

First record of *Parotis marginata* Hampson (Lepidoptera: Crambidae) on *Alstonia scholaris* (Apocynaceae) in Saharanpur, Uttar Pradesh, India

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Abstract

A field study was conducted in the Saharanpur district of Uttar Pradesh to monitor the insect pests affecting the *Alstonia scholaris* plant during the years 2023 to 2024. The study revealed that *Parotis marginata*, known as the Alstonia leaf folder, is a serious pest of *Alstonia scholaris* in Saharanpur, which is recorded in this region for the first time. The study indicated variations in moth abundance throughout the seasons, emphasizing the possible influence of environmental factors (temperature, rainfall, and humidity) on the occurrence of this pest. The pest was first observed in June and remained active until December. A higher population of *P. marginata* was noted in August and September, while the lowest populations were recorded in June and December. The larval population of *P. marginata*, its seasonal occurrence, and the percentage of damage to the host plants varied slightly during both years.

Keywords: *Parotis marginata*, *Alstonia scholaris*, Seasonal incidence, Apocynaceae

Introduction

Alstonia scholaris is also known as the “Indian Devil’s Tree.” It is a large, evergreen tree with rough bark that can grow in height up to 6–10 meters. It is known by a number of names, including Dita bark (English), Devil's Tree, White Cheese Wood, Verbal, Milkwood Pines, Mill Wood, Kilky Pine, and Black Board Tree (Khyade *et al.*, 2014) [9]. It is planted as an ornamental tree along major highways, expressways, and urban landscapes due to its attractive growth form and tolerance for a wide range of soil types, from wet to dry. It is advised for roadside planting in urban areas and is relatively less affected by city traffic pollution (Iqbal and Shafiq, 2003) [11]. *A. scholaris* is present abundantly on roadsides in urban and rural areas of the Saharanpur district. Except for its medicinal and ornamental values, *A. scholaris* is the host plant for several insect pests like *Paurosylla tuberculata* and *Parotis marginata*. *Parotis marginata* (Hampson), also known as the Alstonia leaf folder, is a moth in the family Crambidae. It is found in Southeast Asia, including countries such as Japan, India, China, Fiji, and Bangladesh. It primarily targets the *Alstonia scholaris* plant, leading to skeletonization of its leaves and causing significant damage (Chattopadhyay, 2018). It has been recorded by different authors from different parts of India. According to Ghorpade and Patil (1999) [6], *P. marginata* is among the most commonly occurring species of insect pests infesting forest trees in the Konkan region of Maharashtra (India). Ghirtlahre (2015) [5] reported *P. marginata* on a sapota plant from Bilaspur, Chhattisgarh. Similarly, Kirti *et al.* (2016) [8], Mitra *et al.* (2017) [13], Rathikannu and Chitra (2017) [14], Mathew *et al.* (2018) [12], and Dabhi and Bhatt (2019) [10]

reported the Alstonia leaf folder *P. marginata* from Sikkim, Cachar, Ganjam, Calcutta, Travancore, Ceylon, Nicobars, and Solomons; mangroves of Diu Island; Yercaud, Coimbatore, Tamil Nadu; Vagamon hills (Western Ghats), Idukki district, Kerala; and Gujarat, respectively. Although various authors have reported this pest from different parts of India, so far no one has recorded it from the Saharanpur region of western Uttar Pradesh. This study aims to describe the seasonal incidence of *P. marginata* on *A. scholaris*.

Materials and Methods

A field survey was conducted in Saharanpur (29.97° N, 77.55° E), Uttar Pradesh, India, from June to December during the year 2023–2024 to monitor the insect pests of *Alstonia* plants. During the field survey, the *Alstonia* plants were found severely infested and damaged by lepidopteran larvae at Maa Shakunbhari University, Fandpuri to Nakur Road, and Dehradun road, Saharanpur. These larvae were collected and reared on the natural diet till the emergence of adults in the research laboratory of the zoology department, Maharaj Singh College, Saharanpur. After emergence, the adults (Fig- 1 and 2) were identified as *Parotis marginata*. Saharanpur is recognized for its diverse flora and favorable climatic conditions that promote pest proliferation. For further study, ten infected plants of *Alstonia scholaris* from both sites were randomly selected and permanently marked to monitor larval infestation of *P. marginata* on a monthly basis. The infestation was assessed by examining the presence of folded leaves and calculating the percentage of damage for each leaf and each plant. The number of larvae and the extent of damage on each

plant were evaluated monthly by inspecting the folded and damaged leaves. Photographs of the larvae, pupae, adults, and damage to the host plants were taken with the help of a digital camera. Mean values and standard errors of the collected data were calculated and compiled using Microsoft Excel. The meteorological data, such as temperature, humidity, and rainfall, were taken from the Horticulture Research Institute, Saharanpur, Uttar Pradesh.

