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# POPULATION DYNAMICS AND BIOEFICACY OF NEWER INSECTICIDE AGAINST CHILLI THRIPS, *SCIRTOTHRIPS DORSALIS* (HOOD)

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**ABSTRACT**

**The studies on population dynamics and bioefficacy of newer insecticide against chilli thrips, *Scirtothrips dorsalis* (Hood) was conducted at Vegetable Research Station, MAU, Parbhani during *kharif* 2002-03. The incidence of thrips was highest during 40th meteorological week when the prevailing maximum-minimum temperatures, morning-evening relative humidities, rainfall and bright sunshine hours were 35.8°C, 18.0°C, 76%, 34%, 0.00 mm and 11 hrs., respectively. Thrips population exhibited significant negative correlation with evening relative humidity and rainfall and positive correlation with bright sunshine hours. Regression equations worked out indicated that the population decreased by 0.03, 0.04 and increased by 0.303 per unit of evening relative humidity, rainfall and bright sunshine hours, respectively. Application of phosphamidon 40% + imidacloprid 2% SP @ 700 g/ha was most effective for suppression of thrips population and also increased the yield of green chilli.**

**Key words :** Chilli, population dynamics, bioefficacy, *Scirtothrips dorsalis*, insecticide



Chilli *(Capsicum annum* L.) is an important spice cum vegetable crop commonly used in Indian dietary and grown throughout the year. It ravaged by a number of insect and mite pests causing considerable loss in yields. Chilli thrips, *Scirtothrips dorsalis* (Hood) is the most important pest and under severe infestation 30 to 50% crop may be lost (Kandasamy *et al.*, 1990). Besides damage, this thrips is transmitting leaf curl disease. The study on population dynamics of chilli thrips would give an idea about peak period of their activity which may be helpful in developing pest management strategy. Phosphomidon 40% + imidacloprid 2% SP being new insecticide was taken for the studies.

## MATERIALS AND METHODS

The experiments were conducted in *kharif,* 2002-03 at Vegetable Research Station, Marathwada Agricultural University, Parbhani to study the population dynamics of thrips in a four quadrates of 5 m x 5 m maintained without any plant protection measures. The experiment on bioefficacy of newer insecticide was laid out in randomized block design with 7 treatments, replicated three times. The gross plot size was 4.2 m x 2.7 m and the net plot size was 3.0 x 1.8m. The experimental land was ploughed once and harrowed twice before transplanting. The seedlings of variety Pusa Jawala were sown on 6-7-2002 and grown on raised beds and transplanted after 45 days in laid out fields at the spacing of 45 cm x 60 cm following agronomic practices.

Thrips population was recorded from appearance of incidence (27-8-2002) upto the final harvest of crop at seven days interval in order to study the population dynamics. The observations were recorded from top, middle and bottom leaves from 5 plants selected at random. The data were analysed by working out analysis of variance and correlation regression analysis as per Panse and Sukhatme (1967). Observations on the bioefficacy of newer insecticide were recorded on number of thrips at 2,7,14 and 21 days after spraying on 3 leaves of 5 plants per plot. A Total of three round of sprays were applied. The pre count observation were recorded on 14-9-2002. The data were transformed by using poison formula and then subjected to statistical analysis for interpreting the results. For recording yield, green chillies were harvested and weighed separately from the each net plot.

## RESULTS AND DISCUSSION

### a) Population dynamics of chilli thrips *S. dorsalis*

The incidence of thrips commenced seven days after transplanting (35th meteorological week) reaching its peak (5.45 thrips/3 leaves) during 40th meteorological week when the prevailing maximum-minimum temperatures, morning-evening relative humidities, rainfall and bright sunshine hours were 35.8°C, 18.0°C, 76%, 34%, 0.00 mm and 11 hours, respectively (Table 1).

