

To assess the impact of insecticidal spray on leaf curling caused due to sucking pest and phytotoxic effect of higher doses of insecticides in chilli

ABSTRACT-

The investigation was carried out at Samajik Vigyan Kendra, Dr. B.R. Ambedkar University, Bordi, Sehore (M.P.)-INDIA during kharif 2018-19. To assess the impact of insecticidal spray on leaf curling caused due to sucking pest and phytotoxic effect of higher doses of insecticides in chilli. The bio-efficacy of three different insecticides, namely (i) Chlorfenapyr 240 SC - spray four times with different-different doses, (ii) Fipronil 5% SC and (iii) Imidacloprid 17.8 SL. One untreated plot was also used to investigate against leaf curl and phytotoxic effect on chilli. Among these insecticides, Chlorfenapyr 240SC doses 288 g.a.i/ha (gram active ingredient per hectare) has least leaf curl indications (9.68%). It's most effective insecticide in chilli. The least impact of leaf curl recorded in treatment T4- (9.68%) followed by T3- chlorfenapyr (11.88%), T5- Fipronil 5% SC (14.46%), T6- Imidacloprid (16.68%), T2- chlorfenapyr (17.69%) and the most elevated twisting in T7- untreated control (56.29). Further, the phytotoxic effect of treatment T1 - chlorfenapyr and T2 - chlorfenapyr were connected contrasting and T3 - untreated control. In these treated portions no phytotoxic impact like chlorosis, Epinasty, Necrosis, Scorching, wilting and hyponasty were seen at various interim of perceptions against Chilli crop. The chilli yield was also noted highest in highest dose of T4 (16.0 tonnes ha⁻¹) followed by second highest dose of T3 (15.4 tonnes ha⁻¹), however, it was recorded lowest in untreated control (8.0 tonnes ha⁻¹). The C:B benefit ratio was noted higher in T5- fipronil 5% SC@ 10 g.a.i ha⁻¹ (3.20) followed by T6- imidacloprid 17.8 SL @ 50 g.a.i ha⁻¹ (2.99).

Keywords: Chilli, Leaf curling, Phytotoxic effect, Hybrid, Bio-efficacy

INTRODUCTION-

The chilli is a fruit of plants belongs to the family of "Solanaceae" and genus of "Capsicum". The chilli is also being termed as "Chili Pepper" in many parts of world. Chilli is one of the most important and the largest produced spice crop in Asia. The fruit is actually called "chilli". Chilli have been a part of the human diet in the Americas since at least 7500 BC. There is archaeological evidence at sites located in a tropical lowland area of southwestern Ecuador that chili peppers were domesticated more than 6000 years ago, the chilli grains show that peppers were among the oldest domesticated foods in the hemisphere and is one of the first cultivated crops in the Central and South Americas. India is the world leader in chilli production followed by China and Pakistan. A large demand for chilli comes from several chilli- consuming countries such as India, China, Mexico, Thailand, USA, UK, Germany and Sweden. . The crop has got great export potential besides huge domestic requirement but a number of limiting factors have been attributed for low productivity. The pest spectrum of chilli crop is complex with more than 293 insects and mite species debilitating the crop in the field as well as in storage (Dey *et al.* 2001). One of the practical means of increasing chilli production is to minimize losses caused

by major sucking pests like mites and thrips (Berke and Sheih, 2000). Economic yield loss due to these pests may be 11-75% quantitatively and 60-80% qualitatively in the event of serious infestation.

