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Comparative Field Performance of Recent Insecticide Molecules Against Major Sucking Pests in Hybrid Cotton

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ABSTRACT: A field experiment was conducted during the *Kharif* season of 2020 and 2021 at the Regional Research and Technology Transfer Station (OUAT), Bhawanipatna, Odisha, to evaluate the Comparative field performance of recent insecticide molecules against major sucking pests in hybrid cotton. The experiment was laid out in a randomized block design with eight treatments, including Spinetoram 11.7% @ 50g a.i./ha, Pyriproxyfen 10% EC @ 10g a.i./ha, Dinotefuran 20% SG @ 30g a.i./ha, Spiromesifen 240SC (22.9%) @ 144g a.i./ha, Flonicamid 50% WG @ 75g a.i./ha, Imidacloprid 200SL (17.8%) @ 25g a.i./ha and an untreated control in three replications. Among the treatments, Flonicamid 50% WG @ 75g a.i./ha recorded the lowest population of jassids (0.71/3 leaves), aphids (1.28/3 leaves) and thrips (0.32/3 leaves) after two sprays, followed by Spiromesifen 240SC @ 144 g a.i./ha. Imidacloprid 200SL @ 25g a.i./ha was most effective in reducing whitefly incidence (0.33/3 leaves), which was statistically on par with Spiromesifen and Flonicamid. The highest seed cotton yield (26.54 q/ha) was also recorded in Flonicamid-treated plots, showing a 40.95% increase over the untreated control followed by Spiromesifen (25.64 q/ha). The results indicate that Flonicamid 50% WG is highly effective in managing sucking pests and enhancing seed cotton yield in hybrid cotton cultivation.

Keywords: Hybrid cotton, sucking pests, new insecticides, efficacy, seed cotton yield.

INTRODUCTION

Cotton is one of the most important fibre and cash crops in India, holding significant global economic value. During 2023-24, India produced 32.52 million bales of cotton (each weighing 170 kg) from an area of 12.68 million hectares. In Odisha, cotton was cultivated on 0.22 million hectares, yielding 0.71 million bales with a productivity of 555 kg lint/ha (Anonymous, 2024). However, the productivity in national average remains below the state average of 436 kg lint/ha, largely due to the high incidence of insect pests, particularly sucking pests. The continuous monoculture of cotton has led to the widespread infestation of both chewing and sucking insect pests (Saeed *et al.*, 2007). In India, approximately 162 insect pest species are known to attack the cotton crop from sowing to harvest, causing yield losses of up to 50–60% (Agarwal *et al.*, 1984). Among these, sucking pests such as the cotton aphid (*Aphis gossypii* Glover), leafhopper (*Amrasca biguttula biguttula* Ishida), thrips (*Thrips tabaci* Lind.), and whitefly (*Bemisia tabaci* Genn.) are of major concern (Kadam *et al.*, 2014). These pests infest the crop throughout its growth stages, inflicting both direct damage and indirect yield losses. Satpute *et al.* (1990) reported a reduction of 22.85% in seed cotton yield due to sucking pest infestation alone. The indiscriminate and repeated use of conventional insecticides has led to several ecological and agronomic issues, including pest resistance, resurgence, secondary pest outbreaks, biodiversity loss, environmental contamination, residual toxicity and risks to human health. Despite these concerns, chemical control remains the most widely adopted pest management strategy due to its immediate efficacy and ease of application. In this context, newer insecticides characterized by lower application doses, novel modes of action and greater target specificity - offer promising alternatives for effective and

sustainable management of sucking pests in cotton. Therefore, the present study was undertaken to evaluate comparative field performance of recent insecticide molecules against major sucking pests in hybrid cotton.

