Research Paper :

Management of stem rot of broccoli caused by *Sclerotinia sclerotiorum* through cultural practiced

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SUMMARY

The effect of cultural practices *viz*., date of planting, soil amendments and intercropping were carried out against stem rot of broccoli caused by *Sclerotinia sclerotiorum*. The disease incidence was significantly influenced by planting dates. The crop transplanted in Ist week of October showed minimum disease intensity (19.40% and 18.94 %) in both the years. However, crop transplanted in 3rd week of November showed maximum disease intensity (32.50% and 30.40%) in both the years. The crop transplanted in 1st week of October gave maximum yield. Among eight different amendments, basal application of pyrite @ 2t/ha showed minimum disease intensity (19.15% and 20.50%) followed by neem cake @ 20 t/ha. The gypsum was least effective in controlling the disease. Disease incidence was reduced to a great extent when broccoli plants were intercropped with either one or two rows of onion or garlic.

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Broccoli (*Brassica oleracea* var. *italica* Plenk) is a cole crop gaining importance in India due to its nutritional value. This Brassicaceous vegetable has almost made its place in Indian vegetable market and broccoli of purple green heading type, is a new gift to Indians. However, the productivity of this crop is not as high here as in other countries. Because the crop is prone to several diseases of fungal origin but recently it has been observed that the stem rot caused by *Sclerotinia sclerotiorum* (Lib.) de Bary is increasingly drawing attention as a destructive disease. Intensive use of fungicides for protection of crop from disease is not only injurious to human health but also polluting the environment. Therefore, it was the demand of the time to develop an alternate, effective and safe approach to manage the disease. In present time, cultural practices are the safest and cheapest source of the management of diseases. Hence, present study was undertaken to find out the effect of planting date, soil amendments and intercropping in managing the disease.

MATERIALS AND METHODS

Experiments were carried out to estimate the disease incidence on different transplanting periods during the two crop seasons of *Rabi* 2004-05 and 2005-06. A susceptible variety Montop of broccoli was transplanted in the field on different dates. The treatments were I week of October, III week of October, I week of November and III week of November. Each treatment was replicated thrice. The data on disease intensity were recorded from the first appearance of the disease and subsequently at 10 days interval, till the maximum disease incidence occurred. The yield was also recorded after harvest.

To see the impact of different soil amendments, a trial was laid out in RBD with three replications during two crop seasons of *Rabi* 2004-05 and 2005-06 with susceptible var. Montop in 2 x 3^2 m plot size. Six soil amendments like neem cake, mustard cake, castor cake, water hyacinth, paddy straw and wheat straw @ 20t/ha and two soil amendments *viz*., pyrite and gypsum @ 2 tonnes/ha were incorporated in the soil before

15 days of transplanting. Observations on disease intensity for both the years were recorded. The data on yield were also recorded after harvest.

To see the effect of inter cropping on stem rot, the broccoli crop was intercropped with onion, garlic and marigold. A row of broccoli was alternated with a row of intercrop, while in the second treatment, a row of broccoli was alternated with 2 rows of intercrop. The garlic was sown in field directly while seedlings of onion and marigold were transplanted. Spacing between two rows of broccoli was maintained at 60 x 45 cm. The distance between garlic and onion was maintained at 10 cm and between two rows 20 cm. In marigold, 20 cm distance was maintained between two rows and 45 cm between plant to plant and 30 cm between intercrop. Observations on disease intensity were made at the time of crop maturity and analyzed statistically.

RESULTS AND DISCUSSION

The data presented in Table 1 reveal that alteration in the date of transplanting of the crop was adjusted in such a way so that the temperature and moisture conditions may prevail for rapid growth of the host to escape the critical period of the disease incidence. The different transplanting dates exhibited marked difference in per cent disease intensity and yield. Minimum disease intensity (19.40% and 18.24 %) occurred in the early transplanted crop on 1st week of October as compared to others in both the years, while maximum disease intensity (32.50% and 30.40%) was observed in late transplanted crop in III week of November. With respect to yield, the crop transplanted in I week of October exhibited maximum yield 202q/ha and 209q/ha in both the years. Similar results are favoured by Singh (1996) and Ghasolia *et al*. (2004) that deviation in sowing had significant impact on the incidence of the disease caused by *Sclerotinia sclerotiorum* on pea and mustard, respectively.

It is evident from Table 2 that the disease incidence was significantly minimized in varying degree by the use of soil amendments as compared to control for both the years. Minimum disease intensity (19.15% and 20.50%) was observed when soil was amended with pyrite @ 2 t/ha followed by neem cake applied @ 20 t/ ha. Soil amended with gypsum was least effective in controlling the disease for both the years. Sharma and Sharma (1986) reported that stalk rot of cauliflower caused by *Sclerotinia sclerotiorum* was reduced by soil amendments with sunflower and mustard cake. Singh *et al*. (2000) observed that maximum disease reduction was obtained by soil amended with pyrite, followed by neem cake, mustard cake and gypsum.

