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EVALUATING THE EFFICACY OF NOVEL INSECTICIDES AGAINST PESTS OF SESAME

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ABSTRACT

Sesame (*Sesamum indicum* L.) is a significant oilseed crop in India, often referred to as the "Queen of Oilseed Crops" due to its high-quality polyunsaturated stable fatty acids. This study investigated the efficacy of novel insecticides against major pests affecting sesame. The field study was conducted during the *Kharif* and summer seasons at the Krishi Vigyan Kendra in Kalaburagi, University of Agricultural Sciences, Raichur, Karnataka. The experiment comprised seven treatments, each replicated three times, with a spacing of 30 cm x 15 cm. Insecticides were applied twice to control the leaf roller and gall fly populations. The results indicated that broflanilide 20% SC at a rate of 0.3 ml/L was the most effective in reducing the larval population of the leaf roller, followed by chlorantraniliprole 18.5% SC at 0.3 ml/L and fluxametamide 10% EC at 0.6 ml/L. In contrast, chlorantraniliprole 18.5% SC at 0.3 ml/L demonstrated the highest efficacy against the gall fly.

Key words : Leaf roller, Gall fly, Novel Insecticide, Broflanilide, Chlorantraniliprole.

Introduction

Sesamum indicum Linn. (Pedaliaceae), commonly referred to as sesame, is often dubbed the "Queen of oilseed crops" for the exceptional quality of oil it produces, which is rich in stable fatty acids that help oxidative rancidity. Additionally, sesame contains antioxidants such as sesamol, sesamolin and sesamolinol. Other for sesame. sesame, benniseed, qinqelly, sisim, til, and hawari. This edible oilseed crop is primarily in India, where seeds contain 52- 52-57% and 25 25% (Smith *et al*., 2000). Lack of wider adaptable cultivars, capsule breaking at maturity, asynchronous maturity, poor stand establishment, lack of fertilizer reactions, profuse branching, low harvest index are the main obstacles to sesamum production globally (Ashri, 1994). Factors which are responsible for for lower production and productivity of sesame are biotic and abiotic factors. Among them, insect pests are one of the important limiting factors affecting the production of such an important oilseed crop sesame both in quality and quantity (Egonyu *et al*., 2005 and Ahirwar *et al*., 2010). The different types of insect pests can affect sesamum, although the proportional importance of different insects varies considerably between nations. Certain species prioritize their economic significance by preying on flower heads and immature fruit, whereas in other species, leaf eaters are the primary source of loss. Approximately 65 distinct insect pest species target sesamum at different plant development phases. The major pests attacking on sesamum are -Leaf roller: *Antigastra catalaunalis* (Duponchel), Sphinx or Dead head moth: *Acherontia styx* (Westwood), Linseed Gall fly: *Dasvneura sesami*, Gall fly: *Asphondylia sesami* (Felt), Jassid: *Orosius albicinctus*, Aphids: *Aphis gossypii* (Glover), Mites: *Polyphagotarsonemus latus*, Bihar hairy caterpillar: *Spilaretia oblique* (Walker), Surface grasshopper: *Chrotogonus trachypterus*

(Blanch), White fly: *Bemisia tabaci* (Genn.) (Thakur *et al*., 2019). Amongst all, Sesamum leaf webber and capsule borer (*Antigastra catalaunalis* Duponchel) Lepidoptera: Pyraustidae was considered to be most destructive pest, throughout India. Fletcher (1914) for the first time reported the occurrence of this pest on Sesamum plants from South India. The use of newer insecticides to control major sesame pests is important for improved pest control efficiency and reduced environmental impact. These insecticides, such as systemic and diamide-based products, provide a targeted effect and minimize damage to non-target organisms such as beneficial insects. In addition, they are more effective in controlling resistant pest populations and have a longer residual effect, reducing the frequency of application. This approach supports sustainable pest control and improves crop protection during critical growth phases.

Materials and Methods

The field experiment was conducted during the *Kharif* and Summer season of 2023-24 on a sesamum crop. The experiment was designed using a Randomized Block Design, which included eight treatments and three replications, adhering to all recommended agricultural practices except for the plant protection schedule. Marginal spacing of 1.0 m was maintained between replications and 0.5 m between treatments. The gross plot size was 4.5 m × 3.0 m, while the net plot size was 3.6 m × 2.8 m, ensuring appropriate spacing for accurate data collection and replication across treatments.

