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First Report of *Astraea lobata*

(Linnaeus) Klotzsch

[Euphorbiaceae] in Tirunelveli District, Tamil Nadu

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ABSTRACT

Astraea lobata (L.) Klotzsch (Euphorbiaceae) is reported here for the first time from Tirunelveli district, Tamil Nadu, India. Previously, this species was known only from Maharashtra (Solapur), Tripura (Agartala), West Bengal (Darjeeling), and Assam (Dima Hasao). This paper provides a detailed description, relevant taxonomic information, field data, a distribution map, and photographic plates to aid in the identification of the species.

Keywords: New record, *Astraea lobata*, Euphorbiaceae, Tirunelveli, Tamil Nadu, India

1. INTRODUCTION

For a considerable time, *Astraea lobata* Klotzsch (Euphorbiaceae) was considered synonymous with *Croton* by several authors (Chakrabarty & Balakrishnan, 1997; Schmelzer, 2007). However, molecular phylogenetic studies on *Croton* and related genera conducted by Berry et al., (2005) established *Astraea* as a distinct genus.

The genus *Astraea* is native to South America and the West Indies and currently comprises 13 accepted species: *A. cincta*, *A. comosa*, *A. jatropa*, *A. digitata*, *A. gracilis*, *A. macruora*, *A. manihot*, *A. paulina*, *A. praetervis*, *A. subcomosa*, *A. surinamensis*, *A. trilobata*, and *A. lobata*. *Astraea lobata* (Linnaeus) Klotzsch is the only species that spans the Neotropical biogeographic realm. It has also been introduced into Africa and Yemen (Das et al., 2016; Silva & Cordeiro, 2017).

In the Indian subcontinent, the species has been reported from Bangladesh (Khan & Khan, 2002; Verma et al., 2023) and from several Indian states, including Maharashtra (Gaikwad et al., 2012), Tripura (Das et al., 2016), West Bengal (Biswas & Ghosh, 2019), and Assam (Verma et al., 2023). Here, we report its presence in Tirunelveli district, Tamil Nadu, for the first time.

2. MATERIALS AND METHODS

During a field survey in Munirpallam village, Tirunelveli, Tamil Nadu (8°68'47.39"N and 77°70'9.45"E; elevation 48 meters above sea level), the authors encountered a

plant resembling a species of *Croton* (Figure 1). Photographs were taken, and after carefully analyzing and consulting the relevant taxonomic literature, we identified the plant *Astraea lobata* (Linnaeus) Klotzsch. This finding represents a new addition to the Euphorbiaceae flora of the Tirunelveli district. Voucher specimens have been collected and deposited in the Herbarium of the Xavier Research Foundation (XRF), Tirunelveli.

