DIVERSITY OF SERICIGENOUS INSECTS IN VIDARBHA REGION OF MAHARASHTRA (INDIA)

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Abstract
The present investigation conducted during 2022 to 2025 that offers a novel approach to studying the diversity of sericigenous insects in the Vidarbha region of Maharashtra, with the aim of building an authentic database to support both conservation and employment initiatives. Through comprehensive field surveys in various ecological zones—including forested, semi-forested, and rural areas—nine species of sericigenous insects were identified, encompassing both wild and domesticated varieties. Among these, Bombyx mori was the only domesticated species, predominantly found in sericulture units in Wardha and Nagpur. The wild species, such as Antheraea mylitta, Attacus taprobanis, and Actias selene, were distributed across diverse forest types, demonstrating ecological adaptability and a wide host plant range. Particularly, A. mylitta showed significant potential for commercial Tasar silk production, while species like Attacus ricinii and Attacus atlas indicated the presence of niche silk-producing resources. The study also highlighted lesser-known species such as Gunda javanica and Trilocha varians, calling for further research into their ecological roles and silk-producing capacities. Overall, the findings underscore the biodiversity richness of Vidarbha's Lepidopteran fauna and suggest significant untapped potential for sustainable wild sericulture.
***Keywords**: Silk, Sericigenous, Vidarbha, Moths, Maharashtra*

Introduction

The world around us is a kaleidoscope of ever changing patterns of diversity. Diversity is a cornerstone of life whose pattern changes from place to place with time to time of the day and the season of year. This diversity refers to all species of plants, animals and micro-organisms existing and interacting within an ecosystem (Gadgil 2002). The insects that produce silk of economic value are termed as sericigenous insects. The natural silk producing insects are broadly classified as mulberry and wild or non-mulberry. The mulberry silk moths are represented by domesticated *Bombyx mori. L.* non-mulberry sericulture is universally known as forest or wild sericulture that provides an important source of employment for the native population in forest areas. Northeast region of India is considered as the floral and faunal gate way for Asian main land to Indian Peninsula.

Vidarbha is a region in eastern Maharashtra, comprising Amravati and Nagpur divisions. Located on the Deccan Plateau in Central India, it borders Madhya Pradesh, Chhattisgarh, Telangana, and other parts of Maharashtra. The terrain is mostly flat, with the Satpura Range to the north and significant basaltic rock formations from the Deccan Traps. Bhandara and Gondia districts have unique metamorphic and alluvial geology. The Poorna river basin lies in western Vidarbha. The region faces high soil and water salinity but is rich in biodiversity, supporting sericulture, which is culturally significant for many local communities.

There are number of references regarding report about seri-biodiversity and their wide potential as a source of natural silk in Indian subcontinent (Arora and Gupta, 1979; Thangavelu, 1991; Nassig *et al*., 1996; Chinnaswamy, 2001; Thangavelu *et al.*, 2002; Srivastava and Thangavelu, 2005). Arora and Gupta (1979) enlisted nearly 40 species in India alone. Jolly *et al.*, (1975) recorded approximately 80 species in Asia and Africa producing silk of commercial importance.

The Bombycidae are a family of moths. The best-known species is *Bombyx mori* (Linnaeus) or silkworm, native to northern China and domesticated for millennia. Another well-known species is *Bombyx mandarina*, also native to Asia. The family Saturniidae contains numerous species all over the world. Of which Indian subcontinent *i.e.* from Himalaya to Sri Lanka may comprise nearly 50 species (Nassig *et al.*, 1996). As per classification of Lemaire and Minet (1998) Saturniidae is the largest family of Bombycoidea with about 1861 species of 162 genera and 9 subfamilies. Regier *et al.*, (2008) stated that the family Saturniidae includes some of the largest and most beautiful species of all Lepidoptera are univoltine/ multivoltine as per climate and are present in both temperate and tropical region.

On the other hand, in the backdrop of growing unemployment and slow industrialization, development strategies focusing on traditional seri-

cottage industry may help in improving socio economic status generating employment opportunities. Therefore, considering the importance of sericigenous insects a detailed survey study was carried out on the diversity of sericigenous insects in Assam and their role in employment generation.

