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Toxic effects of Cypermethrin

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Abstract : Cypermethrin is one among the other important synthetic pyrethorids. It is largely used as a pesticide for vegetable crops. This compound has proved to be remarkably toxic to pests with a relatively low toxicity. The studies on phytotoxicity of pesticides are lacking and therefore, in the present work, the studies on toxic effects of eypermethrin (a pyrethmid) on tomato plant have been carried out.

(Key words : Cypermethrin. Pyrethroieds Ibmigants. Pesticides. Phytotoxicity, seedlings)

Introduction

Variability in performance of pesticides is often encountered. Although binding of the chemical within plants occurs, herbicidal uptake from soil is passive rather than an active process. Furthermore, there is no rigorous proof that a particular plant species have an inherently goat capacity to accumulate the pesticide from the soil solution[1].

In vegetable crops, spraying and soil application of herbicide/pesticides must be carefully timed, because if carried out too early there is a danger of phytotoxic damage to the plants, and if it is too late tainting may occur.

Martin *et al*.[2], Singhal and Singh[3] and Edmunds4 have observed the effects of fumigants on the growth and chemical composition of plants and phytotoxicity symptoms on banana.

Keeping in view, a green-house study was conducted to investigate the effect of various concentration of cypermethrin on the growth of tomato plant with or without fertilizers.

Experimental

The experiment comprising of four levels (control without cypermethrin, 25 mg, 50 mg and 100 mg) of cypermethrin with or without fertilizers were conducted in posts. The soil used in incubation study was filled in earthenware pots of 5 kg capacity. Cypermethrin treatments were applied in the form of suspension before on week of transplanting tomato seedlings, a basal does of N, P and K obtained from ammonium sulphate. Superphosphate and muriate of potash respectively @ 200, 120 and 120 kg/hac. At approximate moisture level, the tomato seedlings were transplanted in each pot, these establishment of seedlings, the things of plants was done leaving only one healthy plant in each pot.

Results and Discussion

Visual observations of toxicity symptoms

The visual symptoms appearing on the leaves of the plants were carefully studied. The pattern of 'toxicity symptoms' observed on tomato plants. The toxicity effects of cypermethrin on plants with and without fertilizers, the growth of (root and shoot) plants grown in soil under the influence of cypermethrin and fertilizers. The comparative growth of plants in soil under the influence of cypennethrin with or without fertilizer has been represented in plants.

The toxic symptoms of cypermethrin started appearing first on the plant in the 100-mg treatment. The symptoms were very severe under all the treatments at later stage (one and a half month after transplanting) of growth.

Most important symptoms were yellowing of the leaflets of lower leaves. The tips of the leaves were affected first. This proceeded downwards through leaf margin. All the leaflets were almost equally affected. The roots were severely affected in soil treated with higher doses of cypermethrin. The number and growth of lateral roots were drastically reduced as compared to roots of plants growing in untreated soil. The plants were stunted and bushy with few small thinly branched leaves' supporting small chlorotic leaflets. The symptoms started from higher concentration first. But after few intervals, severity of toxicity reached the same as in 100 and 50 mg of cypermethrin treatments with fertilizer.

The young seedlings at 100 and 50 mg cypermethrin were short and yellow. The injury symptoms appeared earlier in the highest concentration of cypermethrin (100mg) within a week of appearance of yellowing in the leaves. All the leaves except youngest were affected and by this time, older leaves were sufficiently covered with yellow spots. The severity of cypermethrin toxicity decreased with the decrease in its levels. No usual symptoms at the stage were, however, observed in the leaves grown in 25 mg cypermethrin level. The severity of symptoms was also reduced with the application of fertilizer under all the cypermethrin levels.

The drying of tomato plants in the higher concentration of cypermethrin is probably due to the distrurbances of the physiological activities of the plants. Some of the pesticides affect the biosynthesis of carotenoids or cause the destruction of pigments and lipids[5] inhibit phosphorylation[6] or act as an electron transport inhibitors by direct interference with the photosynthetic electron flow[7]. Some plant species may accumulate large quantities of herbicides because of their patterns of root distribution, or their greater transpiration rate. According to Gray[8] and, Weicrich the extent to which root or shoot or both arc involved in pesticidal uptake and action depends on many factors such as concentration, duration of exposure, depth of seed placement and the vertical measurement of the treated layer as well as the particular pesticide and plant species involved.

Mineral nutrients act indirectly by regulating the rate of root and shoot grow which in turn regulate tolerance and rate of accumulation.

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