MATERIALS AND METHODS

A field experiment was conducted during the Kharif season of 2020 and 2021 at the Regional Research and Technology Transfer Station, Bhawanipatna, under the Odisha University of Agriculture and Technology (OUAT)**,** located in Kalahandi district of Odisha. The experiment was laid out in a Randomized Block Design (RBD**)** with eight treatments in three replications. The treatments included: Spinetoram 11.7% SC @ 50g a.i./ha**,** Pyriproxyfen 10% EC @ 100g a.i./ha, Dinotefuran 20% SG @ 30g a.i./ha, Spiromesifen 240 SC (22.9%) @ 144g a.i./ha, Diafenthiuron 50WP @ 300g a.i./ha, Flonicamid 50%WG @ 75g a.i./ha, Imidacloprid 200 SL (17.8%) @ 25g a.i./ha and Untreated control (no spray). Sowing was done on 3rd July, 2020 and 6th 2021 using untreated seeds of the cotton hybrid Ajeet-155 BG II**,** placed at a spacing of 90 cm × 60 cm using the hand dibbling method with two seeds per hill. Recommended fertilizer dose was applied at 120:60:60 kg N:P_2O_5:K_2O/ha. Gap filling was carried out within 5-10 days after emergence, and thinning was done at 15 days after emergence to retain one healthy plant per hill. Intercultural and weeding operations were performed as and when required. Two foliar sprays of the insecticides were applied - the first at the economic threshold level (ETL) of the pests, and the second 15 days after the first spray**.** Observations on the population of major sucking pests- aphids, jassids, thrips and whiteflies - were recorded visually from three leaves (one each from the top, middle, and bottom canopy) on five randomly selected plants per plot. Data were collected one day before spraying and on the 3rd, 7th and 14th day after each spray**.** At harvest, the seed cotton yield from each treatment plot was recorded and expressed in quintals per hectare (q/ha)**.** Insect pest population data were subjected to square root transformation to normalize variance. Statistical analysis was carried out following the procedures outlined by Gomez and Gomez (1984). The standard error of means SE(m) and critical difference (CD) at 5% level of significance were calculated, and treatment means were compared accordingly.

RESULTS AND DISCUSSION

Jassids: Among the major sucking pests**,** jassid (*Amrasca biguttula biguttula*) emerged as the most serious threat to hybrid cotton during the cropping period. The pre-treatment population of jassids ranged from 6.83 to 7.33/3 leaves across all treatments (Table 1). Following the first spray, the lowest mean jassid population was recorded in the treatment with Flonicamid 50% WG @ 75g a.i./ha, which reduced the population to 1.33 jassids/3 leaves, followed by Spiromesifen 240 SC (22.9%) @ 144g a.i./ha with 2.92 jassids/3 leaves. After the second spray, Flonicamid 50% WG @ 75g a.i./ha achieved complete control of jassids, recording zero population/ 3 leaves. This was followed by Spiromesifen 240SC @ 144g a.i./ha with 0.33 jassids/3 leaves and both Spinetoram 11.7% SC @ 50g a.i./ha and Dinotefuran 20% SG @ 30g a.i./ha**,** which recorded 0.92 jassids/3 leaves**.** Considering the mean of both sprays, the lowest overall jassid population was recorded in Flonicamid 50% WG @ 75g a.i./ha with 0.71 jassids/3 leaves**,** followed by Spiromesifen 240SC @ 144g a.i./ha (1.75/3 leaves) and Dinotefuran 20%SG @ 30g a.i./ha (2.18/3 leaves). In contrast, the untreated control recorded the highest population of 10.36 jassids/3 leaves**,** indicating the effectiveness of newer insecticides, particularly Flonicamid, in suppressing jassid infestation in hybrid cotton.

The present findings are in close agreement with those of Hanchinal *et al.* (2024); Kamal *et al.* (2024), Santhoshi *et al.* (2022) ; Chinna Babu Naik *et al.* (2017), who reported that Flonicamid 50WG is highly effective in managing cotton leafhopper populations. Also, Ullah *et al.* (2024) reported that Flonicamid 50WG is most effective against leaf hopper and whitefly in cotton. Similarly, Chandi *et al.* (2016) observed a higher percent reduction in leafhopper population when Flonicamid was applied at 75g a.i./ha, supporting the efficacy recorded in the current study. These results are further corroborated by the findings of Kadam *et al.* (2014); Kumar and Dhawan (2011), who also reported maximum jassid mortality in Flonicamid-treated plots, indicating its consistent performance across different agro-climatic zones and experimental conditions.

Aphids: During the present investigation, the pre-treatment population of aphids (*Aphis gossypii*) ranged from 22.33 to 23.17/ 3 leaves across all treatments (Table 2). Significant differences among treatments were observed following the first insecticidal application. The lowest aphid population was recorded in the plot treated with Flonicamid 50% WG @ 75g a.i./ha, which reduced the population to 2.36 aphids/3 leaves, followed by Spiromesifen 240SC (22.9%) @ 144g a.i./ha (4.36 aphids/3 leaves) and Pyriproxyfen 10% EC @ 100g a.i./ha (5.86 aphids/3 leaves). A similar trend in treatment efficacy was observed after the second spray. Among all the treatments, Flonicamid 50% WG @ 75g a.i./ha remained the most effective, recording the lowest mean aphid population of 1.28/3 leaves, followed by Spiromesifen 240SC @ 144g a.i./ha (2.61 aphids/3 leaves) and Pyriproxyfen 10% EC @ 100g a.i./ha (4.25 aphids/3 leaves). In contrast, the untreated control plot recorded the highest aphid infestation with 28.78 aphids/3 leaves, highlighting the superior performance of Flonicamid in suppressing aphid populations in hybrid cotton.

