

EFFECT OF NUTRITION ON DOWNY MILDEW DISEASE CAUSED BY *PSEUDOPERONOSPORA CUBENSIS* (BERK. & CURT.) ROSTOW. ON MUSKMELON

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Role of host nutrition in modifying the disease severity is well established and the effect varies with the nature and amount of mineral nutrients (Singh et al., 1970; Colhoun, 1973 and Huber, 1980). This paper reports the effect of N P K and mineral nutrition on downy mildew disease of muskmelons caused by *Pseudoperonospora cubensis* (Berk. & Curt.) Rostow. under field conditions.

The experiments were conducted on muskmelon cv. 'Durgapura Madhu' at Agriculture Research Station, Sriganaganagar in sandy loam soil (pH 8 to 10, conductivity 0.32 m mhos/cm, organic carbon 0.45%, total nitrogen 0.047%, available P_2O_5 44 kg/ha and available K_2O 375 kg/ha). To study the effect of N, P and K, the experiment comprised eight treatments (including control and the recommended level of 100 : 50 : 50) replicated thrice (plot size $4 \times 2.5 \text{ m}^2$) in a randomised block design. Full dose of phosphorus and potash and half dose of nitrogen in the form of single super phosphate, muriate of potash and urea were applied basally and remaining half dose of nitrogen was applied as top dressing at 35 days after sowing. Effect of six trace elements was studied in another experiment in the same design with recommended level (100 : 50 : 50) of N, P and K. The treatments included aqueous sprays of borax (0.2%), copper sulphate (0.2%) manganese sulphate (0.5%), zinc sulphate (0.5%), ferrous sulphate (0.5%) and ammonium molybdate (0.03%) at 45 and 60 days of sowing. In each solution of the sprays, quick lime (CaO) was also added in half the quantity of the chemical to check phytotoxicity. In both the experiments, seeds dressed with Thiram @ 2.5 g/kg were dibbled (2-3 seeds per hole) at a spacing of 30 cm and after germination, only one plant per hole was maintained. Per cent disease intensity was recorded at 75 to 80 days after sowing for different treatments in both the experiments and compared with control.

Increase of nitrogen upto 100 kg/ha increased the downy mildew intensity, but further increase with unchanged levels of phosphorus and potash reduced the disease intensity (Table 1) almost at par with the control. Bains and Jhooty (1978) also reported decrease in susceptibility of muskmelon to *P. cubensis* at higher doses of nitrogen. Nitrogenous fertilizers are known to increase the susceptibility of crops. Perhaps, the host-parasite interaction and nutrient combinations determine the effect of doses (Huber, 1980).

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Table 1. Effect of N, P and K levels on the intensity of downy mildew disease in muskmelon cv. 'Durgapura Madhu'

N : P : K (kg/ha)	Per cent disease intensity*
50 : 50 : 50	34.83 (36.13)
100 : 50 : 50	39.50 (38.92)
125 : 50 : 50	32.83 (34.95)
100 : 25 : 50	33.66 (35.44)
100 : 75 : 50	28.16 (32.02)
100 : 50 : 25	38.00 (38.04)
100 : 50 : 75	38.00 (38.05)
Control	31.50 (34.12)
S Em \pm	1.08
CD at 1%	4.55
CD at 5%	3.28

* Figures in parentheses are angular transformed values

Phosphorus is considered beneficial in reducing seedling rot and other fungal diseases, but at N 100 and K 50 kg/ha, increase in P from 25 to 50 kg/ha increased the disease intensity. However, when high dose of phosphorus was applied (75 kg/ha), the downy mildew intensity was minimum as also reported by Bains and Jhooty (1978) and Singh et al. (1970).

Effect of potassium was not clearly evident in the present study. Doran (1932) also observed no effect of potassium on *P. cubensis* in cucumber.

Among the six trace elements tested (Table 2), zinc and copper reduced the disease significantly. Fungicidal properties of both these elements is well known. The other trace elements did not significantly affect the disease intensity and, therefore, were not of any value to check the downy mildew of muskmelons.

Table 2. Effect of trace elements on downy mildew disease intensity in muskmelon cv 'Durgapura Madhu'

Trace element	Per cent disease intensity*
Boron (Borax @ 0.2%)	36.16 (36.96)
Copper (Copper sulphate @ 0.2%)	28.83 (32.46)
Manganese (Manganese sulphate @ 0.5%)	36.33 (37.03)
Zinc (Zinc sulphate @ 0.5%)	27.33 (31.62)
Iron (Iron sulphate @ 0.5%)	37.33 (37.63)
Molybdenum (Ammonium molybdate @ 0.03%)	37.00 (37.45)
Control —	39.50 (38.92)
S Em \pm	1.09
CD at 1%	4.73
CD at 5%	3.37

Figures in parentheses are angular transformed values

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