Original Research Article

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***In Vitro* Evaluation of Some Selected Fungicides against Coconut Leaf Spot Caused by *Pestalotia palmarum* (Cooke) in Bastar Plateau of Chhattisgarh**

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ABSTRACT

Keywords

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Carbendazim 12 + Mancozeb 63 WP, Mancozeb 75% WP, Hexaconazole 5%, Carbendazim 50% WP, Chlorothionil 75% WP, Propiconazole 25% EC, Carbendazim 16 + Hexaconazole 4% SC, Tricyclazole 75% WP, Validamycin, Tabuconazole 10 + Sulphur 65% WG, Tricyclazole + Tabuconazole 36% SC, Isoprothiolane 40% and Propineb 70 WP were evaluated against coconut leaf spot (*P. palmerum*) adopting poisoned food technique. In efficacy of 13 fungicides the superiority in controlling the inhibition of pathogen was managed by Carbendazim 12 +Mancozeb 63 WP, Hexaconazole 5%, Carbendazim 50 % WP, Chlorothionil 75 % WP, Propiconazole 25 % EC and Carbendazim 16 + Hexaconazole 4% SC inhibited the growth of *P. palmarum* totally. No growth was found at given concentration. The Tricyclazole 75% WP, Tricyclazole + Tabuconazole 36 % SC, Isoprothiolane 40% and Mancozeb 75% WP fungicides were also inhibit the fungus up to 68.07, 63.85, 63.85 and 60.24 per cent, respectively. Whereas, Tabuconazole 10 + Sulphur 65 % WG, Propineb 70 WP and Validamycin inhibits the lesser up to 33.73, 25.9 and 24.09 per cent, respectively. The main objective of the study was to find out the best pesticide combination for the management of *P. palmerum*.

Introduction

Coconut is (*Cocus nucifera* Linn.) the most important perennial fruit plant in the world belonging to the family Arecaceae (Palmaceae). Coconut palms are successfully grown in the tropics and hence referred to as 'King of the tropical palms'. The coconut tree, *C. nucifera*, has a long history of providing man with useful materials for his daily life. It

is one of the ten most useful trees in the world. From top to root, every part of the coconut tree is in a way or another essential in farmers' households. The growing tip of the palm makes a tasty treat, the "millionaire's salad"; the sheath protecting unopened flowers is often used to fashion shoes, caps and even a kind of pressed helmet for soldiers¹. Coconut cultivation in India dates back to more than 3,000 years and the plant survived all along

without major pest damage. It is conceivable that the coconut mite, *Aceria guerreronis*, existed in India since the early 1960 even before its first report in Mexico when chemical pesticides were sparingly used, allowing the local natural enemies to keep it under control².

The importance of the palm lies in fact that not only does it supply food, drink and shelter but it also provides raw materials for a number of industries³. In Kerala, coconut occupies first place in the area under cultivation of crops and Kerala ranks top in area (788000 ha) and production (3992 million nuts) of coconut in India⁴.

Materials and Methods

Collection of sample

Diseased leaves of Coconut with typical leaf spot symptoms were collected from AICRP on Palms Research field of SGCARS, Jagdalpur (C.G.).

Isolation of the fungus

The fungus was isolated from the infected leaf of coconut following tissue planting technique⁵.

The infected diseased samples along with healthy tissues were cut into small pieces and surface sterilized by dipping in 0.1% sodium hypochloride (NaOCl) solution for two minutes. NaOCl on the surface of the leaf pieces was decanted by soaking with sterilized blotting paper.

The cut pieces were then placed onto sterilized potato dextrose agar (PDA) in glass petridishes (20 ml/ petridish) and incubated in an incubator at $27 \pm 1^\circ\text{C}$ until mycelium formation. The hyphal tips were transferred onto PDA plate after growing the mycelium.

Identification of fungus

The fungus was then identified on the basis of the morphological characteristics with the help of identifying key book⁶.

Purification

To obtain pure culture of the pathogen, the hyphal tips were transferred aseptically onto PDA plate by using the flame sterilized tip of an inoculation needle. The plate was incubated at room temperature for seven days (Fig. 1).

Multiplication of *P. palmarum*

PDA was poured in sterilized petridishes, 25 ml in each. After solidification, the plates were inoculated by placing 5 mm discs of three days old PDA culture of *P. palmarum*. The discs were cut with flame sterilized cork borer (5 mm diameter). The inoculated petridishes were kept in the growth chamber at a temperature of $28 \pm 1^\circ\text{C}$ for few days. All the works were undertaken under the laminar air flow cabinet.