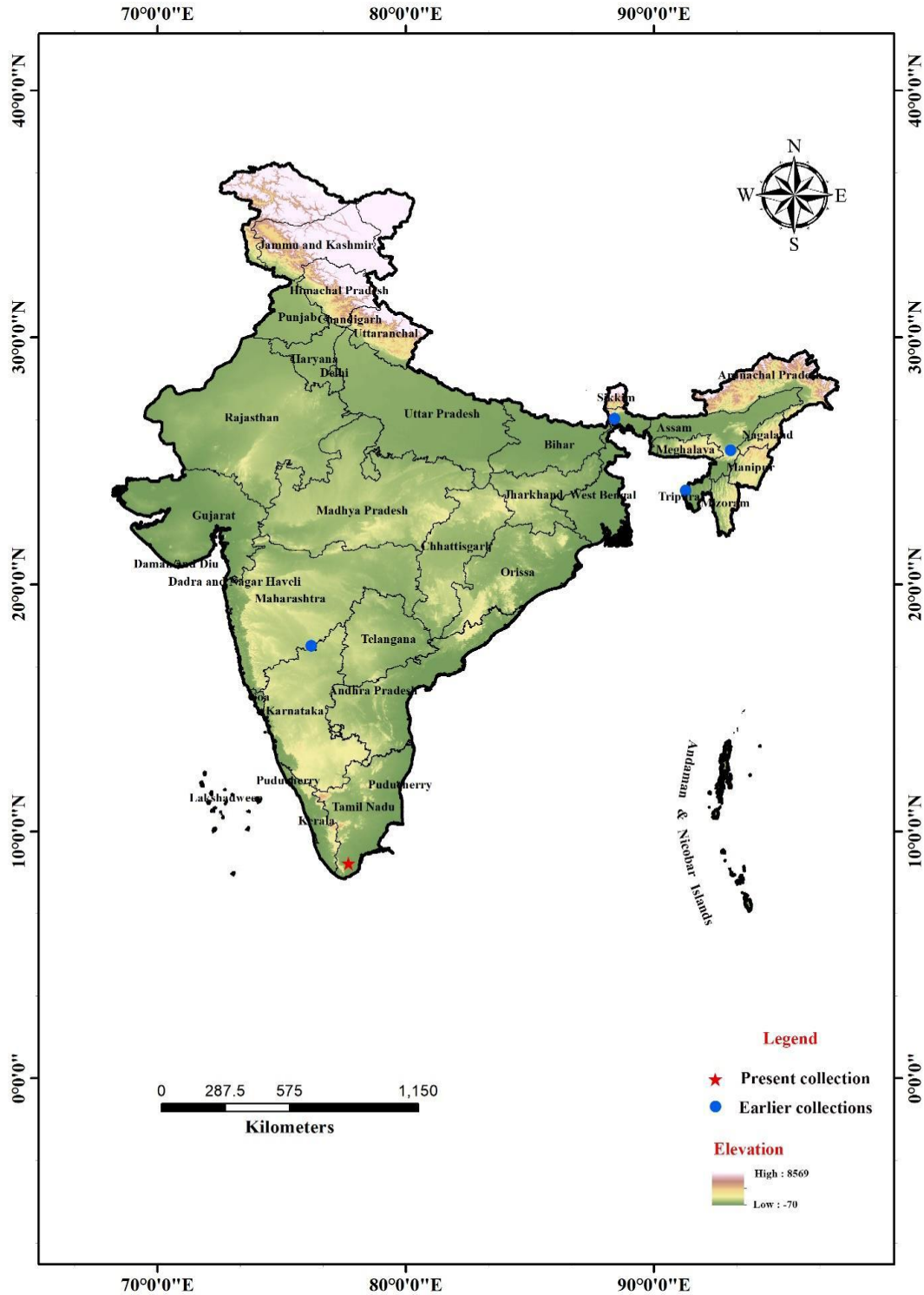


Figure 1. Map showing the documented distribution of *Astraea lobata* (L.) Klotzsch in India, with records from Maharashtra, Tripura, West Bengal, Assam, and the newly reported location in Tamil Nadu.