The present findings are in line with the observations of Hanchinal *et al.* (2024); Kamal *et al.* (2024); Ghelani *et al.* (2014), who reported that treatments with Flonicamid 50WG resulted in significantly higher aphid mortality compared to other insecticides. Similarly, Gaurkhede *et al.* (2015) recorded the minimum aphid population in plots treated with Flonicamid 50WG @ 0.02%, confirming its strong field efficacy. Laboratory studies by Samih *et al.* (2011) also demonstrated the highest aphid mortality under controlled conditions

when Flonicamid was used. Furthermore, Morita *et al.* (2014) reported that Flonicamid exhibited broad-spectrum activity against various aphid species and was also effective against other sucking insect pests in cotton.

Thrips: The data presented in Table 3 indicate that the mean population of thrips before the initiation of insecticidal sprays was uniform across treatments, ranging from 7.67 to 8.58 thrips/3 leaves, showing no significant variation among plots at the pre-treatment stage. Following the first spray, a significant reduction in thrips population was observed across all treated plots. Flonicamid 50% WG @ 75g a.i./ha was the most effective, reducing the population to 0.61 thrips/3 leaves, followed by Spiromesifen 240SC (22.9%) @ 144g a.i./ha (1.39 thrips/3 leaves) and Imidacloprid 200SL (17.8%) @ 25g a.i./ha (2.17 thrips/3 leaves). After the second spray, the same trend in treatment efficacy was evident. Flonicamid continued to perform best, with the population declining further to 0.03 thrips/ 3 leaves, while Spiromesifen and Imidacloprid recorded 0.17 and 0.33 thrips/ 3 leaves, respectively. Overall, Flonicamid proved highly effective in suppressing thrips populations across both spray intervals, followed by Spiromesifen and Imidacloprid.

These findings are in conformity with the results reported by Hanchinal *et al.* (2024) who reported that Flonicamid 50WG was most effective in reducing thrips population in cotton. Also, Gaurkhede *et al.* (2015) noted that Fipronil 5SC, Flonicamid 50WG, Dinotefuran 20SG and Acetamiprid 20SP were effective in reducing thrips population in cotton. Similarly, Ghelani *et al.* (2014); Ravikumar *et al.* (2016) recorded maximum thrips mortality with the application of Flonicamid 50WG, supporting the superior performance observed in the present study. Comparable results were also reported by Meghana *et al.* (2018); Sathyan *et al.* (2016); Patil *et al.* (2009), further validating the efficacy of Flonicamid in managing thrips under field conditions.

Whitefly: The population of whitefly recorded during the study period was relatively low across all treatments (Table 4). However, noticeable differences were observed between treated plots and the untreated control after two consecutive sprays. The lowest mean whitefly population was recorded in the plot treated with Imidacloprid 200 SL (17.8%) @ 25g a.i./ha with 0.33 whiteflies/ 3 leaves, followed by Spiromesifen 240SC (22.9%) @ 144g a.i./ha (0.43/3 leaves) and Flonicamid 50% WG @ 75g a.i./ha (0.52/3 leaves). In contrast, the untreated control plot recorded a significantly higher population of 5.88 whiteflies/ 3 leaves, highlighting the effectiveness of the tested insecticides- particularly Imidacloprid in suppressing whitefly incidence in hybrid cotton.

The results obtained in the present investigation are in agreement with the findings of Ghosal and Chatterjee (2023), who reported that Imidacloprid 17.8 SL @ 50g a.i./ha was highly effective against whiteflies, recording the lowest population (1.55/plant) and achieving 83.15% reduction in whitefly infestation, along with the highest marketable fruit yield. Similarly, Afzal *et al.* (2014) reported that Imidacloprid was among the most effective insecticides in reducing whitefly populations, particularly upto seven days after application. These findings corroborate the current study, where Imidacloprid significantly suppressed whitefly populations and outperformed other treatments under field conditions.

