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Isolation of Leaf Blight of Coconut and Screening of Fungicides against the Pathogen

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ABSTRACT: *In the present study, coconut leaf blight pathogen, Lasiodiplodia theobromae was isolated from the infected leaf using Potato Dextrose Agar (PDA) medium and its pathogenicity was proved under glass house conditions. Pale straw colored, small oval spots were appeared one week after inoculation in inoculated spear leaf. Re-isolation of pathogen from the diseased part was done. The cultural characters of leaf blight pathogen was observed as thin, light grey colored mycelium, later it turned to dark grey. Rapid, profuse mycelial growth was observed under room temperature in 5 days and there was no sporulation in the culture. The dorsal sides of the culture plates become black in color after 7 days.*

In vitro screening of fungicides was done against L. theobromae by poisoned food technique to assess the efficacy of fungicides viz., Mancozeb (75% WP), Metalaxyl (8% WP) + Mancozeb (64% WP), Propiconazole (25 EC), Thiophanate Methyl (70% WP), Tricyclazole (18% WP) + Mancozeb (62% WP), Tricyclazole (75% WP) and Hexaconazole (4% WP) + Zineb (68% WP), Copper hydroxide (77% WP), Azoxystrobin 23% (SC) and Hexaconazole (5% SC) under different concentrations viz., 500 ppm,1000 ppm,1500 ppm, 2000 ppm, 2500 ppm and 3000 ppm.

The fungicides Mancozeb (75 WP) and Metalaxyl (8% WP) + Mancozeb (64% WP) gave 100% inhibition of mycelial growth of the coconut leaf blight fungus even at 500 ppm concentration. Propiconazole (25 EC), Thiophanate Methyl (70% WP) gave 100% inhibition over control except at 500 ppm concentration. Tricyclazole (18%) + Mancozeb 62% WP gave 100% inhibition over the control at 1500 ppm concentration. Tricyclazole (75% WP) and Hexaconazole (4% WP) + Zineb (68% WP) gave 100% inhibition at 1000 ppm. Copper hydroxide (77 WP) and Azoxystrobin 23% (SC) are least effective against L. theobromae

INTRODUCTION

The leaf blight in coconut caused by *Lasiodiplodia theobromae* is a lethal disease and causes lethal disease and cause much more serious economic loss than other foliar diseases like grey leaf blight and leaf rot. The fungus merely accelerates the death of palms having been weakened by other causes such as lack of drainage, water stress or malnutrition. Potassium deficiency is one of the main conditions that make the palm susceptible to attack by this fungus (Naranjo, 1991). The first symptoms are withering and drooping of the distal ends of the leaves, almost breaking away from the remainder of the leaves at a point varying from 30- 100 cm from the top, remaining attacked, hanging directly downwards as a pendulous section. A brown mark produced on the leaf stalk is particularly noticeable on the lower surface of e. The drooping end of the leaf, being yellow at first fin tally turns brown. A cut thorough the rachis at the breaking point shows brown tissue. The fungus spread into the lower part of the leaf, travelling down the rachis and the petiole, finally resulting in the yellowing of the whole leaf.

Recently the disease seems to be fast spreading in Thanjavur districts and the chemical control for the disease needs to be devised, expanded and test verified for the effective disease management.

MATERIALS AND METHODS

In Vitro Isolation of Leaf Blight Pathogen

Leaf blight pathogen was isolated from the infected leaf materials using Potato Dextrose Agar (PDA) medium. Sub-culturing was done in the petriplates and incubated at room temperature for 5-7 days for the further study of morphological and cultural characters of the leaf blight pathogen.

Pathogenicity of Leaf Blight Pathogen

To prove Koch's postulates for leaf blight disease of coconut, the PDA mycelial block of one week old culture of isolated pathogen was inoculated to the leaf

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of one year old ECT coconut seedling under glass house condition by pin prick method. Pale straw colored small oval spots appeared one week after inoculation. Re-isolation of pathogen from the diseased part was done.

In Vitro Screening of Fungicides

In vitro screening of fungicides was done against *L. theobromae* by poisoned food technique in PDA medium, to assess the efficacy of fungicides viz., Mancozeb (75% WP), Metalaxyl (8% WP) + Mancozeb (64% WP), Propiconazole (25 EC), Thiophanate Methyl (70% WP), Tricyclazole (18% WP) + Mancozeb (62% WP), Tricyclazole (75% WP) and Hexaconazole (4% WP) + Zineb (68% WP), Copper hydroxide (77% WP), Azoxystrobin 23% (SC) and Hexaconazole (5% SC) under different concentrations viz., 500 ppm,1000 ppm, 1500 ppm, 2000 ppm, 2500 ppm and 3000 ppm.

