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Evaluation of different fungitoxicants against purple blotch of onion under Kashmir conditions

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Onion (*Allium cepa* L.) an important vegetable crop, is grown as a cash crop in different parts of Jammu & Kashmir. Being seasonal, long term storage is a pre-requisite to regulate its supply and enable the farmers to get a remunerative price for the produce. Diseases such as, downy mildew and purple blotch, are the main constraints in quantitative and qualitative production of this crop. Purple blotch {*Alternaria porri* (Ellis) Cliff} affects quality of the bulbs and causes a yield reduction to the tune of 20-60% during *rabi* season (Thind and Jhooty, 1982; Gupta, 1989). Extent of loss due to this disease depends on time of infection and stage of crop growth. Infection of scapes causes them to topple and results in complete failure of seed crop (Gupta *et al.* 1986).

Since weather conditions in Kashmir are usually favourable for the disease, it takes devastating form quite often. Keeping in view the importance of the crop and devastating nature of the disease, an attempt was made to evaluate some new fungitoxicants for its management under Kashmir conditions.

Nine fungitoxicants at two concentrations were evaluated in laboratory by assessing the spore germination of *Alternaria porri* adopting slide germination technique in 2005-2006. Spore suspension prepared in 2% sucrose solution was used for recording percentages of germinated spores per low power microscopic field and readings replicated five times.

Field trials laid in Randomized Block Design were conducted at Regional Research Station, Wadura, Sopore during 2005-06 and 2006-07 with 3.0 m x 2.0m plot size using susceptible cultivar (Kashmir local) of onion. Seedlings raised from seeds treated with respective fungicides were transplanted in the second week of November at a spacing of 20 cm x 15 cm. Each treatment was replicated thrice. First spray of respective fungi toxicants was conducted at appearance of the disease symptoms followed by two more sprays at an interval of 10 days. Observations were recorded on disease incidence, severity and bulb yield.

Hexaconazole @ 200 and 300µg ml^{-1}, difenoconazole @ 200 and 300µg ml^{-1} and metalaxyl MZ @ 1000 and 2000µg ml^{-1} proved best and completely inhibited the spore germination at each concentration, where as carbendazim @ 400 and 500µg ml^{-1}, proved poor in this regard. Mancozeb, Zineb, Ziram, Captan and Propineb failed to completely inhibit spore germination at 2000 ppm but each gave complete inhibition at a concentration of 3000 ppm. Singh and Singh (2006) also reported that hexaconazole completely inhibited the *in vitro* mycelial growth of *Alternaria alternata*. Complete inhibition of mycelial growth of *Alternaria porri* and *Alternaria alternata* by mancozeb has also been reported by other workers (Mathur and Sharma, 2006; Tetarwal and Rai, 2007).

Seed treatment and three foliar sprays of the crop with the tested fungitoxicants proved very useful in controlling the disease in both the years of trial (Table 1). However, Hexaconazole and difenoconazole were superior over all other fungitoxicants tested, which were at par with each other and restrained the disease incidence and severity to the least value. Metalaxyl, mancozeb, propineb, ziram, captan and zineb were also superior in comparison to the control. However, carbendazim proved least effective fungitoxicants against the disease. Upmanyu (1999) reported that hexaconazole, difenoconazole and metalaxyl were most effective fungicides in controlling

Table 1. Effect of different fungitoxicants on incidence and severity of purple blotch of onion under field conditions (Pooled data of 2005-06 and 2006-07

Treatment	Concentration (%)	Disease incidence (%)	Disease severity (%)	Yield (qha^{-1})
Hexaconazole	0.03	39.26 (38.79)	12.92 (21.06)*	36.62
Difenoconazole	0.03	42.27 (40.55)	14.62 (22.48)*	32.42
Metalaxyl-MZ	0.2	42.31 (40.57)	15.24 (22.97)	29.87
Mancozeb	0.3	51.23 (45.15)	18.29 (25.31)	16.35
Propineb	0.3	56.98 (49.01)	20.91 (27.21)	12.75
Ziram	0.2	57.61 (49.33)	22.57 (28.33)	02.90
Captan	0.2	60.38 (50.99)	23.78 (29.19)	199.60
Zineb	0.02	63.71 (52.97)	25.21 (30.13)	190.05
Carbendazim	0.05	72.10 (58.13)	49.15 (44.51)	139.52
Control	-	80.69 (63.93)	53.83 (47.20)	115.32
LSD (p=0.05)		1.62	1.12	1.82

purple blotch of onion. Amaresh and Nargund (2002) reported that hexaconazole and mancozeb were significantly superior over other fungitoxicants, tested by them, in controlling *Alternaria* leaf blight of sunflower caused by *Alternaria helianthi*. Sugha *et al.* (1993) have also reported metalxyl and mancozeb as effective fungitoxicants for control of purple blotch of onion.

Further analysis of data revealed that the purple blotch severity was negatively correlated with the bulb yield of onion. With increase in disease severity there was corresponding decline in bulb yield. Highest yield of 236.62 q ha^{-1} was recorded in case of hexaconazole, which exhibited least disease severity of 12.92% where as, least bulb yield of 115.32 q ha^{-1} was recorded in case of check, which recorded highest disease severity of 53.83%.

The present findings are useful for recommending control practices for purple blotch of onion, as the fungitoxicants found effective during the present study were not previously being recommened for the management of the disease in Kashmir.

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