

Bio-efficacy of botanicals, microbials and newer insecticides in the management of tomato leafminer, *Liriomyza trifolii* burgess

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ABSTRACT

Studies on the effect of botanicals, microbials and newer insecticides along with conventional insecticides against tomato leafminer were conducted at Experimental Farm of Department of Entomology, Dr.PDKV, Akola during *Kharif* season of 2002-03. Abamectin 0.002% was found to be the most effective treatment in reducing leafminer infestation (13.61 & 16.50%) at five and seven days after spraying (DAS) followed by cypermethrin 0.01%. But significantly the lowest number of mines per leaf was noticed in cypermethrin 0.01% (1.62) at 5 DAS and in abamectin 0.002% (1.89) at 7 DAS. The NSKE 5%, spinosad 0.0015%, neem oil 1% and endosulfan 0.05% were the next best treatments with minimum infestation and lower number of mines per leaf. The *Btk* @ 1.5ml/lit. and newer molecules, thiamethoxam and imidacloprid each at 0.01% were least effective against this pest. The maximum fruit yield (26.25 t/ha) was recorded in abamectin, which increased yield 115.87 per cent than control and at par with spinosad (24.60 t/ha) and scheduled application of endosulfan 0.05% before flower initiation and HaNPV@250 LE/ha during flowering phase of the crop (24.30 t/ha). The highest Incremental Cost Benefit Ratio (ICBR) of 1:23.71 was obtained from endosulfan 0.05% and closely followed by cypermethrin 0.01% (1:21.03) and NSKE 5% (1:20.30). The lowest ICBR was recorded in abamectin (1:0.78). The higher cost of insecticides reduced its ICBR, though it produced highest yield.

Key words : Tomato, *Liriomyza trifolii*, NSKE, Neem oil, Abamectin, Spinosad, Imidacloprid, Thiamethoxam, Endosulfan

INTRODUCTION

Tomato (*Lycopersicon esculentum* Mill.) in one of the most popular and remunerative vegetable crops grown world over and particularly round the year in India for its fleshy delicious fruits. Among the several problems that created obstacles for tomato productivity and quality fruits are heavy losses caused by insect pests. Among them, American serpentine leafminer, *Liriomyza trifolii* Burgess (Diptera: Agromyzidae), a notorious polyphagous pest has recently attained a serious pest status on tomato. Its severe infestation starting from nursery and continue till fruiting stage resulting into severe yield loss. In tomato, the damage caused by this pest has been reported to 30 to 40 per cent (Anon., 1995). Its extensive leaf mining activity reduces the photosynthetic rate to about 62 per cent within mined tissues as compared with unmined leaves, leads to adverse effects on young shoot growth and fruit formation which ultimately reduce the yield (Johnson *et al.*, 1983). Management of this pest becomes very difficult due to internal mining activity of larvae within the leaf. By and large insecticides are used for the control of this problematic pest; however it is necessary to have ecofriendly insecticides of various mode of action to replace the older one. Hence an endeavour has been made to evaluate the efficacy of various ecofriendly insecticides against tomato leafminer.

MATERIALS AND METHODS

The field experiment was conducted at the Experimental Farm of Department of Entomology, Dr. PDKV, Akola during *kharif* 2002-03. This experiment was laid out in Randomized Block Design (RBD) with 12 treatments (Table 1) including untreated control and replicated thrice.

The healthy Pusa Ruby seedlings of about 30 days old having uniform size were transplanted on hills marked

at 60x60 cm in each plot having the size of 3.6x6.0 m. All the agronomic practices as per recommendations were timely followed. Totally five rounds of insecticidal sprays were given at fortnight interval commencing from one month after transplantation.

Five plants were randomly selected in each treatment plot and total number of leaves and infested leaves due to leafminer were counted and the percentage of leafminer infestation was worked out at five and seven days after each spraying. The number of mines or galleries per leaf was also counted in each of available infested leaves restricted to maximum of 25 in each treatment plot at five and seven days after spraying (DAS). The marketable ripened tomato fruits were picked periodically and yield obtained in net plot of each treatment was recorded to compare the responses of different treatments on fruit yield. The income received from the sale of tomato fruits, cost of insecticides and labours cost were used to calculate the Incremental Cost Benefit Ratio (ICBR) to know the economic viability of each treatment. All the cumulative data were statistically analyzed after appropriate transformation (Gomez and Gomez, 1984).

RESULTS AND DISCUSSION

The observation on percentage leafminer infestation and number of mines per leaf (Table 1) indicated that the lowest leaf infestation (13.61 & 16.50%) was recorded in abamectin 0.002% at 5 and 7 DAS, it was closely followed by cypermethrin 0.01% on both days of observation. The other effective treatments in the order of merit were $T_1 > T_2 > T_4 > T_9 > T_3$ and were at par with previous treatment at 5 DAS, whereas this order was slightly changed at 7DAS.

It is evident from the data that the lowest number of mines was recorded in cypermethrin 0.01% (1.62) followed

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