

Original Research Article

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Evaluation of fungicides *in vitro* against *Alternaria porri* causing Purple Blotch of Onion

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ABSTRACT

Keywords

Onion, Purple blotch, Fungicides, *Alternaria porri*, *In vitro* evaluation

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Purple blotch disease of onion (*Allium cepa* L.) is an important foliar disease which is incited by a fungus *Alternaria porri*. This fungus is also a pathogen of leek, garlic and chive. It is responsible for causing severe yield losses ranging from 2.5% to 97% in both bulb and seed crop of onion (Gupta and Pathak, 1998). Though India is the second largest producer of onion in the world but it is not sufficient enough to meet the demands for both domestic requirement and export. The present experiment was conducted in a randomized block design with four replications. Nine fungicides were evaluated *in vitro* against the pathogen *Alternaria porri* and the percent inhibition was estimated during the experimentation. The percent inhibition showed that Propiconazole (0.2%), Tebuconazole (0.15%), Carbendazim (0.1%), Hexaconazole (0.2%) and Carbendazim + Mancozeb (0.15%) reduces the growth of the fungus completely (100%). Metalaxyl 4% w/w + Mancozeb 64% w/w reduces the growth of the fungus upto 90%. Tricyclazole 75% WP and Azoxystrobin 23% SC reduces the fungal growth upto 83% and least reduction of fungal growth observed by Copper oxychloride 50% WP upto 67%.

Introduction

The onion also known as bulb onion or common onion is a vegetable that is most widely cultivated species of the genus *Allium*. Among vegetables, onion often called as “queen of the kitchen” is one of the oldest known and an important crop grown in India (about 1.20 million hectare). China is the largest producer in the world with 23,907,509 tonnes production volume per year followed by India with 19,415,425 tonnes yearly production. But still India is at 90th Place

(14.53 tonnes per hectare) in onion productivity (Jai Gopal, 2014). In Odisha condition, onion is a major ingredient in lots of Odia food. In the state onion is currently being cultivated on 33,189 hectares during both seasons with net production of 3.95 lakh MT an annum. Productivity per hectare is 11.93 MT, which is below the national average of 16 MT/hectare (Minati Singha, 2015). Among the diseases, purple blotch disease is an important foliar disease which is incited by a fungus *Alternaria porri* (Ellis) Cif. causes huge economic loss. It is

responsible for causing severe yield losses ranging from 2.5% to 97% in both bulb and seed crop (Gupta and Pathak, 1998; Lakra, 1999). The low productivity of onion in India is chiefly attributed to prevalence of purple leaf blotch in almost all the onion cultivated areas of Northern and Eastern regions (Gupta *et al.*, 1996; Suhag and Bhatia, 2006), including Odisha. In Odisha purple blotch symptoms starts in the field during Rabi season in January-February and become severe in March-April. Due to this disease, onion production is reduced drastically which is having adverse effect on the onion exports and price hike within the country. In view of the above concerns, a study was undertaken in the Department of Plant Pathology, Institute of Agricultural Sciences, Siksha 'O' Anusandhan, Deemed to be University, Bhubaneswar to find out the effectiveness of different fungicides against the pathogen of purple blotch of onion *in vitro*.

Materials and Methods

The present experiment was undertaken in the laboratory of Department of Plant Pathology, Institute of Agricultural Sciences, Siksha 'O' Anusandhan, Deemed to be University, Bhubaneswar, Odisha, India (20.2961°N latitude, 85.8245° E longitude and having an altitude of 58 m from the Sea level in an average) during Rabi season 2019-20. The fungicides were tested under *in vitro* conditions by using poisoned food technique (Nene and Thapliyal. 1973) as desired concentrations. The fungicides used against the pathogen were Tricyclazole 75% WP (0.3%), Tebuconazole 25.9% EC (0.15%), Propiconazole 25% EC (0.2%), Azoxystrobin 23% SC (0.1%), Carbendazim 50% WP (0.1%), Copper Oxochloride 50% WP (0.3%), Metalaxyl 4% w/w + Mancozeb 64% w/w (0.35%), Hexaconazole 5% SC (0.2%), Carbendazim 12% WP + Mancozeb 63% WP (0.15%). 20 ml of Potato dextrose agar media

was poured into sterilized petridishes. Mycelia disc of five mm from actively growing zone of ten days old culture were inoculated into each plate and at the center of petriplate inverted manner. Control was maintained without adding any fungicide. The present experiment was conducted in a randomized block design with four replications.

The plates were incubated at 27± 10° C temperature and radial growth of fungal mycelium was measured from both direction and radial growth was calculated. The data were analyzed statistically and efficacies of fungicides were expressed as percent of inhibition of mycelia growth over control. The percent of inhibition of fungal mycelium over control was calculated using the formula given by Vincent (1947) as $I = (C-T)/C \times 100$, where I = Percent inhibition, C = Mean radial growth in control, T= Mean radial growth in treatment.

Results and Discussion

Nine fungicides were evaluated against the growth of *Alternaria porri* in laboratory condition and the percent inhibition over control was calculated. Results revealed that all the fungicides and their respective doses significantly minimized the fungal growth in comparison to untreated control. Among the different treatments 100% growth inhibition of the fungus recorded by Propiconazole (0.2%), Tebuconazole (0.15%), Carbendazim (0.1%), Hexaconazole (0.2%) and Carbendazim + Mancozeb (0.15%). More than 90% growth inhibition of the fungus was recorded by Metalaxyl 4% w/w + Mancozeb 64% w/w. It was also observed that Tricyclazole 75% WP and Azoxystrobin 23% SC recorded similar control habit against the pathogen with colony diameter 10.99 mm and 11.10 mm respectively. Minimal control habit was observed by Copper Oxochloride 50%

WP which reduced the fungal growth up to 67.94%. Similar control habit of fungicides have been observed by Savitha and

Ajithkumar (2016), Bachkar *et al.*, (2018), Abdul Kareem *et al.*, (2018).

Table.1

Treatments	Chemicals	Trade name	Dose	Mean Colony diameter (mm)	Per cent inhibition on control
T ₁	Tricyclazole 75% WP	Blastin	0.3%	10.99	83.47
T ₂	Propiconazole 25% EC	Dhanuka	0.2%	0.00	100
T ₃	Tebuconazole 25.9% EC	Folicur	0.15%	0.00	100
T ₄	Azoxystrobin 23% SC	Amistar	0.1%	11.10	83.31
T ₅	Carbendazim 50% WP	Zim50	0.1%	0.00	100
T ₆	Metalyxl 4% w/w + Mancozeb 64% w/w	Ridomil gold	0.35%	5.75	91.35
T ₇	Hexaconazole 5% SC	Trigger pro	0.2%	0.00	100
T ₈	Copper oxychloride 50% WP	Nag copper	0.3%	21.32	67.94
T ₉	Carbendazim 12% WP + Mancozeb 63% WP	Sixer	0.15%	0.00	100
T ₁₀	Control			66.51	
	SE(m) ±			0.02	
	CD (0.05)			0.05	

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