

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^{0}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 though soil water by means of zoospores, hyphal fragments and infected planting materials (Sarma, 1994).

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 (bacterial wilt), *Fusarium solani* (yellows), *Sclerotium rolfsii* (*Sclerotium* rot) and *Meloidogyne incognita* (root knot) as reported by Anand (2014).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

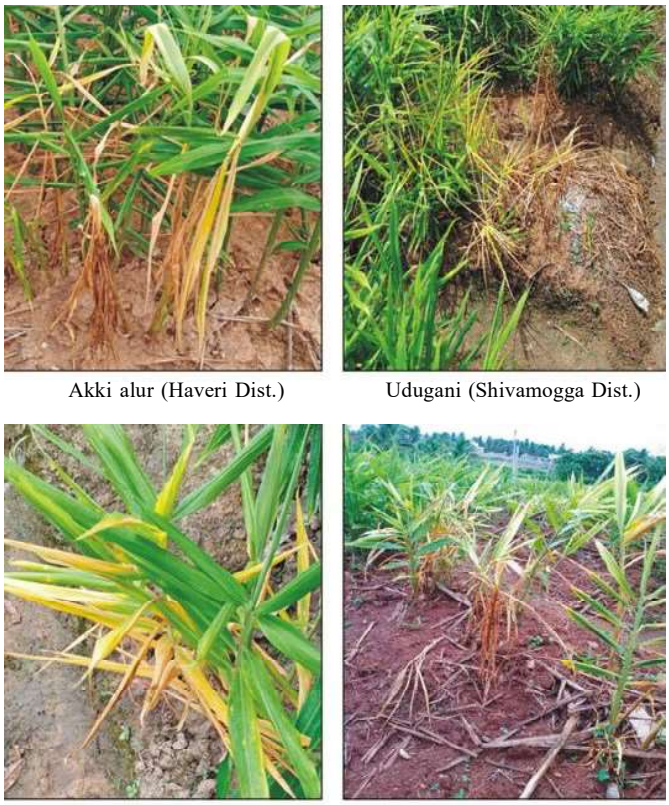
A roving survey was conducted to know the status of the disease in major ginger growing parts of Karnataka, *viz.,* Haveri, Shivamogga and Uttara Kannada districts during *kharif* -2021. During the survey, the observation of rhizome rot complex incidence was recorded, by randomly selecting 50 ginger plants and among them count the number of infected plants repeat these for four times per plot. Based on these observation the percent disease incidence was calculated.The list of different Talukas selected for the survey is furnished in the table below.

The disease incidence in the fields was assessed with the formula given by Bhai *et al.*(2012)

$$\text{Disease incidence (DI)} = \frac{\text{Total number of infected plants}}{\text{Total number of plants examined}} \times 100$$

Results and discussion

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,



Akki alur (Haveri Dist.) Udugani (Shivamogga Dist.)

Hiremaithi (Shivamogga Dist.) Kavalkoppa (Uttara Kannada Dist.)

Fig 1. Symptoms of rhizome rot complex disease of ginger observed in major ginger growing districts of Karnataka

Table 1. Incidence of rhizome rot complex disease of ginger in major growing regions of Karnataka

District	Taluk	Percent disease incidence (PDI)
Haveri	Byadagi	21.5
	Hanagal	23.09
	Hirekerur	31.77
	District mean	25.45
Shivamogga	Hosanagara	26.43
	Shikaripura	29.37
	Shivamogga	30.63
	District mean	28.81
Uttara Kannada	Mundagod	33.25
	Sirsi	35.99
	Yellapura	25.61
	District mean	31.62
Grand mean		28.93

Shivamogga and Uttara Kannada districts. The per cent disease incidence was recorded during the survey.

From the survey it was revealed that, the rhizome rot complex incidence was noticed in all the surveyed talukas, with a range from 11.28 to 58.49 per cent. Among the surveyed taluks, the maximum mean disease incidence of 35.99 per cent was recorded in Sirsi taluk of Uttara Kannada district and the minimum mean disease incidence of 21.50 per cent 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 per cent followed by Shivamogga district with 28.81 per cent and the minimum mean disease incidence was observed in Haveri district of 25.45 per cent (Table 1 and Fig 1).

These results were in accordance with the findings of Kulkarni *et al.* (2004) who observed the ginger rhizome rot incidence in all the surveyed locations of northern parts of Karnataka and incidence was ranged from 2.00 to 47.28 per cent 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.

A similar of study was conducted by Ravikumar and Suryanarayan (2011) 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), the incidence of rhizome rot was noticed in all the surveyed area with range from 3.33 to 60.00 per cent. 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 In conclusion, in some surveyed taluka, 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.

Conclusion

In conclusion, in some surveyed taluka, 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.

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