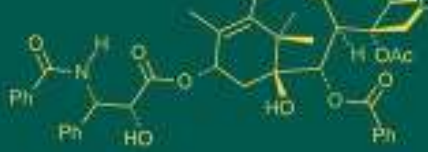
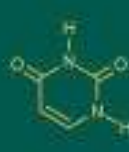
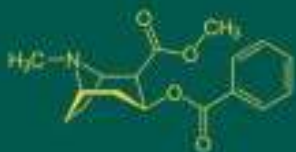


International Journal of Advanced Biochemistry Research



ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2026): 5.29
IJABR 2026; 10(4): 373-381
www.biochemjournal.com
Received: 25-02-2026
Accepted: 29-03-2026

SD Wale

Assistant Maize Entomologist,
AICRP on Maize, Kolhapur,
Maharashtra, India

VN Jalgaonkar

Deputy Director of Research
(Agriculture), Dr. B.S.K.K.V.,
Dapoli, Maharashtra, India

PB Sanap

Director, Extension Education
and Resource Development,
MCAER, Pune, Maharashtra,
India

RS Mule

Assistant Professor,
Department of Agricultural
Entomology, College of
Agriculture, Dr. B.S.K.K.V.,
Dapoli, Maharashtra, India

MC Kasture

Professor and Head,
Department of Soil Science and
Agricultural Chemistry,
College of Agriculture, Dr.
B.S.K.K.V., Dapoli,
Maharashtra, India

Corresponding Author:**SD Wale**

Assistant Maize Entomologist,
AICRP on Maize, Kolhapur,
Maharashtra, India

Efficacy of novel insecticides against thrips infesting chilli

SD Wale, VN Jalgaonkar, PB Sanap, RS Mule and MC Kasture

DOI: <https://www.doi.org/10.33545/26174693.2026.v10.i4e.8209>

Abstract

The evaluation of novel insecticides for their efficacy against thrips infesting chilli, *Capsicum annum* L.” was undertaken at Vegetable Improvement Scheme, Central Experiment Station, Wakawali under Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli during the *Rabi*, 2023-24 and *Rabi*, 2024-25. Experiment was laid out in Randomized Block Design with nine treatments and three replications and 14.4 m² treatment plot area of size 6.0 m x 2.4 m. Three foliar sprays of the insecticide treatments viz., broflanilide 300 g/l SC (@ 0.0037%), cyantraniliprole 10.26% OD (@ 0.0123%), emamectin benzoate 05% SG (@ 0.0020%), fluxametamide 10% w/w EC 0.0080%), isocycloseram 9.2% w/w DC (@ 0.0110%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%), profenofos 40% + fenpyroximate 02.50% w/w EC (@ 0.0850%), emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%) were applied at fortnight interval initiating the first when sufficient thrips incidence was noticed at 45th days after transplanting along with Untreated Control. Pooled data recorded at before and after foliar spray revealed that the pre count thrip population was non-significant ranging between 5.48 to 8.09 per three leaves per plant. During fortnight interval, the treatment with isocycloseram 9.2% w/w DC (@ 0.0110%) found most effective and recorded thrips in range of 0.96 to 3.50 per three leaves per plant and found on par with broflanilide 300 g/l SC (@ 0.0037%) in which thrips ranges from 1.10 to 3.61 and flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) from 2.36 to 3.98 thrips per three leaves per plant. In untreated control, it varied in the range of 7.96 to 8.30 per three leaves per plant.

Keywords: Thrips, efficacy, isocycloseram 9.2% w/w DC, broflanilide 300 g/l SC, flubendiamide 19.92% + thiacloprid 19.92% w/w SC

Introduction

Among the stresses responsible for the lower yield, damage done by biotic stress by insect pests holds a major share. The yield losses caused by chilli thrips, *Scirtothrips dorsalis* (Hood) and chilli aphid, *Myzus persicae* (Sulzer) are ranges from 50-90 percent and 40-70 percent in chilli crop, respectively (Venkateshalu *et al.*, 2009) [18]. Also, Ahmed *et al.* in 1987 [1] reported that the yield losses due to thrips and mites are estimated to the tune of 50 percent. Sucking pest complex attack on different crop stages and causes “Churda murda or leaf curl”. In sucking pest complex, chilli thrips, *Scirtothrips dorsalis* Hood, is a serious pest on chilli in India was documented by Ananthakrishnan (1971) and Krishna *et al.* (1996) [2, 12]. Chemical pest control is the use of pesticides to eliminate pests. These pesticidal solutions are easily available, easy to use and very effective than any other methods. Efficacy testing of novel insecticides against chilli pests is useful for determining which new insecticides are most effective in controlling pests, allowing for the development of more targeted and sustainable pest management strategies. Hence, an attempt is made to study the efficacy of the important novel insecticides against thrips infesting chilli.

Materials and Methods

A field experiments was conducted at Vegetable Improvement Scheme, Central Experiment Station, Wakawali running under Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli to study the efficacy of novel insecticides against thrips infesting chilli during *Rabi*, 2023-24 and *Rabi*, 2024-25. Konkan Kirti cultivar was planted at spacing of 60 cm x 60 cm in 14.4 m² plot area of size of 6 m x 2.4 m for each of the nine treatments in three replications. Each insecticide treatments was applied thrice at fortnight interval initiating the first when, sufficient pest incidence was noticed at 45th days after transplanting.

Water @ 500 Liters per hectare was used as diluent to mix insecticides for foliar spray applications. Hand operated Knapsack Sprayer with hollow cone nozzle was used for foliar spray applications.

The observations on surviving population of thrips were recorded before foliar spray application on the same day as pre count whereas, at 1st, 3rd, 7th, 10th and 14th days after foliar spray application as post count were taken. Observations of 14th day was treated as per count for next foliar spray application.

Results and Discussion

The efficacy data of novel insecticides against thrips infesting chilli during 2023-24, 2024-25 are presented in Table 1 to 7.

1. Efficacy of novel insecticides against thrips infesting chilli (2023-24)

First spray

The data recorded during 2023-24 (Table 1) in the field efficacy studies of novel insecticides against sucking pests revealed that pre-count thrips was found to be non-significant ranging between 7.73 to 10.50 per three leaves per plant. During fortnight period after first spray, the treatment isocycloseram 9.2% w/w DC (@ 0.0110%) recorded least thrips which ranges between 1.10 to 4.87 (3.90, 2.83, 1.10, 3.97, 4.87 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively) and found on par with broflanilide 300 g/l SC (@ 0.0037%) which recorded thrips in range of 1.23 to 4.93 (4.00, 2.93, 1.23, 4.00, 4.93 per three leaves per plant, respectively) and flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) in which thrips were recorded in range of 1.87 to 5.23 per three leaves per plant (5.23, 4.00, 1.87, 4.03, 5.07 per three leaves per plant, respectively). Isocycloseram 9.2% w/w DC (@ 0.0110%) at 7th, 10th and 14th DAS was also found on par with fluxametamide 10% w/w EC (@ 0.0080%) which recorded 2.13, 4.50, 5.23 thrips per three leaves per plant, respectively and cyantraniliprole 10.26% OD (@ 0.0123%) which recorded 2.33, 4.63, 5.30 thrips per three leaves per plant, respectively. Furthermore, in untreated control thrips were recorded in range of 8.03 to 9.03 per three leaves per plant in (9.00, 8.80, 9.03, 9.03, 8.03 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Second spray

