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Short communication

Weather relations of downy mildew and fruit yield modeling in cucumber

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Cucumber is one of the most important vegetable crops of Maharashtra. In konkan region of Maharshtra, it is mostly grown on hilly and slopy upland during *kharif* season. Sowing of this crop is done right from premonsoon to onset of monsoon in June and it is delayed up to August. The crop yield is mostly governed by sowing time, intensity and duration of monsoon and incidence of pests and diseases. Downey mildew is one of the major diseases of cucumber and other cucurbits during *kharif* season. The disease incidence is more during July to October with pronounced severity in September. Kakade and Shelke (2002) reported downy mildew to be deadly disease of ridge gourd which affects foliage and in severe cases causes complete failure of crop if not controlled in time. Sowing time influences the incidence of downy mildew and crop yield in sunflower (Kankal *et.al*. 1999). In view of this, the present investigation was carried out to study the effect of sowing time on the incidence of downy mildew and fruit yield of cucumber.

Field trials were conducted during *kharif,* 2001, 2002 and 2004 at the Agronomy farm, college of Agriculture, Dapoli. District Ratnagiri (M.S.). Treatments comprised of four sowing dates based on Meteorological Week (MW) i.e. sowing during 24th MW (11.06 to 17.06), 25th MW (18.6 to 24.6), 26th MW (25.06 to 01.07) and 27th MW (02.07 to 08.07) replicated five times in randomized block design. Net plot size was 6.0 X 4.0 m. The soil of the experimental site was lateritic, sandy loam in texture. The available nitrogen, phosphorus and potassium content of the soil were 201, 12 and 160 kgha^{-1} respectively. Cucumber variety *Sheetal* was sown as per treatment at a distance of 1.5 X 1.0 m. FYM @ 15 ton ha^{-1} was well mixed with the soil at the time of land preparation. Fertilizers @ 135 kg N, 60 kg P_2O_5 and 30 Kg K_2O ha^{-1} were applied. Out of which 40 percent nitrogen and full dose of P_2O_5 and K_2O was applied at the time of sowing. Remaining 60 percent nitrogen was applied in two equal splits at 30 days interval from sowing. Meteorological data during the crop growth stages were recorded. Similarly, observations on disease incidence were also noted. As per the sowing times, fruit yield of tender fruits harvested for vegetable purpose was also periodically recorded and subjected to the statistical analysis. Three years pooled data were also analyzed statistically.

The fruit yield of cucumber during 2001, 2002 and 2004 and also in pooled data (Table 1), was significantly influenced by different sowing times. During all the three seasons, sowing the crop during 24th MW recorded significantly higher fruit yield over all other weeks.

The incidence of downey mildew was observed on crop sown during 24th, 25th, 26th and 27th MW at the

Table 1: Fruit yield of cucumber as affected by different sowing times.

Treatments (Sowing times)	Fruit yield (t ha^{-1})			Pooled Mean (t ha^{-1})
	2001	2002	2004	
24thMW	9.00	13.23	11.24	10.36
25thMW	5.38	8.88	10.52	8.27
26thMW	5.60	7.92	8.88	7.51
27thMW	5.07	5.49	8.20	6.17
S.E.+	0.298	0.654	0.447	0.263
CD at 5%	0.917	2.017	1.380*	0.812*

Table 2: Downy mildew incidence in cucumber

Sr. No.	Date of observation	% Diseases incidence of downy mildew				Temp (^{O}C)	
		D1	D2	D3	D4	Max	Min
1	20.7.04	0.25	0.1	0.1	0.1	28.4	23.0
2	27.7.04	0.50	0.1	0.1	0.1	26.9	22.4
3	3.8.04	5.32	3.61	2.81	2.5	26.0	22.5
4	10.8.04	8.62	5.5	5.0	3.8	28.0	23.1
5	17.8.04	16.5	15.3	10.8	8.8	27.8	23.0
6	24.8.04	25.3	22.6	20.3	15.6	27.5	22.9
7	31.8.04	36.91	34.01	29.6	25.23	28.6	22.1
8	7.9.04	58.62	36.2	32.65	30.83	28.6	22.1

Table 3: Correlation between weather data and incidence of downy mildew disease

Weather parameter	% Diseases incidence of downy mildew			
	D1	D2	D3	D4
Tmax	0.551*			0.784*
Tmin	0.648*			-0.470*
RH - I	0.564*			0.508*
RH - II	-0.706*			-0.923*

age of 40, 39, 33 and 25 days after sowing (Table 2), respectively. The disease incidence increased progressively with an increase in the age of crop from date of incidence. The Incidence of downy mildew was first noticed in the 29th MW (0.25 %) on the crop sown in 24thMW; other sowings were free during this period. The incidence was maximum in all the observations taken on crop sown in 24th MW i.e. early sowing.

During the period of downy mildew incidence the mean maximum temperature ranged between 27.8 and 28.6 ^{0}C**,** which was slightly lower relatively cooler than that at initial crop growth period (26.0 and 28.4 ^{0}C). The evening relative humidity ranged from 89 to 98 % during the period of incidence of downy mildew. Rainfall as well as rainy days also decreased during 29th to 36th MW. Similar observation regarding incidence of downy mildew was reported by Bains and Jhooty (1978) and Kagadi *et.al* (2000).

Incidence of downy mildew in cucumber showed positive and significant correlation with maximum temperature and morning humidity, whereas negative correlation was evident with minimum temperature in all the sowing dates (Table 3).

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