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Research Article

Survey on the occurrence of root wilt disease of coconut in Tamil Nadu

■ B. MEENA* AND R. SAMIAPPAN

Department of Plant Pathology, Tamil Nadu Agricultural University, COIMBATORE (T. N.) INDIA

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*Corresponding author: meepath@rediffmail.com

ABSTRACT

Root wilt disease (RWD) in coconut caused by an obligate Phytoplasma, is a serious problem in most of the coconut plantations of Kerala and is currently fast spreading and becoming serious production constraint in many districts of Tamil Nadu state. The survey for the occurrence of root wilt disease was conducted in Theni, Kanyakumari, Tirunelveli, Coimbatore and Dindigul districts along the borders of Kerala and Tamil Nadu states by cluster sampling technique. The results revealed that, Cumbum block of Theni District in Tamil Nadu was found to be heavily infected with root wilt disease. In Kanyakumari district, root wilt disease was noticed in Thiruvattar block. Early symptoms of root wilt disease was noticed in Dindigul District.

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INTRODUCTION

The occurrence of root (wilt) disease of coconut was first noticed in 1882 in Erattupetta area of Meenachil taluk in Kottayam District of Kerala state (Koshy, 1999). The disease is prevalent in a continuous manner in eight out of the fourteen districts in Kerala and sporadically in the remaining 6 northern districts of the State and bordering districts of Tamil Nadu such as Theni, Kanyakumari, Tirunelveli, Dindigul and Coimbatore districts. Mathew *et al.* (1993) reported a decline in yield to the tune of 45% in West Coast Tall variety and 60% in DxT hybrids and delayed bearing of seedlings that took up the infection.

The principal diagnostic symptoms of the disease is flaccidity (ribbing) of middle whorl leaves followed by yellowing and marginal necrosis of leaflets in the older leaves. The pathogen is transmitted by insect vectors such as lace bug – *Stephanitis typica* and plant hopper – *Proutista moesta* (Solomon *et al*., 1999). Mycoplasma-like particles (phytoplasma) have been found in the sieve-tube elements of the phloem of coconut and other palms exhibiting characteristic symptoms (Beakbane *et al.,* 1972). Oxytetracycline treatment causes remission of disease symptoms (McCoy, 1975).

Since RWD is caused by phytoplasma, it is not amenable to conventional plant protection measures. Systematic rouging of diseased palms in the mildly affected areas could prevent further spread of the disease. Eradication of disease affected palms to contain the disease within contiguously infected geographic limits can be successful if continuous monitoring for occurrence of the disease and uprooting of suspected and diseased palms are taken up simultaneously. Hence, intensive survey was carried out in Tamil Nadu for the occurrence of root wilt disease in Tamil Nadu.

MATERIALS AND METHODS

The survey for the occurrence of root wilt disease was conducted in Theni, Kanyakumari, Tirunelveli, Coimbatore and Dindigul districts along the borders of Kerala and Tamil Nadu states by cluster sampling technique. Wherever the disease incidence was noticed, garden to garden survey was undertaken and individual tree infected with root wilt disease was identified. Disease incidence was worked out by counting the number of infected palms and healthy palms and expressed in terms of percentage.

RESULTS AND DISCUSSION

Survey on the occurrence of root wilt disease of coconut was conducted in Tamil Nadu - Kerala border areas of Theni, Tirunelveli, Kanyakumari, Dindigul and Coimbatore districts and the infection level are presented in Table 1. The results revealed that, Cumbum block of Theni District in Tamil Nadu was found to be heavily infected with root wilt disease. In

Table 1 : Incidence of coconut root (wilt) disease in various districts of Tamil Nadu

