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Survey on Incidence of Dry Root Rot of Sweet Orange in Aurangabad and Jalna District of Marathwada Region, India

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A B S T R A C T

Dry root rot (*Fusarium solani*) is the major fungal disease affecting both life span and production of sweet orange. The survey revealed incidence of dry root rot in the range of 5 to 50% and nearly 10 to 15% trees were killed every year. In Jalna district, average incidence of dry root rot was 20.49%. However, it was maximum in Jalna and tehsil (24.91%), followed by Mantha (24.23%), Badnapur (22.60%), Jafrabad (19.54%), Ambad (19.36%), Bhokardan (19.60%), and Partur (17.93%). In Aurangabad district average incidence of dry root rot was 16.84 %. However, it was maximum in Aurangabad (21.92%), followed by Soyegaon (21.20), Gangapur (19.54%), Kannd (19.00%), Paithan (15.73%), Vaijapur (14.14%), Phulambri (13.20%) and Kulthabad (14.12%). The lowest disease incidence was reported in Sillod tashil.

Introduction

Sweet orange is one of the most important tropical fruit crop of the world and in India, it is most commercially grown fruit crop. Its cultivation in Marathwada region is facing numerous production constraints including diseases caused by fungi, bacteria and viruses. Dry root rot (*Fusarium solani*) is the major fungal disease affecting both life span and production of sweet orange. Dry root rot of citrus has been reported from California, Australia, and South Africa, usually for trees on trifoliate citrus or citrange rootstocks (Broadbent 2000). Apparently healthy trees suddenly wilt and die, and the roots are blackened and rotted with a brown, vascular discoloration within the stem of the rootstock. In Florida, similar decline symptoms occur with trees affected by blight and tangerine collapse, both with unknown etiologies (Graham *et al.*, 1985). Various fungi have been isolated from trees affected with dry root rot, including *Coprinus micaceus* and *Diaporthe citri*, but *Fusarium solani*, a ubiquitous fungus with varying pathogenicity to citrus under stress conditions, can also induce dry root rot (Broadbent 2000). *F. solani* has also been isolated from affected citrus in Florida, and can cause root necrosis in trifoliate orange seedlings having depleted starch reserves. However, this fungus is not believed to be the primary cause of blight,

which is considered to differ from tangerine collapse (Graham *et al.,* 1985). Dry root rot has not been reported previously in Texas, where most trees are grafted on sour orange rootstocks. However, the recovery of *Fusarium* spp. from both healthy and dead grapefruit twigs has been reported (Okamura and Davis 1987). This paper reports on the results of incidence of the pathogen.

Materials and Methods

Survey of dry root rot of sweet orange

Keeping in view of the importance of sweet orange dry root rot a fix plot roving survey was carried out in the farmers orchards and nurseries for the recording prevalence of disease in Jalna and Aurangabad districts of Marathwada region during rabbi season of 2015-2016 Location were surveyed for each orchard/ nursery.

The incidence of disease was recorded by counting total number of plants and infected plants in each location and per cent disease incidence was determined by using a formula per cent disease incidence of dry root rot of sweet orange was calculated by using formula.

Per cent Disease Incidence =

$$\frac{\text{Number of plants infected}}{\text{Total number of plants examined}} \times 100$$

Results and Discussion

Survey on incidence of dry root rot of sweet orange in Aurangabad and Jalna district of Marathwada region.

For recording the prevalence and distribution of dry root rot of Sweet orange caused by *Fusarium solani*. An extensive survey was undertaken in different 52 orchards main field and 10 nurseries of Aurangabad and Jalna districts.

At nursery stage

The data presented in Table 1 showed that prevalence incidence of dry root rot of Sweet orange at in all the surveyed in Jalna and Aurangabad districts. In Jalna district the disease incidence was ranged from 9.00 to 15.8 per cent. However, the maximum disease incidence of dry root rot was found in Godavari nursery (15.80%), at Krushiraj fruit nursery, Nagik Pangari. This was followed by the Govt. Nursery, Wadigodari (12.30%), Govt. Taluka Fruit nursery, Mantha (11.33%), Govt. Nursery, Jalna (10.50%) and Taluka fruit nursery, Badnapur (9.00%).

The disease incidence of dry root rot in Aurangabad district at nursery stage i.e. at seedling stage reported varied from 07.22 per cent to 13.00 per cent. However, the highest per cent disease incidence was found in Gajanan fruit nursery, Pimpariraja (13.00%).This was followed by Mohini fruit nursery, Aurangabad (12.62%), Govt. fruit nursery, Sillod (10.55 %), Deepak fruit nursery, Adul (09.44 %) and Balaji fruit nursery, Ambekarwadi (07.22%).

At adult stage in main field

The per cent disease incidence of dry root rot of sweet orange in adult stage in Aurangabad and Jalna district of Marathwada region was surveyed and data presented in Table 2.

The data (Table 2) revealed that the average mean per cent disease incidence of dry root rot was recorded in Jalna (20.49 %) followed by Aurangabad (16.84 %).

In Aurangabad district the disease incidence was reported varied from 10.55 per cent to 26.66 %.

