



Efficacy of Different Botanicals and Insecticide against Chafer Beetles on Jamun (*Syzygium cumini* L.)

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Abstract— The present investigation was conducted to evaluate the efficacy of different botanical and chemical treatments against chafer beetles infesting jamun (*Syzygium cumini* L.). Seven treatments, comprising neem oil (2.0 ml/litre), karanj oil (2.0 ml/litre), mahua oil (2.0 ml/litre), *Bacillus thuringiensis* (2.0 g/litre), neem seed kernel extract (NSKE) 5% (50 g/litre), lambda-cyhalothrin 5% EC (1.0 ml/litre), and an untreated control, were evaluated through three consecutive sprays. The pooled results revealed considerable variation in treatment efficacy against chafer beetles. Among the treatments, lambda-cyhalothrin 5% EC recorded the lowest pooled mean infestation value of 7.47 (15.86), followed by NSKE 5% at 8.68 (17.13), neem oil at 10.07 (18.50), *Bacillus thuringiensis* at 10.95 (19.32), karanj oil at 11.57 (19.89), and mahua oil at 12.82 (20.98). The untreated control recorded the highest pooled mean value of 17.63 (24.83). The critical difference at the 5% level was 2.87 for the pooled mean, indicating significant differences among treatments. The results demonstrated that lambda-cyhalothrin 5% EC was the most effective treatment for managing chafer beetles on jamun, followed by NSKE 5% and neem oil. Among the botanical treatments, NSKE 5% showed the greatest efficacy.

Keywords— Jamun, *Syzygium cumini*, chafer beetle, botanical pesticides, NSKE, *Bacillus thuringiensis*, lambda-cyhalothrin, pest management.

I. INTRODUCTION

Jamun (*Syzygium cumini* L.) is an important fruit crop belonging to the family Myrtaceae and is valued for its edible fruits and nutritional and medicinal properties. Several insect pests are associated with jamun and may affect foliage, flowers and fruits. Chafer beetles feed on plant foliage and can cause visible damage that may affect plant vigour. Effective management of these pests is therefore important for maintaining healthy jamun trees. Botanical products such as neem oil, karanj oil, mahua oil and neem seed kernel extract (NSKE), along with microbial biopesticides such as *Bacillus thuringiensis*, may be considered as components of pest management. Chemical insecticides may also provide suppression when used

according to approved label directions. The present investigation evaluated selected botanical, microbial and chemical treatments against chafer beetles on jamun under field conditions.

II. MATERIALS AND METHOD

The field experiment was conducted during 2025–26 in a nine-year-old jamun orchard of the variety ‘Kokan Bahadoli’ at the Research Farm, College of Agriculture, Badnapur, Maharashtra. The orchard spacing was 6 m × 6 m and recommended agronomic practices were followed. The management experiment comprised seven treatments arranged in a Randomized Block Design (RBD) with three replications. Three sprays were applied at 15-day intervals.

Table 1. Experimental details

Sr. No.	Particulars	Details
1	Design	RBD
2	Crop	Jamun (<i>Syzygium cumini</i> L.)
3	Variety	Kokan Bahadoli
4	Age of orchard	9 years
5	Treatments	07
6	Replications	03
7	Spacing	6 m × 6 m
8	Experimental year	2025–26
9	Number of sprays	03

Table 2. Treatment details

Tr. No.	Botanical / Chemical	Dose per litre of water
T1	Neem oil	2.0 ml
T2	Karanj oil	2.0 ml
T3	Mahua oil	2.0 ml
T4	<i>Bacillus thuringiensis</i>	2.0 g
T5	NSKE 5%	50 g
T6	Lambda-cyhalothrin 5% EC	1.0 ml
T7	Untreated control	—

Imposition of Treatments

The seven treatments were imposed as three consecutive sprays at an interval of 15 days. Each treatment was applied at its specified experimental dose, while T7 was maintained as an untreated control. Observations were recorded before and after spraying.

Method of Observations

Chafer beetle infestation was assessed on the selected jamun trees by recording the infestation values before and after the sprays. The treatment data were analysed using analysis of variance (ANOVA) appropriate for a Randomized Block Design. Treatment means were compared using the critical difference (C.D.) at the 5% level of significance. Figures in parentheses are arcsine-transformed values.

RESULTS AND DISCUSSION

The pooled efficacy of three consecutive sprays of the evaluated treatments against chafer beetles on jamun is presented in Table 3. The treatments showed variation in their recorded infestation values. At the initial observation (1 DBS), treatment differences were non-significant (NS). Following the sprays, lower infestation values were recorded in the treated plots, whereas the untreated control retained comparatively high infestation.

Table 3. Pooled efficacy of three consecutive sprays of different botanical treatments against chafer beetles on jamun.