Table 1 : Details of chemicals pesticides used for the management of sesamum pests.

Treatment details	g.a.i/ha	Dosage (ml/lit)
T_1: Flubendiamide 39.35 SC	29.51	0.15ml
T_2: Chlorantraniliprole 18.5 SC	27.75	0.3ml
T_3: Imidacloprid 17.8 SL	26.7	0.3 ml
T_4: Novaluron 5.25+Indoxacarb 4.5 SC	39.37+33.75	1.5ml
T_5: Broflanilide 20 SC	30	0.3 ml
T_6: Fluxametamide 10 EC	30	0.6 ml
T_7: Untreated control	-	-

The treatment was administered 30 days after germination, with the second spray applied 15 days following the first. Observations of the leaf roller (*Antigastra catalaunalis*) were recorded prior to the spray and at 3, 7, and 10 days after each application in both seasons. For the gall fly (*Asphondylia sesami*), assessments of damaged and healthy flowers were conducted after the second spray, on the same days as those for the leaf roller. Five randomly selected plants per treatment plot were evaluated for both pests. The number of leaf roller larvae per plant was recorded to assess the level of infestation. For the gall fly, the counts of damaged and healthy flowers were used to calculate the percentage of flower damage. Treatments were randomized within each block separately. Plots were numbered and labelled accordingly. The application of insecticides was performed using a knapsack sprayer, ensuring uniform coverage of the insecticide in each plot.

Methodology followed to record the insect pests

Leaf roller (*A. catalaunalis*) : The number of larvae per plant was recorded from 5 randomly selected plants of sesamum.

Gall fly (*A. sesami*) : Number of flowers and capsule malformed was counted out of total flowers /plant from 5 randomly selected plants of sesamum.

$$\text{Per cent flower damage} = \frac{\text{No. of damaged flowers}}{\text{Total no. of flowers}} \times 100$$

Statistical analysis

The field observations recorded were subjected to statistical analysis (RBD) to know the significant difference among treatments. The population data was transformed to square root transformation ($\sqrt{X+0.5}$), while values in percentages were transformed to arc sine values before analysis (Gomez and Gomez, 1984).

Results and Discussion

During the *Kharif* and Summer seasons, the effectiveness of newer insecticide treatments to control major pests such as leaf rollers and gall fly in sesame was studied. The results were analyzed, compared and reported as indicated below.

Efficacy of insecticides on leaf roller larval population

After first spray during *Kharif* season

One day prior to the spray, the mean larval population ranged from 4.92 to 4.29 per five plants, with no significant differences observed among the treatments, indicating a uniform distribution of the pest. The insecticide that was significantly more effective in reducing the population after the first spray was broflanide 20% SC @ 0.3ml/L (0.87 larvae per plant). This was followed by chlorantraniliprole 18.5% SC at 0.3 ml/L (1.20 larvae per plant), fluxametamide 10% EC at 0.6 ml/L (1.37 larvae per plant), and novaluron 5.25% + indoxacarb 4.5% SC at 1.5 ml/L (1.40 larvae per plant). The next most effective treatment was flubendiamide 39.35% SC at 0.15 ml/L