Thrip population varied from 4.87 to 8.03 per three leaves per plant across different treatments at 14th DAS following first spray which was considered as pre-count for the second spray (Table 1). During fortnight interval, the treatment isocycloseram 9.2% w/w DC (@ 0.0110%) recorded least thrip population in range of 1.17 to 4.13 (4.13, 2.23, 1.17, 1.73, 2.10 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively) was found most effective and also found on par with broflanilide 300 g/l SC (@ 0.0037%) which recorded in range of 1.43 to 4.30 (4.30, 2.37, 1.43, 1.83, 2.30 per three leaves per plant, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) which recorded in range of 1.57 to 4.47 (4.47, 2.47, 1.57, 2.40, 2.53 per three leaves per plant, respectively), fluxametamide 10% w/w EC (@ 0.0080%) which except 7th DAS recorded in range of 2.47 to 4.80 (4.80, 2.53, 2.47, 2.60 per three leaves per plant, respectively), cyantraniliprole 10.26% OD (@ 0.0123%)

which recorded in range of 1.83 to 5.07 (5.07, 2.63, 1.83, 2.57, 3.00 per three leaves per plant, respectively), emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%) which recorded 5.23 (at 1st DAS), 2.83 (at 3rd DAS) and emamectin benzoate 05% SG (@ 0.0020%) which recorded 5.07 (at 1st DAS), 2.63 thrips per three leaves per plant (at 3rd DAS). However, in untreated control thrip population was recorded in range of 8.03 to 8.37 per three leaves per plant (8.07, 8.03, 8.17, 8.37, 8.07 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Third spray

Thrip population at 14th day following second spray was taken as pre count for third spray which ranges from 2.10 to 8.07 per three leaves per plant among different treatment (Table 2). During fortnight interval after third spray, the treatment isocycloseram 9.2% w/w DC (@ 0.0110%) suppress the thrip population to minimum was found superior than rest of the treatments and recorded thrips in range of 0.57 to 2.23 per three leaves per plant (2.23, 1.73, 0.57, 0.60, 0.70 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). However, this treatment found on par to broflanilide 300 g/l SC (@ 0.0037%) which recorded thrips in range of 0.70 to 2.27 (2.27, 1.77, 0.70, 0.80, 0.87 per three leaves per plant, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) which noted in range of 0.83 to 2.50 (2.50, 1.87, 0.83, 0.97, 1.03 per three leaves per plant, respectively), fluxametamide 10% w/w EC (@ 0.0080%) which noted in range of 0.97 to 2.60 (2.60, 1.90, 0.97, 1.03, 1.17 per three leaves per plant, respectively). However, cyantraniliprole 10.26% OD (@ 0.0123%) at 1st, 3rd, 7th DAS recorded 2.67, 2.07, 1.23 thrips per three leaves per plant, respectively and emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%) at 1st DAS recorded 3.40 thrips per three leaves per plant and also found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). In untreated control, thrips population recorded in range of 7.83 to 8.00 per three leaves per plant (8.00, 7.93, 7.83, 7.90, 7.87 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Average of three spray

Average data of three spray (Table 2) revealed that non-significant thrip population in pre count was in range of 5.38 to 8.08 thrips per three leaves per plant. The treatment with isocycloseram 9.2% w/w DC (@ 0.0110%) was found to be most effective to minimize thrip population which noted in range of 0.94 to 3.43 per three leaves per plant during fortnight interval (3.43, 2.27, 0.94, 2.10, 2.56 thrips per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). However, this treatment found on par with broflanilide 300 g/l SC (@ 0.0037%) which recorded thrips in range of 1.12 to 3.51 (3.51, 2.36, 1.12, 2.21, 2.70 per three leaves per plant, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) which recorded thrips in range of 1.42 to 4.07 (4.07, 2.78, 1.42, 2.47, 2.88 per three leaves per plant, respectively). However, fluxametamide 10% w/w EC (@ 0.0080%) at 1st, 3rd and 14th DAS recorded 4.41, 2.96, 3.00 per three leaves per plant, respectively and cyantraniliprole 10.26% OD (@ 0.0123%) at 14th DAS recorded 3.33 thrips per three leaves per plant and these treatments also found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). In untreated control, thrip population was recorded in the range of 7.99

to 8.43 (8.36, 8.26, 8.34, 8.43, 7.99 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Overall mean

The overall mean of thrips during fortnight interval showed that isocycloseram 9.2% w/w DC (@ 0.0110%) was found most effective to suppress thrips and also found on par with broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) over untreated control and these treatments noted 2.26, 2.38, 2.72 and 8.28 thrips per three leaves per plant, respectively.

Percent reduction

Thrips population on chilli was found to be greatly reduced by treatment isocycloseram 9.2% w/w DC (@ 0.0110%) which found most effective followed by broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) which found at par with isocycloseram 9.2% w/w DC (@ 0.0110%) over the untreated control and the reduction of thrips was noted 72.71, 71.12, 66.96 and 0.00 percent, respectively.

2. Efficacy of novel insecticides against thrips infesting chilli (2024-25)

First spray

Data obtained during 2024-25 (Table 3) revealed that the pre-count thrip population was non-significant ranging 7.77 to 10.47 per three leaves per plant. The treatment isocycloseram 9.2% w/w DC (@ 0.0110%) was found most effective in respect of thrips control which recorded in range of 1.40 to 4.97 per three leaves per plant during fortnight interval after first spray (4.10, 2.90, 1.40, 4.07, 4.97 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). In the same spray interval, the treatments broflanilide 300 g/l SC (@ 0.0037%) (4.23, 3.23, 1.47, 4.10, 5.13 per three leaves per plant, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) (4.47, 3.07, 1.73, 4.30, 5.20 per three leaves per plant, respectively) and fluxametamide 10% w/w EC (@ 0.0080%) (4.47, 3.07, 1.73, 4.30, 5.20 per three leaves per plant, respectively) were found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). However, at 3rd, 7th, 10th, 14th DAS, cyantraniliprole 10.26% OD (@ 0.0123%) (4.13, 2.37, 4.47, 5.43 thrips per three leaves per plant, respectively), at 10th, 14th DAS, treatment emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%) (5.20, 6.23 thrips per three leaves per plant, respectively) as well as emamectin benzoate 05% SG (@ 0.0020%) (4.93, 6.27 thrips per three leaves per plant, respectively) were found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). In untreated control thrip population was in range of 8.10 to 8.83 per three leaves per plant (8.40, 8.70, 8.83, 8.60, 8.10 thrips per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Second spray

Thrips at 14 days after the first spray varied from 4.97 to 8.10 per three leaves per plant in different treatments and served as a pre-count for the second spray (Table 3). In respect of thrips suppression at 1st and 3rd DAS, the treatment isocycloseram 9.2% w/w DC (@ 0.0110%) noted thrips 4.33, 2.13 per three leaves per plant, respectively, however, at 7th, 10th DAS, isocycloseram 9.2% w/w DC (@ 0.0110%) as well as broflanilide 300 g/l SC (@ 0.0037%)

noted similar thrips 1.20 per three leaves per plant at both the days, while at 14th DAS, broflanilide 300 g/l SC (@ 0.0037%) noted 2.33 thrips per three leaves per plant and found most effective. Moreover, at 1st DAS, broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%), fluxametamide 10% w/w EC (@ 0.0080%), cyantraniliprole 10.26% OD (@ 0.0123%), emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%), emamectin benzoate 05% SG (@ 0.0020%) and profenofos 40% + fenpyroximate 02.50% w/w EC (@ 0.0850%) were found at par with isocycloseram 9.2% w/w DC (@ 0.0110%) and recorded thrips 4.50, 4.67, 4.77, 5.37, 5.47, 5.50, 5.73 per three leaves per plant, respectively. At 3rd DAS, broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%), fluxametamide 10% w/w EC (@ 0.0080%), cyantraniliprole 10.26% OD (@ 0.0123%), emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%), emamectin benzoate 05% SG (@ 0.0020%) and profenofos 40% + fenpyroximate 02.50% w/w EC (@ 0.0850%) were found at par with isocycloseram 9.2% w/w DC (@ 0.0110%) and noted thrips 2.33, 2.37, 2.43, 2.50, 2.70, 2.80, 3.30 per three leaves per plant, respectively. At 7th and 10th DAS, flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%), fluxametamide 10% w/w EC (@ 0.0080%), cyantraniliprole 10.26% OD (@ 0.0123%) were found at par with isocycloseram 9.2% w/w DC (@ 0.0110%) and recorded thrips 1.63, 1.67, 1.67 per three leaves per plant, respectively. At 14th DAS, flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%), fluxametamide 10% w/w EC (@ 0.0080%), cyantraniliprole 10.26% OD (@ 0.0123%), emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%) were found at par with isocycloseram 9.2% w/w DC (@ 0.0110%) and noted thrips 2.47, 2.50, 2.57, 3.40, 4.13 per three leaves per plant, respectively. Thrips per three leaves per plant in the untreated control varied from 2.83 to 3.33 during 1st to 14th DAS (8.10, 8.17, 8.13, 8.13, 7.97 per three leaves per plant, respectively).