RESULT AND DISCUSSION

Thin, light grey colored mycelium was initially observed, later it turned to dark grey. The dorsal side of the petriplate becomes black in color after 7 days. Rapid, profuse mycelial growth was observed under room temperature in 5 days and there was no sporulation in the culture. Pathogenicity of coconut leaf blight pathogen was proved under glass house condition.

The fungicides Mancozeb and Metalaxyl (8% WP) + Mancozeb (64% WP) gave 100% inhibition of mycelial growth of the coconut leaf blight fungus even at 500 ppm concentration. Propiconazole (25 EC), Thiophanate Methyl (70% WP) gave 100% inhibition over control except at 500 ppm concentration. Tricyclazole (18%) + Mancozeb 62% WP gave 100% inhibition over the control at 1500 ppm concentration. Tricyclazole (75% WP) and Hexaconazole (4% WP) + Zineb (68% WP) gave 100% inhibition at 1000 ppm. Copper hydroxide and Azoxystrobin 23% (SC) are least effective against *L. theobromae*.

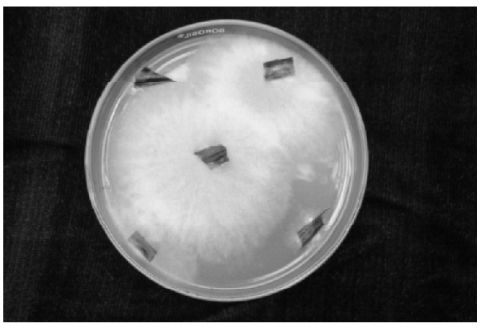
Banik *et al.*, (1998) also found that Carbendazim at 400 ppm completely inhibited the linear growth of *L. theobromae* followed by Thiophanate-methyl at 450 ppm. Sheler *et al.*, (1997) reported that Thiophanate-methyl (0.1%) and Benlate (0.1%) could completely suppress *in vitro* growth of *L. theobromae*. Similarly, Mahmood *et al.*, (2002) reported that Benlate @ 100 ppm and Topsin-M (Thiophanate-methyl) @ 50 ppm completely inhibited the colony growth of *L. theobromae*. Li *et al.*, (1995) also found that Thiophanate-methyl suppressed mycelial growth and conidial germination of *L. theobromae*.

Table 2.1
In vitro* Screening of Fungicides Against *Lasiodiplodia theobromae

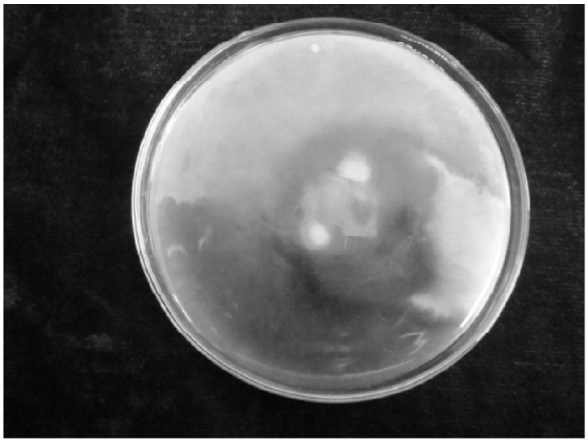
Treatments	*Fungicides*									
	Azoxystrobin 23% (SC)		*Hexaconazole (4% WP) + Zineb (68% WP)*		*Copper hydroxide (77%)*		*Tricyclazole (75% WP)*		*Metalxyll (8% WP) + Mancozeb (64% WP)*	
	Colony diameter (cm)	*% Inhibition over control*	*Colony diameter (cm)*	*% Inhibition over control*	*Colony diameter (cm)*	*% Inhibition over control*	*Colony diameter (cm)*	*% Inhibition over control*	*Colony diameter (cm)*	*%Inhibition over control*
T_1-500 ppm	7.7 (2.863)	13.48	0.5 (1.00)	94.28	4.3 (2.190)	50.57	2.18 (1.637)	75.45	0.0 (0.707)	100
T_2-1000 ppm	6.1 (2.569)	31.46	0.0 (0.707)	100	3.4 (1.974)	60.91	0.00 (0.707)	100	0.0 (0.707)	100
T_3-1500 ppm	5.5 (2.449)	38.20	0.0 (0.707)	100	3.0 (1.870)	65.51	0.00 (0.707)	100	0.0 (0.707)	100
T_4-2000 ppm	4.1 (2.144)	53.93	0.0 (0.707)	100	2.4 (1.702)	72.41	0.00 (0.707)	100	0.0 (0.707)	100
T_5-2500 ppm	3.7 (2.049)	58.42	0.0 (0.707)	100	1.0 (1.224)	87.35	0.00 (0.707)	100	0.0 (0.707)	100
T_6-3000 ppm	3.2 (1.923)	64.04	0.0 (0.707)	100	0.0 (0.707)	100	0.00 (0.707)	100	0.0 (0.707)	100
T_7-Control	8.9 (3.06)		8.75 (3.04)	-	8.7 (3.03)	-	8.88 (3.06)	-	8.98 (3.07)	
SEd	0.198		0.110		0.139		0.060		0.013	
CD=(0.05)	0.413		0.229		0.290		0.126		0.027	

