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Damage Caused by Jute Hairy Caterpillar and Its Control Using Insecticide in Rowmari Gaon, Dhing, Nagaon, Assam

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Abstract

Assam is the second largest jute-producing state of India where the districts of Nagaon, Goalpara, Barpeta and Darrang are the major jute producing areas. Farming has its own share of problems, one such is the defoliation, stunted growth and significant reduction in yields caused by the jute hairy caterpillar (Spilosoma obliqua) in Rowmari Gaon in Nagaon which feeds relentlessly on the underside of the leaves. The highest number of infestations was observed in the months of May and June 2025, and this period was the peak for larvae during the year. Efforts to control the infestation using light traps and manual removal of egg masses and caterpillars were attempted to control the infestation without the application of chemicals. However, they were inefficient and time consuming, particularly on crops planted at specific times of the year. Within seven days of spraying, the infestation was reduced up to 90% following chemical control namely Alphamethrin 10% (also known as ULFA). The results show that while there are several good non-chemical methods for integrated pest management, the best and most practical way to control S. obliqua in Assam's jute fields is using Alphamethrin.

Keywords: *Alphamethrin, chemical control, hairy caterpillar, Jute, Nagaon, pest damage, S. obliqua.*

Introduction

Jute is one of the most important fibre crops in the world due to its cultural and trade values, hence the name "golden fibre". There are only a few numbers of South American countries and Southeast Asian countries like India, Nepal, Bangladesh, China, Indonesia, Thailand and Myanmar where it is cultivated. Jute is the most economical fibre crop in India and two native fibre crops such as *Corchorus capsularis* (white jute) and *C. olitorius* (Tossa jute) are extremely economically and medicinally important due to their high carbohydrate, vitamin (A), amino acid and protein content [5]. In India, jute is mainly grown in northern part of the country and it is the second largest producer of jute in the world after Bangladesh [1], [7]. Almost 75% of the world's jute is produced by West Bengal, Bihar and Assam together, which makes the three states the largest in the production of jute. Assam districts like Nagaon, Goalpara, Barpeta, Darrang are in the third rank after West Bengal and Bihar, in production.

The agriculture-based economic condition of Assam can be attributed to the fact that about 75% of the population in Assam is involved in one way or the other in agricultural activity. The processing and production of jute is one of the most primitive commercialized crops of Assam which is very important in the development of agriculture and industry. There are more than twelve million families who are engaged in farming, processing, and trade and the fibre industry contributes significantly in the economic transformation of rural areas. Although jute is an important socio-economic crop, its production is greatly affected by insect pests and an estimated loss of 31–34% of the fibre is due to insect pests each year in India.

Jute hairy caterpillar (*Spilosoma obliqua*) is one of the most harmful pests of Assam. The larvae eat leaves at an astonishing rate, causing poor growth, defoliation and reduced yield. The insect passes through the following stages during its life cycle of 37–42 days: egg, larva, pupa and adult [8]. It is resistant to several

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pesticides, occasional and polyphagous [4]. Farmers generally use chemical control and synthetic pyrethroids such as Alphamethrin are highly effective. According to [2], modern neurotoxic insecticide Alphamethrin is extracted from natural pyrethrins, immediately paralyzes and kills insects by attacking their nervous system. Studies have shown that Alphamethrin kills pests and recovers plants in one week. It begins to work as soon as it gets applied in minutes.

The present study was conducted to find out the extent of damage caused by *S. obliqua* and efficiency of its control in the field by using Alphamethrin in the economically important plant Jute in Rowmari Gaon, Nagaon district, Assam.

Fig-1. caterpillar *S. obliqua*

Fig.-2. Adult moth of *S. obliqua*

Materials and Methods

The present investigation was done in the jute growing season between March and June, 2025 at Rowmari Gaon, District Nagaon, Assam, India. The study site lies at latitude 26°29'23.0064"N and longitude 92°31'5.628″E. The experimental plot consisted of 1 bigha of cultivated jute field (14,400 sq.ft.) and the work was done in the summer (Kharif) season.