Third spray

As a pre-count for the third spray, the number of thrips at 14 days after the second spray ranged from 2.33 to 7.97 per three leaves per plant across various treatments were taken (Table 4). During 1st to 14th DAS, the treatment with isocycloseram 9.2% w/w DC (@ 0.0110%) was found most superior recording thrips in range of 0.33 to 2.27 (2.27, 1.80, 0.33, 0.43, 0.57 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th, respectively) and also found on par to broflanilide 300 g/l SC (@ 0.0037%) which recorded thrips in range of 0.57 to 2.37 (2.37, 1.90, 0.57, 0.70, 0.77 per three leaves per plant, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) which noted thrips in range of 0.73 to 2.53 (2.53, 2.07, 0.73, 0.80, 0.93 per three leaves per plant, respectively). However, at 1st, 3rd, 10th, 14th DAS treatment fluxametamide 10% w/w EC (@ 0.0080%) recorded 2.63, 2.33, 0.93, 1.07 per three leaves per plant, respectively whereas, at 1st, 3rd DAS treatment cyantraniliprole 10.26% OD (@ 0.0123%) recorded 3.30, 2.50 thrips per three leaves per plant, respectively and also found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). In untreated control, thrip population recorded in range of 7.70 to 7.90 per three leaves per plant in the fortnight interval after third spray (7.90, 7.87, 7.80, 7.77,

7.70 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Average of three spray

Average data of three spray of 2024-25 (Table 4) revealed that thrip population in pre count was non-significant found in range of 5.54 to 8.10 per three leaves per plant across different treatments. The treatment with isocycloseram 9.2% w/w DC (@ 0.0110%) was found most effective to suppress thrips on chilli to minimum range of 0.98 to 3.57 per three leaves per plant during fortnight interval (3.57, 2.28, 0.98, 1.90, 2.67 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). The treatment with broflanilide 300 g/l SC (@ 0.0037%) was found at par recording thrips in range of 1.08 to 3.70 (3.70, 2.49, 1.08, 2.00, 2.74 per three leaves per plant, respectively). At 1st, 3rd, 10th, 14th DAS, treatment flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) recorded 3.89, 2.50, 2.24, 2.88 and fluxametamide 10% w/w EC (@ 0.0080%) recorded 3.96, 2.70, 2.33, 2.98 thrips per three leaves per plant, respectively. At 14th DAS, cyantraniliprole 10.26% OD (@ 0.0123%) recorded 3.56 thrips per three leaves per plant. These treatments were found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). Thrip population in untreated control was recorded in the range of 7.92 to 2.26 per three leaves per plant during fortnight interval (8.13, 8.24, 8.26, 8.17, 7.92 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Overall mean

The overall mean thrip population revealed that isocycloseram 9.2% w/w DC (@ 0.0110%) was found most effective for thrips control, while broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC, fluxametamide 10% w/w EC (@ 0.0080%) were found at par with it over an untreated control and the thrips noted 2.28, 2.40, 2.58, 2.69 and 8.14 per three leaves per plant, respectively.

Percent reduction

Percent reduction in thrips infesting chilli was noted maximum in treatment isocycloseram 9.2% w/w DC (@ 0.0110%) which found most effective and on par with broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%), fluxametamide 10% w/w EC (@ 0.0080%) over untreated control and recorded 72.03, 70.26, 68.32, 66.97 and 0.00 percent reduction in thrips, respectively.

3. Efficacy of novel insecticides against thrips infesting chilli (Pooled)

First spray

The pooled data (Table 5) revealed that pre count thrip population was found non-significant ranging 7.95 to 10.23 per three leaves per plant. The post count data exhibits that the treatment isocycloseram 9.2% w/w DC (@ 0.0110%) was most effective to suppress thrips which noted in ranges of 1.25 to 4.92 per three leaves per plant during fortnight interval (4.00, 2.87, 1.25, 4.02, 4.92 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). It was found on par to broflanilide 300 g/l SC (@ 0.0037%) recording thrips in range of 1.35 to 5.03 (4.12, 3.08, 1.35, 4.05, 5.03 per three leaves per plant, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@

0.0159%) recording thrips in range of 1.80 to 3.15 (4.85, 3.53, 1.80, 4.17, 5.13 per three leaves per plant, respectively). At 3rd to 14th DAS, fluxametamide 10% w/w EC (@ 0.0080%) recorded thrips in range of 2.00 to 5.27 (3.88, 2.00, 4.45, 5.27 per three leaves per plant, respectively). However, at 14th DAS, cyantraniliprole 10.26% OD (@ 0.0123%), emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%), emamectin benzoate 05% SG (@ 0.0020%) and profenofos 40% + fenpyroximate 02.50% w/w EC (@ 0.0850%) recorded 5.37, 5.90, 6.05, 6.13 thrips per three leaves per plant, respectively and found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). The untreated control recorded thrips in range of 8.07 to 8.93 per three leaves per plant (8.70, 8.75, 8.93, 8.82, 8.07 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Second spray

As a pre-count for the second spray, the number of thrips at 14 days following the first spray ranged from 4.92 to 8.07 per three leaves per plant were taken across various treatments (Table 5). During the fortnight interval, the treatment with isocycloseram 9.2% w/w DC (@ 0.0110%) found most superior in suppressing thrips which varies from 1.18 to 4.23 (4.23, 2.18, 1.18, 1.47, 2.28 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). This treatment was found on par to broflanilide 300 g/l SC (@ 0.0037%) which noted 1.32 to 4.40 (4.40, 2.35, 1.32, 1.52, 2.32 thrips per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) which recorded 1.60 to 4.57 (4.57, 2.42, 1.60, 2.02, 2.52 thrips per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). However, at 1st, 3rd, 10th, 14th DAS, fluxametamide 10% w/w EC (@ 0.0080%) (4.78, 2.48, 2.07, 2.58 thrips per three leaves per plant, respectively), cyantraniliprole 10.26% OD (@ 0.0123%) (5.22, 2.57, 2.12, 3.20 thrips per three leaves per plant, respectively), at 1st, 3rd DAS, emamectin benzoate 5% w/w + lufenuron 40% w/w WG (@ 0.0054%) (5.35, 2.77 thrips per three leaves per plant, respectively), emamectin benzoate 05% SG (@ 0.0020%) (5.22, 2.57 thrips per three leaves per plant, respectively) were also found at par with isocycloseram 9.2% w/w DC (@ 0.0110%). In untreated control the thrips recorded in range of 8.02 to 8.25 (8.08, 8.10, 8.15, 8.25, 8.02 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Third spray

Thrip population at 14 days following the second spray ranging between 2.28 to 8.02 per three leaves per plant among different treatments was treated as a pre-count for the third spray (Table 6). The treatment isocycloseram 9.2% w/w DC (@ 0.0110%) found most effective to minimize thrips which observed in range of 0.45 to 2.27 during fortnight spray interval (2.27, 1.77, 0.45, 0.52, 0.63 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively) and also found on par to broflanilide 300 g/l SC (@ 0.0037%) which recorded thrips in range of 0.63 to 2.30 (2.30, 1.83, 0.63, 0.75, 0.82 per three leaves per plant, respectively), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) recorded thrips in range of 0.78 to 2.52 (2.52, 1.97, 0.78, 0.88, 0.98 per three leaves per plant, respectively), fluxametamide 10% w/w EC (@ 0.0080%) recorded thrips in range of 0.93 to 2.62 (2.62, 2.12, 0.93, 0.98, 1.12 per three leaves per plant, respectively).