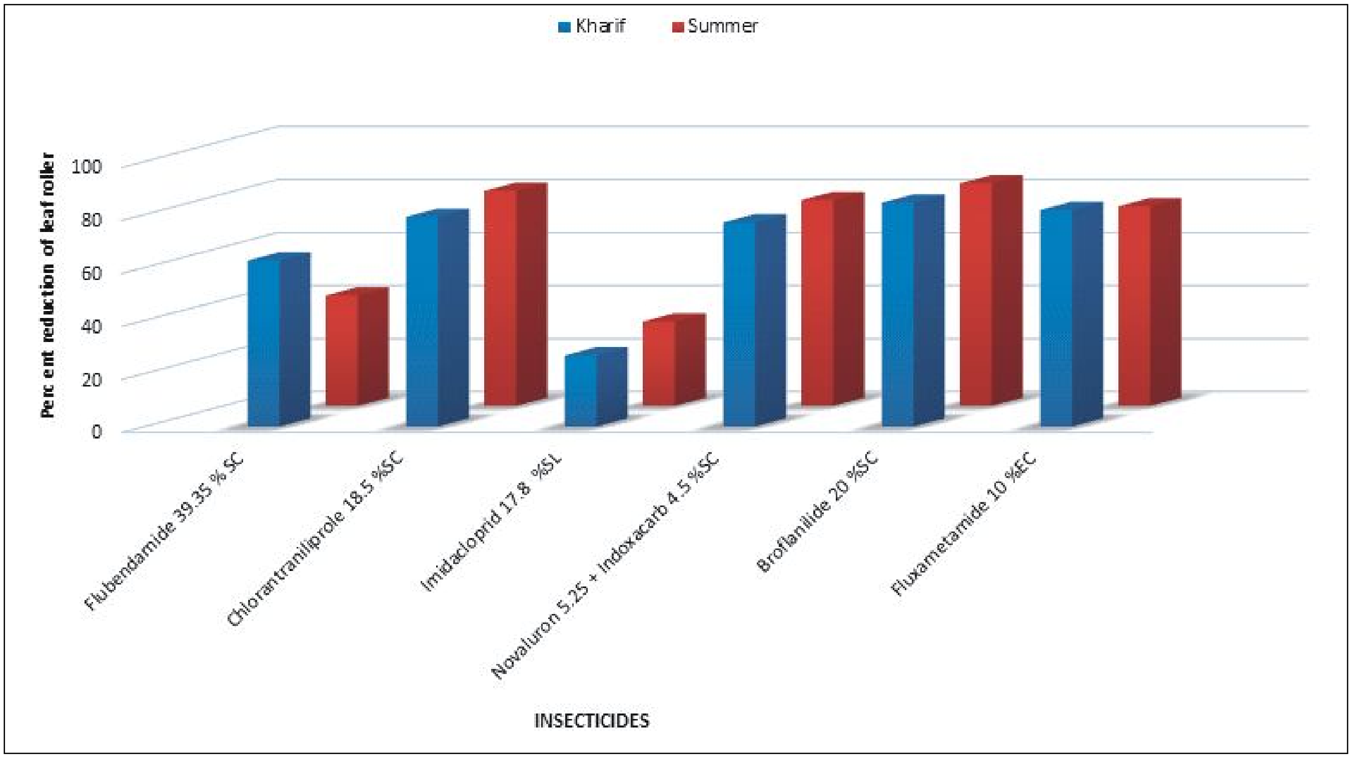

Fig. 1 : Per cent reduction of leaf roller incidence in different treatments during *Kharif* and Summer.

(2.15 larvae per plant). The least effective insecticide was imidacloprid 17.8% SL at 0.3 ml/L (3.06 larvae per plant) (Table 2).

After second spray during summer season

Table 2 indicates a further reduction in the larval population, specifically with fluxametamide 10% EC at 0.6 ml/L (0.45 larvae per plant), broflanid 20% SC at 0.3 ml/L (0.68 larvae per plant), novaluron 5.25% + indoxacarb 4.5% SC at 1.5 ml/L (0.88 larvae per plant), and chlorantraniliprole 18.5% SC at 0.3 ml/L (0.89 larvae per plant). These treatments were superior in reducing the larval population. Flubendiamide 39.35% SC at 0.15 ml/L (1.57 larvae per plant) was comparable to the aforementioned treatments. The least effective treatment was imidacloprid 17.8% SL at 0.3 ml/L (2.17 larvae per plant), which was on par with the untreated control.

Among all the treatments, the highest percentage reduction was observed with broflanilide 20% SC at a concentration of 0.3 ml/L, achieving an 84.40% reduction. The treatment with fluxametamide 10% EC at 0.6 ml/L demonstrated an 81.70% reduction. In contrast, the lowest reduction was noted with imidacloprid 17.8% SL at 0.3 ml/L, which resulted in a 26.80% reduction.

After first spray during summer season

One day prior to the spray, the mean larval population increased from 2.53 to 2.27, and no significant differences were observed among the treatments, indicating a uniform distribution of the pest. The treatment that was significantly more effective in reducing the population after the first spray was broflanide 20% SC at a rate of 0.3 ml/litre (0.53 larvae per plant). The next most effective treatments included chlorantraniliprole 18.5% SC at 0.3 ml/litre (0.90 larvae per plant), novaluron 5.25% + indoxacarb 4.5% SC at 1.5 ml/litre (1.00 larvae per plant), fluxametamide 10% EC at 0.6 ml/litre (1.07 larvae per plant), and flubendiamide 39.35 SC at 0.15 ml/litre (2.08 larvae per plant), all of which were comparable to the aforementioned treatments. The least effective insecticide was imidacloprid 17.8 SL at 0.3 ml/litre (2.35 larvae per plant), which was on par with the untreated control treatment (Table 3).

