



A note on the distribution of *Abroma augustum* (L.) L.f. (Malvaceae) in Odisha, India

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Abstract

Abroma augustum (L.) L.f. (Malvaceae) is a potential medicinal plants cultivated and introduced in botanical gardens of India. The species is reported here as a new addition to the flora of Odisha. The medicinal properties, morphological description, taxonomy, photographs and detailed microscopic observations of reproductive structures were provided.

Keywords: *Abroma augustum*, malvaceae, new distribution, Odisha

Introduction

The family Malvaceae of order Malvales is represented by 245 genera and 4225 species in the world (Christenhusz and Byng, 2016) [1]. The members of family are distributed worldwide especially in tropical regions from South China to Tropical Asia. In India the family is represented by 22 genera and 125 species (Rahman and Gondha, 2014) [7]. Besides several economic importance, members of the family have known for their high medicinal properties, and as, fibre yielding, food and flavour yielding plants. The family characterized by stellate trichomes, epicalyx, valvate aestivation of calyx, the corolla often convolute the stamens connate as a tube or 5-∞ bundles, with monotheal or ditheal anthers, gynoeceum syncarpous, ovary superior, ovules axile or marginal, the fruit a capsule, schizocarp of mericarps, berry, or samara.

During the exploration of flora in the coastal districts of Odisha, one population of *Abroma augustum* (L.) L.f. was collected from Gelpur, Bhadrak, Odisha. Pursuance of literature (Saxena and Brahmam, 1996; Haines, 1925) [9] revealed that the species is not reported from the state of Odisha neither from Eastern Ghats of India. Therefore, the species is appended here with a detailed description, digital image and critical notes on its distribution.

Abroma augustum is reported for multifarious medicinal use particularly for gynaecological disorders, (Magtalas *et al.*, 2023) [5], menstrual disturbances (Woldeamanal *et al.*, 2022) [12] etc. Traditionally the plant is used for treating for sexually transmitted diseases like gonorrhoea. Decoction of bark powder is helpful in treating menstrual disturbances. The leaf extract is reported to cure diabetes induced nephrological problem (Khanra *et al.*, 2015) [3]. The leaf and root juice are also used to treat diabetes.

Major phytochemicals such as, Taraxerol, Friedelin, β -Sitosterol, α -Amyrin, Lupeol, Octacosanol, have also found in the plant which are potential to control diabetes, anti-inflammation and gynaecological disorders etc. Acetone extract of leaf showed high anti-microbial effect against Gram-positive bacteria. Simultaneously, acetone leaf extracts shown anti-fungal activity against *Candida albicans*, *Rhizopus oryzae*, *Aspergillus fumigatus* (Goswami *et al.*, 2023) [4].

The plant is also cultivated for its medicinal uses. Seeds and stems cuttings are most suitable method for propagating the plant. The plants seldom associate with few fungi as mycorrhizal (VAM) partner (Thapa *et al.*, 2015) [11]. Mature seeds, which are black in colour at maturity, can be collected during April to June. Then, the seeds are sown between June -Aug for faster germination and growth. Sandy loam soils are ideal for growth of this plant.

Taxonomy

Abroma augustum (L.) L.f. Suppl. 341.1781; Master in Hook.f. Fl. Brit. India 1: 375, 1874; Cooke, Fl. Pres. Bombay 1:144. 1958 (Repr.); Malick in Sharma *et al.* Fl. India 3:409.1993. *Theobroma augusta* L. Syst. 233.1767. N.P. Singh & S. Karthikeyan 2000 [10], Flora of Maharashtra vol. 1; Sasidharan, N. 2011 [8]. Flowering plants of Kerala, DVD, V2, KFRI.

Erect shrub or small tree up to 4 m tall, normally branching at 1–2 m height but often grows multi stemmed from the base; stem and branches with tenacious bark; Leaves alternate, simple, highly variable but two main forms exist (heterophylly): lobed (often on orthotropic branches) or unlobed (often on plagiotropic branches); lobed form with petiole up to 40 cm long, blade 3–5-lobed, cordate-ovate in outline, up to 30–40 cm × 30–40 cm, base palmately 3–7-veined, margin irregularly dentate; unlobed form with petiole up to 1.5 cm long, blade lanceolate, 10–23 cm × 9–12 cm, cordate at base, margin denticulate, palmately pinnately veined. Inflorescence a leaf-opposed or terminal 1(–4)-flowered cyme; 1-4-flowered cyme (usually only 1 flower develops) peduncle 1–3 cm long; bracts 6–8 mm long. Flowers bisexual, pendent, 3–5 cm in diameter, 5-merous; bracteoles 2, pedicel 1–3.5 cm long, articulate; calyx deeply divided into 5 lobes, lobes entire, triangular, 15–20 mm × 6 mm, greenish; petals 5, spoon-shaped, 2–3.5 cm × 1 cm, base concave and white, blade dark purple, red or yellow, ciliate; staminal tube short, apically with 5 fascicles of anthers alternating with 5 petal-like staminodes, each fascicle with 3(–4) anthers; ovary superior, 2–3 mm long, 5-lobed, 5-celled, style 1–2.5 mm long, with 5 branches. Fruit an obconical capsule 4–5 cm × 3–4 cm, base rounded, top truncate, 5-winged and angled, sometimes beaked, enveloped by the slightly enlarged calyx, densely