However, at 1st, 3rd DAS, cyantraniliprole 10.26% OD (@ 0.0123%) recorded 2.98, 2.28 thrips per three leaves per plant, respectively. In untreated control, thrip population recorded in range of 7.78 to 7.95 per three leaves per plant in the fortnight interval after third spray (7.95, 7.90, 7.82, 7.83, 7.78 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Average of three spray

Pooled data (Table 6) revealed that the pre count thrip population found non-significant ranged between 5.48 to 8.09 per three leaves per plant. The treatment with isocycloseram 9.2% w/w DC (@ 0.0110%) found most effective recording least thrips in range of 0.96 to 3.50 per three leaves per plant during fortnight interval (3.50, 2.27, 0.96, 2.00, 2.61 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively) and also found on par with broflanilide 300 g/l SC (@ 0.0037%) in which thrips ranges from 1.10 to 3.61 (3.61, 2.42, 1.10, 2.11, 2.72 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively). However, flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) at 1st, 3rd, 10th, 14th DAS recorded 3.98, 2.64, 2.36, 2.88 thrips per three leaves per plant, respectively, fluxametamide 10% w/w EC (@ 0.0080%) at 1st, 14th DAS recorded 4.18, 2.99 thrips per three leaves per plant, respectively and cyantraniliprole 10.26% OD (@ 0.0123%) at 14th DAS recorded 3.44 thrips per three leaves per plant which found at par to isocycloseram 9.2% w/w DC (@ 0.0110%). Thrip population in untreated control varied in the range of 7.96 to 8.30 per three leaves per plant during fortnight interval (8.24, 8.25, 8.30, 8.30, 7.96 per three leaves per plant at 1st, 3rd, 7th, 10th, 14th DAS, respectively).

Overall mean

The overall mean of pooled thrip population during fortnight interval revealed that isocycloseram 9.2% w/w DC (@ 0.0110%) was most superior for thrips control and found on par to broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) over untreated control in which thrips noted 2.27, 2.39, 2.65 and 8.21 per three leaves per plant, respectively.

Percent reduction

Percent reduction in thrips infesting chilli was recorded maximum in treatment isocycloseram 9.2% w/w DC (@ 0.0110%) which found most promising for thrips control and also found on par to broflanilide 300 g/l SC (@ 0.0037%) as well as flubendiamide 19.92% + thiacloprid 19.92% w/w SC over untreated control and the reduction of thrips was noted 72.37, 70.69, 67.64 and 0.00 percent, respectively.

The current study assessed three sprays of nine treatments against thrips that infested chilli under a field condition. All of the treatments were shown to be statistically effective in lowering the number of thrips on chilli when compared to an untreated control. The foliar spraying with isocycloseram 9.2% w/w DC (@ 0.0110%), broflanilide 300 g/l SC (@ 0.0037%), flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) exhibited statistically similar results over an untreated control for lowering thrips on chilli.

Similar results were documented by Hemalatha *et al.* (2025) [10] who observed isocycloseram 9.2% DC was most effective for cotton thrips. Blythe *et al.* (2022) [7] reported that isocycloseram was a novel isoxazoline insecticide very

active against thysanopterans. Bekelja *et al.*, in 2024 [5] reported that isocycloseram shows promising results against southern corn rootworm, *Diabrotica undecimpunctata* Howard a peanut pest. Isocycloseram decreased thrips populations in blueberry plants in a greenhouse was documented by Shimat in 2024 [17]. These studies support our findings that isocycloseram 9.2% w/w DC is effective for thrips control on chilli. Chen *et al.* in 2022 [9] confirms that broflanilide was highly effective against various thrips species. Murali *et al.* in 2023 [13], Prajapati and Patel (2025) [15] reported that thrips on chilli, gram pod borer on pigeonpea were effectively controlled by broflanilide. Bhede *et al.* (2008) [6] documented that newer insecticides cyantraniliprole and broflanilide effectively control thrips on chilli. Exciting results of broflanilide under laboratory condition against *Thrips parvispinus* were reported by Anu *et al.* (2024) [3] which are in support of our findings. Bojan *et al.* (2010) [8] reported that flubendiamide + thiacloprid 480 SC (ready mix) significantly lowered the whitefly population in okra. Cyantraniliprole displayed moderate toxicity against *Thrips parvispinus* (Karny) affecting at least two stages in either exposure route. (Ataide *et al.*, 2024) [4]. Kaur *et al.* (2021) [11] demonstrated that thrips on cucumber was effectively controlled by flubendiamide 19.92% + thiacloprid 19.92% w/w SC which are in evidence to support our findings.

4. Effect of novel insecticides on yield of chilli

5. Effect of novel insecticides on yield of chilli (2023-24)

The treatment with flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) found most effective in obtaining maximum yield of green chillies which noted 132.02 q ha⁻¹ and it found on par to isocycloseram 9.2% w/w DC (@ 0.0110%) (125.34 q ha⁻¹), broflanilide 300 g/l SC (@ 0.0037%) (121.63 q ha⁻¹), fluxametamide 10% w/w EC (@ 0.0080%) (117.85 q ha⁻¹) and cyantraniliprole 10.26% OD (@ 0.0123%) (115.18 q ha⁻¹). An untreated control recorded minimum yield of 88.39 q ha⁻¹ green chillies.

6. Effect of novel insecticides on yield of chilli (2024-25)

The treatment with flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) found statistically most superior in obtaining maximum yield of green chillies which recorded 134.71 q ha⁻¹. Whereas, isocycloseram 9.2% w/w DC (@ 0.0110%) (130.08 q ha⁻¹), broflanilide 300 g/l SC (@ 0.0037%) (124.66 q ha⁻¹) and fluxametamide 10% w/w EC (@ 0.0080%) (124.23 q ha⁻¹) were found statistically at par to flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) over an untreated control (84.97 q ha⁻¹).

7. Effect of novel insecticides on yield of chilli (Pooled)

It is revealed from pooled data that treatment flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) was found most effective in obtaining maximum yield of green chillies which noted 133.37 q ha⁻¹ and also found statistically on par to isocycloseram 9.2% w/w DC (@ 0.0110%) and broflanilide 300 g/l SC (@ 0.0037%) which recorded 127.71 and 123.14 as against 86.68 q green chillies ha⁻¹ in an untreated control.

In the current study flubendiamide 19.92% + thiacloprid 19.92% w/w SC (@ 0.0159%) found most effective as the combination of flubendiamide and thiacloprid is an effective tool against a broad spectrum of insect pests in chilli,

including both chewing and sucking types. This treatment was followed by isocycloseram 9.2% w/w DC (@ 0.0110%) an isoxazoline insecticide that modulates GABA-gated chloride channels in the insect's central nervous system, effective against a wide range of crop-damaging pests, including lepidopterans, hemipterans, coleopterans, and thysanopterans (thrips). It was documented by Pradhan (2025) ^[14] who reported effectiveness of flubendiamide 19.92% + thiacloprid 19.92% w/w SC against fruit borers, whiteflies on chilli, cotton and isocycloseram against stem borers which contributed in the higher yield of green chillies

which supports our findings. Broflanilide 300 g/l SC (@ 0.0037%) was the next best treatment in respect of good yield. The findings of Wale and Mohite (2019) ^[19] who reported effectiveness of broflanilide against diamond back moth as well as tobacco leaf eating caterpillar while findings of Shen *et al.* (2021) ^[16] who reported high level toxicity of broflanilide against two spotted spider mites supports our yield trends as in our investigation fruit borer and mites were the major pests which can threatens yield of green chillies.