However, no detailed information is found on sericigenous insects of Vidarbha. At the present time many important genetic resources of silk moths are facing threats due to indiscriminate destruction of forests. Hence the present study is the assessment of Diversity of Sericigenous Insects in Vidarbha Region of Maharashtra (India)

Materials And Methods

Study Area: Vidarbha is a geographical region in the west Indian state of Maharashtra. Forming the eastern part of the state, it comprises Amravati and Nagpur divisions. Vidarbha lies in Central India on the northern part of the Deccan Plateau. It borders the state of Madhya Pradesh to the north, Chhattisgarh to the east, Telangana to the south and Marathwada and Uttar Maharashtra regions of Maharashtra to the west. It lies in the rain shadow region of the Western Ghats and the terrain is largely flat. The Satpura Range lies to the north of Vidarbha region with Melghat in Amravati district forming part of the southern offshoot of the Satpura Range. Large basaltic rock formations exist throughout the region, part of the 66-million-year-old volcanic Deccan Traps. Bhandara and Gondia district are entirely occupied by metamorphic rock and alluvium, making their geology unique in Maharashtra. The Poorna river basin lies in Western Vidarbha and comprises Akola, Amaravati and Buldhana districts. The region has extremely high innate soil and water salinity. The region is also considered as one of the biodiversity hot spots of Maharashtra and makes an ideal home for several sericigenous insects. For the people of many parts of India, sericulture is the part of their culture and tradition, rather than a profitable business. Its healthy climate, mountainous terrain, rugged configuration and sudden fall in elevation are phenomenal. The climatic condition of this district is characterized by a hot summer, well-distributed rainfall during the south-west monsoon season and generally dry weather during the rest of the year. The cold season is from December to February (Falling Rain Genomics. 2020-25).

Collection and identification of Specimens: The specimens will be collected periodically from different habitats by using sweep net and grub and maggot will be transfer into small plastic containers. Adult moths were photographed and indentified with the help of available literature (Hampson, 1894; Inatachat and Woiwood, 1999).

Diversity And Statistical Analysis: Results were recorded as Mean ± Standard Deviation (SD). Data were collected, organized and analyzed with using of the Microsoft Excel Program (Joshi *et al.*, 2015). Diversity and correlation was quantified with the help of PAST Version 1.60 software (Hammer *et al.* 2001). The p *value* <0.05 was statistically significant

Results and Discussion

The present investigation is the novel approach to Study the Diversity of Sericigenous Insects in Vidarbha of Maharashtra. The outcomes of the study will help to develop the authenticate database of Sericigenous Insects for conservation as well for employment purpose.

The present study was conducted to explore the diversity of sericigenous insects in the Vidarbha region of Maharashtra, India. Extensive field surveys across different forested, semi-forested, and rural areas led to the identification of nine sericigenous species, both wild and domesticated. The species observed include: *Bombyx mori, Gunda javanica, Trilocha varians, Actias selene, Antheraea mylitta, Attacus taprobanis, Antheraea paphia, Attacus ricinii, Attacus atlas*

Table 1: A checklist of sericigenous moth species from Vidarbha Region (M.S.) India

Family	Sub-family	Genus /Species	Status
Superfamily: Bombycoidea			
Bombycidae	Bombycinae	*Bombyx mori*	Common
		Gunda javanica	Rare
		Trilocha varians	Common
Saturnidae	Saturniinae	*Actias selene*	Common
		Antheraea mylitta	Common
		Antheraea paphia	Rare
		Attacus taprobanis	Uncommon
		Attacus ricinii	Uncommon
		Attacus atlas	Rare

Among the nine species recorded, *Bombyx mori* was the only fully domesticated species, while the remaining eight were wild sericigenous insects with varying ecological niches and host plant preferences.

The frequency of occurrence and relative abundance of these species varied across different habitats. The tropical deciduous forests of Chandrapur, Gadchiroli, and Melghat ranges showed a higher occurrence of *Antheraea* and *Attacus* species, especially *Antheraea mylitta* and *Attacus taprobanis*, which are known for their ecological adaptability and wide host range. *Actias selene* was frequently observed near semi-evergreen zones and areas with higher humidity. *Gunda javanica* and *Trilocha varians* were sporadically encountered but were noted in regions with abundant secondary vegetation.

The diversity of sericigenous insects recorded in the Vidarbha region reflects the richness of Lepidopteran fauna and the ecological suitability of the region for sericulture-related biodiversity. The identification of eight wild sericigenous species alongside the domesticated *Bombyx mori* points to the unexplored potential of wild silk moths in local silk production and conservation efforts.

As the cornerstone of commercial silk production, *B. mori* was observed in controlled rearing units and sericulture farms primarily in Wardha and Nagpur districts. Due to its domesticated nature, it was not found in the wild.

