



Integrated management of fusarium wilt of brinjal

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Abstract : Wilt of brinjal (*Solanum melongena* L) due to (*Fusarium solani*) caused much damage to the crop. To manage wilt through integrated approach an experiment was conducted with thirteen treatments of green manuring, seedling treatments, soil drenching with chemicals and bio-agents. The seedling treatment with carbendazim solution (0.25%) for thirty minutes with soil drenching by carbendazim solution @ (0.25%) three times at 15 days interval, starting at the age 25 days of crop after transplanting was best, which gave average (6.70%) disease intensity and average fruit yield (91.11 kg) in 5m x 3m plot of crop and highest C:B ratio 1:2.84.

Key Words : *Fusarium solani*, Bio-agents, Carbendazim , Drenching, *Trichoderma harzianum*

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INTRODUCTION

Brinjal (*Solanum melongena* L.) is a widely grown vegetable crop in Asian countries. It occupies the third position amongst vegetable crops in our country. Among other factors for low productivity of the brinjal crop, disease is one of them. Wilt is the most important disease for poor yield (Abdel-el-Rehim *et al.*, 1987, Celar, 2000). Species of *Fusarium* are responsible for vascular wilt e.g., *F. solani* f. sp. cucurbitae, cause crown rot, foot rot and fruit rot of squash and pumpkin (Zitter, 1996) which can be seed borne both internal and external and survive more than 1-2 years in seed (Watt, 2006). After germination secondary infection of the fungus may be managed by use of carbendazim, aliette and benlate. Carbendazim completely eradicated seed borne infection of *F. solani* in bitter melon and gave maximum reduction in cucumber and bottle gourd. Root infection was completely checked by benlate and carbendazim (Nasreen and Ghaffar, 2010). Hence, an attempt was made to study the integrated approach of management of wilt brinjal.

MATERIALS AND METHODS

The experiment was conducted at the vegetable Research

farm Kalyanpur, Chandra Shekhar Azad University of Agric. and Tech., Kanpur in randomized block design with thirteen treatments along with three replications. The brinjal variety K S 235 was taken for experiment. Treatments were (T₁) green manuring, (T₂) seedling treatment with carbendazim, (T₃) soil drenching with carbendazim three times, (T₄) soil drenching with carbendazim two times, (T₅) seed treatment with *Trichoderma harzianum*, (T₆) soil drenching with *Trichoderma harzianum*, (T₇) green manuring + soil drenching with carbendazim two times, (T₈) green manuring + seed treatment with *Trichoderma harzianum*, (T₉) seedling treatment with carbendazim + soil drenching with *Trichoderma harzianum* three times, (T₁₀) seedling treatment with carbendazim + soil drenching with *Trichoderma harzianum* two times, (T₁₁) green manuring + soil drenching with *Trichoderma harzianum* + soil drenching with carbendazim two times, (T₁₂) seedling treatment with carbendazim + soil drenching with *Trichoderma harzianum* + soil drenching with carbendazim two times and (T₁₃) green manuring + seedling treatment with carbendazim + soil drenching with *Trichoderma harzianum* + soil drenching with carbendazim two times were used. To get the maximum disease intensity, disease sick plot was used for transplanting in all the three years. The total population of causal agent was

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10⁹/g in the soil of sick plot before transplanting which was calculated during last week of July in 2008-9, 2009-10 and 2010-11. Disease intensity were recorded after 12 days of every spraying and average were calculated as well as yield were also recorded after picking of the edible brinjal fruits and average were calculated.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Disease intensity:

The perusal of result depicted in Table 1 it revealed that in all three years all thirteen treatments checked the intensity in comparison to control. Treatment (T₉) seedling treatment

with carbendazim (0.25%) for thirty minutes before transplanting + soil drenching with carbendazim (0.25%) solution, three times at 15 days interval, started with age of 25 days after transplanting followed by (T₁₀) seedling treatment with carbendazim + soil drenching with *Trichoderma harzianum* two times, (T₇) green manuring + soil drenching with carbendazim two times, (T₁₃) green manuring + seedling treatment with carbendazim + soil drenching with *Trichoderma harzianum* + soil drenching with carbendazim two times, (T₃) soil drenching with carbendazim three times, (T₄) soil drenching with carbendazim two times, (T₁₂) seedling treatment with carbendazim + soil drenching with *Trichoderma harzianum* + soil drenching with carbendazim two times, (T₂) seedling treatment with carbendazim, (T₁₁) green manuring + soil drenching with *Trichoderma harzianum* + soil drenching with carbendazim two times, (T₅) seed treatment with *Trichoderma*