Name of the village	Number of palms		% infection
	Observed	Infected	
District : Theni			
Block : Cumbum			
1. K.K.Patti	5820	1652	28.4
2. Surilipatti	8860	2853	32.2
3. Keelagudalur	10600	3774	35.6
4. Melagudalur	12550	4794	38.2
5. Cumbum	8075	1663	20.6
Total	45905	14736	32.1
Block : Theni			
1. Muthuthevanpatti	2540	5	0.2
2. Balagurunathapuram	1750	0	0.0
3. Upparpatti	5500	0	0.0
4. Allinagaram	4090	12	0.3
5. Thiagarajapuram	1300	0	0.0
6. Kodangipatti	680	6	0.1
7. Theerthathotti	8450	0	0.0
8. Kallupatti	6400	0	0.0
Total	30710	23	0.1
Block : Bodi			
1. Ammakulam	2821	0	0.0
2. Bodi	3485	0	0.0
3. Thirumalapuram	5213	0	0.0
4. Kamarajapuram	2835	0	0.0
5. Durairajapuram	3742	0	0.0
6. Anaikkaraipatti	2830	0	0.0
7. Silamani	3145	0	0.0
8. Silamarathupatti	3520	0	0.0
Total	27591	0	0.0
District : Kanyakumari			
Block : Thiruvattar			
1. Eathankadu	700	0	0.0
2. Kulasekaram	140	22	15.7
3. Adayamadai	150	14	9.3
4. Ponmanai	290	0	0.0
5. Surulode	1000	39	3.9
6. Thiruparappu	420	15	3.6
7. Maniyankuzhi	680	25	3.7
8. Thumbakodu	1025	40	3.9
9. Thirunanthikarai	1060	32	3.0
10.Mangalam	650	24	3.7
11.Kattulai	710	0	0.0
Total	6825	211	3.1

Table 1 contd..

Contd....Table 1

District : Tirunelveli			
Block : Shengottai			
1. Poolangudi	4550	166	3.6
2. Ilangi	2825	93	3.3
3. Vallam	3500	12	0.3
4. Shengottai	3290	115	3.4
5. Lalagudi	285	41	14.3
6. Sivaramapettai	300	30	10.0
7. Ayakudi	350	30	8.6
8. Mekarai	2600	10	0.4
9. Panpozhi	4550	647	14.2
Total	22250	1144	5.1
Block : Thenkasi			
1. Thenpothai	2875	223	7.8
2. Meenatchipuram	2700	273	10.1
3. Kanakkapillaivalasai	6930	1601	23.1
4. Kuthukkalvalasai	400	34	8.5
5. Vadagarai	750	40	5.3
Total	13655	2171	15.9
District : Coimbatore			
Block : Anaimalai			
1.Valanthayamaram	4080	0	0.0
2. .Moolathurai	450	0	0.0
3. Meenakshipuram	6650	0	0.0
4. Nedumparaithottam	360	0	0.0
5. Ambarampalayam	350	0	0.0
6. Semmanampathy	1250	0	0.0
7.Marappangounderpudur	2150	0	0.0
8. Odayakulam	2090	0	0.0
9. Pethanaickanur	1380	0	0.0
10. Subbeagoundanpudur	2030	0	0.0
11. Arthanaripalayam	950	0	0.0
12. Vellaivarithottam	3560	0	0.0
13. Gengampalayam	5100	0	0.0
14.Kaliapuram	3725	0	0.0
15.Narikkalpathi	3860	0	0.0
16.Sethumadai	39100	0	0.0
17.Saralapathy	31000	0	0.0
18.Alangadavu	13520	0	0.0
19.Sarkarpathy	27000	0	0.0
20.Thammampathy	15120	0	0.0
21.Thathur	1400	0	0.0
22.Kambalapatti	2500	0	0.0
23.Manakkadavu	2000	65	3.3
Total	169625	65	0.04

Table 1 contd.....

Contd..... Table 1

District : Dindigul			
Block : Athur			
1. Iyampalayam	2960	9	0.3
2. Alamarathupatti	1545	0	0.0
3. Ambadurai	1565	0	0.0
4. Athur	1450	0	0.0
5. Podikambanvadi	1525	0	0.0
6. Sivalsaragu	1635	0	0.0
7. Kalikampatti	1545	0	0.0
8. Keelakottai	1365	0	0.0
9. Kummampatti	1435	0	0.0
10. Manalur	1850	0	0.0
11. Manilakottai	1365	0	0.0
12. Palayamkottai	1500	0	0.0
13. Panchampatti	1850	0	0.0
14. Paraipatti	1625	0	0.0
15. Pillayarnatham	1555	0	0.0
16. Sitharevu	11967	45	0.4
17. Thopampatti	1430	0	0.0
18. Vakkampatti	1025	0	0.0
19. Narasingapuram	800	0	0.0
20. Chithayankottai	900	0	0.0
21. Chinnalapatti	560	0	0.0
Total	41,452	54	0.13

Cumbum block, root wilt disease incidence of 28.4 per cent, 35.6 per cent and 38.2 per cent was observed in the villages *viz*., K.K.Patti, Keelagudalur and Melagudalur, respectively. Advanced symptoms of root wilt disease was noticed in Gudalur and Surilipatti villages of Cumbum block. Mid-whorl yellowing was noticed in several gardens. Leaf rot disease symptom was also observed in several palms.