Table 1: Efficacy of novel insecticides against thrips infesting chilli (2023-24)-First and second spray

Tr. No.	Treatment (@ Spray concentration)	No. of thrips per 3 leaves per plant											
		1 st spray						2 nd spray					
		Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS	Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS
T ₁	Broflanilide 300 g/l SC (@ 0.0037%)	8.90 (3.03)	4.00 (2.11)	2.93 (1.84)	1.23 (1.31)	4.00 (2.11)	4.93 (2.31)	4.93 (2.31)	4.30 (2.18)	2.37 (1.69)	1.43 (1.39)	1.83 (1.52)	2.30 (1.67)
T ₂	Cyantraniliprole 10.26% OD (@ 0.0123%)	9.10 (3.07)	5.97 (2.53)	4.57 (2.23)	2.33 (1.65)	4.63 (2.26)	5.30 (2.40)	5.30 (2.40)	5.07 (2.32)	2.63 (1.76)	1.83 (1.50)	2.57 (1.74)	3.00 (1.87)
T ₃	Emamectin benzoate 05% SG (@ 0.0020%)	7.73 (2.87)	7.07 (2.75)	6.33 (2.61)	5.80 (2.51)	5.60 (2.45)	5.83 (2.50)	5.83 (2.50)	5.30 (2.40)	2.97 (1.86)	2.30 (1.67)	2.87 (1.80)	5.67 (2.46)
T ₄	Fluxametamide 10% w/w EC 0.0080%)	9.53 (3.12)	5.83 (2.51)	4.43 (2.21)	2.13 (1.62)	4.50 (2.20)	5.23 (2.39)	5.23 (2.39)	4.80 (2.29)	2.53 (1.74)	1.80 (1.51)	2.47 (1.71)	2.60 (1.76)
T ₅	Isocycloseram 9.2% w/w DC (@ 0.0110%)	10.20 (3.23)	3.90 (2.10)	2.83 (1.82)	1.10 (1.26)	3.97 (2.10)	4.87 (2.31)	4.87 (2.31)	4.13 (2.14)	2.23 (1.65)	1.17 (1.28)	1.73 (1.48)	2.10 (1.54)
T ₆	Flubendiamide 19.92% + Thiacloprid 19.92% w/w SC (@ 0.0159%)	8.63 (2.94)	5.23 (2.38)	4.00 (2.11)	1.87 (1.49)	4.03 (2.12)	5.07 (2.35)	5.07 (2.35)	4.47 (2.23)	2.47 (1.72)	1.57 (1.43)	2.40 (1.70)	2.53 (1.74)
T ₇	Profenofos 40% + Fenpyroximate 02.50% w/w EC (@ 0.0850%)	7.83 (2.80)	8.17 (2.94)	8.17 (2.94)	6.67 (2.68)	5.73 (2.46)	5.97 (2.53)	5.97 (2.53)	5.47 (2.43)	3.00 (1.87)	3.17 (1.91)	3.83 (2.08)	7.50 (2.82)
T ₈	Emamectin Benzoate 5% w/w + Lufenuron 40% w/w WG (@ 0.0054%)	10.50 (3.13)	6.23 (2.59)	4.77 (2.29)	2.90 (1.82)	5.50 (2.43)	5.57 (2.44)	5.57 (2.44)	5.23 (2.38)	2.83 (1.82)	2.07 (1.58)	2.83 (1.81)	3.97 (2.11)
T ₉	Untreated Control	8.97 (3.04)	9.00 (3.08)	8.80 (3.05)	9.03 (3.09)	9.03 (3.04)	8.03 (2.92)	8.03 (2.92)	8.07 (2.93)	8.03 (2.91)	8.17 (2.93)	8.37 (2.96)	8.07 (2.92)
SE±		0.39	0.10	0.13	0.14	0.10	0.10	0.10	0.12	0.09	0.07	0.10	0.16
CD (p=0.05)		N.S.	0.31	0.38	0.43	0.30	0.30	0.30	0.35	0.27	0.22	0.30	0.49

()-square root transformed values

Table 2: Efficacy of novel insecticides against thrips infesting chilli (2023-24)-Third and average of three sprays

Tr. No.	Treatment (@ Spray concentration)	No. of thrips per 3 leaves per plant												Mean	Percent reduction
		3 rd spray						Mean of three sprays							
		Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS	Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS		
T ₁	Broflanilide 300 g/l SC (@ 0.0037%)	2.30 (1.67)	2.27 (1.65)	1.77 (1.50)	0.70 (1.09)	0.80 (1.13)	0.87 (1.17)	5.38 (2.40)	3.51 (1.99)	2.36 (1.68)	1.12 (1.27)	2.21 (1.64)	2.70 (1.78)	2.38 (1.69)	71.12 [57.60]
T ₂	Cyantraniliprole 10.26% OD (@ 0.0123%)	3.00 (1.87)	2.67 (1.77)	2.07 (1.58)	1.23 (1.30)	1.57 (1.43)	1.70 (1.48)	5.80 (2.50)	4.57 (2.24)	3.09 (1.88)	1.80 (1.49)	2.92 (1.84)	3.33 (1.96)	3.14 (1.90)	61.98 [52.01]
T ₃	Emamectin benzoate 05% SG (@ 0.0020%)	5.67 (2.46)	5.40 (2.43)	4.97 (2.32)	4.67 (2.26)	4.53 (2.22)	4.60 (2.25)	6.41 (2.63)	5.92 (2.53)	4.76 (2.29)	4.26 (2.18)	4.33 (2.18)	5.37 (2.42)	4.93 (2.33)	40.41 [39.49]
T ₄	Fluxametamide 10% w/w EC 0.0080%)	2.60 (1.76)	2.60 (1.75)	1.90 (1.54)	0.97 (1.21)	1.03 (1.23)	1.17 (1.29)	5.79 (2.49)	4.41 (2.21)	2.96 (1.86)	1.63 (1.46)	2.67 (1.76)	3.00 (1.87)	2.93 (1.85)	64.51 [53.50]
T ₅	Isocycloseram 9.2% w/w DC (@ 0.0110%)	2.10 (1.54)	2.23 (1.65)	1.73 (1.48)	0.57 (1.03)	0.60 (1.04)	0.70 (1.09)	5.72 (2.46)	3.43 (1.98)	2.27 (1.66)	0.94 (1.20)	2.10 (1.60)	2.56 (1.74)	2.26 (1.65)	72.71 [58.60]
T ₆	Flubendiamide 19.92% + Thiacloprid 19.92% w/w SC (@ 0.0159%)	2.53 (1.74)	2.50 (1.72)	1.87 (1.52)	0.83 (1.15)	0.97 (1.20)	1.03 (1.24)	5.41 (2.41)	4.07 (2.13)	2.78 (1.81)	1.42 (1.38)	2.47 (1.71)	2.88 (1.84)	2.72 (1.79)	66.96 [54.96]
T ₇	Profenofos 40% + Fenpyroximate 02.50% w/w EC (@ 0.0850%)	7.50 (2.82)	6.27 (2.59)	5.80 (2.49)	5.27 (2.36)	5.13 (2.33)	5.30 (2.40)	7.10 (2.74)	6.63 (2.67)	5.66 (2.48)	5.03 (2.35)	4.90 (2.31)	6.26 (2.59)	5.70 (2.49)	30.79 [33.70]
T ₈	Emamectin Benzoate 5% w/w + Lufenuron 40% w/w WG (@ 0.0054%)	3.97 (2.11)	3.40 (1.97)	3.37 (1.95)	2.87 (1.82)	3.73 (2.06)	4.07 (2.10)	6.06 (2.53)	4.96 (2.33)	3.66 (2.03)	2.61 (1.74)	4.02 (2.12)	4.53 (2.23)	3.96 (2.10)	52.38 [46.40]
T ₉	Untreated Control	8.07 (2.92)	8.00 (2.91)	7.93 (2.90)	7.83 (2.89)	7.90 (2.90)	7.87 (2.89)	8.08 (2.92)	8.36 (2.97)	8.26 (2.96)	8.34 (2.97)	8.43 (2.98)	7.99 (2.91)	8.28 (2.96)	0.00 [0.00]
SE±		0.16	0.11	0.10	0.11	0.11	0.12	0.18	0.08	0.07	0.08	0.05	0.09	0.05	1.38
CD (p=0.05)		0.49	0.32	0.29	0.34	0.32	0.35	N.S.	0.23	0.21	0.24	0.15	0.26	0.14	4.15