After second spray during summer season

Further reductions in the larval population were observed in the treatments of chlorantraniliprole 18.5% SC at 0.3 ml/litre (0.53 larvae per plant), broflanilide 20% SC at 0.3 ml/litre (0.68 larvae per plant), novaluron 5.25% + indoxacarb 4.5% SC at 1.5 ml/litre (0.69 larvae per plant), and fluxametamide 10% EC at 0.6 ml/litre (0.80 larvae per plant). The next most effective treatment was flubendiamide 39.35% SC at 0.15 ml/litre (2.33 larvae / plant) were at par with the above the treatments. The least effective insecticide was imidacloprid 17.8% SL at 0.3 ml/litre (2.81 larvae per plant), which was on par with the untreated control.

Table 2 : Efficacy of insecticides against leaf roller during *Kharif* season, 2023.

Treatment details	Dosage g.a.i/ha	Number of leaf roller larvae/plant*									Overall after spray mean	Reduction over control (%)
		After 1st spray					After 2nd spray					
		Pre count	3 DAS	7 DAS	10 DAS	Mean population after spray	3 DAS	7 DAS	10 DAS	Mean population after spray		
T_1: Flubendiamide 39.35 % SC	29.51	4.92 (2.33)*	2.77(1.81)	2.56(1.75)	1.12(1.27)	2.15(1.63)^{ab}	1.52(1.42)	2.14(1.62)	1.05(1.24)	1.57(1.44)^{ab}	1.86	62.60
T_2: Chlorantraniliprole 18.5% SC	27.75	4.85(2.31)	1.37(1.37)	1.00(1.22)	1.22(1.31)	1.20(1.30)^{ab}	1.08(1.26)	0.50(1.00)	1.08(1.26)	0.89(1.18)^{a}	1.04	79.10
T_3: Imidacloprid 17.8% SL	26.7	4.23(2.17)	3.24(1.93)	2.76(1.81)	3.17(1.92)	3.06(1.89)^{bc}	4.32(2.20)	4.20(2.17)	4.15(2.16)	4.22(2.17)^{bc}	3.64	26.80
T_4: Novaluron 5.25%+Indoxacarb 4.5%SC	39.37+ 33.75	4.29(2.19)	1.24(1.32)	1.87(1.54)	1.10(1.26)	1.40(1.38)^{ab}	1.18(1.30)	0.96(1.21)	0.50(1.00)	0.88(1.17)^{a}	1.14	77.00
T_5: Broflanilide 20% SC	30	4.44(2.22)	0.90(1.18)	1.10(1.26)	0.60(1.05)	0.87(1.17)^{a}	0.50(1.00)	0.65(1.07)	0.90(1.18)	0.68(1.09)^{a}	0.78	84.40
T_6:Fluxametamide 10% EC	30	3.98(2.12)	1.76(1.50)	1.27(1.33)	1.07(1.25)	1.37(1.37)^{ab}	0.44(0.97)	0.12(0.79)	0.80(1.14)	0.45(0.98)^{a}	0.91	81.70
T_7: Untreated control	-	4.89(2.32)	4.26(2.18)	4.78(2.30)	5.65(2.48)	4.90(2.32)^{c}	5.23(2.39)	4.64(2.27)	5.28(2.40)	5.05(2.36)^{c}	4.97	-
S.Em (±)		0.04	0.20	0.06	0.08	0.07	0.08	0.06	0.09	0.07	-	-
C.D @ 5 %		NS	0.63	0.19	0.27	0.21	0.25	0.20	0.29	0.24	-	-

*DAS: Days After Spray
*Mean of 5 plants observation
*Figures in parentheses are square root ($\sqrt{x + 0.5}$) transformation values.
*Means followed by similar alphabets are not differ statistically as per DMRT in a column.

Table 3 : Efficacy of insecticides against leaf roller during Summer, 2024.