Table 1. Weather parameters and incidence of thrips, *S. dorsalis* on chilli during 2002-03

| Sr. No. | Meteoro-logical week | Duration | Temperature °C | | Relative humidity (%) | | Rain fall (mm) | Bright sunshine hours | Thrips population/ three leaves |
|---|---|---|---|---|---|---|---|---|---|
| | | | Max. | Min. | Morning | Evening | | | |
| 1 | 34 | 20.8.02 to 26.8.02 | 27.7 | 21.6 | 90 | 77 | 112.4 | 0.7 | 0.00 |
| 2 | 35 | 27.8.02 to 2.9.02 | 29.0 | 21.9 | 89 | 74 | 58.2 | 5.3 | 1.25 |
| 3 | 36 | 3.9.02 to 9.9.02 | 28.7 | 21.2 | 86 | 72 | 68.4 | 5.1 | 0.70 |
| 4 | 37 | 10.9.02 to 16.9.02 | 31.8 | 20.3 | 87 | 53 | 3.2 | 9.6 | 2.50 |
| 5 | 38 | 17.9.02 to 23.9.02 | 32.1 | 21.1 | 85 | 55 | 8.4 | 7.3 | 4.00 |
| 6 | 39 | 24.9.02 to 30.9.02 | 34.1 | 21.1 | 79 | 43 | 0.0 | 9.6 | 4.80 |
| 7 | 40 | 1.10.02 to 7.10.02 | 35.8 | 18.0 | 76 | 34 | 0.0 | 11.0 | 5.45 |
| 8 | 41 | 8.10.02to 14.10.02 | 33.5 | 20.6 | 75 | 45 | 0.0 | 7.8 | 4.40 |
| 9 | 42 | 15. 10.02 to 21. 10.02 | 31.8 | 19.9 | 89 | 50 | 0.0 | 6.9 | 3.85 |
| 10 | 43 | 22.10.02 to 28. 10.02 | 33.3 | 14.4 | 73 | 26 | 0.0 | 10.9 | 4.35 |
| 11 | 44 | 29.10.02 to 4.11.02 | 32.4 | 11.5 | 71 | 27 | 0.0 | 10.6 | 4.20 |
| 12 | 45 | 5. 11.02 to 11.11.02 | 32.1 | 14.1 | 74 | 33 | 0.0 | 10.2 | 4.10 |
| 13 | 46 | 12. 11.02 to 18.11.02 | 30.7 | 13.3 | 76 | 37 | 0.0 | 9.2 | 3.45 |
| 14 | 47 | 19.11.02 to 25. 11.02 | 31.2 | 9.1 | 79 | 26 | 0.0 | 10.9 | 3.60 |
| 15 | 48 | 26. 11. 02 to 2. 12.02 | 32.7 | 11.3 | 73 | 37 | 0.0 | 10.8 | 4.30 |
| 16 | 49 | 3. 12.02 to 9.12.02 | 31.4 | 12.1 | 76 | 28 | 0.0 | 10.2 | 3.75 |
| 17 | 50 | 10.12.02 to 16.12.02 | 31.5 | 10.6 | 78 | 24 | 0.0 | 10.2 | 3.80 |
| 18 | 51 | 17. 12.02 to 23. 12.02 | 31.7 | 11.2 | 79 | 23 | 0.0 | 10.3 | 4.00 |
| 19 | 52 | 24.12.02 to 31. 12.02 | 30.8 | 10.8 | 77 | 23 | 0.0 | 10.5 | 3.50 |

The thrips population exhibited significant negative correlation with evening relative humidity (r = -0.550) and rainfall (r = -0.843). The population showed positive correlation (r = 0.631) with bright sunshine hours. The population did not show any significant correlation with maximum-minimum temperatures and morning relative humidity. Similar observations were also reported by other workers (Lingeri *et al.*, 1998 and Panickar and Patel, 2001). The regression equations worked out for evening relative humidity, rainfall and bright sunshine hours were y = 4.936-0.035x, y = 3.989-0.048x and y = 0.921+0.303x indicating decrease of 0.035, 0.048 and increase of 0.303 per unit increase of above parameters (Table 2).