Table 1 : Average disease intensity for three years

Sr. No.	Treatments	Disease intensity (%)			Mean
		2008-09	2009-10	2010-11	
1.	Green manuring 20t/ha	19.49 (26.20)	21.12 (27.36)	17.40 (24.65)	19.34
2.	Seedling treatment with carbendazim @ (0.25%)	16.00 (23.58)	17.66 (24.85)	16.96 (24.32)	16.87
3.	Soil drenching with carbendazim @ (0.25%) 3 time at 15 days interval starting at the age of 25 days after transplanting.	14.55 (22.45)	17.00 (24.35)	16.40 (23.89)	15.98
4.	Soil drenching with carbendazim @ (0.25%) two time at 15 days interval starting at the age of 25 days after transplanting.	14.58 (22.45)	17.29 (24.57)	17.03 (24.37)	16.30
5.	Seed treatment with <i>Trichoderma harzianum</i> @ 5g/kg seed.	16.78 (24.18)	18.88 (25.76)	18.06 (25.15)	17.91
6.	Soil drenching with <i>Trichoderma harzianum</i> @ 10g/litre of water at 25 days after transplanting.	19.27 (26.04)	19.99 (26.56)	19.49 (26.20)	19.58
7.	T ₁ + T ₄	8.49 (16.95)	9.97 (18.41)	9.58 (18.03)	9.35
8.	T ₁ + T ₅	18.79 (25.69)	19.24 (26.02)	17.20 (24.50)	18.41
9.	T ₂ + T ₃	6.97 (15.31)	7.00 (15.34)	6.12 (14.32)	6.70
10.	T ₂ + T ₄	8.00 (16.43)	9.44 (17.90)	8.54 (16.99)	8.66
11.	T ₁ + T ₆ +T ₇	16.00 (23.58)	17.95 (25.07)	16.87 (24.25)	16.94
12.	T ₂ + T ₆ +T ₇	15.48 (23.17)	16.90 (24.26)	17.87 (25.01)	16.75
13.	T ₁ + T ₂ +T ₆ +T ₇	14.22 (22.16)	15.65 (23.30)	14.25 (22.18)	14.71
15.	Control	22.34 (28.21)	24.25 (29.48)	24.43 (29.62)	23.67
	C.D. (P= 0.05)	2.90	2.67	0.94	
	C.V. %	5.65	3.18	1.79	

Table 2 : Average yield with economics of the crop for three years

Sr. No.	Treatments	Yield kg./plot (5mx3m)			Mean	C:B ratio
		2008-09	2009-10	2010-11		
1.	Green manuring 20t/ha	72.00	70.20	71.02	71.07	1:2.24
2.	Seedling treatment with carbendazim @ (0.25%)	75.00	73.49	73.60	74.03	1:2.41
3.	Soil drenching with carbendazim @ (0.25%) 3 time at 15 days interval starting at the age of 25 days after transplanting.	78.50	80.26	80.52	79.76	1:2.51
4.	Soil drenching with carbendazim @ (0.25%) two time at 15 days interval starting at the age of 25 days after transplanting.	82.25	81.30	81.62	81.72	1:2.41
5.	Seed treatment with <i>Trichoderma harzianum</i> @ 5g/kg seed.	76.50	75.23	75.33	75.69	1:2.22
6.	Soil drenching with <i>Trichoderma harzianum</i> @ 10g/litre of water at 25 days after transplanting.	70.00	69.43	69.67	69.70	1:1.94
7.	T ₁ + T ₄	83.00	82.83	83.22	83.02	1:2.55
8.	T ₁ + T ₅	67.90	67.22	68.27	67.80	1:1.97
9.	T ₂ + T ₃	90.00	89.83	93.50	91.11	1:2.84
10.	T ₂ + T ₄	85.50	84.28	84.95	84.91	1:2.68
11.	T ₁ + T ₆ +T ₇	78.00	78.02	79.07	78.36	1:2.00
12.	T ₂ + T ₆ +T ₇	80.00	79.58	80.37	79.98	1:2.09
13.	T ₁ + T ₂ +T ₆ +T ₇	82.55	82.15	82.07	82.26	1:2.08
15.	Control	60.00	59.73	61.90	60.54	1:1.99
	CD (P= 0.05)	7.14	6.93	8.04		
	C.V. %	7.14	6.93	8.04		

harzianum, (T₈) green manuring + seed treatment with *Trichoderma harzianum*, (T₁) green manuring and (T₆) soil drenching with *Trichoderma harzianum* with (6.70%), (8.66%), (9.35%), (14.71%), (15.98%), (16.30%), (16.75%), (16.87%), (16.18%), (16.94%), (17.91%), (18.41%), (19.34%), and (19.58%), gave average disease intensity.

Yield:

The result noted in Table 2 that average yield of brinjal fruits per plot (5m x 3m) was 91.11kg, 84.91kg, 83.02kg, 82.26kg, 81.72kg, 79.98kg, 79.76kg, 78.36kg, 75.69kg, 74.03kg, 71.07kg, 69.70kg, and 67.80kg in (T₉), (T₁₀), (T₇), (T₁₃), (T₄), (T₁₂), (T₃), (T₁₁), (T₅), (T₂), (T₁), (T₆) and (T₈), respectively. The findings of present investigation is similar to Sultan and Ghaffar (2010), Javed *et al.* (1997), who achieved best control of *F. solani* infection in onion by carbendazim and vitavax.

Economics:

The result (Table 2) indicated that seedling treatment with carbendazim + soil drenching with *T. harzianum* three times gave highest benefit cost ratio (1:2.84).

Conclusion:

On the basis of above result, it may be concluded that seedling treatment with carbendazim (0.25%) solution for thirty minutes and soil drenching with carbendazim solution (0.25%) solution for three times at 15 days interval with age of

25 days after transplanting may be recommended for management of wilt of brinjal.

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