Treatment details	Dosage (g.a.i/ha)	Number of larvae/plant*										Overall mean after spray
		After 1st spray					After 2nd spray					
		Pre count	3DAS	7DAS	10DAS	Mean population after spray	Pre count	3DAS	7DAS	10DAS	Mean population after spray	
T_1: Flubendiamide 39.35 % SC	29.51	2.36 (1.69)*	1.89(1.55)	2.10(1.61)	2.25(1.66)	2.08(1.61)[ab]	2.94(1.85)	2.37(1.69)	2.31(1.68)	2.32(1.68)	2.33(1.68)[ab]	2.21
T_2: Chlorantraniliprole 18.5% SC	27.75	2.48(1.72)	1.08(1.26)	0.98(1.22)	0.64(1.07)	0.90(1.18)[ab]	3.10(1.90)	0.36(0.93)	0.56(1.03)	0.66(1.08)	0.53(1.01)[a]	0.71
T_3: Imidacloprid 17.8% SL	26.7	2.32(1.68)	2.22(1.65)	2.38(1.70)	2.46(1.72)	2.35(1.69)[bc]	3.01(1.87)	2.66(1.78)	2.84(1.83)	2.92(1.85)	2.81(1.82)[bc]	2.58
T_4: Novaluron 5.25%+Indoxacarb 4.5% SC	39.37+ 33.75	2.39(1.70)	1.37(1.37)	0.69(1.09)	0.93(1.20)	1.00(1.22)[ab]	3.08(1.89)	0.71(1.10)	0.52(1.01)	0.85(1.16)	0.69(1.09)[a]	0.85
T_5: Broflanilide 20% SC	30	2.27(1.66)	0.38(0.94)	0.52(1.01)	0.68(1.09)	0.53(1.01)[a]	3.12(1.90)	1.06(1.25)	0.43(0.96)	0.56(1.03)	0.68(1.09)[a]	0.61
T_6: Fluxametamide 10% EC	30	2.33(1.68)	0.74(1.11)	1.14(1.28)	1.32(1.35)	1.07(1.25)[ab]	2.90(1.84)	0.79(1.14)	0.68(1.09)	0.93(1.20)	0.80(1.14)[a]	0.93
T_7: Untreated control	—	2.53(1.74)	3.34(1.96)	3.48(1.99)	3.94(2.11)	3.59(2.02)[c]	3.71(2.05)	3.79(2.07)	4.02(2.13)	4.15(2.16)	3.99(2.12)[c]	3.79
S.Em (±)		0.06	0.07	0.06	0.06	0.07	0.05	0.06	0.07	0.06	0.06	-
C.D @ 5 %		NS	0.22	0.20	0.20	0.22	NS	0.20	0.21	0.20	0.20	-

* DAS: Days after spray
* Mean of 5 plants observation
* Figures in parentheses are square root ($\sqrt{x + 0.5}$) transformation values
*Means followed by similar alphabets are not differ statistically as per DMRT in a column.