In Kanyakumari district, root wilt disease was noticed in Thiruvattar block. The highest root wilt disease incidence was observed in the Kulasekaram village (15.7%). This was followed by Adayamadai, Thumbakode and Surulode villages. There was no root wilt disease incidence in Eathankadu, Kattulai and Ponmanai villages of Kanyakumari district. In Tirunelveli district, root wilt disease was observed in Poolangudi, Sivaramapettai, Ayakudi, Mekarai, Panpozhi, Thenpothai, Meenatchipuram, Lalagudi, Kanakkapillaivalasai and Kuthukkalvalasai villages. A report on the spread, occurrence and importance of root wilt disease in coconut was indicated in Kanyakumari and Tirunelveli districts of Tamil Nadu as early as in 1970s (Subba Raja and Jaleel Ahamed, 1975).

Only early symptoms of root wilt disease was noticed in Ayyampalayam areas of Dindigul District. The disease incidence level of 0.3 per cent was observed in Ayyampalayam village. In Coimbatore district, disease incidence was noticed in Manakkadavu village of Anaimalai block. Out of 2000 palms surveyed, 65 palms were found to be infected in Manakkadavu village (Table 1). Mathew *et al.* (1993) reported a decline in yield to the tune of 45per cent in West Coast Tall variety and 60% in DxT hybrids and delayed bearing of seedlings that took up the infection.

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Research Article

Studies on per cent incidence and reaction of tomato cultivars to bacterial wilt

■ V. JANAKI* AND T.B. PUTTURAJU

Department Horticulture, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA

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*Corresponding author:

ABSTRACT

Thirty two F_1 hybrids developed as a result of line x tester design involving eight lines and four testers were evaluated in RCBD with three replications during 2005-2006 for per cent incidence and reaction of tomato cultivars to bacterial wilt.Two parents (T1,T2) and three crosses among hybrids were superior to commercial check.

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INTRODUCTION

Tomato is the world's largest grown vegetable crop known as protective food both because of its nutritive value and also because of its wide spread production. Tomato is rich source of minerals, vitamins and organic acid, essential amino acids and dietary fibres. The estimated area and production of tomato crop are about 3.50 lakh ha and 53 lakh tons (www.indiaagronet.com). Sucessful cultivation of tomato crop has been hindered due to numerous pests and devastating diseases.Chiefly of these, the Bacterial wilt caused by *Ralstonia solanacearum* (Yabuchii *et al.,* 1992) is difficult to control due to broad host range, wide spread distribution and vast genetic variability. Devloping commercially acceptable tomato varieties and hybrids with good horticultural qualities and tolerance to bacterial wilt has been the objective of many breeding programmes. In view of this a study was conducted at Department of Horticulture, University of Agricultural Sciences, Bangalore during 2005-2006.

MATERIALS AND METHODS

The experiment was carried out at the Department of Horticulture, University of Agricultural Sciences, Gandhi Krishi Vignana Kendra, Bangalore during 2005-2006. The experimental material consisted of F_1 population of 32 crosses, developed by crossing 8 lines and 4 testers. The F_1 population of 32 crosses were grown and assesed for per cent incidence and reaction of tomato cultivars to bacterial wilt along with Commercial check and their parents. Spacing was maintained at 50 cm between the plants and 100 cm between the rows and plants were provided with simple staking. The number of plants affected by bacterial wilt was recorded at 15 days after transplanting, 5 days before flowering,5 days after flowering, at fruiting and at harvest.

