

YIELD LOSSES AMONGST FOUR VARIETIES OF MUSTARD DUE TO POWDERY MILDEW IN MAHARASHTRA

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An extensive field experiments were conducted to estimate the losses in mustard varieties viz., Seeta, Pusa Bold, Bio 902, TM 17 due to infection of powdery mildew at two locations. The highest incidence of powdery mildew was noted in Pusa Bold (77.2%) followed by Seeta and Bio 902. The disease severity also similarly occurred in Pusa Bold followed by Seeta, Bio 902 and TM 17. The grain weight, oil content and yield were higher in TM 17 followed by other varieties at both the locations. The higher loss in yield was noted in variety Seeta (40%) at Aurangabad location however pooled loss was more in Pusa Bold.

Keywords: Mustard; Oil content; Powdery mildew; Yield loss.

Mustard (*Brassica campestris* L.) is the most important oilseed crop in Maharashtra. The seeds contain oil ranging from 30 % to 40 %. The mustard accounts 24.7 % area and 27.5 % of the total production of oilseed in the country. Powdery mildew caused by *Erysiphe cruciferarum* is one of the serious diseases and has become a constraint in the cultivation of mustard in Maharashtra. Severe epiphytotic of powdery mildew have been reported¹⁻³. The disease is favoured by dry climate and moderate temperature. In Maharashtra mustard sown generally in October–November where temperature ranges from 20 to 30°C which is favourable for disease development. The exact losses due to powdery mildew of mustard in Maharashtra are not available. In this paper experimental studies and discussions offer the tremendous scope in stabilizing the mustard productivity and help in edible oil production in country.

The experiments were carried out during post rainy (*rabbi*) season of 2005–06 and 2006–07 at Parbhani and Aurangabad location. The field experiments were arranged in split plot design with four replications. Individual plot size was 5.4 m × 4.5 m. The seeds, fertilizers and fungicide tridemorph were obtained and applied as per recommended doses of Marathwada Agricultural University, Parbhani. Four different varieties were considered in main plot while treated and non-treated plots were considered as sub-plots. Seeds were dibbled at 15 cm distance between two rows. All the cultural operations were performed as per recommendations. Plant protection operations were carried out for management of insect–pest at both 54 DAP (days after plantation) and continued with an interval of 12 days to know the progress of disease in various treatments.

The combined data of incidence and severity of powdery mildew is presented in Table 1. It was noted that incidence of powdery mildew is higher in Pusa Bold

(77.2%) than other varieties like Seeta (68.3%), Bio 902 (64.2%) and TM 17 (61.0%). It was also noted that incidence of pathogen is reduced up to 50% in protected crop due to application of fungicide. Similar results were observed in severity of powdery mildew. The Pusa Bold showed more severity than other varieties. In protected plots it was reduced to more than 50%. The yield loss amongst mustard cultivars was studied and depicted in Table 2. It was noted that the percent loss was from 15% to 40%. The highest losses were observed in variety Seeta, however, lowest were noted in TM 17 at Aurangabad. At Parbhani it was observed more in Pusa Bold and lower TM 17. At both the locations TM 17 is suitable in relation to yield. The pooled loss at both the places was 24.7. Similarly, all varieties were screened for yield contribution factors at both the locations. The results were presented in Table 3. The weight of 1000 grains and its yield were measured; it was higher in TM 17. Pusa Bold showed higher in seed weight but less in yield than TM 17. The varieties Bio 902 and Seeta were followed than TM 17 at Aurangabad location. At Parbhani, if yield factor considered the variety TM 17 is suitable and gave higher yield than Pusa Bold, Bio 902, and Seeta. The weight of seeds was higher in Pusa Bold. Overall at both the locations, the variety TM 17 gave higher yield and suitable for cultivation under the influence of powdery mildew. The oil content is similar in all cultivars at both the places i.e. 37.3% to 37.6%. Similar results were presented by other workers⁴⁻⁵ in Maharashtra. Hare⁶ reported the losses due to severity of powdery mildew tune from 45% to 90% in Pusa Bold and Seeta cultivars. The earlier studies^{7,8} indicated the loss in yield was 20% to 40% and oil content was noted from 2% to 7%. From the results of estimation of losses, it is concluded that powdery mildew reduces the yield of mustard by 24.7% in different cultivars. The reduction in yield was varied. It

Table 1. Percent incidence and severity of powdery mildew of mustard.

