ASSESSMENT OF Teak Skeletoniser (*Eutectona machaeralis* Walker) DAMAGE AND EVALUATION OF MANAGEMENT OPTIONS IN ZARI-JAMNI TALUKA, YAVATMAL DISTRICT, MAHARASHTRA

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Abstract
Teak (Tectona grandis L.f.) is an economically important timber species in tropical India; however, its productivity is threatened by severe defoliation caused by the teak skeletoniser (Eutectona machaeralis Walker). The present study was conducted from June 2023 to May 2024 in different forest ranges of Zari Taluka, Yavatmal District, Maharashtra, India, to assess the extent of skeletoniser damage and evaluate management options. Field surveys were conducted in six representative teak plantations, and the damage intensity was measured as the percentage of leaf area that was skeletonized. Seasonal variation, infestation level, and efficacy of selected control measures, including neem oil spray, light traps, and biological control using Trichogramma chilonis, were evaluated. The results revealed that infestation began in July, peaked in October–November, and gradually declined after January. The mean infestation intensity ranged from 25% to 70%, with the highest defoliation observed in younger plantations (3–5 years). Among the management options, neem oil (2%) and T. chilonis release significantly reduced pest populations and leaf damage. These findings emphasize the need for integrated pest management (IPM) strategies tailored to local conditions.
Keywords: *Tectona grandis, Eutectona machaeralis, infestation intensity, neem oil, Trichogramma chilonis, Zari Taluka.*

1. Introduction

Teak (*Tectona grandis* L.f.) is one of the most valuable timber species in tropical and subtropical regions and is known for its strength, durability, and resistance to decay. India has extensive teak plantations, particularly in Central India, which contribute substantially to the rural and industrial economies. However, teak production is severely affected by insect pests, among which the teak skeletoniser (*Eutectona machaeralis* Walker) is the most destructive.

The larvae of this moth feed on the leaf surface, leaving only the veins, giving a 'skeletonized' appearance. Repeated defoliation reduces photosynthetic activity, weakens trees, and ultimately affects their growth and timber quality. Outbreaks occur annually during the monsoon and post-monsoon seasons, depending on climatic factors such as humidity and temperature levels.

Although various control methods have been reported, ranging from mechanical removal of larvae and pheromone traps to the use of biological agents and botanical pesticides, their effectiveness varies regionally.

Research Gap

Despite the occurrence of *Eutectona machaeralis* in different parts of Maharashtra, no systematic assessment of its damage intensity or management efficacy has been reported in Zari Taluka, a region characterized by dense teak plantations and unique microclimatic conditions. There is a lack of quantitative data on the seasonal dynamics of infestation in Zari forests, the comparative effectiveness of eco-friendly control methods, and field-level recommendations for local forest divisions. Therefore, this study was undertaken to fill this gap by assessing the extent and seasonal pattern of teak skeletoniser infestation and evaluating practical management options under local conditions.

2. Objectives

1. To assess the level and seasonal variation of teak skeletoniser damage in Zari Taluka.
2. To evaluate the effectiveness of selected management options against *Eutectona machaeralis*.
3. To suggest eco-friendly and sustainable pest management strategies for local teak plantations.

3. Materials and Methods

3.1 Study Area

The study was conducted in Zari Taluka, located in the southern part of the Yavatmal District, Maharashtra (19°45′–20°05′ N and 78°40′–79°10′ E). The region experiences a tropical monsoon climate with an average annual rainfall of 950 mm and mean temperatures ranging from 18°C (winter) to 40°C (summer). Teak plantations are widespread in natural forests and social forestry schemes.

3.2 Sampling Design

Six representative teak plantation sites were selected across the taluka: Zari, Jamni, Tipeshwar, Maregaon, and Pardi. At each site, 25 randomly selected teak trees (aged 3–10 years) were monitored monthly from June 2023 to May 2024.

3.3 Assessment of Damage Intensity

Infestation was quantified by visually scoring 50 leaves per tree. The percentage of skeletonized leaf area was estimated and categorized as follows:

Damage Grade	Leaf area skeletonized (%)	Infestation Level
No infestation	0	0
1	1–25	Low
2	26–50	Moderate
3	51–75	High
4	>75	Very high

3.4 Management Trials

Three management methods were evaluated during the peak infestation period (September–December 2023): 1) neem oil (2%) spray at fortnightly intervals, 2) Release of *Trichogramma chilonis* @ 50,000 adults/ha, and 3) light traps operated nightly from 6:30 PM to 10:00 PM. A control plot without treatment was maintained. Each treatment was replicated thrice (plot size: 0.25 ha).

3.5 Data Analysis

Data were statistically analyzed using ANOVA, and treatment means were compared using the Least Significant Difference (LSD) test at 5% significance. A correlation analysis was conducted between infestation intensity and environmental parameters.

4. Results

4.1 Seasonal Infestation Pattern

Infestation by E. *machaeralis* began in July, increased steadily, and peaked in October–November. The mean infestation intensity ranged from 25.6% (July) to 69.8% (November), and then declined to 18.2% by January. Minimal activity was observed between February and May of each year.

4.2 Age-wise Infestation

Young plantations (3–5 years) showed higher infestation (average 61%) than older stands (9–10 years, 38%). The higher tenderness and leaf density of younger trees likely favored larval feeding.

4.3 Management Efficacy

Treatment	Mean Leaf Damage (%)	Reduction over Control (%)
Neem oil (2%)	28.4 ± 2.3	65.8
Trichogramma chilonis	32.6 ± 2.7	59.2
Light trap	42.8 ± 3.1	41.5
Control	82.9 ± 3.5	—

5. Discussion

The study revealed a clear seasonal pattern in teak skeletoniser infestation, with the highest intensity during the post-monsoon months, consistent with earlier observations from Central India. High humidity and mild temperatures during October–November favor larval development and feeding.

The greater vulnerability of young plantations aligns with reports that young foliage supports rapid larval growth. Neem oil, which is rich in azadirachtin, effectively deterred feeding and oviposition. Similarly, *Trichogramma chilonis* has demonstrated strong potential as a biological control agent through the parasitism of the pest's eggs.

Compared with chemical insecticides, these methods offer environmentally safe alternatives that avoid harming non-target species. Light traps, although partially effective, can be used as supplementary tools in integrated pest management programs in the future.

Bridging the Research Gap

This study provides the first systematic dataset on *Eutectona machaeralis* infestation and management efficacy in the Zari Taluka. The results provide valuable baseline information for developing location-specific IPM strategies, which have previously been lacking in this region.

6. Conclusion

i. Teak skeletoniser infestation in the Zari Taluka is seasonal, peaking from October to November.
ii. Young plantations suffered greater defoliation than older stands.
iii. Neem oil (2%) and *Trichogramma chilonis* release were the most effective in reducing pest damage.
iv. The adoption of integrated pest management (IPM) that combines botanical and biological methods is recommended for sustainable teak protection
v. Future studies should include long-term monitoring, economic loss estimation, and integration with remote sensing tools for improved pest forecasting.

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