Yield: The data presented in Table 4 show that the maximum mean seed cotton yield of 26.54 q/ha was recorded in the plot treated with Flonicamid 50% WG @ 75g a.i./ha, followed closely by Spiromesifen 240SC (22.9%) @ 144g a.i./ha with 25.04 q/ha, Pyriproxyfen 10% EC @ 100g a.i./ha with 24.96 q/ha, and Diafenthiuron 50 WP @ 300g a.i./ha with 24.87 q/ha. The untreated control plot recorded the lowest yield of 18.83 q/ha, indicating a significant yield increase in response to effective insecticidal management of sucking pests.

Table 1: Effect of the different newer chemicals on population of jassids in cotton (Pooled mean of 2 years).

Treatments	Mean Jassids population / 3 leaves										Mean of 2 sprays
	Before first spray	After 1st spray				Before second spray	After 2nd spray				
		3 DAS	7 DAS	14 DAS	Mean		3 DAS	7 DAS	14 DAS	Mean	
T_1: Spinetoram 11.7% @ 50 g a.i/ha	7.33 (2.80)*	2.75 (1.79)	3.50 (1.98)	3.75 (2.05)	3.33 (1.94)	4.08 (2.14)	1.25 (1.32)	1.00 (1.22)	0.92 (1.19)	1.06 (1.24)	2.19 (1.59)
T_2:Pyriproxyfen 10% EC @ 100 g a.i/ha	6.92 (2.72)	2.83 (1.83)	3.08 (1.89)	3.58 (2.02)	3.17 (1.91)	3.50 (2.00)	1.50 (1.41)	1.17 (1.29)	0.92 (1.19)	1.19 (1.30)	2.18 (1.61)
T_3:Dinotefuran 20% SG @ 30 g a.i/ha	6.75 (2.69)	2.92 (1.85)	3.25 (1.93)	3.75 (2.05)	3.31 (1.94)	4.00 (2.12)	1.17 (1.29)	1.08 (1.26)	0.92 (1.19)	1.06 (1.25)	2.18 (1.59)
T_4:Spiromesifen 240 SC (22.9%) @ 144 g a.i/ha	7.08 (2.75)	2.42 (1.71)	2.92 (1.85)	3.42 (1.98)	2.92 (1.84)	3.17 (1.91)	0.83 (1.15)	0.58 (1.04)	0.33 (0.90)	0.58 (1.03)	1.75 (1.44)
T_5:Diafenthiuron 50 WP @ 300 g a.i/ha	7.08 (2.75)	3.17 (1.91)	3.92 (2.09)	4.42 (2.21)	3.83 (2.07)	4.42 (2.22)	1.67 (1.47)	1.58 (1.44)	1.25 (1.32)	1.50 (1.41)	2.67 (1.74)
T_6:Flonicamid 50% WG @ 75 g a.i/ha	6.83 (2.70)	0.58 (1.04)	1.67 (1.47)	1.75 (1.50)	1.33 (1.34)	1.92 (1.55)	0.17 (0.81)	0.08 (0.76)	0.00 (0.71)	0.08 (0.76)	0.71 (1.05)
T_7:Imidaclopride 200SL (17.8%) @ 25 g a.i/ha	6.92 (2.72)	3.25 (1.93)	3.83 (2.08)	4.33 (2.20)	3.81 (2.07)	4.42 (2.22)	1.83 (1.53)	1.50 (1.41)	1.08 (1.26)	1.47 (1.40)	2.64 (1.73)
T_8: Control	6.92 (2.72)	9.58 (3.17)	10.83 (3.37)	11.33 (3.44)	10.58 (3.33)	11.50 (3.46)	10.50 (3.32)	10.00 (3.24)	9.92 (3.23)	10.14 (3.26)	10.36 (3.29)
SE(m)	**0.09**	**0.09**	**0.13**	**0.11**	**0.11**	**0.06**	**0.07**	**0.07**	**0.06**	**0.07**	**0.09**
CD(0.05)	**0.19**	**0.19**	**0.28**	**0.24**	**0.24**	**0.12**	**0.14**	**0.15**	**0.14**	**0.14**	**0.19**
CV %	**3.99**	**5.58**	**7.77**	**6.25**	**6.53**	**3.21**	**5.19**	**5.92**	**5.79**	**5.63**	**6.08**

*Transformed values (square root +0.5 transformed mean)

Table 2: Effect of the different newer chemicals on population of aphids in cotton (Pooled mean of 2 years).

