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Effect of micronutrients as IDM component on host proneness for chlorotic mottle (Geminivirus) disease in frenchbean (*Phaseolus vulgaris* L.)

ASHISH BOBADE, AVINASH CHAURASIYA AND SUBHASH KATARE

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See end of the article for authors' affiliations

Correspondence to:

SUBHASH KATARE
Krishi Vygyan Kendra,
Joara, RATLAM (M.P.)
INDIA

ABSTRACT

Micronutrient application as IDM component was found to trigger resistance in Frenchbean (*Phaseolus vulgaris* L.) cv. CONTENDER against development of chlorotic mottle (Geminivirus) disease tested in *rabi* and *kharif* seasons. Observations in the form of vigor, appearence of disease at days after sowing and stress tolerance index Irevealed positive effect of micronutrients in comparison to insecticidal treatment in microplot studies. The effects of micronutrients on chlorotic mottle disease were evidently seen in *rabi* season and *kharif* season crop.

Key words : Frenchbean, Chlorotic mottle, Geminivirus, Vigour.

Frenchbean (*Phaseolus vulgaris* L.) is an important vegetable and pulse crop. After chlorotic mottle (geminivirus) disease outbreak the crop cultivation became non profitable. Chlorotic mottle (geminivirus) disease in Frenchbean has a very short history in Jabalpur region (Keshwal, 2001). Before that Frenchbean crop was extensively grown in this area. Practice like vector control yielded no result. The effect of mirconutrients as IDM (integrated disease managment) components have been studied to know as what type of effect they do on host vis-a-vis reduction and or increase in disease, helping fight back phenomenon of the host and so on. The effect of micronutrients was aimed at analysing the above effect in terms of increasing plant resistant once, suppression of inoculum build up and sustaining health/growth and yield. These were mediated in a trial through microplot studies and study of various disease aspects and yield parameters/plant performance.

MATERIALS AND METHODS

Experiments were conducted in the Plant Virology Laboratory, cagehouse, glasshouse and microplots of Plant Pathology Department, College of Agriculture, JNKVV, Jabalpur (M.P.). Election microscopy was done in Advance Centre for Plant Virology, IARI, New Delhi. Study on inoculum reduction and factors indicating host resistance against chlorotic mottle (geminivirus) disease in Frenchbean was done. Experiment was conducted in microplot in the cagehouse in *kharif* and *rabi* seasons of year 2002-2003 using Frenchbean cultivar, Contender. Micronutrients (in the form of chemical compounds) were taken alongwith the application of systemic insecticides (Metasystox and Carbofuran) for vector control. Application of sulphur, metasystox, zinc sulphate, ferrous sulphate, carbofuran and manganese sulphate was done. Micronutrients as soil application were applied at once before sowing of seeds and followed by spray application twice at 15 and 30 days after germinaion of seeds. Four replications were made. Routine seed treatment with fungicides, thiram (3g/kg) and bavistin (1.5 g/kg) along with Rhizobium culture was followed. The plants in pots with severe symptoms of chlorotic mottle (geminivirus) disease were kept in between the replications for natural inoculation. Observations were recorded as appearence of disease at days after sowing, plant vigour (plant vigour was calculated by indirect method with the help of disease index), disease index (calculated from five rendom plants), stress tolerence index (STI) and yield per plant and yield per plot. Data were used for computation of various parameters using the following formula:-

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

$$\text{Stress tolerance index(STI)} = \frac{\text{Yield of healthy plant xYield of disease plants}}{(\text{mean yield of healthy plant})^2}$$

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.

RESULTS AND DISCUSSION

It is evident from the date present in the Table 1 that