Species like *Antheraea mylitta* (Tasar silkworm) and *Antheraea paphia* have economic importance due to their silk-producing capabilities. *A. mylitta* was the most frequently observed wild species and has long been used in tribal-based Tasar silk industries. Its presence across varied forest zones indicates its adaptability and potential for sustainable sericulture expansion.

The discovery of *Attacus ricinii* and *Attacus atlas* suggests a significant ecological value, as these moths are known for their large size and impressive wingspan. While not commercially exploited at scale in India, their silk (Fagara silk or Eri silk in the case of *A. ricinii*) holds niche value. Their occurrence indicates favorable larval host plants such as *Ricinus communis* (castor), which were present in the study areas.

Actias selene, commonly known as the Indian Moon Moth, though not commercially significant, represents an important component of the wild moth diversity due to its aesthetic appeal and ecological role as a pollinator.

The lesser-documented species like *Gunda javanica* and *Trilocha varians* require further taxonomic and ecological studies to ascertain their life cycles, silk properties (if any), and conservation status. Their presence in the region suggests a wider diversity of host plants and microhabitats than previously recorded.

The study highlights the rich sericigenous insect biodiversity in Vidarbha, which holds both ecological and economic significance. However, increasing deforestation, habitat fragmentation, and monoculture plantations threaten the habitats of many of these wild silk moths. Conservation strategies should include habitat protection, host plant conservation, and integration of wild silk moths into sustainable livelihoods for local communities.

Moreover, promoting community-based wild silk farming with species like *A. mylitta* and *A. ricinii* could boost rural economies while conserving native species. There is also a need for systematic documentation of larval host plants, seasonal behavior, and rearing techniques to facilitate wider use of wild silk moths.

These findings of the present study are found to be in well agreement with earlier studies of Thangavelu *et al.* (2002), Singh and Maheswami (2003); Chowdhury (2004); Srivastava and Thangavelu (2005); Regier *et al.* (2008); Kakati and Chutia (2009); Ahmed and (2011); Aland *et al.* (2011); Brahma *et al.* (2011); Chinnaswamy (2011); Kumar *et al.*, (2016); Tarali and Karabi (2017); Thanavendan *et al.* (2020); Singh *et al.*, (2024); Mammadov *et al.*, (2025) and name a few.

Conclusion

In conclusion, the study emphasizes the Vidarbha region's substantial and diverse population of sericigenous insects, many of which possess considerable ecological and economic value. The documentation of eight wild silk moth species alongside the domesticated *B. mori* opens new avenues for promoting wild sericulture and integrating it into rural development strategies. Conservation of these species is crucial in the face of deforestation and habitat degradation, and efforts should prioritize ecological preservation, host plant protection, and the development of rearing methods tailored to local environmental conditions. Promoting community-based wild silk cultivation, particularly with species like *A. mylitta* and *A. ricinii*, could offer livelihood opportunities for tribal and rural populations while preserving native biodiversity. This study serves as a foundational step toward recognizing the value of wild sericigenous insects and integrating their conservation with sustainable economic practices in the region.