prickly hairy, apical portion loculicidal, lateral, with numerous seeds. Seed cylindrical to obovoid, 3–4 mm × 2 mm, without wings or aril, black.

Flowering & Fruiting: December-August

Distribution, habitat & ecology: *Abroma augustum* was published by Singh & Karthikeyan (2000) [10] in Flora of Maharashtra followed by Sasidharan (2011) [8] in Flowering Plants of Kerala. Now, it is reported from roadside wasteland of Bhadrak district, Odisha. The associated taxa

of this species were found to be *Tragia involucrata*, *Xanthium strumarium*, *Clitoria ternatea*, *Hyptis suaveolens*, *Datura stramonium* etc. It is globally distributed from North East India to Malesia and Micronesia.

Specimen examined: India, Odisha, Gelpur, Bhadrak, 06.08.2023, Jena & Sahu 3174 (Herbarium of Department of Botany, MSCB University, Bariapada, Odisha)

Conservation status: The species is listed as Not Evaluated (NE) in accordance with IUCN (2019) rules.

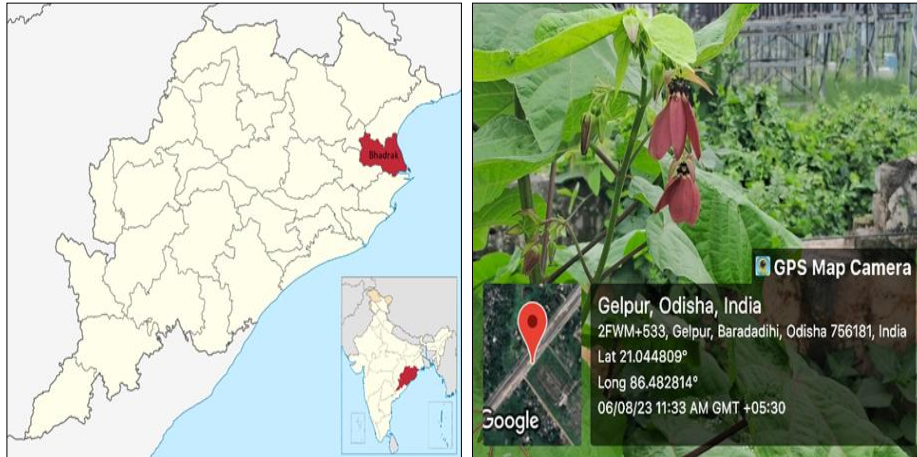


Fig 1: Map showing location and growing habitat of *Abroma augustum* (L.) Lf. in Odisha