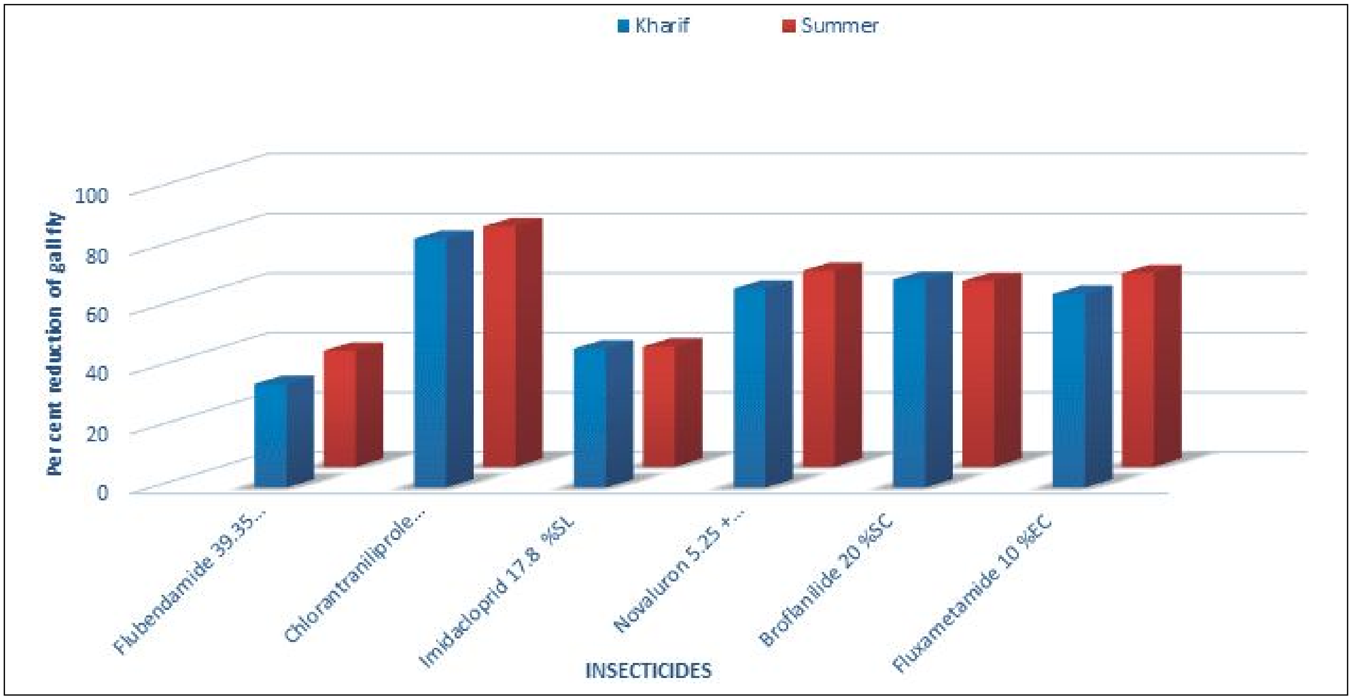

Fig. 2 : Per cent reduction of gall fly incidence in different treatments during *Kharif* and Summer.

Among all the treatments, the highest percentage reduction was observed with broflanilide 20% SC at a concentration of 0.3 ml/litre, achieving an 84.02% reduction. The treatment with chlorantraniliprole 18.5% SC at the same concentration of 0.3 ml/litre demonstrated an 81.16% reduction. In contrast, the lowest reduction was recorded with imidacloprid 17.8% SL at 0.3 ml/litre, which resulted in a 31.85% reduction (Fig. 1).

The results of the present investigation are partially consistent with those reported by Rachappa et al. (2020), which indicated that broflanilide 30% SC, applied at dosages of 18.6 g a.i./ha and 12.6 g a.i./ha, was highly effective in controlling *Helicoverpa armigera* (0.19 and 0.42 larvae per 5 plants, respectively) and *Maruca vitrata* (0.97 and 1.09 webs per 5 plants, respectively).

Efficacy of insecticides on gall fly

During insecticidal imposition on crop, second spray was considered for efficacy of insecticides against per cent flower infestation of *A. sesami* due to this pest is active during flowering stage of the crop.

After second spray during *Kharif* season

Before spray, the mean population was from 5.15-4.99 and indicating uniform distribution of the pest. The treatment which was significantly superior in reducing the population after was chlorantraniliprole 18.5% SC @ 0.3ml/L (0.95) and next best treatments were broflanilide 20% SC @ 0.3ml/L (1.74), novaluron 5.25% + indoxacarb 4.5% SC @1.5ml/L (1.91) and fluxametamide 10% EC @0.6 ml/L (2.01) were on par with each other. The treatment which was least effective was imidacloprid 17.8% SL @ 0.3m (3.06).

Among all the treatments, highest per cent reduction was found in the treatment chlorantraniliprole 18.5% SC@ 0.3ml/L with 83.34 per cent. However, lowest reduction was observed in the treatment flubendiamide 20% SC @0.15ml/L at 34.71 per cent.

After second spray during summer season

One day before spray, the mean pest population ranged from 3.20 to 3.30, with no significant differences observed among the treatments, indicating a uniform distribution of the pest. The most effective treatment for minimizing the pest population was chlorantraniliprole 18.5% SC at a rate of 0.3 ml/litre, resulting in a flower infestation rate of 0.73%. The next most effective treatments included novaluron 5.25% + indoxacarb 4.5% SC at 1.5 ml/litre (1.29% flower infestation), broflanilide 20% SC at 0.3 ml/litre (1.42% flower infestation), and fluxametamide 10% EC at 0.6 ml/litre (1.32% flower infestation), all of which were statistically comparable to the above treatments. The least effective insecticides were imidacloprid 17.8% SL at 0.3 ml/litre (2.24% flower infestation) and flubendiamide 20% SC at 0.15 ml/litre (2.30% flower infestation) (Table 4).

