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Study on screening the role of micronutrients on chlorotic mottle (geminivirus) disease development in frenchbean (*Phaseolus vulgaris* L.)

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ABSTRACT

Application of micronutrients was found effective in Frenchbean (*Phaseolus vulgaris* L.) cultivar Contender, against chlorotic mottle disease by spray and soil application. Observation were recorded in the form of disease severity (disease index). After the application of micronutrients it was found that ferrous sulphate was more effective by both soil applications as well as spray applications. By soil application zinc sulphate was found effective. Boron was found effective only by spray application. It was also found that micronutrients had significant effect in reducing the disease severity.

Key words : Chlorotic mottle, Resistant, *kharif*.

Frenchbean (*Phaseolus Vulgaris* L.) is an important short duration vegetable and grain crop. The crop is cultivated in *kharif*, autumn, *rabi* and summer seasons. Due to its cultivation all the year round this crop serves as a good host of so many viruses. Chlorotic mottle disease of frenchbean caused by chlorotic mottle virus (Geminivirus) has a very short history of three years in Jabalpur region (Keshwal, 2001). The name of chlorotic mottle was coined to decribe the characteristics foliar symptoms in beans (Jayasinghe,1982). Management of diseases caused by geminivirus through vector control and or use of resistant varieties have been found to be of no promise (Mali, 1986).Protective means of virus disease control like insectcidal and fungicidal sprays thus becomes inpracticable, laborious and costly.The role of micronutrients has been studied to know as what type of effect they do on host vis-a-vis reduction and or increase in disease. Experiment was conducted to screening and testing the effect of micronutrients on disease development.

MATERIALS AND METHODS

Experiments were conducted in the plant virology Laboratory, and glasshouse of Plant Pathology Department, College of Agriculture, JNKVV, Jabalpur (M.P.). Election microscopy was done in Advance Centre for Plant Virology, IARI, New Delhi. Screening of 21 micronutrients (in the form of chemical compounds) and other chemicals *viz.*, manganese sulphate, zinc sulphate, copper sulphate, ferrous sulphate, calcium carbonate, potassium sulphate, sulphur, magnesium sulphate, magnesium chloride, molybdenum oxide, copper oxide, calcium sulphate, lime, boron, ferric chloride, boric acid, zinc phosphate, selicylic acid, sodium phosphate, silver nitrate, silver chloride. Experiment was done in pot culture in *kharif* season of year 2002. Contender variety of frenchbean was grown in pots of 30 cm diameter in four replications. Micronutrients were applied at once only in soil before sowing of seeds. In a separate test micronutrients were applied only as spray at 15 and 30 days after germination of seeds. Routine seed treatment with fungicides thiram 3 g/kg and bavistin 1.5 g/kg along with rhizobium culture was done. Plants grown in pots with severe symptoms of chlorotic mottle (Geminivirus) disease were kept in between replications for natural inoculation. Observations were recorded regularly on symptom severity as disease index (calculated from five rendom plants). For the computation of disease index following formula was used.

Disease index:

Numerical rating	Description
0	Healthy
1	Initial symptoms on leaf
2	Mild symptoms on leaf
3	Symptoms on leaf and other parts of plant
4	Severe symptoms over category 3
5	Complex symptoms, distortion, dwarfing etc.

$$\text{Disease index (DI)} = \frac{\text{ġ=of numercial ratings x 100}}{\text{No. of plants observed x highest degree of rating}}$$

RESULTS AND DISCUSSION

The data in given Table 1 which indicated that soil application of ferrous sulphate was effective to reduce

Table 1 : Screening tests of micronutrients on Chlorotic mottle disease

Sr. No.	Treatments	Dose (%)	Symptom severity observed by	
			Soil application	Spray application
1.	Manganese sulphate	0.05	48.29	53.32
2.	Zinc sulphate	0.05	28.30	33.32
3.	Copper sulphate	0.05	41.65	54.97
4.	Ferrous sulphate	0.05	18.32	19.98
5.	Calcium carbonate	0.05	28.32	48.31
6.	Potassium sulphate	0.05	43.30	59.98
7.	Potassium chloride	0.05	31.63	51.62
8.	Sulphur	0.05	48.30	59.98
9.	Magnesium sulphate	0.05	33.32	26.66
10.	Magnesium chloride	0.05	39.98	61.63
11.	Molybdenum oxide	0.05	56.61	56.62
12.	Copper oxide	0.05	63.27	54.96
13.	Calcium sulphate	0.05	61.62	48.29
14.	Lime	0.05	29.98	54.97
15.	Boron	0.05	44.98	16.66
16.	Ferric chloride	0.05	48.29	63.30
17.	Boric acid	0.05	48.29	66.63
18.	Zinc phosphate	0.05	34.97	58.32
19.	Selicylic acid	0.05	36.65	54.99
20.	Sodium phosphate	0.05	56.62	49.97
21.	Silver nitrate	0.05	38.31	48.29
22.	Silver chloride	0.05	39.96	69.98
23.	Check		44.97	56.64
	S.E.±		8.15	7.57
	C.D. (P=0.05)		16.27	15.11

symptom severity (disease index) to a tune of (18.32) per cent. Spray application of boron was found to affect symptom severity (disease index) by (16.66) per cent followed by spray of ferrous sulphate (19.98), magnesium sulphate (26.66), zinc sulphate (33.22), calcium carbonate (48.31) and potassium chloride (51.62). By soil application the reduction in disease severity (disease index) by lime was observed to be 29.98 per cent, zinc sulphate (28.30) per cent followed by calcium carbonate (28.32), potassium chloride (31.63), magnesium sulphate (33.32), Zinc Phosphate (34.97) and salicylic acid (36.65), ferrous sulphate was found to be effective by both soil as well as spray application (18.32) and (19.98), respectively followed by zinc sulphate and calcium carbonate. In case of boron, soil application was not found effective but its spray was significantly effective in reducing the disease severity (disease index) by (16.66) per cent.

The soil application of micronutrients, the symptom severity (disease index) was reduced in a range of 18.32 and 39.96 per cent as compared to 44.97 per cent in check. By spray application the reduction in symptom severity (disease index) ranged from 16.66 to 51.62 per cent as compared to 56.64 per cent in check. Likely same results were found on okra yellow vein (Geminivirus) disease by (Pun *et al*., 2000).

Application of micronutrients was done as sprays and soil application. Application of ten micronutrients as soil application and six micronutrients as spray application were found to affect symptom severity (disease index) of chlorotic mottle disease in frenchbean cultivar contender.

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REFERENCES

Jayasinghe, U. (1982). Chlorotic mottle of bean (*Phaseolus vulgaris* L.). CIAT monograph, Series 09EB-2, **82 :** 157.

Keshwal, R.L. (2001). Annual Report, Department of Plant Pathology, J.N.K.V.V., Jabalpur for the year 2000-01.

Mali, V.R. (1986). Virus diseases of Frenchbean in the tropics. *Rev. Trop. Pl. Path.* Today and Tomorrow's Printers and Publishers, New Delhi. pp. 421-480.

Pun, K.B., Doraiswamy, S. and Jeyarajan, S. (2000). Screening of virus inhibitory chemicals and neem products against okra yellow vein mosaic virus. *Indian Phytopath.*, **53:** 95-96.

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