It is evident from Table 3 that the minimum incidence of stem rot was recorded on broccoli plants

Table 1 : Effect of alteration in the date of transplanting on disease intensity

Sr. No.	Date of transplanting	Disease intensity (%)		Yield (q/ha)	
		2004-05	2005-06	2004-05	2005-06
1.	I week of October	19.40 (26.12)	18.24 (25.27)	202	209
2.	III week of October	23.32 (28.86)	22.50 (28.31)	190	196
3.	I week of November	29.20 (32.70)	28.00 (31.94)	170	174
4.	III week of November	32.50 (34.75)	30.40 (33.94)	158	162
	C.D. (P=0.05)	1.96	1.55	5.53	5.73

Table 2 : Effect of different soil amendments on disease intensity

Sr. No.	Soil amendments	Disease intensity (%)		Yield (q/ha)	
		2004-05	2005-06	2004-05	2005-06
1.	Pyrites	19.15 (25.94)	20.50 (26.91)	200.00	198.50
2.	Neem cake	20.40 (26.82)	22.13 (28.01)	194.00	192.00
3.	Mustard cake	22.33 (28.14)	21.40 (27.55)	182.50	184.60
4.	Castor cake	23.52 (29.01)	25.42 (30.27)	178.20	174.52
5.	Water hyacinth	25.60 (30.39)	27.20 (31.43)	171.00	167.80
6.	Paddy straw	28.30 (32.13)	29.40 (32.73)	168.60	165.20
7.	Wheat straw	36.00 (36.86)	37.32 (37.65)	151.80	148.70
8.	Gypsum	39.00 (38.64)	40.50 (39.52)	145.34	142.00
9.	Control	50.78 (45.44)	51.84 (46.05)	128.30	126.25
	C.D. (P=0.05)	1.39	1.59	4.93	5.10

Table 3 : Effect of intercropping in management of stem rot of broccoli caused by *Sclerotinia sclerotiorum*

Treatment/Crop		Disease incidence (%)	
		2004-05*	2005-06
Onion	One row	42.3 (40.56)	15.60 (23.24)
	Two row	41.5 (40.09)	14.30 (22.20)
Garlic	One row	43.7 (41.38)	17.40 (24.65)
	Two row	41.8 (40.28)	18.00 (25.01)
Marigold	One row	45.2 (42.24)	22.33 (28.19)
	Two row	44.50 (41.84)	20.40 (26.82)
Control		49.0 (44.42)	25.42 (30.37)
C.D. (P=0.05)		2.52	1.38

after intercropping with two and one row of onion (41.50% and 42.30 %) followed by two rows of garlic (41.8 %) and one row of garlic (43.70%) and one or two rows of marigold during the crop season 2004-05. During the crop season 2005-06, the lowest disease incidence was recorded when intercropped with two and one row of onion (14.30% and 15.60%), followed by one and two rows of garlic (17.40% and 18.00%) and one and two rows of marigold (20.40% and 22.33%). The present findings are similar with Qais *et al*. (2005), who reported that intercropping of cauliflower with onion or garlic significantly reduced the incidence of stalk rot. The study indicated that stem rot disease can be minimized to a thresh hold level through cultural practices.

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REFERENCES

Ghasoilia, R.P., Shivpuri, Asha and Bhargava, A.K.(2004). Sclerotinia rot of Indian mustard in Rajasthan . *Indian Phytopath*., **57** (1) : 76-79.

Qais, K., Zewain, P. Bahadur and Sharma, P. (2005). Integrated disease management of stalk rot of cauliflower. *Indian Phytopath*., **58** (2) : 167-173.

Sharma, R.C. and Sharma, S.L. (1986). Effect of soil amendments and artificial defoliation of infested leaves on Sclerotinia stalk rot of cauliflower. *Indian J. Pl. Pathol*., **4** : 126-128.

Singh, Dhanbir (1996). Effect of sowing date on white rot (*Sclerotinia sclerotiorum*) development in pea. *Indian J. Agric. Sci*., **65** : 621-623

Singh, Ramesh., Singh, S.B. and Palat, R. (2000). Management of Sclerotinia stem rot of *Ajowan* through soil amendments. Paper presented in National Symposium on Important plant diseases of North-eastern India and their management at N.D. University of Agriculture and Technology, Kumarganj, Faizabad on Dec., 6-7, 2000 (Abstract).

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