**b) Bioefficacy of newer insecticide against chilli thrips *S. dorsalis***

It is evident from data in Table 3 that the pre count of thrips was non-significant showing even distribution of thrips before spraying. On second day of observation, all the insecticidal treatments were significantly superior over untreated check. The treatment of phosphamidon 40% + imidacloprid 2% SP @ 700 g/ha was most effective, followed by its lower

Table 2. Correlation and regression coefficient between weather parameters and population of chilli thrips, *S. dorsalis* during 2002-03

| Sl.No | Pest population vs | Thrips | | |
|---|---|---|---|---|
| | | 'r' | 'b' | 'a' |
| 1 | Maximum temperature | 0.342 | 0.056 | 1.906 |
| 2 | Minimum temperature | -0.178 | -0.037 | 4.196 |
| 3 | Morning RH | -0.065 | -0.004 | 3.936 |
| 4 | Evening RH | -0.550* | -0.035 | 4.936 |
| 5 | Rainfall | -0.843* | -0.048 | 3.989 |
| 6 | Bright sunshine | 0.631 | 0.303 | 0.921 |

• Significant at 5%



dosage 500 & 600g/ha. The untreated check recorded maximum thrips population. It is evident from the that on 14th day, minimum thrips population was recorded in phosphamidon 40% + imidacloprid 2% SP @ 700 g/ha. However, it was at par with phosphamidon 40% + imidacloprid 2% SP @ 600 and 500 g/ha and imidacloprid 17.8 SL @ 112 ml/ha. The maximum thrips population was recorded in untreated check. On 21st day of observation, treatment with phosphamidon 40% + imidacloprid 2% @ 700 g/ha recorded minimum thrips

Table 3. Bioefficacy of newer insecticide against *S. dorsalis* on chilli

| Sr. No. | Treatments | Dose ha (g or ml) | Av. number of thrips per three leaves | | | | | Yield of green chilli (q/ha) |
|---|---|---|---|---|---|---|---|---|
| | | | Pre count | Days after spraying | | | | |
| | | | | 2 | 7 | 14 | 21 | |
| 1 | Phosphamidon 40% | 500 | 4.06 | 0.84 | 1.06 | 1.44 | 1.97 | 37.30 |
| | +Imidacloprid 2% SP | | (2.13) | (1.15) | (1.24) | (1.38) | (1.55) | |
| 2 | Phosphamidon 40% | 600 | 4.00 | 0.53 | 0.93 | 1.24 | 1.73 | 41.26 |
| | +Imidacloprid 2% SP | | (2.12) | (1.00) | (1.18) | (1.31) | (1.45) | |
| 3 | Phosphamidon 40% | 700 | 4.06 | 0.13 | 0.62 | 1.01 | 1.50 | 43.52 |
| | +Imidacloprid 2% SP | | (2.13) | (0.78) | (1.03) | (1.22) | (1.38) | |
| 4 | Phosphamidon 40% | 1200 | 4.26 | 1.08 | 1.44 | 1.88 | 2.44 | 34.92 |
| | +Imidacloprid 2% SP | | (2.18) | (1.25) | (1.38) | (1.54) | (1.71) | |
| 5 | Phosphamidon 40 SL | 625 | 3.93 | 1.28 | 1.75 | 2.15 | 2.86 | 30.59 |
| | | | (2.10) | (1.32) | (1.49) | (1.62) | (1.82) | |
| 6 | Imidacloprid 17.8SL | 112 | 4.00 | 0.95 | 1.15 | 1.73 | 2.33 | 35.71 |
| | | | (2.12) | (1.20) | (1.28) | (1.48) | (1.65) | |
| 7 | Untreated control | | 4.13 | 4.91 | 5.10 | 5.19 | 5.33 | 26.57 |
| | | | (2.15) | (2.31) | (2.31) | (2.38) | (2.41) | |
| | SEm± | | 0.05 | 0.04 | 0.05 | 0.04 | 0.04 | 2.46 |
| | CD at 5% | | N.S. | 0.15 | 0.17 | 0.13 | 0.13 | 7.58 |

*Figures in parentheses are value $\sqrt{x + 0.5}$

population. However, it was at par with phosphamidon 40% + imidacloprid 2% SP @ 600 g/ha, 500 g/ha, 1200 g/ha and imidacloprid 17.8 SL @ 112 ml/ha. The treatment of phosphamidon 40 SL @ 625 ml/ha was at par with untreated check.

Yield of green chilli presented in Table 3 revealed that maximum yield (43.52 q/ha) was recorded in phosphamidon 40% + imidacloprid 2% SP @ 700 g/ha, however, it was at par with its lower dosages 600 g/ha and 500 g/ha (41.26 q/ha and 37.30 q/ha, respectively). The untreated check recorded the lowest yield of green chilli (26.57 q/ha.).

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