Treatments	Mean Aphids population / 3 leaves										Mean of 2 sprays
	Before first spray	After 1st spray				Before second spray	After 2nd spray				
		3 DAS	7 DAS	14 DAS	Mean		3 DAS	7 DAS	14 DAS	Mean	
T_1: Spinetoram 11.7% @ 50 g a.i/ha	22.33 (4.77)*	7.58 (2.84)	5.50 (2.44)	9.00 (3.08)	7.36 (2.79)	10.17 (3.25)	3.33 (1.95)	3.08 (1.89)	4.75 (2.29)	3.72 (2.04)	5.54 (2.42)
T_2:Pyriproxyfen 10% EC @ 100 g a.i/ha	22.67 (4.80)	5.75 (2.49)	4.08 (2.13)	7.75 (2.87)	5.86 (2.50)	7.92 (2.90)	2.17 (1.63)	2.17 (1.63)	3.58 (2.01)	2.64 (1.76)	4.25 (2.13)
T_3:Dinotefuran 20% SG @ 30 g a.i/ha	23.00 (4.84)	9.00 (3.08)	7.33 (2.80)	12.50 (3.60)	9.61 (3.16)	13.00 (3.67)	4.33 (2.20)	4.08 (2.14)	6.08 (2.56)	4.83 (2.30)	7.22 (2.73)
T_4:Spiromesifen 240 SC (22.9%) @ 144 g a.i/ha	22.17 (4.76)	4.50 (2.23)	3.08 (1.89)	5.50 (2.44)	4.36 (2.19)	5.25 (2.40)	0.33 (0.90)	0.42 (0.95)	1.83 (1.52)	0.86 (1.12)	2.61 (1.65)
T_5:Diafenthiuron 50 WP @ 300 g a.i/ha	23.17 (4.86)	10.08 (3.25)	8.50 (3.00)	12.75 (3.64)	10.44 (3.30)	11.83 (3.50)	5.17 (2.37)	4.33 (2.19)	5.67 (2.46)	5.06 (2.34)	7.75 (2.82)
T_6:Flonicamid 50% WG @ 75 g a.i/ha	23.08 (4.85)	3.25 (1.93)	1.17 (1.29)	2.67 (1.78)	2.36 (1.66)	3.58 (2.01)	0.08 (0.76)	0.08 (0.76)	0.42 (0.93)	0.19 (0.82)	1.28 (1.24)
T_7:Imidaclopride 200SL (17.8%) @ 25 g a.i/ha	22.75 (4.81)	8.08 (2.93)	5.92 (2.53)	9.50 (3.16)	7.83 (2.87)	9.75 (3.18)	4.17 (2.16)	3.50 (2.00)	6.00 (2.55)	4.56 (2.23)	6.19 (2.55)
T_8: Control	22.33 (4.78)	27.50 (5.29)	28.42 (5.38)	32.92 (5.78)	29.61 (5.48)	33.42 (5.82)	27.58 (5.30)	26.92 (5.23)	29.33 (5.46)	27.94 (5.33)	28.78 (5.41)
SE(m)	**0.27**	**0.18**	**0.15**	**0.12**	**0.15**	**0.25**	**0.14**	**0.13**	**0.18**	**0.15**	**0.15**
CD(0.05)	**0.57**	**0.38**	**0.33**	**0.26**	**0.32**	**0.54**	**0.30**	**0.27**	**0.39**	**0.32**	**0.32**
CV %	**6.82**	**7.16**	**7.08**	**4.58**	**6.27**	**9.28**	**8.07**	**7.48**	**9.08**	**8.21**	**7.24**

*Transformed values (square root +0.5 transformed mean)

Table 3: Effect of the different newer chemicals on population of thrips in cotton (Pooled mean of 2 years).