Results and Discussion

The results obtained in Table 1 show that the larval activity of *Parotis marginata* was observed on *Alstonia scholaris* during the first week of June, indicating a mild infestation for the year 2023-2024. In the month of June the larval population of *P. marginata* was recorded to be 15.50±1.52 larvae/plant and 12.35±1.32% leaf damage/plant during the year 2023 and 14.24±1.21 larvae/plant with 11.91±1.55% leaf damage/plant in 2024. The population of *P. marginata* larvae started to increase gradually from the first week of July in both years and reached 56.51±1.48 larvae/plant with 60.51±1.46% leaf damage/plant in 2023 and 54.23±1.29 larvae/plant with 59.89±1.25% leaf damage/plant during the year 2024. The population of larvae increased drastically in the month of August and reached 160.62±1.69 larvae/plant with 98.21±1.62% leaf damage/plant during the year 2023 and 155.65±1.15 larvae/plant with 92.16±1.39% leaf damage/plant in 2024. The population of *P. marginata* declined slightly in the month of September and was observed to be 155.69±1.49 larvae/plant, leading to 82.31±1.13% leaf damage/plant in 2023 and 145.84±1.64 larvae/plant with 79.92±1.55% leaf damage/plant during the year 2024. In the month of October the population of *P. marginata* decreased significantly and reached 80.75±1.46 larvae/plant, causing 60.34±1.58% leaf damage/plant in 2023, and 76.62±1.42 larvae/plant with 58.33±1.45±1.45% leaf damage/plant during the year 2024. The population of *P. marginata* larvae decreased significantly in the month of November and was followed by December, with total larval counts of 45.39±1.71, 12.59±1.73, 43.38±1.35, and 10.61±1.65 larvae/plant, causing 43.97±1.54, 9.32±1.39, 42.12±1.36, and 8.15±1.35% leaf damage per plant, respectively, during the years 2023 and 2024. There was no

incidence of *P. marginata* in the 3rd and 4th weeks of December in both years (2023-2024).

Several authors have reported *Parotis marginata* from different parts of India; however, *Parotis marginata* has not been recorded in the Saharanpur area until now. Additionally, Chattopadhyay (2017)^[4] documented the larval infestation of *P. marginata* on *Alstonia scholaris* for the first time at Birsa Agricultural University in Ranchi, which supports our findings. The *Alstonia* leaf folder, *P. marginata*, was first observed in June and remained active until December, a period similar to that reported by Baksha (1990)^[2] in Chittagong, Bangladesh. Dabhi and Bhatt (2019)^[10] recorded *P. marginata* on *Tabernaemontana divaricate* and *Alstonia scholaris* for the first time in Gujarat, which favours our results. Similarly, Atanu (2020) reported the occurrence of *P. marginata* starting in July, with the highest level of infestation observed in October and November.

Symptoms of infestation and damage

The field study revealed that the infestation initially appeared as rolled leaves (Fig-3) at the apical whorl of the *Alstonia* plant. Young larvae feed on the soft tissue of leaves, creating a skeleton of veins (Fig-6). Early instar larvae feed on the tender leaves by scraping the epidermal surface, which eventually results in an irregular web-like appearance on the apical leaves. The early instar larvae fold the leaf margins longitudinally (Fig-4) from the top of the leaf using a silk thread to create a shelter for feeding, whereas, the late instar larvae (Fig-5) tied the lateral margin of the entire leaf using silk threads. After consuming all of the epidermal tissue, the larvae abandoned the old folded leaf and constructed a new leaf fold for further feeding. Generally, a single larva was found in a leaf fold, indicating that the later instar larvae tend to be solitary. Occasionally, larvae spun two leaves together to build their shelter. The final instar larvae built their shelters by weaving the leaves together in a congregated way and pupated (Fig-7) within these shelters. Similar observation were recorded by Dabhi and Bhatt (2019)^[10] which are in supports of our results. During a severe infestation, nearly all of the leaves were infected, dried, and hang from the branches, which give the plants a ruined and burning look (Fig-8).

Table 1: Seasonal incidence of *Parotis marginata* in *Alstonia scholaris*

Years	Months	No of Larvae per plant	% of leaf damage/ plant	Mean temp. values (°C)	Rain fall (in mm)	R. H. (In %)
	June	15.50±1.52	12.35±1.32	34.21	94.70	31.23
	July	56.51±1.48	60.51±1.46	30.15	415.45	55.56
	August	160.62±1.69	98.21±1.62	29.41	354.25	76.90
2023	September	155.69±1.49	82.31±1.13	28.50	208.39	63.25
	October	80.75±1.46	60.34±1.58	26.49	20.51	61.81
	November	45.39±1.71	43.97±1.54	22.96	4.25	47.84
	December	12.59±1.73	9.32±1.39	15.70	25.58	40.51
	June	14.24±1.21	11.91±1.55	36.71	90.10	10.21
	July	54.23±1.29	59.89±1.25	30.29	305.62	58.32
	August	155.65±1.15	92.16±1.39	28.32	310.25	74.32
2024	September	145.84±1.64	79.92±1.55	29.41	208.39	72.28
	October	76.62±1.42	58.33 ±1.45	27.67	16.49	60.83
	November	43.38±1.35	42.12±1.36	23.98	14.56	51.61
	December	10.61±1.65	8.15±1. 35	15.32	12.45	30.15