For systematic observation, the field was divided into ten equal parts of 1,440 square feet each, using temporary bamboo sticks and thin ropes. This division helped to control individual jute plants and to determine the extent of infestation of pests. Weekly observations were made in order to record the incidence of *Spilosoma obliqua* infestation and data were carefully noted in a field notebook.

Both non-chemical and chemical methods were employed for pest management. Non-chemical techniques involved hand picking and destroying egg masses, hand picking caterpillars at early stages, and using light traps to help control the adult moths. Second and third instar larvae were also found in the plot in natural infestation and these were the non-chemical measures used to suppress the pest.

Chemical control was started during the first week of May when maximum infestation was noted. Alphamethrin 10% (trade name ULFA, made by Plant Remedies Pvt. Ltd. ISO 9001:2008) was used for application using a hand sprayer. This formulation was prepared using Alphamethrin (10% w/w), emulsifiers (calcium alkyl aryl sulphate and phenyl ethylene oxide condensates (10% w/w)) and xylene (100% w/w) as solvent. A 100 ml formulation of the pesticide was used for the treatment.

Fungicide treatment and count of affected plants was done before and 7 days after spraying. The reduction of infestation was estimated as a percentage to evaluate the effectiveness of the therapy administered. The overall infestation level in the plot also was determined. Finally, all the data were compiled and analyzed on MS Excel and relevant findings were drawn regarding the success of the pest management measures.

Results and Discussion

During the present investigation, it was found that the most injurious stage of *Spilosoma obliqua* was the larval stage which was particularly injurious during the 2nd and 3rd instars. Larvae fed exclusively on the green portions of the leaves, leaving them to gradually defoliate and reduce the plant's vitality. Table 1 shows that there was a significant increase in infestation during the weeks of the non-spraying period from 41 plants at mid-March, 2025 infested plants at the end of April, 2025. This rapid increase coincided with the most active larval stage and the best summer conditions as observed in the past years insect pest control still remains as an important problem in jute cultivation.

A significant decrease in infestation was observed after the treatment of Alphamethrin in early May. The number of affected plants decreased to less than 100 within a week of spraying and no new infestations were noted by the end of May. This indicates the quick and enduring effect of chemical treatment in decreasing insect populations. The high field efficiency of Alphamethrin can be attributed to its neurotoxic activity, causing a rapid effect on the nervous system of insects leading to paralysis and death [2]. Laboratory studies have also indicated the high bioefficacy of the modern pesticides like Alphamethrin against *S. obliqua* which is in line with the current field observations [3].

When evaluated site-wise Alphamethrin proved to be effective as presented in Table 2. The percentages of infestation at the sites before spraying ranged from 10.64% to 38.74%. The spraying resulted in a decrease of the infestation to less than 0.5% in all plots, and to a complete eradication in some cases. Alphamethrin was highly effective against *S. obliqua*, as evidenced by the 97.02% to 100% reduction in the number of larvae calculated from the experimental results (Table 3).

No new infestations were reported after the chemicals were applied, indicating that apart from reducing the numbers, Alphamethrin also prevented further spread. Enhanced survival and recovery were shown by the appearance of the new leaves on the treated jute 7 days after spraying. This indicates that correct chemical action at the appropriate time can limit crop damage and ensure better yields.

While some non-chemical control measures such as light traps and hand picking were used initially, they proved to be ineffective and too labor intensive to be implemented on a large scale. Chemical control using Alphamethrin was able to rapidly and reliably reduce the pest populations without the excessive costs. The results are consistent with previous research which has demonstrated the excellent control of lepidopteran pests in fiber crops achieved by pyrethroid insecticides. Furthermore, the life cycle of *S. obliqua* has been studied and its destructive potential confirmed in the field while host plant resistance is recognized as a valuable complementary control measure for managing jute pests (*S. obliqua*) [9], [6]. An effective pest management strategy is crucial for Assam's jute crop because of the crop's economic importance which is reflected in the state's marketing practices and the livelihoods of its farmers [10].