Treatments	Mean Thrips population / 3 leaves										Mean of 2 sprays
	Before first spray	After 1st spray				Before second spray	After 2nd spray				
		3 DAS	7 DAS	14 DAS	Mean		3 DAS	7 DAS	14 DAS	Mean	
T_1: Spinetoram 11.7% @ 50 g a.i/ha	7.67 (2.86)*	2.92 (1.84)	3.83 (2.08)	4.75 (2.29)	3.83 (2.07)	4.75 (2.29)	2.58 (1.75)	1.92 (1.55)	2.33 (1.67)	2.28 (1.66)	3.06 (1.86)
T_2:Pyriproxyfen 10% EC @ 100 g a.i/ha	8.25 (2.96)	2.58 (1.75)	3.42 (1.97)	3.58 (2.01)	3.19 (1.91)	3.92 (2.09)	2.08 (1.60)	2.00 (1.58)	1.83 (1.53)	1.97 (1.57)	2.58 (1.74)
T_3:Dinotefuran 20% SG @ 30 g a.i/ha	8.00 (2.91)	2.92 (1.85)	3.00 (1.87)	4.25 (2.18)	3.39 (1.96)	4.42 (2.21)	2.25 (1.65)	1.75 (1.50)	1.67 (1.47)	1.89 (1.54)	2.64 (1.75)
T_4:Spiromesifen 240 SC (22.9%) @ 144 g a.i/ha	8.25 (2.95)	0.92 (1.19)	1.42 (1.38)	1.83 (1.51)	1.39 (1.36)	1.67 (1.46)	0.25 (0.86)	0.08 (0.76)	0.17 (0.81)	0.17 (0.81)	0.78 (1.08)
T_5:Diafenthiuron 50 WP @ 300 g a.i/ha	8.25 (2.95)	3.08 (1.88)	4.33 (2.19)	4.92 (2.32)	4.11 (2.13)	5.08 (2.36)	2.58 (1.75)	2.00 (1.58)	2.33 (1.68)	2.31 (1.67)	3.21 (1.90)
T_6:Flonicamid 50% WG @ 75 g a.i/ha	8.58 (3.01)	0.33 (0.90)	1.00 (1.22)	0.50 (0.99)	0.61 (1.04)	0.33 (0.91)	0.08 (0.76)	0.00 (0.71)	0.00 (0.71)	0.03 (0.72)	0.32 (0.88)
T_7:Imidaclopride 200SL (17.8%) @ 25 g a.i/ha	8.58 (3.01)	1.83 (1.52)	2.17 (1.61)	2.50 (1.73)	2.17 (1.62)	2.92 (1.84)	0.33 (0.91)	0.42 (0.96)	0.25 (0.86)	0.33 (0.91)	1.25 (1.26)
T_8: Control	8.08 (2.93)	9.67 (3.19)	10.42 (3.30)	10.08 (3.25)	10.06 (3.25)	10.58 (3.33)	10.75 (3.35)	11.08 (3.40)	10.92 (3.38)	10.92 (3.38)	10.49 (3.31)
SE(m)	**0.13**	**0.16**	**0.16**	**0.13**	**0.15**	**0.15**	**0.10**	**0.07**	**0.10**	**0.09**	**0.12**
CD(0.05)	**0.29**	**0.33**	**0.34**	**0.28**	**0.32**	**0.32**	**0.22**	**0.16**	**0.22**	**0.20**	**0.26**
CV %	**5.53**	**10.83**	**9.80**	**7.91**	**9.51**	**8.83**	**7.92**	**6.07**	**8.44**	**7.48**	**8.49**

*Transformed values (square root +0.5 transformed mean)

Table 4: Effect of the different newer chemicals on population of whitefly in cotton (Pooled mean of 2 years).