MATERIALS AND METHODS-

Investigation on field evaluation of impact of insecticidal spray on leaf curling caused due to sucking pest and phytotoxic effect of higher doses of chlorfenapyr 240SC on chilli. Infesting chilli was carried out in kharif period of 2018-19 at Samajik Vigyan Kendra DR. B.R. Ambedkar University, Bordi Sehore (M.P.) . The experiment was laid out in a Randomized Block Design with three replication having the plot size of 198.45 m². For the purpose Chilli Hybrid F1 variety NHC-886 (Priya) was raised at 45 X 45 cm spacing. All the Recommended agronomical practices except plant protection were followed for raising the crop. First spray application of respective insecticides was given on the appearance of the pests and subsequently two sprays were given using manually operated knapsack sprayer having nozzle with slight moister stage. The observation on the impact of insecticidal spray on leaf curling caused due to sucking pest (Mites and Thrips) and phytotoxic effect were recorded by selecting five plants randomly from net plot area of each plot and tagged. From five leaves of tagged plants. and note-down impact of insecticidal spray and phytotoxic effect after each spray with different-different day. The yield of chilli natural products got from various treatment kg/ plot recorded aimed every picking the yield information acquired were changed over into per ha. Yield and exposed to factual investigation.

Treatments Details-

| S. No. | Treatment Details | Dose/hac | | |
|--------|------------------------|----------|------------------------|--------------------|
| | | a.i | Formulations (mi or g) | Water volume (lit) |
| 1 | T1-Chlorfenapyr 240SC | 144 | 600 | 500 |
| 2 | T2-Chlorfenapyr 240SC | 192 | 800 | 500 |
| 3 | T3-Chlorfenapyr 240SC | 240 | 1000 | 500 |
| 4 | T4-Chlorfenapyr 240SC | 288 | 1200 | 500 |
| 5 | T5-Fipronil 5% SC | 10 | 200 | 500 |
| 6 | T6-Imidacloprid 17.8SL | 50 | 250 | 500 |
| 7 | T7-Untreated control | - | - | - |

Treatments for Phytotoxicity observation-

| Tr No | Treatment details | Does/ha | | |
|-------|--------------------|---------|-----------------|-----------------|
| | | g.a.i. | Formulation(ml) | water volum (L) |
| T1 | Chlorfenapyr 240SC | 240 | 1000 | 500 |
| T2 | Chlorfenapyr 240SC | 480 | 2000 | 500 |
| T3 | Untreated control | | | |

RESULTS AND DISCUSSION-

Insecticidal spray effect on leaf curling-

The results presented in (Table 1) revealed that all spray schedules were significantly superior in reducing the leaf curl disease at 30, 50 and 70 days after sowing. The minimum leaf curl was observed in Following ten days of first spray the leaf curling was fundamentally most important in untreated control (44.68%). It was least in T4-chlorofenapyr (21.67%) and at standard with T3-chlorofenapyr (24.15%) trailed by T5-Fipronil 5% SC (28.55%), T6-Profenophos (29.89%), T2-chlorofenapyr (30.39%) and T1-chlorofenapyr (32.08%).

In second spray the most elevated leaf curling was noted in T7-51.49% was essentially high over every one of treatment. leaf curling was seen in T4-chlorofenapyr-17.26%, which demonstrated important distinction plus T3-chlorofenapyr (18.77%) trailed by T5-Fipronil 5% SC (21.56%), T6-Imidacloprid (23.69%), T2-chlorofenapyr (25.48%) and T1-chlorofenapyr (27.63%).

In third spray T4-chlorofenapyr demonstrated best with least leaf curling side effects (9.68%) which was at standard with T3-chlorofenapyr (11.88%) trailed by T5-Fipronil 5% SC (14.46%), T6-Imidacloprid (16.68%), T2-chlorofenapyr (17.69%) and T1-chlorofenapyr (19.48%). The most elevated curling was recorded in T7-56.29. Hossain et. al. (2016) reported that spraying of chlorphenapyr (Intrepid 10SC) @ 1ml/litre of water + white sticky trap @ 40 traps/ha resulted negative correlation of thrips and mite population with Chlorophyll Concentration Index of leaf. However, the lowest percentage of upward (19.05%) and downward leaf curl (21.08%) was also obtained from chlorphenapyr + white sticky trap treated plot. Pandey et. al. (2010) studied the management of chilli leaf curl disease management by insecticides, imidacloprid 17.8 SL (0.003%) was most effective than spinosad 48 EC (0.02%), malathion 50 EC (0.05%), acephate 75 SP (0.1%) and methyl-demeton 25EC (0.025%). Management of chilli leaf curl was done by seed extract of plants and insecticides at different concentrations. These findings are in support of present study.

