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Management of Purple blotch disease of Onion under field condition

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Abstract

Onion (*Allium cepa* L.) is one of the oldest known and an important vegetable crop grown in India. Productivity of onion is affected by many biotic and abiotic stresses. Among the biotic stresses diseases play an important role and among them, purple blotch caused by *Alternaria porri* is one of the most destructive disease. The study was conducted to check the efficacy of different fungicides and bio-agents under field condition. The results revealed that among the chemicals Difenconazole 25 EC (Score) @ 0.1 % was found effective in reducing the disease with a per cent disease reduction over control of (62.23) was on par with (Tebuconazole + Trifloxystrobin) @ 0.05 % (60.51). Among the bio-agents tested *Trichoderma harzianum* was found effective with the per cent disease reduction over control of (54.47) followed by treatment with a combination of *Trichoderma harzianum* and *Pseudomonas flourosceus* (41.91).

Keywords: Onion, *Alternaria porri*, Difenconazole, *Trichoderma harzianum*, *Pseudomonas flourosceus*

Introduction

Onion (*Allium cepa*, L.) is one of the most important fresh vegetable crop cultivated across the world and is an important vegetable grown in all most all parts of India. Onion is regarded as a highly export oriented crop and earn valuable foreign exchange in the country. In India, Onion occupies an area of 1.20 million hacters with a production of 19.40 million tonnes and the productivity of 16.10 metric tonnes / ha, in the year 2015. The major onion growing states are Maharastra, Mandhyapradesh, Karnataka, Gujarat, Bihar, Andra pradesh, Rajasthan, Haryana, Tamilnadu, Odisha, Telangana , UP etc., Maharastra stands 1st in production of onion followed by MP and Karnataka. In Karnataka onion is cultivated in an area of 1.36 lakh hactares, with production of 2.06 million tones and productivity of 15.1 MT/ ha, contributing 11% to the total onion production of the country (Anon., 2015) [1]. Purple blotch disease of onion is a serious menace in majority of the onion-producing countries of the world (Pandotra, 1965) [2]. Purple blotch of onion caused by *Alternaria porri* (Ellis) Cif. is one among the serious fungal diseases that affect onion, causing heavy yield loss ranging from 2.5 to 87.8 per cent (Srivastava *et al.*, 1994) [3]. Purple blotch appears on leaves and seed stalk of onion and cause serious damage throughout the onion producing area of the country. Due to this, onion production is reduced drastically which is having adverse effect the exports and also results in price hike within the country. In this regard experiment was undertaken to evaluate different fungicides and bio-control agents against purple blotch of onion under field condition.

Material and Methods: In order to identify the effective Fungicides and bio agents against Purple blotch disease of onion, the experiment was laid out in Randomized Complete Block Design (RCBD) with three replications. Onion was cultivated as per recommendations by package of practice. Five sprays were given with 15 days interval. Five plants in each sub plot were scored for disease by using disease scale given by Sharma (1986) [4] and data were converted into Per cent Disease Index (PDI) by using formula given by wheeler (1969) [5].

Disease Scale (Sharma 1986) [4]

Scale	Description
0	No disease symptom
1	A few spots towards tip covering 10 per cent leaf area.
2	Several purplish brown patches covering upto 20 per cent of leaf area.
3	Several patches with paler outer zone covering upto 40 per cent leaf area.
4	Leaf streaks covering up to 75 per cent leaf area or breaking of leaves from center.
5	Complete drying of the leaves or breaking of leaves from center.

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The per cent disease index was calculated by using the formula (wheeler, 1969) [5].

$$\text{Per cent disease index} = \frac{\text{Sum of individual rating}}{\text{No of leaves examined} \times \text{maximum disease grade}} \times 100$$

Treatment details for disease management

T ₁	<i>Trichoderma harzianum</i> @ 5 g/ltr (seedling dip) and 6×10 ⁷ cfu/ml of water (spray)
T ₂	<i>Pseudomonas fluorescens</i> @10g/ltr (seedling dip) and 6×10 ⁷ cfu/ml of water (spray)
T ₃	<i>Trichoderma harzianum</i> @ 5 g/ltr (seedling dip) and 6×10 ⁷ cfu/ml of water (spray) + <i>Pseudomonas fluorescens</i> @10g/ltr (seedling dip) and 6×10 ⁷ cfu/ml of water (spray)
T ₄	Carbendazim12% + Mancozeb 63% @ 0.25% spray
T ₅	Azoxystrobin @ 0.05 % spray
T ₆	Tebuconazole 50% + Trifloxystrobin 25 % @ 0.05% spray
T ₇	Difenconazole @ 0.1% spray
T ₈	Control