Treatments	Mean Whitefly population / 3 leaves										Mean of 2 sprays	Yield (q/ha)
	Before first spray	After 1st spray				Before second spray	After 2nd spray					
		3 DAS	7 DAS	14 DAS	Mean		3 DAS	7 DAS	14 DAS	Mean		
T_1: Spinetoram 11.7% @ 50 g a.i/ha	4.33 (2.20)*	2.75 (1.80)	2.58 (1.75)	2.92 (1.84)	2.75 (1.80)	3.83 (2.08)	1.08 (1.25)	0.92 (1.19)	0.92 (1.19)	0.97 (1.21)	1.86 (1.50)	24.07
T_2:Pyriproxyfen 10% EC @ 100 g a.i/ha	4.17 (2.15)	1.83 (1.52)	1.67 (1.47)	2.00 (1.58)	1.83 (1.52)	2.67 (1.78)	1.17 (1.28)	0.92 (1.19)	0.83 (1.15)	0.97 (1.21)	1.40 (1.37)	24.96
T_3:Dinotefuran 20% SG @ 30 g a.i/ha	4.42 (2.22)	1.92 (1.54)	1.75 (1.50)	2.08 (1.60)	1.92 (1.55)	2.92 (1.84)	1.17 (1.28)	1.00 (1.22)	0.83 (1.15)	1.00 (1.22)	1.46 (1.38)	24.69
T_4:Spiromesifen 240 SC (22.9%) @ 144 g a.i/ha	4.33 (2.20)	0.83 (1.15)	0.67 (1.08)	0.83 (1.15)	0.78 (1.13)	1.08 (1.25)	0.08 (0.76)	0.08 (0.76)	0.08 (0.76)	0.08 (0.76)	0.43 (0.94)	25.04
T_5:Diafenthiuron 50 WP @ 300 g a.i/ha	4.42 (2.21)	1.92 (1.55)	1.75 (1.50)	2.92 (1.85)	2.19 (1.63)	3.67 (2.04)	1.42 (1.38)	1.42 (1.38)	1.58 (1.44)	1.47 (1.40)	1.83 (1.52)	24.87
T_6:Flonicamid 50% WG @ 75 g a.i/ha	4.25 (2.18)	0.83 (1.15)	0.67 (1.08)	0.75 (1.11)	0.75 (1.11)	0.92 (1.19)	0.42 (0.94)	0.33 (0.90)	0.10 (0.77)	0.28 (0.87)	0.52 (0.99)	26.54
T_7:Imidaclopride 200SL (17.8%) @ 25 g a.i/ha	4.92 (2.33)	0.42 (0.96)	0.33 (0.91)	0.75 (1.11)	0.50 (0.99)	1.08 (1.25)	0.17 (0.80)	0.17 (0.80)	0.17 (0.80)	0.17 (0.80)	0.33 (0.90)	23.85
T_8: Control	4.17 (2.16)	4.58 (2.25)	5.00 (2.34)	5.42 (2.43)	5.00 (2.34)	6.08 (2.56)	6.50 (2.64)	6.58 (2.66)	7.17 (2.77)	6.75 (2.69)	5.88 (2.52)	18.83
SE(m)	**0.13**	**0.09**	**0.08**	**0.09**	**0.09**	**0.10**	**0.14**	**0.11**	**0.08**	**0.11**	**0.10**	**1.50**
CD(0.05)	**0.27**	**0.20**	**0.17**	**0.20**	**0.19**	**0.20**	**0.29**	**0.23**	**0.17**	**0.23**	**0.21**	**3.22**
CV %	**7.05**	**7.76**	**6.57**	**7.31**	**7.21**	**6.65**	**13.01**	**10.28**	**7.72**	**10.34**	**8.78**	**7.64**

*Transformed values (square root +0.5 transformed mean)

CONCLUSIONS

The present study concludes that sucking pests of cotton like aphids, jassids, thrips and whitefly can be effectively managed by applying Flonicamid 50% WG @ 75g a.i./ha at the economic threshold level (ETL), followed by two consecutive sprays at 15 days intervals. This treatment not only provided the most effective pest control but also resulted in the highest seed cotton yield of 26.54 q/ha, representing a 40.95% increase over the untreated control.

FUTURE SCOPE

Recent insecticides such as Flonicamid, Spiromesifen, Pyriproxyfen, and Spinetoram have demonstrated superior efficacy against major sucking pests in hybrid cotton, leading to improved yield and profitability. Future research should focus on exploring combination treatments and sequential application strategies to enhance pest control. Emphasis should also be placed on resistance monitoring, the development of novel chemistries, and the integration of these insecticides into sustainable pest management programs.

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Conflict of Interest. None.

REFERENCES

Agarwal, R. A., Gupta, G. P. and Garg, D. O. (1984). Cotton pest management in India. *Research Publication*, Azadnagar, Delhi, 1-19.

Afzal, M., Babar, M. H. and Iqbal, Z. (2014). Bio-efficacy of new insecticides against whitefly, *Bemisia tabaci* (Genn.) on cotton, Bt-121. *Pakistan Journal of Nutrition*, *13*(6), 340-343.

Anonymous (2024). Annual Report, ICAR- All India Coordinated Research Project on Cotton, CICR-Regional Station, Coimbatore, pp-3.

Chandi, R. S., Kumar, V., Bhullar, H. S. and Dhawan, A. K. (2016). Field efficacy of flonicamid 50 WG against sucking insect pests and predatory complex on Bt cotton. *Indian J. Plant Protection*, *44*, 1-8.

Chinna Babu Naik, V., Kranthi, S. and Viswakarma, R. (2017). Impact of newer pesticides and botanicals on sucking pest management in cotton under high density planting system (HDPS) in India. *J. Ento. And Zoology Studies*, *5*(6), 1083-1087.

Gaurkhede, A. S., Bhalkare, S. K., Sadawarte, A. K. and Undirwade, D. B. (2015). Bio efficacy of new chemistry molecules against sucking pests of Bt transgenic cotton. *Int. J Plant Protec.*, *8*(1), 7-12.

Ghelani, M. K., Kabaria, B. B. and Chhodavadia, S. K. (2014). Field efficacy of various insecticides against major sucking pests of Bt. Cotton. *J Biopest.*, *7*, 27-32.

