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Effect of Vinclozolin Spray, Plant Growth Habit and Inter-Row Spacings on Botrytis Grey Mold and Yield of Chickpea

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Of late, botrytis grey mold of chickpea (*Cicer arietinum* L.), caused by *Botrytis cinerea* Pers. ex Fr., has assumed economic importance in north-east India (Grewal and Laha, 1983), Nepal (Reddy *et al.*, 1988), and Bangladesh (Reddy, 1990). Our experience has shown that development of botrytis grey mold is greater in bushy genotypes, close inter-row spacings (i.e., high plant density with crop canopy), and high relative humidity. To confirm these observations, a field experiment was conducted at Pantnagar during the 1988/89 and 1989/90 post-rainy seasons. Various combinations of foliar sprays with a new fungicide, vinclozolin (Ronilan^{50}), genotypes with different growth habits, and inter-row spacings were tested for their influence on disease development and yield.

Two chickpea genotypes; ICCL 87322- an ICRISAT breeding line with tall, erect, and compact growth habit, and H 208- a traditional bushy and spreading type; two row spacings; 30 x 10, and 60 x 5 cm; and two spray treatments (spray and no spray with vinclozolin) were tested. The experiment was designed in a split-plot design with three replications. Vinclozolin spray was treated as main plots. The two genotypes with two different spacings were treated as sub-plots. The sub-plot size was 5.4 m^2.

Plants were artificially inoculated with botrytis grey mold spore suspension (40,000 conidia/ml) of *B. cinerea* on 7th and 14th February during 1989 and 1990, 105 days after planting, to ensure uniform

Vinclozolin (0.2%) was

at the flowering and podding stages depending on disease appearance (on 23rd February and 10th March in 1989, and on 6th and 14th February in 1990). Observations on botrytis grey mold severity were recorded at flowering and early podding stage using a 1 - 9 scale (1 = no symptoms; 2 = 1 - 5% foliar damage; 3 = 6 - 10% foliar damage; 4 = 11 - 40% foliar damage; 5 = 41 - 50% foliar damage; 6 = 51 - 60% foliar damage; 7 = 61 - 70% foliar damage; 8 = 71 - 90% foliar damage; and 9 = >90% plants killed). Grain yield was recorded after harvest.

Disease severity scores and grain yield in different treatments are presented in Table 1. The disease pressure in both the seasons was high as indicated by the damage scores of 8 and 9 in H 208 in 30 x 10 cm spacing in the unsprayed plots. Vinclozolin sprays significantly reduced grey mold severity and increased yields in both the seasons. Differences in grey mold severity between the genotypes were highly significant. The conventional genotype, H 208 suffered significantly less disease and gave higher grain yield at a wider row spacing (60 x 5 cm) under sprayed and unsprayed situations in both the seasons. ICCL 87322 yielded over 5 t/ha at 60 x 5 cm spacing during 1988/89. It significantly out-yielded the spreading genotype, H 208.

Though the interaction between cultivars and spacings for disease severity was not significant, it was highly significant for yield in both the seasons. The interaction between cultivars and fungicide application, and between fungicide and spacings was significant for both disease severity and yield in both the seasons.

These results clearly reveal that in addition to vinclozolin sprays, the use of tall, erect, and compact genotypes, and wider row spacings can play an important role in the integrated management of botrytis grey mold. It is likely that at wider row spacings, the relative humidity in crop canopy is low resulting in low disease development. The reasons for increase in yield in the tall genotype, ICCL 87322 at wider row spacing during 1988/89 without a decrease in disease severity are not clear. This may be attributed to the effect of wider spacings on other biotic yield reducing factors.

Table 1. Influence of vinclozolin spray, growth habit of chickpea genotypes and row spacing on botrytis grey mold severity and grain yield

Treatments		Disease rating		Grain yield kg/ha	
		1988/89	1989/90	1988/89	1989/90
Sprayed with vinclozolin					
Tall genotype					
ICCL 87322	30x10 cm	4.3	5 0	3537	2901
	60x5 cm	3.3	3 3	5179	3062
Conventional genotype					
H 208	30x10 cm	6 7	6 0	2778	1309
	60x5 cm	5 0	4 7	3065	1981
Unsprayed					
Tall genotype					
ICCL 87322	30x10 cm	5 3	6 0	3417	2444
	60x5 cm	4 1	5 7	4462	2444
Conventional genotype					
H 208	30x10 cm	8 0	9 0	1009	321
	60x5 cm	7 1	7 3	1907	864
Cultivar	SE ±	0.56**	0 20***	77 3***	48 9**
CV(%)		17 0	6 0	4 2	4 4
Spacing and spray	SE ±	0 16**	0 10***	26 7***	27 7***
Cultivar x space	SE ±	0 59	0 23	81 8***	56 2***
Cultivar x spray	SE ±	0 59***	0 23**	81 8***	56 2***
Space x spray	SE ±	0 23***	0 15	37 8*	39 2

Significant at P = 0 05, ** Significant at P=0 01 *** Significant at P=0 001

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