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Management of Pea Powdery Mildew (*Erysiphe polygoni*) by Fungicides

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A B S T R A C T

Powdery mildew of pea caused by *Erysiphe polygoni* has emerged as a constraint in its cultivation in Rajasthan. Disease appeared in first week of January and reaches its peak in March. Powdery mildew disease is easily detected by the presence of white floury patches appearing on both sides of the leaves as well as tendril stem, pods *etc*. In extreme severe conditions it causes significant losses in quantity as well as quality of seed.

Introduction

Pea is an important vegetable crop grown in the cool season through the world. In India, it is grown as winter vegetable in the plains of North India and as summer vegetable in the hills.

It belongs to the family *Leguminosae* and sub-family *Papilionaceae*. The archaeological studies have indicated that pea has been cultivated since ancient times and cultivation of pea was very old practice.

The Central Asia was regarded as the birth place of all legumes including pea whereas Asia secondary centre of origin (Bose and Som, 1986). The chromosome number of pea is 2n=14. The genus *Pisumsativum* includes the following sub-species: *Pisum sativum* Linn. *var*. *hortense* (garden pea) and *Pisum sativum* Linn. *var*. *arvense* (field pea). Pea plant is herbaceous annual climbing by means of leaflet tendrils, glabrous with or without wax covering. Pods are swollen or compressed, straight or curved. On short stalks with as many as ten seeds. Seeds are angular or globose and smooth or wrinkled.

Out of five fungicides evaluated for their efficacy for the control of powdery mildew in pea, two sprays of karathane @ 0.1% at 15 days interval were observed most effective with maximum 80.43 per cent disease control. Hexaconazole was next best and statistically at par with wettablesulphur in reducing disease over control. The cost benefit ratio was highest (5.68) in karathane treatment.

Materials and Methods

Efforts were made to manage the disease by applying foliar application of fungicides. Following fungicides were used as followed

Field experiment was conducted for two consecutive years during *rabi* 2015-16 and 2016-17. Sowing was done in 31st October in both the years using local susceptible cultivar Azad P-1 of pea in randomized block design with 5 treatments including control in four replications.

Fungicides were sprayed twice at an interval of 15 days starting from the initial appearance of the disease. One untreated control was maintained. The per cent disease intensity recorded after 15 days of last spray of fungicides by examining 20 leaves from 10 randomly selected plants in each treatment. The severity of powdery mildew was rated using 0-5 rating scale and per cent disease intensity was calculated by using formula given earlier. The seed yield was recorded in each treatment and cost benefit ratio was worked out. The results were analyzed statistically.

Results and Discussion

Six fungicides were evaluated for management of powdery mildew of pea by spraying twice at 15 days interval under natural field conditions. Two years pooled data on per cent disease intensity (Table 4.18) revealed that all the fungicides were significantly effective in reducing the powdery mildew disease intensity over control (64.63 per cent). The minimum 12.65 per cent disease intensity was recorded with the application of Karathane by decreasing 80.43 per cent disease intensity. However, hexaconazole was second best and recorded 18.47 per cent disease intensity by decreasing 71.43 per cent disease intensity. Wettablesulphur and propiconazole were found moderately effective where, 22.68 per cent and 30.47 per cent per cent, respectively disease intensity was recorded. Among the fungicides maximum 34.11 per cent disease intensity was recorded in the treatment of wetablesulphur (Table 1).

Table.1

S.N.	Common Name	Trade Name	Conc.	Chemical Name
1	Wettable Sulphur	Sulfex	0.2	Sulphur
2	Hexaconazole	Contaf	0.1	(RS)-2-(2,4-dichlorophenyl) -1-(1H-1,2,4-triazole-1-yl) hexan-2-01
3	Karathane	Karathane	0.1	2,4-Dinitro-6-Octylphenyl crotonate and 2,6-dinitro-4-Ocyylphenyl crotonate
4	Propiconazole	Tilt	0.1	1-[2- (2,4-dichlorophenyl)-4-Proyl-1,3-dioxdan-2yl-methyl]-1H-1,2,4-triazole
5	Tridemorph	Calixin	0.1	-N-tridecyl-2,6-dimethylmorpholine,750g/L SC

Table.2 Effect of fungicides on powdery mildew disease intensity and pod yield of pea

Fungicides	Concentration (%)	Per cent disease intensity*			Decrease in PDI over control (%)	Pod yield (q/ha)*			Increase in pod yield over control (%)
		2015-16	2016-17	Pooled		2015-16	2016-17	Pooled	
Karathane (Dinocap)	0.1	10.40	14.90	12.65	80.43	110.10	90.52	100.31	42.23
		18.81	22.71	20.83					
Hexaconazole	0.1	15.10	21.83	18.47	71.43	104.51	85.34	94.93	34.60
		22.87	27.85	25.45					
Wettable Sulphur	0.2	20.80	24.55	22.68	64.91	99.64	82.14	90.89	28.88
		27.13	29.70	28.44					
Propiconazole	0.1	25.22	35.72	30.47	52.85	95.47	80.35	87.91	24.65
		30.15	36.70	33.50					
Tridemorph	0.1	30.72	37.50	34.11	47.22	91.48	75.54	83.51	18.41
		33.66	37.76	35.74					
Control		64.25	65.00	64.63		70.14	70.91	70.53	-
		53.28	53.73	53.50					
SEm+		0.53	0.53	0.53		2.81	2.88	2.85	
CD (p=0.05)		1.61	1.60	1.59		8.48	9.10	8.79	
CV		3.44	3.05	3.21		5.91	6.97	6.44	

*Average of four replications

Pooled analysis of two year pod yield data of pea was found statistically significant over control. Result showed that maximum 100.31 q/ha pod yield was recorded in karathane with increasing 42.23 per cent pod yield followed by hexaconazole recorded 94.93 q/ha pod yield with increasing 34.60 per cent pod yield. Wattablesulphur, propiconazole and Tridemorph recorded 90.89 q/ha, 87.91 q/ha and 83.51 q/ha seed yield. Minimum 70.53 q/ha seed yield was recorded in control.

Based on the cost of different treatment and net profit, benefit cost ratio was worked out. The highest net profit of Rs. 82650 and benefit cost ratio 5.68 was obtained with the application of karathane. The second best with propiconazole (4.39). Spray of karathane @ 0.1% also good with 5.68 B: C ratio (Table 2).

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