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Contact Fungicides and Biological Equilibrium of Soil

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Abstract : Fungicides are one of the essential inputs in the improved technology for increasing crop production through crop protection. Contact fungicides Blitox and Fungimar are used widely as foliar sprays for control of many plant diseases . As major portion of fungicides applied to economically important crops eventually finds its way to soil, may disrupt the activities of microorganisms in the soil and thereby altering the biological equilibrium of soil . It is therefore planned to study the biological health of the soil with the help of viable counts of nine strains of *R. japonicum* after 21, 30 & 45 days intervals at 100 to 500 ppm concentrations of the two Contact Fungicides. Results reveal that Blitox is more compatible than Fungimar to *R. japonicum.*

Key words : Blitox, Fungimar *R. japonicum*, Fungicides, Viable counts.

Introduction :

With the advent of high yielding crop varieties, the pest problems have become more acute, adversely affecting the crop yields. Fungicides are therefore, one of the major inputs in the improved technology for increasing crop production through crop protection, (Dharival and Singh, 1993). A major portion of fungicides applied to economically important crops eventually finds its way to soil or aquatic system. On reaching the soil, the fungicides and/or their degradation products may disrupt the activities of the microorganisms in the soil and thereby alter its biological equilibrium with eventual repercussions on soil health, leading to agro-ecological problems of great concern.

As contact fungicides are widely used for the control of many vegetables, fruits and flowering plant diseases; hence the present study was planned.

Material Methods :

Black cotton soil samples were collected and sterilized in an autoclave for three consecutive days at 121° C for two hours per day.

Five days old cultures of *Bradyrhizobium japonicum* having 10^8 cells/ml were added to soil in the ratio of 10 ml of both culture in 100 gms of soil. Calculated quantities of fungicide solution were added to maintain the concentration of 100, 200, 300, 400, and 500 ppm. The contents were mixed thoroughly and packed in low density polythene bags of 200 gauge sealed by electric sealer and kept for 21, 30, and 45 days at 28 ± 2° C. After completion of desired incubation period, soil samples were withdrawn and used for colony counting with the help of colony counter.

Results and Discussion :

The survival studies of isolates of *R.japonicum* in contact with Contact

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Fungicides (Blitox and Fungimar) reveal that they show a decrease on increasing the concentration of fungicides from 100 to 500 ppm and also on increasing the time of contact from 21 to 45 days.

At 100 ppm concentration of Blitox fungicides viable counts decrease from 56×10^5 to 23×10^5, at 200 ppm concentration 56×10^5 to 15×10^4, at 300 ppm concentration 46×10^5 to 93×10^4, at 400 ppm concentration from 35×10^5 to 76×10^4 and at 500 ppm concentration 26×10^5 to 53×10^4 .

Observations with Fungimar Fungicide viable counts decrease from 39×10^5 to 9×10^5 at 100 ppm, from 29×10^5 to 68×10^4 at 200 ppm, from 15×10^5 to 35×10^4 at 300 ppm, from 9×10^5 to 26×10^4 at 400 ppm, from 93×10^4 to 15×10^3 at 500 ppm concentration. Observations suggest that Blitox is more compatible than Fungimar to *R. Japonicum*. Fungitoxic component of Contact Fungicides is the cupric ion for which little biochemical specificity exists. The strong inhibitory action of Fungimar in comparison to Blitox is attributed to its strong bonding affinity to amino and carboxylic groups. It reacts with protein and acts as an enzyme inhibitor (Agrochemical Handbook, 1987). Among the strains CH-1, CH-2, CH-6 and CH-7C were observed to give higher counts suggesting better quality strains than others. There is not much difference in the viable counts of organism in the fungicide treated soils and untreated control therefore fungicide treatment can safely be used as a routine.

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