()-square root transformed values, []-angular transformed values, DAS-Days after spray

Table 3: Efficacy of novel insecticides against thrips infesting chilli (2024-25)-First and second spray

Tr. No.	Treatment (@ Spray concentration)	No. of thrips per 3 leaves per plant											
		1 st spray						2 nd spray					
		Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS	Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS
T ₁	Broflanilide 300 g/l SC (@ 0.0037%)	10.47 (3.31)	4.23 (2.16)	3.23 (1.89)	1.47 (1.39)	4.10 (2.14)	5.13 (2.36)	5.13 (2.36)	4.50 (2.23)	2.33 (1.68)	1.20 (1.29)	1.20 (1.29)	2.33 (1.68)
T ₂	Cyantraniliprole 10.26% OD (@ 0.0123%)	9.50 (3.15)	5.47 (2.44)	4.13 (2.13)	2.37 (1.63)	4.47 (2.21)	5.43 (2.43)	5.43 (2.43)	5.37 (2.42)	2.50 (1.72)	1.67 (1.45)	1.67 (1.45)	3.40 (1.97)
T ₃	Emamectin benzoate 05% SG (@ 0.0020%)	8.37 (2.90)	7.27 (2.78)	6.73 (2.68)	5.77 (2.49)	4.93 (2.32)	6.27 (2.57)	6.27 (2.57)	5.50 (2.44)	2.80 (1.80)	2.40 (1.68)	2.40 (1.68)	5.83 (2.46)
T ₄	Fluxametamide 10% w/w EC 0.0080%)	9.13 (3.09)	4.47 (2.21)	3.33 (1.94)	1.87 (1.51)	4.40 (2.19)	5.30 (2.40)	5.30 (2.40)	4.77 (2.29)	2.43 (1.71)	1.67 (1.46)	1.67 (1.46)	2.57 (1.73)
T ₅	Isocycloseram 9.2% w/w DC (@ 0.0110%)	10.27 (3.28)	4.10 (2.11)	2.90 (1.81)	1.40 (1.36)	4.07 (2.13)	4.97 (2.33)	4.97 (2.33)	4.33 (2.20)	2.13 (1.61)	1.20 (1.29)	1.20 (1.29)	2.47 (1.71)
T ₆	Flubendiamide 19.92% + Thiacloprid 19.92% w/w SC (@ 0.0159%)	8.93 (3.05)	4.47 (2.22)	3.07 (1.84)	1.73 (1.49)	4.30 (2.19)	5.20 (2.37)	5.20 (2.37)	4.67 (2.27)	2.37 (1.69)	1.63 (1.45)	1.63 (1.45)	2.50 (1.72)
T ₇	Profenofos 40% + Fenpyroximate 02.50% w/w EC (@ 0.0850%)	8.07 (2.77)	7.47 (2.82)	8.00 (2.90)	6.80 (2.67)	5.23 (2.39)	6.30 (2.60)	6.30 (2.60)	5.73 (2.48)	3.30 (1.94)	3.43 (1.98)	3.43 (1.98)	6.57 (2.61)
T ₈	Emamectin Benzoate 5% w/w + Lufenuron 40% w/w WG (@ 0.0054%)	7.77 (2.75)	6.60 (2.66)	5.07 (2.33)	3.70 (2.05)	5.20 (2.36)	6.23 (2.57)	6.23 (2.57)	5.47 (2.42)	2.70 (1.74)	2.73 (1.79)	2.27 (1.65)	4.13 (2.13)
T ₉	Untreated Control	8.23 (2.88)	8.40 (2.98)	8.70 (3.02)	8.83 (3.03)	8.60 (2.98)	8.10 (2.93)	8.10 (2.93)	8.10 (2.92)	8.17 (2.92)	8.13 (2.92)	8.13 (2.92)	7.97 (2.88)
SE±		0.41	0.10	0.14	0.13	0.09	0.12	0.12	0.10	0.12	0.08	0.09	0.18
CD (p=0.05)		N.S.	0.31	0.41	0.39	0.28	0.35	0.35	0.29	0.35	0.24	0.27	0.53

() -square root transformed values

Table 4: Efficacy of novel insecticides against thrips infesting chilli (2024-25)-Third and average of three sprays

Tr. No.	Treatment (@ Spray concentration)	No. of thrips per 3 leaves per plant												Mean	Percent reduction
		3 rd spray						Mean of three sprays							
		Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS	Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS		
T ₁	Broflanilide 300 g/l SC (@ 0.0037%)	2.33 (1.68)	2.37 (1.67)	1.90 (1.55)	0.57 (1.03)	0.70 (1.09)	0.77 (1.12)	5.98 (2.54)	3.70 (2.04)	2.49 (1.72)	1.08 (1.25)	2.00 (1.58)	2.74 (1.80)	2.40 (1.70)	70.26 [57.03]
T ₂	Cyantraniliprole 10.26% OD (@ 0.0123%)	3.40 (1.97)	3.30 (1.95)	2.50 (1.73)	1.23 (1.31)	1.47 (1.40)	1.83 (1.53)	6.11 (2.56)	4.71 (2.28)	3.04 (1.87)	1.76 (1.48)	2.53 (1.73)	3.56 (2.01)	3.12 (1.90)	61.12 [51.51]
T ₃	Emamectin benzoate 05% SG (@ 0.0020%)	5.83 (2.46)	5.63 (2.45)	5.10 (2.31)	4.80 (2.30)	4.47 (2.22)	4.70 (2.28)	6.82 (2.70)	6.13 (2.57)	4.88 (2.31)	4.32 (2.19)	3.93 (2.10)	5.60 (2.47)	4.97 (2.33)	38.49 [38.36]
T ₄	Fluxametamide 10% w/w EC 0.0080%)	2.57 (1.73)	2.63 (1.77)	2.33 (1.68)	0.90 (1.18)	0.93 (1.19)	1.07 (1.25)	5.67 (2.48)	3.96 (2.11)	2.70 (1.78)	1.48 (1.39)	2.33 (1.67)	2.98 (1.86)	2.69 (1.78)	66.97 [54.95]
T ₅	Isocycloseram 9.2% w/w DC (@ 0.0110%)	2.47 (1.71)	2.27 (1.66)	1.80 (1.52)	0.33 (0.91)	0.43 (0.96)	0.57 (1.03)	5.90 (2.53)	3.57 (2.01)	2.28 (1.66)	0.98 (1.21)	1.90 (1.54)	2.67 (1.78)	2.28 (1.66)	72.03 [58.12]
T ₆	Flubendiamide 19.92% + Thiacloprid 19.92% w/w SC (@ 0.0159%)	2.50 (1.72)	2.53 (1.74)	2.07 (1.57)	0.73 (1.11)	0.80 (1.14)	0.93 (1.20)	5.54 (2.45)	3.89 (2.09)	2.50 (1.72)	1.37 (1.36)	2.24 (1.65)	2.88 (1.83)	2.58 (1.75)	68.32 [55.77]
T ₇	Profenofos 40% + Fenpyroximate 02.50% w/w EC (@ 0.0850%)	6.57 (2.61)	6.50 (2.61)	5.87 (2.48)	5.40 (2.42)	5.03 (2.33)	4.97 (2.29)	6.98 (2.68)	6.57 (2.65)	5.72 (2.48)	5.21 (2.38)	4.57 (2.25)	5.94 (2.51)	5.60 (2.46)	31.24 [33.98]
T ₈	Emamectin Benzoate 5% w/w + Lufenuron 40% w/w WG (@ 0.0054%)	4.13 (2.13)	4.10 (2.14)	3.93 (2.10)	3.27 (1.94)	4.17 (2.15)	4.23 (2.16)	6.04 (2.51)	5.39 (2.42)	3.90 (2.09)	3.23 (1.93)	3.88 (2.08)	4.87 (2.30)	4.25 (2.17)	47.71 [43.71]
T ₉	Untreated Control	7.97 (2.88)	7.90 (2.86)	7.87 (2.87)	7.80 (2.88)	7.77 (2.88)	7.70 (2.86)	8.10 (2.91)	8.13 (2.92)	8.24 (2.94)	8.26 (2.95)	8.17 (2.93)	7.92 (2.90)	8.14 (2.93)	0.00 [0.00]
SE±		0.18	0.12	0.13	0.07	0.10	0.13	0.20	0.07	0.05	0.04	0.06	0.10	0.04	1.13
CD (<i>p</i> =0.05)		0.53	0.37	0.40	0.22	0.29	0.38	N.S.	0.20	0.16	0.13	0.17	0.30	0.13	3.39