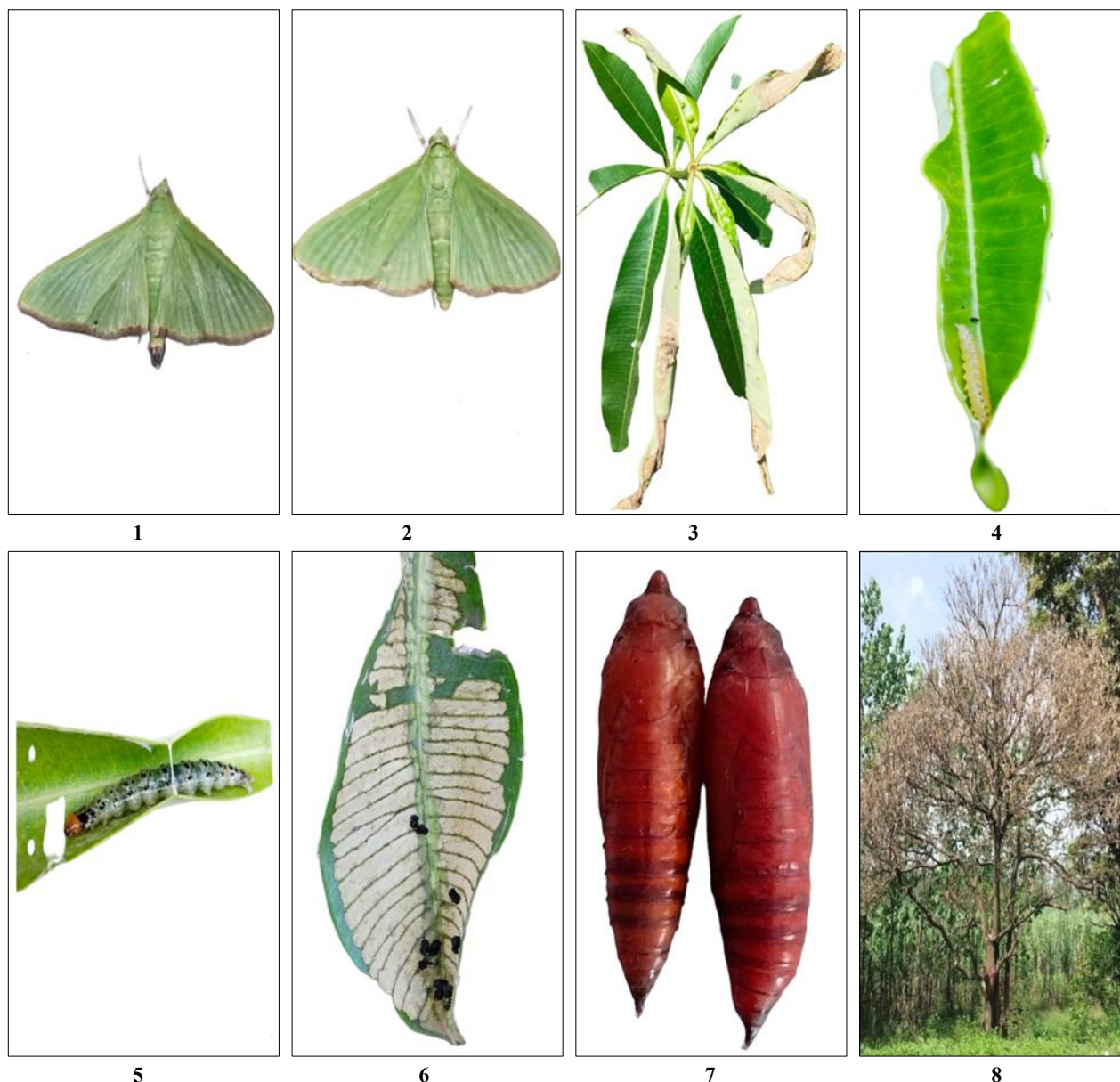


Fig 1: (1) Adult male (2) Adult female (3) Infested leaves of *Alstonia scholaris* (4) Early instar larva feeding on leaf (5) Fifth instar larva (6) Skeletonized and damaged leaf of *A. scholaris* (7) Pupa of *Parotis marginata* (8) Severely damaged plant of *A. scholaris* with burning look. (Photo courtesy: Dr. Om Datta, Head of Zoology Department, Maharaj Singh College, Saharanpur)

Conclusion

The study concludes that the *Alstonia* leaf folder, *Parotis marginata*, is a serious pest of *Alstonia scholaris* in Saharanpur. During the peak infestation period, up to 98% leaf damage was noted, and nearly all the leaves were infected, dried, and hung from the branches, giving the plants a ruined and burned appearance. Several plants suffered complete desiccation and ultimately died due to extensive infestation of *P. marginata*. Additionally, the study indicated that *P. marginata* was distributed sporadically on the study sites in Saharanpur.

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