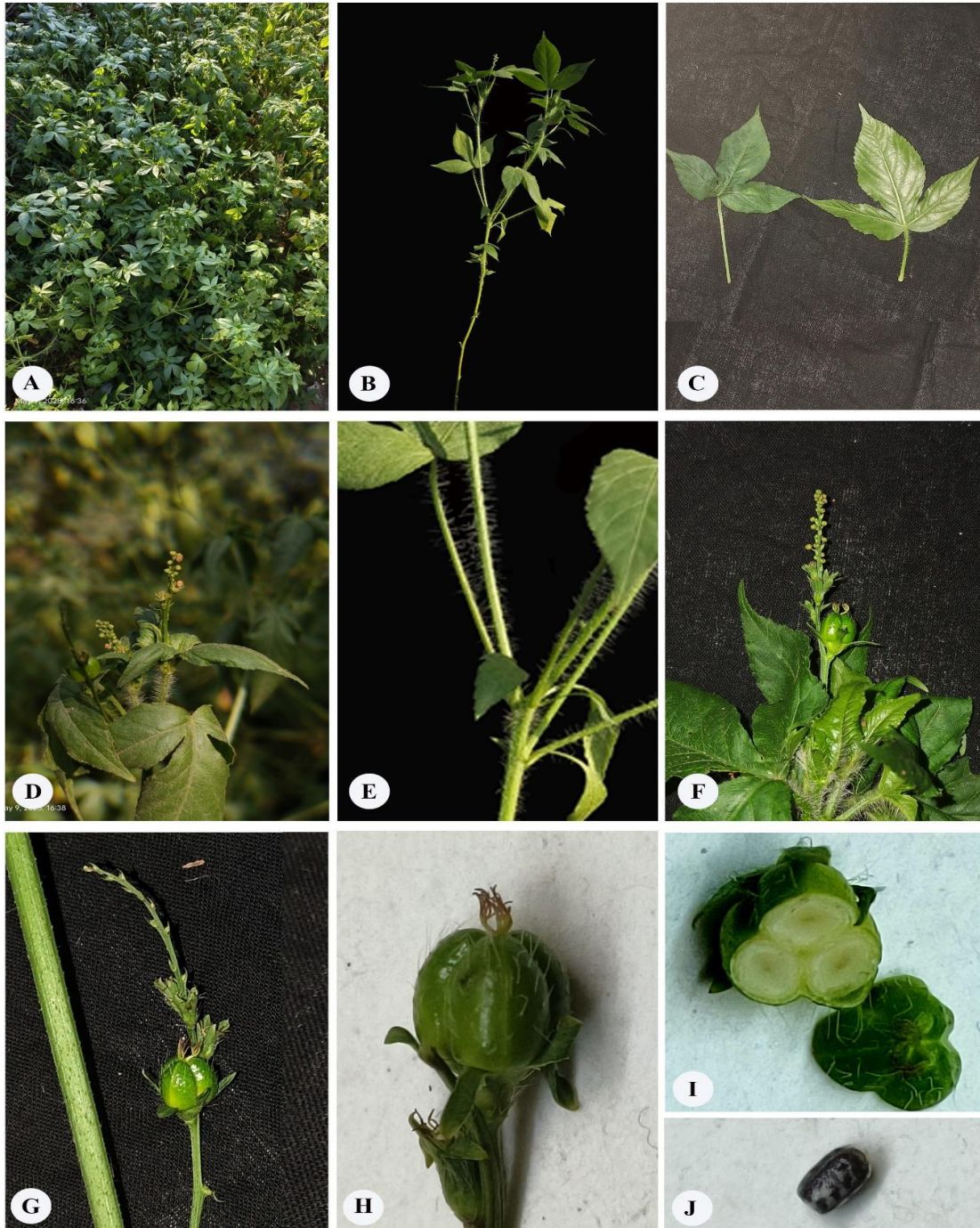


Plate 1: *Astraea lobata* (L.) Klotzsch.

- A. Natural habitat showcasing the typical environment where *Astraea lobata* grows.
- B. Overall habit of the plant, illustrating its growth form and structure.
- C. Detailed view of the leaf, displaying both the dorsal (upper) and ventral (lower) surfaces to highlight texture and venation.
- D. Inflorescence, showing the arrangement and structure of the flowers.
- E. Close-up of the stem surface featuring stellate (star-shaped) hairs characteristic of the species.
- F & G. Inflorescence with developing fruits, illustrating the progression from flowering to fruiting stage.
- H. Mature trilobed fruit densely covered with hairs, emphasizing its shape and surface texture.
- I. Cross-sectional view of the fruit, revealing internal anatomy and seed arrangement.
- J. Fully mature seed of *Astraea lobata*, showing its size, shape, and surface features.

3. RESULTS

Astraea lobata (L.) Klotzsch, *Arch. Naturgesch.* (Berlin) 7: 194. 1841; Gaikwad et al., *Rheedea* 22(2): 131. 2012; Das et al., *Pleione* 10(2): 392. 2016; Biswas & Ghosh, *Pleione* 13(2): 422. 2019; Silva & Cordeiro, *Pl. Syst. Evol.* 306: 41, figs. 17–19. 2017. *Croton lobatus* L., *Sp. Pl.* 2: 1005. 1753 'lobatum'; Chakrabarty & Balakrishnan in Balakrishnan et al., *Fl. India* 23: 504. 2012 (Figure 1).

Annual, erect, monoecious herb or subshrub reaching 60–70 cm in height; branched. Stem ribbed or rounded, with white stellate hairs. Stipules linear-lanceolate or filiform, slightly pubescent, small (approximately 4–5 mm long).

Leaves simple, alternate (sometimes opposite near the apex), 2.5–10 cm long, 3–5 lobed; margins serrate, apex acuminate, base 3–5-nerved; surface sparsely stellate-hairy, glabrous or slightly hairy above, pubescent beneath. Petioles 6–15 cm long; basal glands absent.

The Inflorescence is a slender, terminal or axillary raceme, 4–12 cm long. Male and female flowers are borne separately, though they may occasionally occur intermixed on the same rachis. The flowers pentamerous, actinomorphic, incomplete, unisexual, and regular, with a greenish-yellow to yellowish-white coloration.

Male flowers (3–16 per inflorescence): Bracts filiform, 1–1.3 mm long; buds globular; pedicels 1.5–2 mm, slender, slightly hairy or glabrous. Sepals 5, unequal, 1–1.5 mm long, ovate-oblong, obtuse at apex, free, greenish-purple, ciliate. Petals 5, hyaline, 1.5–2 mm long, obovate-oblong. Stamens 10–13, inflexed in bud; filaments 1–2 mm long; anthers 0.5 mm, 2-celled.

Female flowers (1–6 per inflorescence): Bracts 1 mm, linear-lanceolate, subulate, and hairy. Pedicels 1–1.5 mm, stout. Sepals 5, 4.5–8 × 1–1.5 mm, green, persistent, oblanceolate to spatulate, connate at base, acute at apex, dentate and glandular-pubescent at margins. The corolla sometimes reduced to a single hair. Ovary superior, trilocular, glabrous or sparsely stellate-hairy. Styles 3, 2–4 mm long, each divided into 2–4 linear branches.

Fruit: Capsule ovoid-oblong, 7 mm in diameter, glabrous or sparsely covered with stellate hairs, and 3-lobed. Each capsule contains three seeds, 4.5–6 × 2.5–3.5 mm. The seeds are ellipsoid, thick, rugulose, with an ash-grey and dull brown spots. The caruncle is conical or reniform to peltate in shape and yellowish in color (Plate 1).