Among all the treatments, the highest percentage reduction was observed with chlorantraniliprole 18.5% SC at a concentration of 0.3 ml/litre, achieving a reduction of 80.48%. Conversely, the lowest reduction was noted with flubendiamide 20% SC at a concentration of 0.15

Table 4 : Efficacy of insecticides against gall fly during *Kharif*, 2023.

Treatment details	Dosage g.a.i/ha	Second spray at 45 days after sowing					Reduction over control (%)
		Pre count	3 DAS	7 DAS	10 DAS	Mean population after spray	
T_1:Flubendiamide 39.35 % SC	29.51	5.10(13.05)	4.92(12.82)	3.84(11.30)	2.45(9.01)	3.74(11.15)[d]	34.71
T_2: Chlorantraniliprole 18.5% SC	27.75	4.57(12.34)	1.42(6.84)	0.62(4.52)	0.82(5.20)	0.95(5.60)[a]	83.34
T_3:Imidacloprid 17.8% SL	26.7	4.54(12.30)	2.52(9.13)	3.22(10.34)	3.45(10.70)	3.06(10.08)[c]	46.48
T_4:Novaluron 5.25%+Indoxacarb 4.5% SC	39.37+ 33.75	4.23(11.87)	2.52(9.13)	2.02(8.17)	1.20(6.29)	1.91(7.95)[b]	66.57
T_5:Broflanilide 20% SC	30	4.24(11.88)	1.02(5.80)	2.15(8.43)	2.05(8.23)	1.74(7.58)[b]	69.60
T_6:Fluxametamide 10% EC	30	4.67(12.48)	1.14(6.13)	2.06(8.25)	2.84(9.70)	2.01(8.16)[b]	64.82
T_7:Control	-	5.45(13.50)	5.55(13.63)	5.64(13.74)	5.98(14.15)	5.72(13.84)[e]	
S.Em (±)		-	0.09	0.05	0.06	0.05	
C.D @ 5 %		-	0.29	0.15	0.21	0.16	

*DAS: Days after spray *Mean of 5 plants observation * Figures in parentheses are arc sine values.
*Means followed by similar alphabets are not differ statistically as per DMRT in a column.

Table 5 : Efficacy of insecticides against gall fly during Summer, 2024.

Treatment details	Dosage (g.a.i./ha)	Flower damage (%)				
		After 2nd spray				
		Pre count	3 DAS	7DAS	10DAS	Mean population after spray
T_1: Flubendiamide 39.35 % SC	29.51	3.24 (10.37)	2.32 (8.76)	2.22 (8.57)	2.35 (8.82)	2.30 (8.72)[c]
T_2: Chlorantraniliprole 18.5% SC	27.75	3.22 (10.34)	0.62 (4.52)	0.76 (5.00)	0.82 (5.20)	0.73 (4.91)[a]
T_3: Imidacloprid 17.8% SL	26.7	3.20 (10.30)	1.74 (7.58)	2.84 (9.70)	2.15 (8.43)	2.24 (8.61)[c]
T_4: Novaluron + Indoxacarb 5.25% + 4.5% SC	-39.37+ 33.75	3.24 (10.37)	0.98 (5.68)	1.37 (6.72)	1.52 (7.08)	1.29 (6.52)[b]
T_5: Broflanilide 20% SC	30	3.28 (10.43)	0.78 (5.07)	1.38 (6.75)	2.10 (8.33)	1.42 (6.84)[b]
T_6: Fluxametamide 10% EC	30	3.23 (10.35)	0.88 (5.38)	1.88 (7.88)	1.20 (6.29)	1.32 (6.60)[b]
T_7: Untreated Control	-	3.30 (10.47)	3.65 (11.01)	3.74 (11.15)	3.88 (11.36)	3.76 (11.18)[d]
S.Em (±)		0.06	0.07	0.07	0.06	0.07
C.D @ 5 %		NS	0.20	0.20	0.19	0.20

*DAS: Days after spray *Mean of 5 plants observation *Figures in parentheses are arc sine values.
*Means followed by similar alphabets are not differ statistically as per DMRT in a column.

ml/litre, resulting in a reduction of only 38.86% (Fig. 2).