Table 1-Insecticidal spray effect on leaf curling-

| Treatments | Dose/ha | Pre - treatment Count | Per cent leaf curling | | |
|--------------------------------------|---------|-----------------------|---------------------------------|---------------------------------|---------------------------------|
| | | | After Spray | | |
| | | | 1 st Spray 10 DAS | 2 nd Spray 10 DAS | 3 rd Spray 10 DAS |
| T ₁ .Chlorfenapyr 240 | 144 | 39.69 (39.02) | 32.08 (34.48) | 27.63 (31.71) | 19.48 (26.16) |
| T ₂ .Chlorfenapyr 240 | 192 | 41.09 (39.84) | 30.39 (33.43) | 25.48 (30.32) | 17.69 (24.86) |
| T ₃ .Chlorfenapyr 240 | 240 | 36.8 (37.38) | 24.15 (29.39) | 18.77 (25.51) | 11.88 (20.03) |
| T ₄ .Chlorfenapyr 240 | 288 | 35.58 (36.47) | 21.67 (27.63) | 16.26 (23.47) | 9.68 (17.57) |
| T ₅ . Fipronil 5% SC | 10 | 33.76 (39.1) | 28.55 (32.57) | 21.56 (27.61) | 14.46 (22.34) |
| T ₆ . Imidacloprid 17.8SL | 50 | 40.08 (39.25) | 29.89 (33.12) | 23.69 (29.07) | 16.68 (23.99) |
| T ₇ .Uncontrol | ---- | 41.69 (40.2) | 44.68 (41.9) | 51.49 (45.81) | 56.29 (48.6) |
| S Em± | | 1.58 | 1.05 | 1.33 | 1.37 |
| CD at 5 % (p=0.05) | | NS | 3.21 | 4.09 | 4.21 |
| CV % | | 7.03 | 5.44 | 7.52 | 9.01 |

The values in parentheses are angular transformed (arc sin) values

DAS- Days After Spray

Phytotoxic effect-

In present investigation (Table 2) the higher portion as treatment T₁ - chlorfenapyr and T₂ - chlorfenapyr were connected contrasting and T₃ - untreated control. In these tried portions no phytotoxic impact likes Chlorosis, rot, Necrosis, hyponasty, Scorching, Wilting and epinasty were seen at various interim of perceptions against Chilli crop. Sontakke et. al. (2007) reported that chlorfenapyr 240SC in chilli showed no any phytotoxic effect on plants. Sarkar and Samanta. (2010) stated that chlorfenapyr did not produce any phytotoxic symptoms in chilli.

(Table 2) Phytotoxic effect of higher doses of chlorfenapyr 240SC in chilli

| Treatment | Dose g.a.i./hac | Chlorosis | Necrosis | Wilting | Scorching | Hyponasty | Epinasty |
|-------------------------|-----------------|-----------|----------|---------|-----------|-----------|----------|
| T1- Chlorfenapyr 240 SC | 240 | 0 | 0 | 0 | 0 | 0 | 0 |
| T2- Chlorfenapyr 240 SC | 480 | 0 | 0 | 0 | 0 | 0 | 0 |
| T3- Untreated Check | . | 0 | 0 | 0 | 0 | 0 | 0 |

CONCLUSION-

Treatment T4- chlorfenapyr 240SC @288 proved, the most effective with least leaf curling symptoms--9.68% which at par with T3- chlorfenapyr 240SC @240 (11.88%) followed by T5- Fipronil 5% SC @10 (14.46%) and The maximum leaf curling was noted in T7-Untreated control (56.29%) and no phytotoxic effect of higher does of chlorfenapyr 240SC on chilli.

DISCLAIMER:

Authors have declared that no competing interests exist.

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