Result and discussion: The study was undertaken to evaluate different fungicides and bio-control agents against purple blotch of onion under field condition. The PDI was recorded when the crop was at 45 days, 60 days, 75 days, 90 days and at 105 days and the per cent disease reduction over control was calculated. The results revealed that among the chemicals Difenconazole 25 EC (Score) @ 0.1 % was found effective in reducing the disease with a per cent disease reduction over control of (62.23) and was onpar with (Tebuconazole + Trifloxystrobin) @ 0.05 % (60.51). Among the bio agents tested *Trichoderma harzianum* found effective with the per cent disease reduction over control of (54.47) followed by treatment with a combination of *Trichoderma harzianum* and *Pseudomonas flourosceus* (41.91) and *Pseudomonas flourosceus* was least effective (41.25). Maximum PDI was recorded in unprotected check (69.9 %) at 105 days. The data is represented in table (1) and Fig (1).

Table 1: Per cent disease index during different duration

Treatments	PDI (%)					
	45 Days	60 Days	75 Days	90 Days	105 Days	Per cent disease reduction over control
T1	21.10 (27.33)	31.94 (34.37)	40.96 (39.79)	35.27 (36.42)	31.63 (34.21)	54.47
T2	21.26 (27.46)	31.06 (33.78)	42.14 (40.47)	47.8 (43.73)	41.06 (39.84)	41.25
T3	21.26 (27.46)	32.83 (34.89)	43.63 (41.33)	45.13 (42.19)	40.6 (39.57)	41.91
T4	21.16 (27.38)	31.82 (34.30)	39.73 (39.07)	33.14 (35.12)	30.53 (33.50)	56.32
T5	21.33 (27.50)	31.82 (34.30)	36.26 (37.02)	32.41 (34.65)	28.93 (32.53)	58.61
T6	21 (27.27)	31.17 (33.90)	38.56 (38.37)	34.52 (35.97)	27.60 (31.57)	60.51
T7	20.8 (27.13)	29.50 (32.81)	34.52 (35.97)	30.53 (33.50)	26.4 (30.85)	62.23
T8	20.8 (27.17)	38.89 (38.58)	51.06 (45.61)	60.73 (52.99)	69.9 (56.82)	
S. Em ±	0.42	0.95	0.79	1.40	1.30	
CD at 5%	1.28	2.88	2.40	4.24	3.97	

* Figures in parentheses are arcsine transformed values

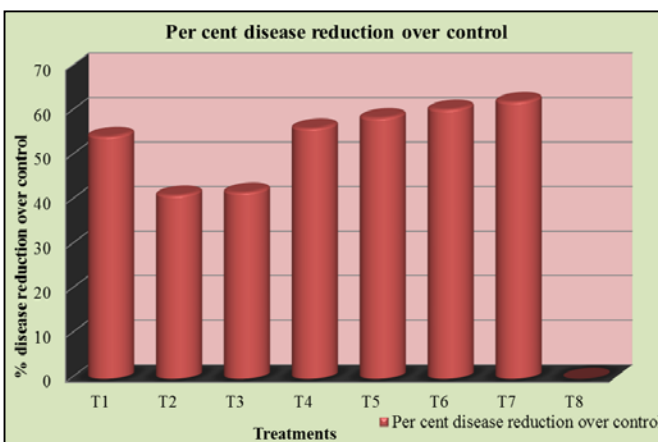
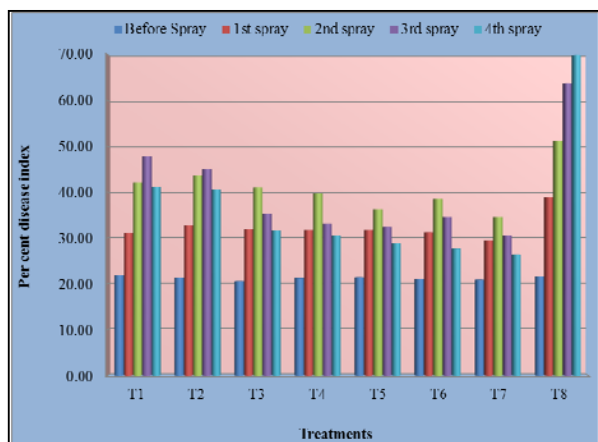


Fig 1: Integrated management of purple blotch of onion under field condition

Fig 2: Per cent disease reduction over control

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