() -square root transformed values, [] -angular transformed values, DAS-Days after spray

Table 5: Efficacy of novel insecticides against thrips infesting chilli (Pooled)-First and second spray

Tr. No.	Treatment (@ Spray concentration)	No. of thrips per 3 leaves per plant											
		1 st spray						2 nd spray					
		Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS	Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS
T ₁	Broflanilide 300 g/l SC (@ 0.0037%)	9.68 (3.17)	4.12 (2.14)	3.08 (1.86)	1.35 (1.35)	4.05 (2.12)	5.03 (2.34)	5.03 (2.34)	4.40 (2.21)	2.35 (1.68)	1.32 (1.34)	1.52 (1.41)	2.32 (1.67)
T ₂	Cyantraniliprole 10.26% OD (@ 0.0123%)	9.30 (3.11)	5.72 (2.49)	4.35 (2.18)	2.35 (1.64)	4.55 (2.24)	5.37 (2.42)	5.37 (2.42)	5.22 (2.37)	2.57 (1.74)	1.75 (1.48)	2.12 (1.60)	3.20 (1.92)
T ₃	Emamectin benzoate 05% SG (@ 0.0020%)	8.05 (2.88)	7.17 (2.76)	6.53 (2.65)	5.78 (2.50)	5.27 (2.39)	6.05 (2.54)	6.05 (2.54)	5.40 (2.42)	2.88 (1.83)	2.35 (1.68)	2.63 (1.74)	5.75 (2.46)
T ₄	Fluxametamide 10% w/w EC 0.0080%	9.33 (3.11)	5.15 (2.36)	3.88 (2.08)	2.00 (1.57)	4.45 (2.20)	5.27 (2.40)	5.27 (2.40)	4.78 (2.29)	2.48 (1.72)	1.73 (1.48)	2.07 (1.59)	2.58 (1.74)
T ₅	Isocycloseram 9.2% w/w DC (@ 0.0110%)	10.23 (3.25)	4.00 (2.10)	2.87 (1.82)	1.25 (1.31)	4.02 (2.11)	4.92 (2.32)	4.92 (2.32)	4.23 (2.17)	2.18 (1.63)	1.18 (1.29)	1.47 (1.39)	2.28 (1.63)
T ₆	Flubendiamide 19.92% + Thiacloprid 19.92% w/w SC (@ 0.0159%)	8.78 (3.00)	4.85 (2.30)	3.53 (1.98)	1.80 (1.49)	4.17 (2.15)	5.13 (2.36)	5.13 (2.36)	4.57 (2.25)	2.42 (1.71)	1.60 (1.44)	2.02 (1.58)	2.52 (1.73)
T ₇	Profenofos 40% + Fenpyroximate 02.50% w/w EC (@ 0.0850%)	7.95 (2.79)	7.82 (2.88)	8.08 (2.92)	6.73 (2.67)	5.48 (2.42)	6.13 (2.56)	6.13 (2.56)	5.60 (2.46)	3.15 (1.90)	3.30 (1.95)	3.63 (2.03)	7.03 (2.71)
T ₈	Emamectin Benzoate 5% w/w + Lufenuron 40% w/w WG (@ 0.0054%)	9.13 (2.94)	6.42 (2.63)	4.92 (2.31)	3.30 (1.93)	5.35 (2.40)	5.90 (2.51)	5.90 (2.51)	5.35 (2.40)	2.77 (1.78)	2.40 (1.68)	2.55 (1.73)	4.05 (2.12)
T ₉	Untreated Control	8.60 (2.96)	8.70 (3.03)	8.75 (3.04)	8.93 (3.06)	8.82 (3.01)	8.07 (2.92)	8.07 (2.92)	8.08 (2.92)	8.10 (2.92)	8.15 (2.93)	8.25 (2.94)	8.02 (2.90)
	SE±	0.36	0.08	0.10	0.10	0.08	0.10	0.10	0.08	0.09	0.06	0.09	0.14
	CD (<i>p</i> =0.05)	N.S.	0.24	0.29	0.29	0.23	0.30	0.30	0.25	0.26	0.18	0.26	0.42

() -square root transformed values

Table 6: Efficacy of novel insecticides against thrips infesting chilli (Pooled)-Third and average of three sprays

Tr. No.	Treatment (@ Spray concentration)	No. of thrips per 3 leaves per plant												Mean	Percent reduction
		3 rd spray						Mean of three sprays							
		Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS	Pre count	1 DAS	3 DAS	7 DAS	10 DAS	14 DAS		
T ₁	Broflanilide 300 g/l SC (@ 0.0037%)	2.32 (1.67)	2.30 (1.66)	1.83 (1.52)	0.63 (1.06)	0.75 (1.11)	0.82 (1.15)	5.68 (2.47)	3.61 (2.02)	2.42 (1.70)	1.10 (1.26)	2.11 (1.61)	2.72 (1.79)	2.39 (1.67)	70.69 [57.73]
T ₂	Cyantraniliprole 10.26% OD (@ 0.0123%)	3.20 (1.92)	2.98 (1.86)	2.28 (1.65)	1.23 (1.31)	1.52 (1.42)	1.77 (1.50)	5.96 (2.53)	4.64 (2.26)	3.07 (1.88)	1.78 (1.49)	2.73 (1.79)	3.44 (1.98)	3.13 (1.88)	61.55 [51.97]
T ₃	Emamectin benzoate 05% SG (@ 0.0020%)	5.75 (2.46)	5.52 (2.44)	5.03 (2.32)	4.73 (2.28)	4.50 (2.22)	4.65 (2.26)	6.62 (2.66)	6.03 (2.55)	4.82 (2.30)	4.29 (2.18)	4.13 (2.14)	5.48 (2.44)	4.95 (2.32)	39.45 [38.72]
T ₄	Fluxametamide 10% w/w EC 0.0080%)	2.58 (1.74)	2.62 (1.76)	2.12 (1.61)	0.93 (1.19)	0.98 (1.21)	1.12 (1.27)	5.73 (2.48)	4.18 (2.16)	2.83 (1.82)	1.56 (1.42)	2.50 (1.72)	2.99 (1.86)	2.81 (1.80)	65.74 [54.49]
T ₅	Isocycloseram 9.2% w/w DC (@ 0.0110%)	2.28 (1.63)	2.27 (1.66)	1.77 (1.50)	0.45 (0.97)	0.52 (1.00)	0.63 (1.06)	5.81 (2.50)	3.50 (1.99)	2.27 (1.66)	0.96 (1.20)	2.00 (1.57)	2.61 (1.76)	2.27 (1.64)	72.37 [58.84]
T ₆	Flubendiamide 19.92% + Thiacloprid 19.92% w/w SC (@ 0.0159%)	2.52 (1.73)	2.52 (1.73)	1.97 (1.55)	0.78 (1.13)	0.88 (1.17)	0.98 (1.22)	5.48 (2.43)	3.98 (2.11)	2.64 (1.76)	1.39 (1.37)	2.36 (1.68)	2.88 (1.83)	2.65 (1.75)	67.64 [55.70]
T ₇	Profenofos 40% + Fenpyroximate 02.50% w/w EC (@ 0.0850%)	7.03 (2.71)	6.38 (2.60)	5.83 (2.49)	5.33 (2.39)	5.08 (2.33)	5.13 (2.35)	7.04 (2.71)	6.60 (2.66)	5.69 (2.48)	5.12 (2.36)	4.73 (2.28)	6.10 (2.55)	5.65 (2.47)	31.01 [33.33]
T ₈	Emamectin Benzoate 5% w/w + Lufenuron 40% w/w WG (@ 0.0054%)	4.05 (2.12)	3.75 (2.05)	3.65 (2.03)	3.07 (1.88)	3.95 (2.10)	4.15 (2.13)	6.05 (2.52)	5.17 (2.37)	3.78 (2.06)	2.92 (1.84)	3.95 (2.10)	4.70 (2.26)	4.10 (2.13)	50.05 [45.04]
T ₉	Untreated Control	8.02 (2.90)	7.95 (2.88)	7.90 (2.89)	7.82 (2.88)	7.83 (2.89)	7.78 (2.88)	8.09 (2.92)	8.24 (2.95)	8.25 (2.95)	8.30 (2.96)	8.30 (2.95)	7.96 (2.90)	8.21 (2.94)	0.00 [0.00]
SE±		0.14	0.10	0.09	0.08	0.08	0.11	0.17	0.06	0.04	0.05	0.04	0.09	0.04	1.16
CD (<i>p</i> =0.05)		0.42	0.31	0.27	0.25	0.24	0.32	N.S.	0.19	0.13	0.14	0.12	0.26	0.12	3.47