Tr. No.	Botanical / Pesticide	Dose / litre	1 DBS (First spray)	First spray Mean	Second spray Mean	Third spray Mean	Pooled mean of all sprays
T1	Neem oil	2.0 ml	16.97 (24.33)	11.74 (20.04)	9.94 (18.38)	8.54 (16.99)	10.07 (18.50)
T2	Karanj oil	2.0 ml	18.33 (25.35)	13.41 (21.48)	11.47 (19.80)	9.84 (18.28)	11.57 (19.89)
T3	Mahua oil	2.0 ml	18.00 (25.10)	14.71 (22.55)	12.62 (20.81)	11.13 (19.49)	12.82 (20.98)
T4	<i>Bacillus thuringiensis</i>	2.0 gm	17.20 (24.50)	13.40 (21.47)	10.44 (18.85)	9.01 (17.47)	10.95 (19.32)
T5	NSKE 5%	50 gm	16.50 (23.97)	10.31 (18.73)	8.32 (16.76)	7.40 (15.79)	8.68 (17.13)
T6	Lambda-cyhalothrin 5% EC	1.0 ml	15.80 (23.42)	8.98 (17.44)	7.03 (15.38)	6.40 (14.65)	7.47 (15.86)

T7	Untreated control	—	16.03 (23.60)	18.37 (25.38)	17.82 (24.97)	16.69 (24.11)	17.63 (24.83)
S.E. $\pm$			1.35	1.05	0.97	0.78	0.93
C.D. at 5%			NS	3.23	2.99	2.40	2.87
C.V. (%)			13.78	13.99	15.10	13.79	14.29

(Figures in parentheses are arcsine-transformed values.)

First spray application

After the first spray, lambda-cyhalothrin 5% EC @ 1.0 ml/litre (T6) recorded the lowest mean infestation of 8.98 (17.44). It was followed by NSKE 5% @ 50 g/litre (T5) with 10.31 (18.73), neem oil @ 2.0 ml/litre (T1) with 11.74 (20.04), *Bacillus thuringiensis* @ 2.0 g/litre (T4) with 13.40 (21.47), karanj oil @ 2.0 ml/litre (T2) with 13.41 (21.48), and mahua oil @ 2.0 ml/litre (T3) with 14.71 (22.55). The untreated control recorded the highest value of 18.37 (25.38). The C.D. at 5% was 3.23.

Second spray application

Following the second spray, lambda-cyhalothrin 5% EC (T6) continued to record the lowest mean infestation of 7.03 (15.38), followed by NSKE 5% (T5) at 8.32 (16.76), neem oil (T1) at 9.94 (18.38), *Bacillus thuringiensis* (T4) at 10.44 (18.85), karanj oil (T2) at 11.47 (19.80), and mahua oil (T3) at 12.62 (20.81). The untreated control recorded 17.82 (24.97). The C.D. at 5% was 2.99.

Third spray application

After the third spray, T6 recorded the lowest mean infestation of 6.40 (14.65), followed by NSKE 5% (T5) at 7.40 (15.79), neem oil (T1) at 8.54 (16.99), *Bacillus thuringiensis* (T4) at 9.01 (17.47), karanj oil (T2) at 9.84 (18.28), and mahua oil (T3) at 11.13 (19.49). The untreated control recorded the highest infestation value of 16.69 (24.11). The C.D. at 5% was 2.40.

Pooled mean

The pooled mean of the three consecutive sprays demonstrated that lambda-cyhalothrin 5% EC @ 1.0 ml/litre (T6) was the most effective treatment, recording the lowest pooled mean infestation of 7.47 (15.86). It was followed by NSKE 5% @ 50 g/litre (T5) at 8.68 (17.13), neem oil @ 2.0 ml/litre (T1) at 10.07 (18.50), *Bacillus thuringiensis* @ 2.0 g/litre (T4) at 10.95 (19.32), karanj oil @ 2.0 ml/litre (T2) at 11.57 (19.89), and mahua oil @ 2.0 ml/litre (T3) at 12.82 (20.98). The untreated control recorded the highest pooled mean of 17.63 (24.83). The pooled C.D. at 5% was 2.87, S.E. $\pm$ was 0.93 and C.V. was 14.29%. Among the botanical treatments, NSKE 5% was the most effective, followed by neem oil. Thus, lambda-cyhalothrin 5% EC gave the strongest overall suppression

in this experiment, while NSKE 5% was the best-performing botanical option.

III. CONCLUSION

The field evaluation indicated differences among treatments against chafer beetles on jamun. Lambda-cyhalothrin 5% EC @ 1.0 ml/litre recorded the lowest pooled mean infestation of 7.47 (15.86), followed by NSKE 5% @ 50 g/litre with 8.68 (17.13). Among the botanical treatments, NSKE 5% was the most effective, followed by neem oil. The untreated control recorded the highest pooled mean infestation of 17.63 (24.83).

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