The studies are partially in line with the results of Pande (2019), which that that, based the basis percent percentage gall fly, fly infestation, the treatments of 18.5% SC @ at 0.006%, by fenvalerate 20% EC @ at 0.012%, novaluron 5.25% + indoxacarb 4.5% SC @ at 0.014%, found to be be the effective in order of merit.

Broflanilide 20% SC is a member of the meta-diamide group and functions as an allosteric modulator of GABA-gated chloride channels. It interferes with nerve signal transmission, resulting in paralysis and mortality in insect larvae (Sparks et *al.*, 2020). This innovative mode of action renders it particularly effective against lepidopteran pests, such as leaf rollers, which accounts for the significant larval mortality observed in this study (84.40% reduction).

Chlorantraniliprole 18.5% SC is an anthranilic diamide insecticide that specifically targets ryanodine receptors (RyRs). This action results in uncontrolled calcium release in muscle cells, ultimately leading to paralysis and death (Lahm *et al*., 2009). Since leaf rollers and gall flies depend on continuous muscle movement for feeding and survival, this mechanism effectively reduces their populations. The highest efficacy, with an 83.34% reduction in gall fly populations, can be attributed to its systemic activity, which provides protection even in concealed areas such as flower buds, where the pest lays its eggs.

Conclusion

The high efficacy of broflanilide 20% SC and chlorantraniliprole 18.5% SC in controlling leaf roller and gall fly is the result of their high activity, new modes rollers action, and flies fluxametamide attributed to novaluron potent indoxacarb results from their selective mechanisms novel their effects. By comparison, flubendiamide had minimal residual activity, while imidacloprid was least potent because it targets sucking insects over lepidopteran. In contrast, the effectiveness and the combination of and stems mechanisms, which manifest Comparatively, exhibited demonstrated the potency.

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References

Ahirwar, R.M., Gupta M.P. and Banerjee S. (2010). Field efficacy of natural and indigenous products on sucking pests of sesame. *Indian J. Nat. Prod. Resources*, **1(2)**, 221-226.

Ashri, A. (1994). Genetic resources of sesamum Present and future perspectives. *J. Enviorn Eco.*, **31(4A)**, 1878-1841.

Egonyu, J.P., Kyamanywa S., Anyang W. and Sekabembe C.K. (2005). Review of pests and diseases of sesame in Uganda. *Afr. Crop Sci. Conf. Proceed.*, **7**, 1411-1416.

Fletcher, T.B. (1914). Some south Indian insects and other animals of importance. Govt. Press, Madras, 441.

Gomez, K.A. and Gomez A. (1984). Statistical procedures for Agricultural Research. A Willey- inter Science., New York (UAS). *Agric. Res*., 5: 241-247.

Lahm, G.P., Cordova D. and Barry J.D. (2009). New and selective ryanodine receptor activators for insect control. *Bioorganic & Medicinal Chemistry*, **17(12)**, 4127-4133.

Pande, Pavan, Haridas (2019). Evaluation of newer insecticides against major insect pests of sesame. Department of Agricultural Entomology, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. *M. Sc.* 2019.

Rachappa, V., Rajput R., Teggelli R., Karbantnal S.S. and Rathod P. (2020). Management of pigeon pea pod borers using a novel meta diamide molecule: broflanilide 30% SC. *J. Entomol. Zool. Stud*., **8(2)**, 1625-1630.

Smith, D.T., Grichar W.J. and McCallum A.A. (2000) Texas Agricultural Experiment Station, College Station and Yoakum prepared, 1-19.

Sparks, T.C., Watson G.B., Loso M.R., Geng C., Babcock J.M. and Thomas J.D. (2020). Broflanilide: A novel meta-diamide insecticide with a unique mode of action. *Pesticide Biochemistry and Physiology*, **168**, 104623.

Thakur, S.R., Nayak M.K., Ratan S. and Tiwari U.K. (2019). Seasonal incidence of major insect pests of sesamum with relation to weather parameters in Bundelkhand Zone of Madhya Pradesh. *Bull. Environ. Pharmacol. Life Sci.*, **8(10)**, 125-127.