Flowering and fruiting period: June to September

Global distribution: Native to South America and the West Indies. Also reported in Senegal, Eritrea, Ethiopia, the Arabian Peninsula, Bangladesh, and India.

Indian distribution: Previously recorded in Maharashtra, Tripura, West Bengal, Assam, the species is now newly reported in Tirunelveli, Tamil Nadu.

Specimens examined:

India: Tamil Nadu, Tirunelveli district, Munirpallam village (8°68'47.39"N & 77°70'9.45"E; elevation: 48 m). Identified by Dr. V. Chelladurai, Emeritus Scientist, Xavier Research Foundation, St. Xavier's College, Palayamkottai. **Specimen No.** 40589 (XCH).

Astraea lobata (incorrectly listed as *Melastomataceae* in some records) and *Croton* belong to distinct taxa. Below are the diagnostic comparisons:

Astraea lobata

Family: Euphorbiaceae

- **Leaf morphology:** Simple, entire leaves with an opposite or whorled arrangement; elliptic to lanceolate in shape with prominent venation.
- **Inflorescence:** Terminal or axillary racemes or panicles; small to medium-sized flowers, usually five-parted.
- **Fruit:** Capsule, often dehiscent, containing numerous small seeds.
- **Habitat:** Tropical or subtropical environment, typically found in moist forests or along stream banks.

Croton spp.

Family: Euphorbiaceae

- **Leaf morphology:** Highly variable, ranging from simple to compound, with entire or deeply lobed margins.
- **Inflorescence:** Varies widely, including racemes, panicles, spikes, and umbels.
- **Fruit:** Capsule or schizocarp, often three-lobed
- **Habitat:** Cosmopolitan, found in a variety of environment from rainforests to arid zones, especially in disturbed habitats.

Key Differences

- **Family affiliation:** Both species belong to the Euphorbiaceae family, correcting the earlier misplacement of *Astraea lobata* under *Melastomataceae*.
- **Leaf complexity:** *Astraea lobata* consistently has simple leaves, while *Croton* shows much greater leaf variation.
- **Inflorescence:** *Astraea lobata* typically has racemes or panicles, whereas *Croton* includes a wider variety of inflorescence types.
- **Fruits:** *Astraea lobata* bears capsules with stellate hairs, while *Croton* produces capsules or schizocarps, often three-lobed.

4. DISCUSSION

Astraea lobata (L.) Klotzsch is considered an exotic species in India, and the mode of its introduction into Munirpallam village, Tirunelveli, Tamil Nadu remains uncertain. The authors speculate that its presence may result from accidental introduction through human transportation or dispersal by animals such as bats.

In India, this species was first reported in 2012 from Maharashtra (Gaikwad et al., 2012), followed by records from Tripura (Das et al., 2016), West Bengal (Biswas & Ghosh, 2019), and Assam (Verma et al., 2023). The present record from Tamil Nadu extends its known distribution to southern India, and highlighting its ecological adaptability across varied Indian habitats.

5. CONCLUSIONS

The present study documents the first record of *Astraea lobata* (L.) Klotzsch (Euphorbiaceae) from Tirunelveli district, Tamil Nadu, significantly expanding the known distribution of this species within India. Previously, *A. lobata* was reported only from Maharashtra, Tripura, West Bengal, and Assam, making this new finding a noteworthy addition to the flora of southern India. Detailed morphological descriptions, field observations, and voucher specimen deposition support the accurate identification of the species in Munirpallam village.

The discovery highlights the dynamic nature of plant distribution and underscores the importance of continued botanical surveys in underexplored regions. While the exact mode of introduction of *A. lobata* to Tirunelveli remains uncertain, possible vectors such as human-mediated transport or animal dispersal are suggested. This record not only enriches the floristic diversity of Tamil Nadu but also provides a valuable reference for future taxonomic and ecological studies on the species.

In summary, the addition of *Astraea lobata* to the flora of Tirunelveli district emphasizes the need for ongoing field research and documentation to better understand plant diversity, distribution patterns, and the ecological implications of exotic species in India.

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Author Contributions

All authors contributed equally to the research, data collection, analysis, and preparation of the manuscript.

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Conflict of Interest

The authors declare that there are no conflicts of interests.

Informed consent

Not applicable.

Ethical approval & declaration

In this article, as per the plant regulations followed in the Xavier Research Foundation, St. Xavier's College, Palayamkottai, Tamil Nadu, India; the authors observed the *Astraea lobata* (Linnaeus) Klotzsch [Euphorbiaceae] in Tirunelveli District, Tamil Nadu. The ethical guidelines for plants & plant materials are followed in the study for species observation, identification & experimentation.

Data and materials availability

All data associated with this study will be available based on the reasonable request to the corresponding author.

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