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The Malaysian Moon Moth (*Actias maenas*): Ecological Significance, Sericogenic Potential, and Conservation Challenges

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Abstract:

Actias maenas Doubleday (1847), known as the Malaysian Moon Moth, has drawn significant attention from collectors and researchers alike, although its larval stages remain poorly documented. This species boasts a wide distribution, extending from northeastern India through mainland Southeast Asia to the Greater Sunda Islands, exceeding 4000 km. In India, five species of *Actias* have been recorded, with the Malaysian Moon Moth being notable for its exquisite appearance and ecological significance. As India continues to be a leader in sericulture, the potential of *Actias maenas* as a sericogenic resource merits exploration, especially given its morphological similarities to other silk moths. Despite the challenges faced due to habitat loss, climate change, pesticide use, and limited research, conservation efforts emphasize the need for habitat preservation and public engagement. Effective conservation strategies aimed at the protection of *Actias maenas* focus on maintaining its host plants and increasing community awareness to improve its survival prospects.

Key words: *Actias maenas,* Malaysian Moon Moth, conservation strategies, host plants, habitat preservation

Introduction:

The *Actias maenas* moth, commonly known as the Malaysian Moon Moth, has been recognized for over a century and is highly sought after by collectors; however, the larval stages of this species remain poorly documented. It extends from the sub-Himalayan areas of northeastern India across the majority of mainland Southeast Asia and the Greater Sunda Islands, covering more than 4000 km. In India, five species have been reported so far: *Actias maenas* (Malaysian Moon Moth), *Actias selene* (Indian Moon Moth), *Actias rhodopneuma* (Asian Moon Moth), *Actias parasinensis* (Western Chinese Moon Moth), and *Actias keralana* (Kerala Moon Moth) (Sondhi et al., 2025). The Malaysian Moon Moth is notable for its graceful appearance and intricate patterns, making it one of the most beautiful moths and a favorite among nature enthusiasts.

With its rich biodiversity and long-standing tradition in sericulture, India has been a global leader in silk production. Although the mulberry silk moth (*Bombyx mori*) remains the cornerstone of the Indian silk industry, there has been increasing interest in non-mulberry or wild silk moths such as *Antheraea assamensis* (Muga), *Antheraea mylitta* (Tasar), and *Philosamia ricini* (Eri). *Actias maenas* represents a promising sericogenic resource deserving of scientific exploration due to its potential silk properties. While not yet extensively studied in India for its silk-producing capabilities, related species within the *Actias* genus have shown silk with morphological and physical structures akin to those of typical wild silks, and their tensile properties resemble *B. mori* silk (Reddy and Yang, 2012). The growing interest in sustainable, indigenous, and eco-conscious textile resources aligns with national goals of rural development, tribal empowerment, and biodiversity conservation.

Characteristics, Life Cycle and Reproduction:

The initial instar larva of *Actias maenas* is orange with a black band encircling its middle segments and a black head capsule. After the first moult, second instar larvae are green with yellow-orange tubercles and a brown head capsule, while later instars develop delicate white dot patterns. The final three instars exhibit countershading, providing effective camouflage against predators. Males typically complete their development quicker than females, and adults demonstrate sexual dimorphism, with males displaying vibrant yellow coloration and females appearing pale green.

Fig1: *Actias maenas* Doubleday (Male)

Host Plants and Conservation Efforts:

Actias maenas feeds on a variety of host plants, primarily from the Juglandaceae, Anacardiaceae, and Lecythidaceae families, including Juglans and Mangifera species (Gaden et al., 2023). The caterpillars are reliant on these plants for survival and development. The conservation status of *Actias maenas* is currently not well-documented, yet like many moth species, it faces threats from habitat loss due to forest fires, agricultural development, urbanization, and climate change (Gogoi et al., 2014; Fox, 2013; Wagner,

2021). This has led to decreasing populations in certain areas and has emphasized the necessity of habitat preservation, restoration, and community engagement in conservation efforts.

Challenges to Conservation:

Conserving *Actias maenas* involves navigating several challenges:

1. Habitat Loss: Habitat destruction from agricultural development and urbanization reduces the availability of essential host plants, contributing to population declines (Wagner, 2021).

2. Climate Change: Shifts in climate patterns impact the distribution and lifecycle synchrony of both the moth and its host plants (Fox, 2013).

3. Pesticide Use: Pesticides negatively affect moth populations by reducing food sources and breeding success (Wagner, 2021).

4. Limited Research: Insufficient data on population dynamics and habitat requirements hinders effective conservation planning.

5. Public Awareness and Engagement: Lack of community understanding regarding the ecological importance of moths results in inadequate conservation initiatives.

Addressing these challenges requires a multifaceted approach that includes habitat preservation, research initiatives, and educational programs to ensure the conservation of the *Actias maenas* moth and its ecosystem target pests but also non-target species, including pollinators and beneficial insects, potentially reducing the moth's food sources and breeding success.

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