Fig 2: Solitary flower in a cyme and single flower



Petal like staminodes

Carpel

Fig 3: Petals like staminodes & a distinct Carpel

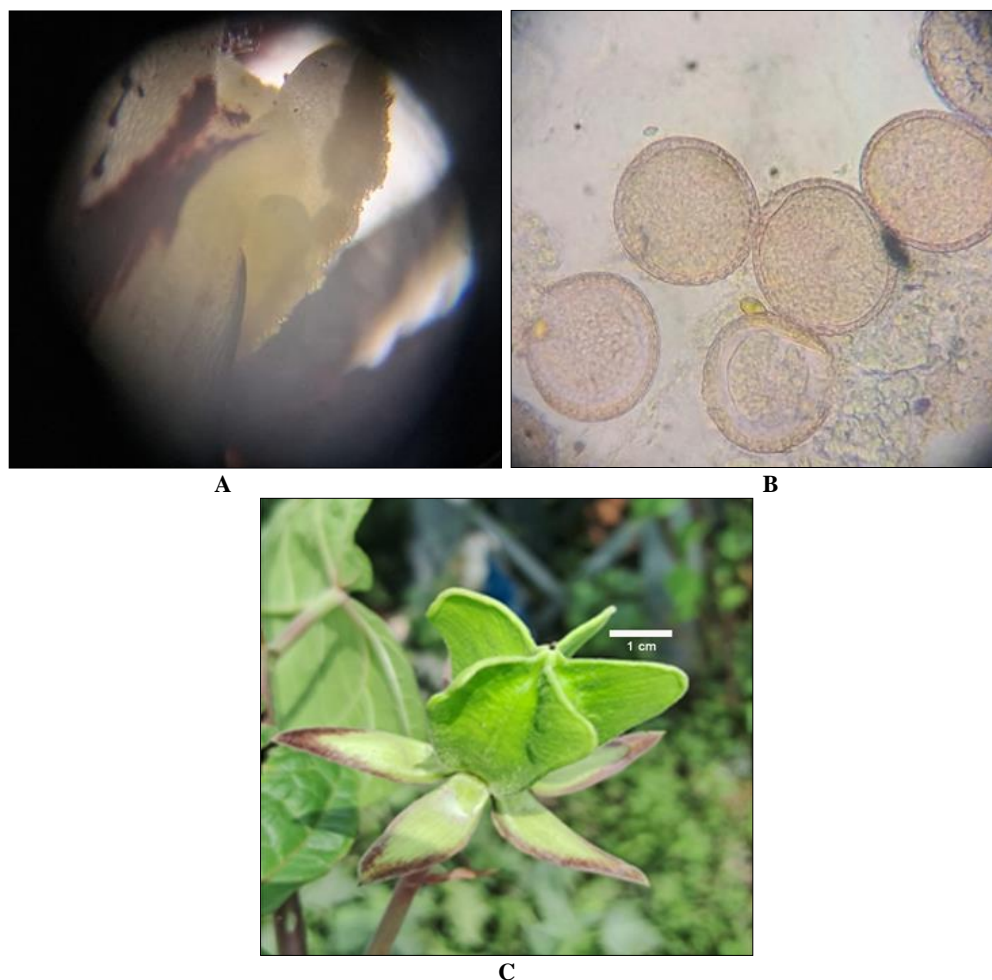


Fig 4: A- Anther, B-Pollen grains (100X), C- Fruit

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References

- Christenhusz M, Byng J. The number of known plants species in the world and its annual increase. *Phytotaxa*,2016;261:201–217. Doi: 10.11646/phytotaxa.261.3.1.
- Haines HH. The Botany of Bihar and Orissa, I-VI, Botanical Survey of India, Calcutta, 1921, 25.
- Khanra Ritu, Dewanjee Saikat, Dua Tarun K, Sahu Ranabir, Gangopadhyay Moumita, Feo Vincenzo De, *et al.* *Abroma augusta* L. (Malvaceae) leaf extract attenuates diabetes induced nephropathy and cardiomyopathy via inhibition of oxidative stress and inflammatory response, *Journal of Translational Medicine*,2015;13:6.
- Goswami Rakesh, Chatterjee Priyajit, Sinha Tanmoy. *Abroma augusta* (L.) L. f.: An ethno pharmacological review of its traditional uses and modern applications. *World Journal of Biology Pharmacy and Health Sciences*,2023;14(03):113–121.
- Magtala Mariel C, Balbin Patrick Tracy, Cruz Elljhay C, Adizas Arcel V, Gerardo John Patrick Z, Sausa Rausche B, *et al.* A systematic review of medicinal plants used in the treatment of gynaecologic diseases in the Philippines. *Phytomedicine Plus.*,2023;3:1-14.
- Islam MK, Saha Sanjib, Mahmud I, Mohamad K, Awang Khalijah, Uddin SJ, *et al.* An ethnobotanical study of medicinal plants used by tribal and native people of Madhupur forest area, Bangladesh. *Journal of Ethnopharmacology*,2014;151:921–930.
- Rahman A, Gondha R. Taxonomy and Traditional Medicine Practices on Malvaceae (Mallow Family) of Rajshahi, Bangladesh. *Open J. Bot*,2014;1:19–24.
- Sasidharan N. Flowering Plants of Kerala ver. 2.0. KFRI DVD No. 14. Kerala Forest Research Institute, Peechi, 2011.
- Saxena HO, Brahmam M. Flora of Orissa (1994-1996): Volume I-IV, Orissa Forest Development Corporation, Bhubaneswar.
- Singh MP, Karthikeyan S. Flora of Maharashtra, Botanical Survey of India. Flora of India Series-2, 2000.
- Thapa Tulshi, De Utanka Kumar, Chakraborty Bishwanath. Association and root colonization of some medicinal plants with Arbuscular Mycorrhizal Fungi, *Journal of Medicinal Plants Studies*,2015;3(2):25-35.
- Woldeamanel MM, Senapati S, Mohapatra S, Subudhi HN, Rath Prasanta, Panda Alok Kumar. Ethnomedicinal and Ethnobotanical Investigations and Documentation of Plants Used by Traditional Healers of Eastern India. *Current Traditional Medicine*,2022;8(6):1-19.