Table 2.2
In Vitro Screening of Fungicides against Lasiodiplodia theobromae (continued)

Treatments	*Fungicides*									
	Mancozeb (75%WP)		*Propiconazole (25% EC)*		*Thiophanate Methyl (70 WP)*		*Tricyclazole (18%) + Mancozeb 62% WP*		*Hexaconazole (5%SC)*	
	Colony diameter (cm)	*% Inhibition over control*	*Colony diameter (cm)*	*%Inhibition over control*	*Colony diameter (cm)*	*% Inhibition over control*	*Colony diameter (cm)*	*% Inhibition over control*	*Colony diameter (cm)*	*% Inhibition over control*
T_1-500 ppm	0.00 (0.707)	100	0.1 (0.774)	98.87	0.125 (0.790)	98.87	4.98 (2.340)	44.35	2.70 (1.788)	69.42
T_2-1000 ppm	0.0 (0.707)	100	0.0 (0.707)	100	0.00 (0.707)	100	2.78 (1.811)	68.93	1.30 (1.341)	85.27
T_3-1500 ppm	0.0 (0.707)	100	0.0 (0.707)	100	0.00 (0.707)	100	0.0 (0.707)	100	1.18 (1.296)	86.63
T_4-2000 ppm	0.0 (0.707)	100	0.0 (0.707)	100	0.00 (0.707)	100	0.0 (0.707)	100	1.05 (1.244)	88.10
T_5-2500 ppm	0.0 (0.707)	100	0.0 (0.707)	100	0.00 (0.707)	100	0.0 (0.707)	100	0.93 (1.195)	89.46
T_6-3000 ppm	0.0 (0.707)	100	0.0 (0.707)	100	0.00 (0.707)	100	0.0 (0.707)	100	0.68 (1.086)	92.29
T_7-Control	8.9 (3.06)		8.85 (3.05)	-	8.85 (3.05)	-	8.95 (3.07)	-	8.83 (3.05)	-
SEd	0.037		0.037	-	0.025	-	0.045	-	0.102	-
CD=(0.05)	0.078		0.076	-	0.053	-	0.093	-	0.212	-

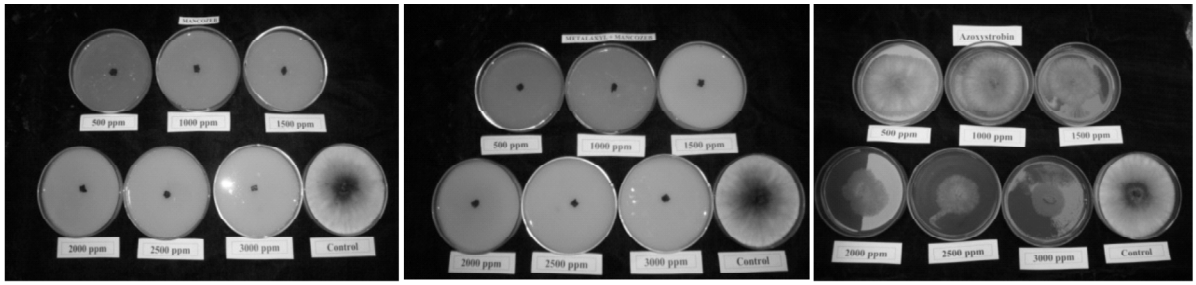


In vitro isolation of pathogen from leaf blight samples under



Dorsal view of the petriplate showing blackening of culture medium

Pathogenicity test in pot culture plant under glass house condition



In vitro screening of fungicides under different concentrations-Mancozeb alone, Mancozeb+Metalaxyl and Azoxystobin

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