Ghosal, A. and Chatterjee, M. L. (2023). Bioefficacy of imidacloprid 17.8 SL against whitefly, *Bemisia tabaci* (Gennadius) in brinjal. (2023). *The Journal of Plant Protection Sciences*, *5*(1), 37-41.

Gomez, K. A. and Gomez, A. A. (1984). Statistical Procedure for Agricultural Research. Second edition, Int. Rice Research Institute, Los Babus, Philippines.

Hanchinal, S. G., Rakhesh, S., Mahantesh, S. T., Ashiq, I. M., Nidagundi, J. M., Ajaykumar, M. Y. and Vijayakumar, J. S. (2024). Comparative bio-efficacy of different insecticides on major sucking pests of Bt-cotton. *Journal of Farm Sciences*, *37*(1), 40-46.

Kadam, D. B., Kadam, D. R. and Lekurwale, R. S. (2014). Seasonal incidence of sucking pests of *Bt* cotton in different intercropping systems and their natural enemies. *J. Plant and Pest Sci.*, *1*(1), 29-33

Kamal, P. A., Navi, S., Vijaykumar, L. Kumar, C. S., Somu, G., Rajendra, B. and Chikkarugi, N. M. (2024). Field Evaluation of Newer Insecticides for the Management of Sucking Pests in Cotton (*Gossypium hirsutum* L.). *Mysore J. Agric. Sci.*, *58*(1), 48-57.

Kumar, V. and Dhawan, A. K. (2011). New chemistry molecules for the management of cotton jassid in transgenic cotton. New Horizons in Insect Science. *International Conference on Insect Science*, Bangalore, India, 19.

Meghana, H., Jagginarar, S. B. and Sunitha, N. D. (2018). Efficacy of insecticides and bio pesticides against sucking insect pests on Bt cotton. *Int. J Curr. Microbiol. App. Sci.*, *7*(6), 2872-2883.

Morita, M., Yoneda, T. and Akiyoshi, N. (2014). Research and development of noval insecticide, flonicamid. *J. Pesticide Sci.*, *39*(3), 179-180.

Patil, S. B., Udikeri, S. S., Matti, P.V., Guruprasad, G. S., Hirekuruban, R. B., Shaila, H. M. and Vandal, N. B. (2009). Bio efficacy of new molecule fipronil 5% SC against sucking pests. *Karnataka Journal of Agricultural Sciences*, *22*(5), 1029-1031.

Ravikumar, V., Prasad, N. V. V. S. D. and Madhumathi, T. (2016). Ralative toxicity of different insecticides against *Thrips tabaci* (Lindeman) on cotton. *I. J. T. A.*, *34*(5), 1387-1391.

Saeed, S., Ahmad, M. and Kwon, Y. J. (2007). Insecticidal control of mealy bug, *Phenacoccus gossypiphilous* (Hemiptera: Pseudococcidae). *Entomol. Res., 37*, 76-80.

Samih, A.M., Zarabi, M. and Rouhani, M. (2011). Toxicity of imidacloprid, thiamethoxam, thiacloprid and flonicamid against green peach aphid *Myzus persicae*, New Horizons in Insect Science. ICIS 2013, *International Conference on Insect Science*, Bangalore, India, 114.

Santhoshi, T., Srinivasa Reddy, S., Rajashekhar, M., Krishna, K. S., Shaila, O. and Divya Rani, V. (2022). Bioefficacy of Newer Insecticides against Cotton Leafhopper, *Amrasca biguttula biguttula* (Ishida) under HDPS & Normal Planting Methods. *Biological Forum – An International Journal*, *14*(3), 235-239.

Sathyan, T., Murugesan, N., Elanchezhyan, K., Arockia, S.R.J. and Ravi, G. (2016). Efficacy of synthetic insecticides against sucking insect pests in cotton. *Gossypium hirsutum* L. *Int. J. Entomol. Res.*, *1*(1), 16-21.

Satpute, U. S., Patil, B. N., Katole, S. R., Men, V. D. and Thakare, A. V. (1990). Avoidable field losses due to sucking pests and bollworms in cotton. *Journal Zoological Research*, *1*(2), 67-72.

Ullah, M. I., Hasnain, M., Luqman, M., Hussnain, H., Tauseef, M., Ahmad, A., Shahid, M., Abbas, Q., Hussain, M., Raza, A., Khan, M. M. A., Nadeem, M. K. and Nadeem, S. (2024). Evaluation of new chemistry insecticides against sucking insect pests of cotton. *Sarhad Journal of Agriculture*, *40*(3), 858-865.

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