Different fungicides used in this experiment

Different fungicides were evaluated in *in vitro* condition against *P. palmarum* following poisoned food technique⁷. All the fungicides were tested at recommended by adopting poisoned food technique (Table 1).

The test pathogen was grown on PDA medium in Petri plates for seven days prior to setting up of experiment. The required fungicidal suspension was added to the melted PDA medium to obtain the desired concentration on the basis of active ingredients present in the chemical.

20 ml of poisoned medium was poured in each Petri plate. Suitable checks were maintained without addition of fungicides. A mycelial

disc of five mm diameter was taken from the periphery of 7 days old colony and placed in the centre and incubated at $28 \pm 2^{\circ}\text{C}$ for full growth of the fungus. Three replications were maintained for each treatment. The radial growth of the colony was measured in two directions and average was recorded. Per cent inhibition was recorded by using the formula as under⁸:

$$\text{PI} = [(C-T)/C] \times 100$$

Where,

PI = Per cent inhibition

C = Growth in control

T = Growth in treatment

Results and Discussion

Efficacy of 13 fungicides viz. Carbendazim 12 +Mancozeb 63 WP, Mancozeb 75 % WP, Hexaconazole 5%, Carbendazim 50 % WP,

Chlorothionil 75 % WP, Propiconazole 25 % EC, Carbendazim 16 + Hexaconazole 4% SC, Tricyclazole 75 % WP, Validamycin, Tabuconazole 10 + Sulphur 65 % WG, Tricyclazole + Tabuconazole 36 % SC, Isoprothiolane 40 % and Propineb 70 WP were evaluated against coconut leaf spot (*P. palmerum*) adopting poisoned food technique. Observations of the radial growth of the pathogen were recorded after 7 day after inoculation. The percent inhibition of the pathogen over control was calculated and presented in Table 2, Figure 2 and Chart. 1.

The superiority in controlling the inhibition of pathogen was managed by Carbendazim 12 +Mancozeb 63 WP, Hexaconazole 5%, Carbendazim 50 % WP, Chlorothionil 75 % WP, Propiconazole 25 % EC and Carbendazim 16 + Hexaconazole 4% SC inhibited the growth of *P. palmarum* totally.

Table.1 The fungicides used in the experiment are

Treatments	Name of the fungicides	Doses (Per cent)
T ₁	Carbendazim 12 +Mancozeb 63 WP	0.1
T ₂	Mancozeb 75 % WP	0.1
T ₃	Hexaconazole 5%	0.1
T ₄	Carbendazim 50 % WP	0.1
T ₅	Chlorothionil 75 % WP	0.1
T ₆	Propiconazole 25 % EC	0.1
T ₇	Carbendazim 16 + Hexaconazole 4% SC	0.1
T ₈	Tricyclazole 75 % WP	0.1
T ₉	Validamycin	0.1
T ₁₀	Tabuconazole 10 + Sulphur 65 % WG	0.1
T ₁₁	Tricyclazole + Tabuconazole 36 % SC	0.1
T ₁₂	Isoprothiolane 40 %	0.1
T ₁₃	Propineb 70 WP	0.1

Table.2 Percent inhibition of the radial growth of the pathogen of coconut leaf spot in *in-vitro*

Treatment	Mean of radial colony growth (mm) of pathogen	Per cent Inhibition of growth of the pathogen over control
T ₁	0	100
T ₂	6.6	60.24
T ₃	0	100
T ₄	0	100
T ₅	0	100
T ₆	0	100
T ₇	0	100
T ₈	5.3	68.07
T ₉	12.6	24.09
T ₁₀	11	33.73
T ₁₁	6	63.85
T ₁₂	6	63.85
T ₁₃	12.3	25.90
Control	16.6	-
C.D. at 5 %	0.97	-
S.E.(m)±	0.33	-

Fig.1 Pure culture of *P. palmarum* **Fig.2** Effect of different fungicides on *P. palmarum*246

Chart.1 Percent inhibition of the radial growth of the pathogen of coconut leaf spot in *in-vitro*

No growth was found at given concentration. The Tricyclazole 75 % WP, Tricyclazole + Tabuconazole 36 % SC, Isoprothiolane 40 % and Mancozeb 75 % WP fungicides were also inhibit the fungus up to 68.07, 63.85, 63.85 and 60.24 per cent, respectively.

Whereas, Tabuconazole 10 + Sulpher 65 % WG, Propineb 70 WP and Validamycin inhibits the lesser up to 33.73, 25.9 and 24.09 per cent, respectively (Table 2). Carbandazim was most effective against the *P. Palmarum*⁹ while, Propiconazole was found very effective in the inhibition of *P. palmarum* in the study¹⁰. Mancozeb found as the most effective but in present study it was effective only^{11 and 12}.

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