() -square root transformed values, [] -angular transformed values, DAS-Days after spray

Table 7: Effect of novel insecticides application on yield of green chilli

Tr. No.	Treatment (@ Spray concentration)	Yield of green chilli (q ha ⁻¹)		
		2023-24	2024-25	Pooled
T ₁	Broflanilide 300 g/l SC (@ 0.0037%)	121.63	124.66	123.14
T ₂	Cyantraniliprole 10.26% OD (@ 0.0123%)	115.18	114.24	114.71
T ₃	Emamectin benzoate 05% SG (@ 0.0020%)	111.92	107.77	109.85
T ₄	Fluxametamide 10% w/w EC (@ 0.0080%)	117.85	124.23	121.04
T ₅	Isocycloseram 9.2% w/w DC (@ 0.0110%)	125.34	130.08	127.71
T ₆	Flubendiamide 19.92% + Thiacloprid 19.92% w/w SC (@ 0.0159%)	132.02	134.71	133.37
T ₇	Profenofos 40% + Fenpyroximate 02.50% w/w EC (@ 0.0850%)	101.92	98.51	100.22
T ₈	Emamectin Benzoate 5% w/w + Lufenuron 40% w/w WG (@ 0.0054%)	113.44	105.19	109.32
T ₉	Untreated Control	88.39	84.97	86.68
	SE±	5.96	4.00	3.99
	CD (<i>p</i> =0.05)	17.85	11.98	11.97

References

- Ahmed K, Mehmood MG, Murthy NSR. Losses due to various pests in pepper. Capsicum Newsletter. 1987;6:83-84.
- Ananthakrishnan TN. Thrips: Biology and control. McMillan Company of India, Delhi press, Delhi. 1971:120.
- Anu A, Sireesha K, Rachana RR. Comparative Bio Assay of new generation insecticides against invasive southeast asian thrips, *Thrips parvispinus* (Karny). J Sci Res Rep. 2024;29(1):97-101. doi:10.9734/JSRR/2024/v29i1.2525.
- Ataide LMS, Vargas G, Velazquez-Hernandez Y, Reyes-Arauz I, Villamarin P, Canon MA, *et al.* Efficacy of conventional and biorational insecticides against the invasive pest *Thrips parvispinus* (Thysanoptera: Thripidae) under containment conditions. Insects. 2024;15:48. <https://doi.org/10.3390/insects15010048>.
- Bekelja KM, Malone S, Mascarenhas V, Taylor SA. A novel insecticide, isocycloseram, shows promise as an alternative to chlorpyrifos against a direct pest of peanut, *Diabrotica undecimpunctata Howardi* (Coleoptera: Chrysomelidae). J Econ Entomol. 2024;117(2):537-544. doi:10.1093/jee/toae017. PMID: 38366888.
- Bhede B, Suryawanshi DS, Moore DG. Population dynamics and bioefficacy of newer insecticide against chilli thrips, *Scirtothrips dorsalis* (Hood). Indian J Entomol. 2008;70:223-226.
- Blythe J, Earley FGP, Piekarska-Hack K, Firth L, Bristow J, Hirst EA, *et al.* The mode of action of isocycloseram: A novel isoxazoline insecticide. Pestic Biochem Physiol. 2022;187:105217. doi:10.1016/j.pestbp.2022.105217.
- Bojan V, Nagalingam K, Dharmar K, Kuttalam S. Bioefficacy of flubendiamide + thiacloprid 480 SC against insect pests of tomato. Pestology. 2010;34:44-48.
- Chen JC, Cao LJ, Sun LN, Gao YF, Cao HQ, Ma ZZ, *et al.* Variation in the toxicity of a novel meta-diamide insecticide, broflanilide, among thrips pest species and developmental stages. Pest Manag Sci. 2022;78(11):4933-4942. doi:10.1002/ps.7124.
- Hemalatha G, Omprakash S, Vijayalakshmi K, Ramya V. Evaluating efficacy of novel insecticides against *Thrips tabaci*, under high density planting system on cotton. J Adv Biol Biotechnol. 2025;28:1589-1596. doi:10.9734/jabb/2025/v28i72672.
- Kaur A, Chandi RS, Sharma S. Efficacy of Belt expert 480SC (flubendiamide 19.92% + thiacloprid 19.92% SC) against thrips and fruit fly in cucumber. Indian J Plant Protect. 2021;48(3):137-142.
- Krishna KNK, Aradhya M, Deshpande AA, Anand N, Ramachandar PR. Screening of chilli and sweet pepper germplasm for resistance to chilli thrips, *Scirtothrips dorsalis* Hood. Euphotic. 1996;89:319-324.
- Murali MK, Anandmurthy T, Dileepkumar NT, Shivanna B, Archana BR. Bio-efficacy of novel insecticides and biorationals against invasive thrips, *Thrips parvispinus* (Karny) (Thripidae: Thysanoptera) on chilli. Pest Manag Horticult Ecosyst. 2023;29(1):97-103. doi:10.5958/0974-4541.2023.00015.2.
- Pradhan PK. Bayer Insecticide: Revolutionizing Crop Protection for Sustainable Farming. Agritell, Agriculture Blogs. 2025. <https://www.agritell.com/agriculture-article/bayer-insecticide/>.
- Prajapati RV, Patel SD. Bio-efficacy of insecticides against gram pod borer (*Helicoverpa armigera*) infesting pigeon pea. Plant Arch. 2025;25(2):3050-3053.
- Shen N, Li Y, Leviticus K, Chang XL, Tang T, Cui L, Zhao CQ. Effect of broflanilide on the phytophagous mite *Tetranychus urticae* and the predatory mite *Typhlodromips swirskii*. Pest Manag Sci. 2021;77(6):2964-2970.
- Shimat VJ. Efficacy of isocycloseram and spinosad against redbanded thrips in containerized blueberry in greenhouse, 2023. Arthropod Manag Tests. 2024;49(1):107. <https://doi.org/10.1093/amt/tsae107>.
- Venkateshalu AG, Srinivas SN, Hanumantharaya L. Bio-efficacy of plant product, Stanza against chilli thrips, *Scirtothrips dorsalis* Hood and chilli mite, *Polyphagotarsonemus latus* (Banks). Karnataka J Agric Sci. 2009;22(3):559-560.
- Wale SD, Mohite PB. Evaluation of Broflanilide 300 g/l SC against *Plutella xylostella* L. and *Spodoptera litura* Fab. on Cabbage, Brassica oleracea var. capitata L. Ann Plant Protect Sci. 2019;27(3):316-319.