Table.1 Per cent disease incidence of dry root rot of sweet orange nurseries in Jalna and Aurangabad districts

Sr. No	District		Name of nursery	Availability of no. of plant	Variety	Disease incidence (%)
1.	Jalna	1	Govt. Nursery, Jalna	20000	Nucellar, Local	10.5
		2	Govt. Nursery, Wadigodari	20000	Sathgudi, Nucellar	12.30
		3	Krushiraj fruit nursery, Nagik Pangari	12,000	Local	15.8
		4	Govt. Nursery, Badnapur	2385	Nucellar, Local, Sathgudi	9.00
		5	Taluka Fruit nursery, Mantha	1,00,000	Local, Nucellar	11.33
2.	Aurangabad	1	Balaji fruit nursery,Ambekarwadi (Taluka-Paithan)	7,0000	Local, Nucellar	07.22
		2	Govt. fruit nursery, Sillod	10,000	Nucellar, Local, Sathgudi	10.55
		3	Gajanan fruit nursery, Pimpariraja	75,000	Local	13.00
		4	Deepak fruit nursery, Adul (Taluka-Paithan)	13,00,00	Nucellar, Local	09.44
		5	Mohini fruit nursery, Aurangabad	20,000	Sathgudi, Nucellar	12.62

Table.2 Per cent disease incidence of dry root rot of sweet orange in orchards at Aurangabad district

Sr. No	District	Taluka	Village	Disease incidence (%)
1	Aurangabad	1) Aurangabad	Shendra	21.80
			Karmad	17.30
			Ladsavangi	26.66
		2) Soegaon	Fardapur	18.70
			Naygaon	25.60
			Wadi	19.30
		3) Sillod	Lihakhedi	11.20
			Mandana	14.40
			Bodvad	12.70
		4) Kannad	Bramhani	20.50
			Dabhadi	19.44
			Kolewadi	17.10
		5) khultabad	Boodkha	10.55
			Dhamni	14.60
			Ghodegaon	17.20
		6) Gangapur	Manjari	18.70
			Wadgaon	17.30
			Ambegaon	22.60
		7) Paithan	Pimpalwadi	17.70
			Baorgaon	15.10
			Sulatanapur	14.40
		8) Phulambri	Nimkheda	14.21
			Bhoyagoan	12.16
			Girsavali	13.22
		9)Vaijapur	Narla	14.10
			Shivagoan	13.18
			Khirdi	15.14
Average district mean				**16.84**

Table.3(a) Mean of disease incidence in Tahsils of Aurangabad District

Sr. No	District	Name of taluka	Mean per cent incidence
1	Jalna	Jalna	24.91
2		Badnapur	22.6
3		Bhokardan	19.00
4		Jafrabad	19.54
5		Ambad	19.36
6		Ghansavangi	16.40
7		Mantha	24.23
8		Partur	17.93

Table.3(b) Mean of disease incidence in Tahsils of Aurangabad District

Sr. No	District	Name of taluka	Mean per cent incidence
1	Aurangabad	Aurangabad	21.92
2		Soegaon	21.20
3		Sillod	12.77
4		Kannad	19
5		Khultabad	14.12
6		Gangapur	19.54
7		Paithan	15.73
8		Phulambri	13.20
9		Vaijapur	14.14

Table.4 Per cent disease incidence of dry root rot of sweet orange in orchards at Jalna district

Sr. No	District	Taluka	Village	Disease incidence (%)
2	Jalna	1) Jalna	Revagaon	25.22
			Motigavhan	24.60
			ManegaonKhalsa	24.90
		2) Badnapur	Somthana	20.50
			Warudi	25.60
			Kandari	21.70
		3) Bhokardan	Tandulwadi	17.80
			Hasnabad	19.22
			Nimgaon	20.00
		4) Jafrabad	Kusali	20.50
			Khanapur	18.50
			Ambegaon	19.60
		5) Ambad	Pimpalkhed	21.30
			Naghzari	17.55
			Khedgaon	19.22
		6) Ghansavangi	Tirthapuri	16.20
			Bahiregaon	17.40
			Ukkadgaon	15.60
		7) Mantha	Shirpur	22.40
			Limbkheda	24.60
			Jatkheda	25.70
		8. Partur	Partur	17.22
			Masla	18.13
			Aakoli	18.46
Average district mean				**20.49**

However the maximum disease incidence noticed in in Ladsavangi (26.66 %) than other locations that surveyed. The disease prune areas reported were Naygaon (25.60%), Ambegaon (22.60%), Shendra (21.80%) and Bramhani (20.50%).

The lowest disease incidence was recorded at Boodkha (10.55%) and at Lihakhedi (11.20 %) among all the locations surveyed.

In Jalna district the disease incidence of dry root rot was reported in the range of 15.60 to 25.22%. However, higest disease incidence was noticed at Jatkheda (25.70%) than the other locations that surveyed. This was followed by Warudi (25.60%), Revagaon (25.22%) Limbhkheda (24.60%) and Motigavhan (24.60%).

The lowest disease incidence was noticed at Ukkadgaon (15.60 %) and Partur (17.22 %) villages among all the orchards surveyed.

Mean disease incidence

The data from the (Table 3a) revealed that during this year, the mean disease incidence observed in eight tahasils of Jalna district ranged from 16.40 to 24.91 per cent. The highest mean disease incidence was found in Jalna tahasil (24.91) per cent. This was followed by Mantha (24.23%), Badnapur (22.60%), Jafrabad (19.54%), Ambad (19.36%), Bhokardan (19.60%) and Partur tahasil (17.93%). The lowest mean incidence was found in Ghansavangi (16.40%).

It is revealed from the results of (Table 3b) that the mean disease incidence in different tahasils of Aurangabad district ranged from 12.77 to 21.92 per cent. The highest mean disease incidence was found in Aurangabad tahasil (21.92%). This was followed by soegaon (21.20%) Gangapur (19.54%), Kannd (19.00%), Paithan (15.73%), Vaijapur (14.14%), Phulambri (13.20%) and Kulthabad (14.12%). The lowest disease incidence was reported in sillod tashil (Table 4).

The highest disease incidence in Jalna could be due to the presence of shallow, calcaroius soil with high soil pH which predisposes the trees to infection by pathogen, the same opinion was also expressed by Reddy and Paparao (1960), Reedy *et al.,* (1999) and Gopal *et al.,* (2000).

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