Scale:

0- No symptoms.
1- 1 to 2 lower leaves showing bronzing.
2- 2 to 3 leaves in a single branch drooping.
3-Partial wilting of 2-3 branches/plant.
4-All leaves drooping except the terminal leaves/ branches.
5-Complete wilting of plant

Disease scoring:

Wilt incidence (%)	Resistance level
0	Highly resistant
1-5	Resistant
5-20	Moderately resistant
21-51	Moderately susceptible
>51	Susceptible

RESULTS AND DISCUSSION

Entries were evaluated under natural epiphytotic

conditions for incidence of bacterial wilt. The per cent incidence of bacterial wilt ranged from 12.00 (L2) to 100.00 (L5) among lines. In testers, it ranged from 0 (T1, T2) to 10 per cent (T4). Among crossed, it ranged from 6.00 per cent (L2 x T1) to 80.00 (L5 x T4). The parent and crosses which were resistant to the disease were T1, T2 among the parents L2xT2, L4 x T1 was superior to commercial check and the crosses L3 x T3 was on par with commercial check (Table 1). Soil bacterial population was recorded at the time of planting, mid season of the crop and at the end of the crop. The soil bacterial population was recorded low at the time of planting 3.00x104 and high at the end of the season 5.00x104 cfu/g.. Abeygunawardena and Srivastava (1963) and Homsor *et al.* (1998) investigated resistance in tomato to bacterial wilt. Dhaliwal *et al.* (2003) used line x tester analysis for yield and processing attributes in tomato.

Table 1 : Per cent with incidence, level of tolerence and estimated for parents hybrids and commercial check in tomato

Entries	Bacterial with incidence		Estimated yield (T/ha)
	Per cent incidence (%)	Disease section	
Lines	32.0	Moderately susceptible	31.20
L1:L-15			
L2:Vybhav	12.0	Moderately resistant	39.20
L3:Hissaranmol	21.0	Moderately resistant	31.20
L4:PKM-1	22.8	Moderately resistant	32.60
L5:Pusa Ruby	100.0	Susceptible resistant	25.20
L6:Arka Vikas	42.0	Moderately susceptible	36.00
L7:Arka Meghali	30.0	Moderately susceptible	36.60
L8:Arka Saurabha	38.0	Moderately susceptible	36.60
Testers:	0	High resistant	37.80
T1:Arka Abha			
T2:Arka Alok	0	High resistant	39.75
T3:Sankranthi	6.0	Moderately resistant	37.20
T4:Nandi	10.0	Moderately resistant	34.60
Hybrids	18.0	Moderately resistant	42.00
L1*T1			
L1*T2	19.6	Moderately resistant	42.00
L1*T3	21.0	Moderately susceptible	37.20
L1*T4	25.0	Moderately susceptible	40.00
L2*T1	12.0	Moderately resistant	49.20
L2*T2	6.0	Moderately resistant	60.80
L2*T3	24.0	Moderately susceptible	45.00
L2*T3	33.0	Moderately susceptible	47.20
L3*T1	15.0	Moderately resistant	48.00
L3*T2	15.0	Moderately resistant	43.20
L3*T3	10.0	Moderately resistant	51.20
L3*T4	35.5	Moderately susceptible	43.20
L4*T1	8.0	Moderately resistant	60.00
L4*T2	20.9	Moderately resistant	44.00
L4*T3	43.0	Moderately susceptible	43.00
L4*T4	48.0	Moderately susceptible	40.00
L5*T1	35.0	Moderately Resistant	40.60
L5*T2	48.0	Moderately Resistant	39.20
L5*T3	75.0	Moderately susceptible	37.20
L5*T4	80.0	Moderately susceptible	36.68
L6*T1	23.0	Moderately susceptible	37.20
L6*T2	18.0	Moderately resistant	40.60
L6*T3	48.2	Moderately susceptible	36.00
L6*T4	39.5	Moderately susceptible	34.30
L7*T1	18.0	Moderately resistant	42.80
L7*T2	18.0	Moderately resistant	42.60
L7*T3	48.2	Moderately susceptible	39.20
L7*T4	39.5	Moderately susceptible	37.20
L8*T1	17.5	Moderately resistant	39.2
L8*T2	15.8	Moderately resistant	36.6
L8*T3	36.0	Moderately susceptible	37.4
L8*T4	38.5	Moderately susceptible	35.2
Commercial check–Arka Abhijith.	8.0	Resistant	48.6

Contd… Table 1

Table 1 contd…

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