References

1. Ahmed SA, Ranjan RK. 2011. Exloration of Vany Silk Biodiversity in North Eastern Region of India: Sustainable Livelihood and Poverty Alleviation. In: International conference on Management, Economics and Social Sciences, Bangkok 2011; 485-489
2. Aland S. R., Mamlayya A. B. and Bhawane G. P. 2011. The Silk Moths (Lepidoptera: Saturniidae) Of Amba Reserve Forest, Western Ghats, Kolhapur District, Maharashtra. The Bioscan, 6(2): 279-281.
3. Arora, G. S. and Gupta, I. J. 1979. Taxonomic studies of some of the Indian non-mulberry silk moths (Lepidoptera: Saturniidae). Memoirs of Zoological Survey of India. 16: 1-63.
4. Brahma D, Neli S, Saikia P, Choudhury S, Dutta K. 2011. Morphological and Productivity Differences between Samia ricini, Samia canningi and their cross. The Ecoscan; 1:287-290.
5. Chinnaswamy, K. P. 2001. Sericulture biodiversity in India. pp 54- 61. In: Participatory Biodiversity Conservation in South Asia Region. Fonarem, Kathmandu, Nepal.
6. Chowdhary, S. N. 1983. Eri Silk Industry. Directorate of Sericulture and Weaving. Govt. of Assam. Dumbre, R. B., Khanvilkar, V. G., Dalvi, C. S. and Bhole, S. R. 1985. Field studies on tasar silkworm rearing in the Konkan region. Indian Journal of Entomology. 50(4): 441-448.
7. Chowdhury SN. 2004. Origin, Evolution and Distribution of Silkworms Species. J Assam Sc Soc; 45:43-51.
8. Falling Rain Genomics. 2020-21. Database of Vidarbha:; Physiography and Climates. Redirected from www.fallingrain.com.
9. Gadgil M. 2002. Diversity- The Cornerstone of Life. Vigyan Prasar Publication, N.Delhi. 75 pp.
10. Hampson, G. F. 1894. The fauna of British India including Ceylon and Burma Vol. I Saturniidae to Hypsidae (Ed. W. T. Blanford). Taylor and Francis, London, p.527.
11. Inatachat, J. and Woiwood, I. P. 1999. Trap design for monitoring moth biodiversity in tropical rainforests. Bulletin of Entomological Research. 89: 153-163.
12. Jolly, M. S., Chowdhury, S. N. and Sen, S. K. 1975. Non-mulberry sericulture in India. Central Silk Board, Bombay.
13. Kakati LN, Chutia BC. 2009. Diversity and Ecology of wild Sericigenous insects in Nagaland, India. Tropical Ecology; 50(1):137-146.
14. Kumar, R., P. Chutia, M. Ahmed, G. Rajkhowa and N.I. Singh, 2016. Checklist of wild silk moths of North East India (Lepidoptera: Saturniidae, Bombycidae). Munis Entomol. Zool., 11: 508-514.
15. Lemaire, C. and Minet, J. 1998. The Bombycoidea and their relatives. Pp. 321-353. In: N. P. Kristensen (ed.) Lepidoptera, Moth and Butterflies. Volume I: Evolution, Systematics and Biogeography. Walter de Gruyter., Inc., Hawthome.
16. Mammadov, R., Jalilov, R., Samedova, A., & Sabirova, S. (2025). A review of the family Coleophoridae of Azerbaijan (Lepidoptera: Gelechioidea). Russian Entomological Journal, 34(3), 235–248.
17. Myers N, Mittermeier RA, Mittermeier CG, Fonseca AB Kent J. 2000. Biodiversity Hotspots for Conservation Priorities. Nature; 403:853-858.
18. Nassig, W. A., Lempe, R. E. J. And Kger, S. 1996. The Saturniidae of Sumatra (Lepidoptera). Heterocera Sumatra. 10: 3-10.
19. Regier, J. C., Grant, M. C., Mitter, C., Cooks C. P., Peigler, R. S. and Rougerie, R. 2008. Phylogenetic relationships of wild silk moths (Lepidoptera: Saturniidae) inferred from four protein-coding nuclear genes. Systematic Entomology. 10: 1-10.
20. Seitz, A. 1933. The Macrolepidoptera of the World Indo-Australian Bombyces and Sphinges. Stuttgart-Verlag des seitz sehen werkes. Alfred kenen. Pub. Stuttgart.
21. Singh RN, Maheswami M. 2003 Conservation and Utilization of Sericigenous Insects in North East Region of India. Sericologia 43(1):1-15.
22. Singh, N., Raha, A., Ahmad, J., Shah, S. K., Mishra, P., & Joshi, R. (2024). A new species and five new records of Erebidae (Lepidoptera) from India. Journal of Asia-Pacific Biodiversity, 17(3), 562–572.
23. Srivastava, P. K. And Thangavelu, K. 2005. Sericulture and Seribiodiversity. Associated Publishing Company, New Delhi.
24. Tarali K . Karabi D. (2017). Biodiversity of Sericigenous insects in Assam and their role in employment generation. Journal of Entomology and Zoology Studies 2014; 2 (5): 119-125
25. Tarali K and D Karabi (2017). Biodiversity of sericigenous insects in Assam and their role in employment generation. Journal of Entomology and Zoology Studies, 2(5), 119–125.
26. Thanavendan G., Lokesh G. .Geetha N. Murthy, 2020. Explorative Survey of Wild Mulberry Silkworm Genetic Resources. Singapore Journal of Scientific Research, 10: 28-34.

27. Thanavendan, G., Lokesh, G., & Murthy, G. N. (2020). Explorative survey of wild mulberry silkworm genetic resources. Singapore Journal of Scientific Research, 10(1), 28–34.
28. Thangavelu, K. 1991. Wild Sericigenous insects of India. A need for conservation. Wild Silk moths. 91: 71-77.
29. Thangavelu, K., Rao, K. V. S. and Pandey, V. K. 2002. Wild silk moths diversity and conservation. Inter. J. Wild Silk Moths Silk. 7: 87-93.