The results show that Alphamethrin can be a valuable tool for jute pest control in Assam. In the long-term, resistance can occur if chemical controls are used alone. As recommended for Jute ecosystem, an integrated pest management (IPM) approach which incorporates chemical, cultural and mechanical control would be a sustainable management strategy for *S. obliqua*.

Table 1. Incidence of S. obliqua infestation on C. olitorious

Nos. of weeks	Date	Nos. of infested plants	Nos. of new infested plants
1st (NSW)	15.3.23 - 22.3.23	41	50
2nd (NSW)	22.3.23 - 29.3.23	308	258
3rd (NSW)	29.3.23 - 5.4.23	985	677
4th (NSW)	5.4.23 - 12.4.23	2500	1513
5th (NSW)	12.4.23 - 19.4.23	4911	2411
6th (NSW)	19.4.23 - 26.4.23	7845	2934
7th (NSW)	26.4.23 - 3 .5.23	8924	1079
8th (SW)	3.5.23 - 10.5.23	97 (partially)	00
9th (SW)	10.5.23 - 17.5 .23	53 (partially)	00
10th (SW)	17.5.23 - 24.5.23	10 (partially)	00
11th (SW)	24.5.23 - 31.5.23	00	00
12th (SW)	31.5.23 - 7.6.23	00	00

* Spraying Week = SW, No spraying Week = NSW.

Table 2. Infestation evaluation of S. obliqua on C. olitorious (Jute plants) before and after spray

No of Site	Nos. of total plants	Nos. of infested plants before spray	Percentage of infestation before spray	No of Infested plants after spray	Percentage of Infestation after spray
1	4563	553	12.12%	12	0.26%
2	4001	751	18.74%	10	0.24%
3	4222	492	11.65%	4	0.09%
4	4881	660	13.52%	0	0%
5	5211	1149	22.04%	13	0.24%
6	3500	1348	38.51%	11	0.31%
7	4001	1550	38.74%	17	0.42%
8	4231	601	14.31%	7	0.16%
9	4310	1350	31.32%	9	0.20%
10	4419	470	10.64%	14	0.31%

Table 3. Field efficiency of Alphamethrin on S. obliqua and comparison between before and after spray

No. of site	No. of infested plants before spray	No. of infested plants after 7 days of spray	Pct. Of reduction of infestation after 7 days of spray
1	553	12	97.83%
2	751	10	98.67%
3	492	4	99.19%
4	660	0	100%
5	1149	13	98.87%
6	1348	11	99.18%
7	1550	17	98.90%
8	601	7	98.84%
9	1350	9	99.33%
10	470	14	97.02%

Fig- 3**.** Jute Plants infected by *S. obliqua*

Fig- 4: After 1 hour of spraying, the pests start to die and fall to the ground

Conclusion

This study revealed that the jute hairy caterpillar (Spilosoma obliqua) is a serious pest of jute crop in Rowmari Gaon, Nagaon district and maximum infestation of jute crop occurred in the month of April and May, where over 20% of jute plants were infested. The study revealed that Alphamethrin 10% was highly effective in controlling the pest with up to 90–100% reduction in infestation level after 7 days of application. Treatment with insecticides has an immediate effect on yield but careful dose administration is necessary to ensure the maintenance of fibre quality. Non-chemical methods are less practical and more labour intensive for seasonal crops; although they are environmentally safer. Thus, chemical control using Alphamethrin is still the best solution, but a combination of cultural and mechanical procedures should be used to reduce the effects on non-target species and the potential for sustainable pest management.

Conflict of Interest

The authors declare that there is no conflict of interest.

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