Cultivar	Incidence (%)		Severity (%)	
	Protected	Un-protected	Protected	Un-protected
Seeta	30.5	68.3	19.2	51.6
Pusa Bold	28.2	77.2	17.0	58.9
Bio 902	30.0	64.2	19.8	50.2
TM 17	32.8	61.0	20.1	42.9
Pooled mean	30.0	67.5	19.4	49.6

Table 2. Yield loss in mustard cultivars due to powdery mildew.

Cultivar	Yield (kg/ha)						
	Aurangaba			Parbhani			Pooled loss
	Protected	Un-Protected	Loss %	Protected	Un-Protected	Loss %	
Seeta	802	474	40.0	821	577	29.0	34.5
Pusa Bold	1289	855	34.0	1158	740	37.0	35.5
Bio 902	1376	876	36.0	1107	789	28.0	32.0
TM 17	1202	1014	15.0	910	748	17.0	16.0
Pooled mean	1137	861	24.0	981	732	25.0	24.7

Table 3. Yield and yield contributing factors of mustard influenced by powdery mildew.

Cultivar	Aurangabad			Parbhani		
	Wt. of 1000 seeds (gm)	Oil content (%)	Yield (kg/ha)	Wt. of 1000 seeds (gm)	Oil content (%)	Yield (kg/ha)
Seeta	1.85	37.3	688	2.65	37.3	699
Pusa Bold	3.65	37.3	1072	4.25	37.3	994
Bio 902	2.75	37.5	1108	3.15	37.5	829
TM 17	2.8	37.6	1126	3.7	37.6	998
CD at 5%	0.3	1.05	173	0.4	1.1	91
Protected	3.05	37.2	1137	3.35	37.5	981
Unprotected	2.55	37.4	1231	3.25	37.3	732
CD at 5%	0.2	0.7	99.5	1.3	0.7	126
CD at 5% (C'P)	0.45	1.5	202	0.65	1.6	61

was highest in Pusa Bold followed by Seta and Bio 902 at both the locations. In case of oil content, the pathogen induced the highest loss of 1.17 % in Bio 903 followed by Pusa Bold, Seta and TM 17.

Acknowledgment

One of the authors (VCK) expresses his gratitude to University Grants Commission, New Delhi for financial assistance and Principal, Vasantrao Naik Mahavidyalaya, Aurangabad for laboratory facilities.

References

- Shankhala H C, Delelu G D and Mathur R L 1967, Occurrence of perithecial stage of *Erysiphe polygoni* on *Brassica juncea*. *Plant Dis Repr* 51.
- Sharma A K 1979, Powdery mildew of some crucifers from J and K State. *Indian J. Mycol. Pl. Pathol.* 9 29.
- Saharan G S and Kaushik J G 1981, *Indian Phytopath* 34 (1) 54.
- Munjal R L, Chennulu V V and Hora T S 1963, assessment of losses due to powdery mildew (*Erysiphe polygoni* D.C.) on pea. *Indian Phytopath.* 16 268-269.
- Husain S M, Akram and Wajid Khan M 1997, Epidemiology and management of powdery mildew. In: Management of threatening plant disease of national importance (Ed. Agnihotri V P, Sarbhoy A K and Singh D Y) MPH Publ New Delhi.
- Hare R M 1994, Influence of date of sowing on powdery mildew of rapeseed mustard. M.Sc. (Agri.) Thesis, MAU, Parbhani, pp 1-47.
- Samudre R A 1994, Influence of spacing of powdery mildew on four cultivars of rapeseed mustard. M.Sc. (Agri.) Thesis, MAU, Parbhani, pp 1-43.
- Hingole D G 1995, Estimation of yield losses in rapeseed mustard due to powdery mildew and white rust. M.Sc. (Agri.) Thesis, MAU, Parbhani, pp 1-52.