

Chapter 7

Habitat evaluation and ecological significance of *Globba marantina* L.

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Abstract

Globba marantina is a plant species that inhabits a diverse range of ecosystems. An analysis of its associated plant species revealed a community comprising 17 species from 12 families. The community exhibits a mix of herbaceous and woody vegetation, with a range of growth forms, from herbs and grasses to shrubs and trees. The species may occupy a specific ecological niche, relying on associated species for shelter, nutrients, or other benefits. Conservation efforts for *G. marantina* should consider the preservation of its associated plant community, which could have broader benefits for biodiversity conservation.

Keywords: Plant community, Ecological significance, Habitat analysis

Introduction

Globba marantina (Figure 1) is a plant species belonging to the family Zingiberaceae (Kumar *et al.*, 2022). Despite its widespread distribution, *G. marantina* remains a

relatively understudied species, with limited information available on its ecological characteristics and conservation status. The study of plant communities is essential for understanding the complex relationships between species and their environments (Rahman *et al.*, 2023; Lv *et al.*, 2024; He *et al.*, 2024). Plant communities provide important ecosystem services, including primary production, nutrient cycling, and habitat provision for other organisms (Diaz *et al.*, 2007; Power, 2010; Turnbull *et al.*, 2016; La *et al.*, 2017; Brun *et al.*, 2022). However, plant communities are facing numerous threats, including habitat destruction, climate change, and invasive species (Bellard *et al.*, 2012; Havel *et al.*, 2015; Early *et al.*, 2016; Singh *et al.*, 2023; Pfenning *et al.*, 2024). This study aims to contribute to our understanding of its ecological characteristics by examining its associated plant species. By identifying the plant species that co-occur with *G. marantina*, we can gain insights into its habitat preferences, ecological niche, and potential conservation requirements. This information will be essential for developing effective conservation strategies for *G. marantina* and its associated plant community.



Figure 1: Flower of *Globba marantina*

Morphology

G. marantina is a slender erect or inclined herb (Figure 2). It has stem with the lowest sheaths often purple. Leaves are distichous, elliptic-oblong, oblong, lanceolate or elliptic, long-acuminate, glabrous above, shortly pubescent beneath. Flowers yellow, bracts folded, with broad base and a very acute tip; the lower bracts usually bearing a solitary bulbil in place of a flower, bulbil erect. Filament strongly arched; anther with 2 large spreading lateral wings cut nearly to the base into two triangular segments. Petals and staminodes reflexed, dorsal petal boat-shaped, lateral similar, rather smaller. Lateral staminodes petaloid, oblong. Lip oblong, gradually wider towards tip with 2 oblique lobes. Ovary often 3-celled at base. Capsule rugose. Seeds globose, pale-brown, pubescent, seated on a cupular-lobed aril (Saxena and Brahman, 1995).



Figure 2: Habitat of *Globba marantina*

Methodology

A field survey was conducted in Sundargarh district, Odisha state to identify the plant species associated with *G. marantina*. The survey was carried out during 2022-2024 (Kumar *et al.*, 2021). Quadrat sampling method was used to collect data on the plant species co-occurring with *G. marantina*. A total of 10 quadrats of 10 x10 m were randomly placed in the study area, and all plant species within each quadrat were identified and recorded (Hao *et al.*, 2020).

Observations

The Table 1 lists 17 plant species from 12 different families that are associated with *G. marantina*. This diverse plant community suggests that *G. marantina* inhabits areas with a mix of herbaceous and woody vegetation. Herbs (8 species) are dominate the list, indicating a high proportion of herbaceous vegetation. The presence of trees and shrubs in the list is also notable. Three tree species, including *Azadirachta indica* (Neem) and *Syzygium cumini* (Java plum) having common medicinal species and three shrub species, such as *Murraya paniculata* (Orange jasmine) and *Phyllanthus reticulatus* (Black-berried featherfoil), indicate that *G. marantina* co-exists with a mix of woody and herbaceous vegetation.

Table 1: Associated plants of *G. marantina*

Scientific name	Common name	Family	Habit
<i>Asystasia gangetica</i>	Creeping foxglove (Plate 1f)	Acanthaceae	Herb
<i>Azadirachta indica</i>	Neem	Meliaceae	Tree
<i>Cayratia pedate</i>	Birdfoot grape vine (Plate 1a)	Vitaceae	Shrub
<i>Chromolaena odorata</i>	Siam weed	Asteraceae	Herb

<i>Commelina erecta</i>	Whitemouth dayflower	Commelinaceae	Herb
<i>Cyperus mindorensis</i>	White water sedge (Plate 1b)	Cyperaceae	Herb
<i>Digitaria abludens</i>	Stalked crabgrass	Poaceae	Grass
<i>Grewia tiliifolia</i>	Dhaman	Malvaceae	Tree
<i>Mikania micrantha</i>	Bitter vine (Plate 1c)	Asteraceae	Climber
<i>Mimosa pudica</i>	Touch-me-not plant (Plate 1d)	Fabaceae	Herb
<i>Murraya paniculata</i>	Orange jasmine	Rutaceae	Shrub
<i>Phyllanthus reticulatus</i>	Black-berried featherfoil	Phyllanthaceae	Shrub
<i>Ruellia tuberosa</i>	Snapdragon root	Acanthaceae	Herb
<i>Sphagneticola calendulacea</i>	Chinese wedelia (Plate 1e)	Asteraceae	Herb
<i>Syzygium cumini</i>	Java plum	Myrtaceae	Tree
<i>Tridax procumbens</i>	Tridax daisy	Asteraceae	Herb
<i>Urochloa mutica</i>	Buffalo grass	Poaceae	Grass

The ecological significance of its association with these plant species is worth exploring. *G. marantina* may occupy a specific ecological niche, relying on the associated plant species for shelter, nutrients, or other benefits.

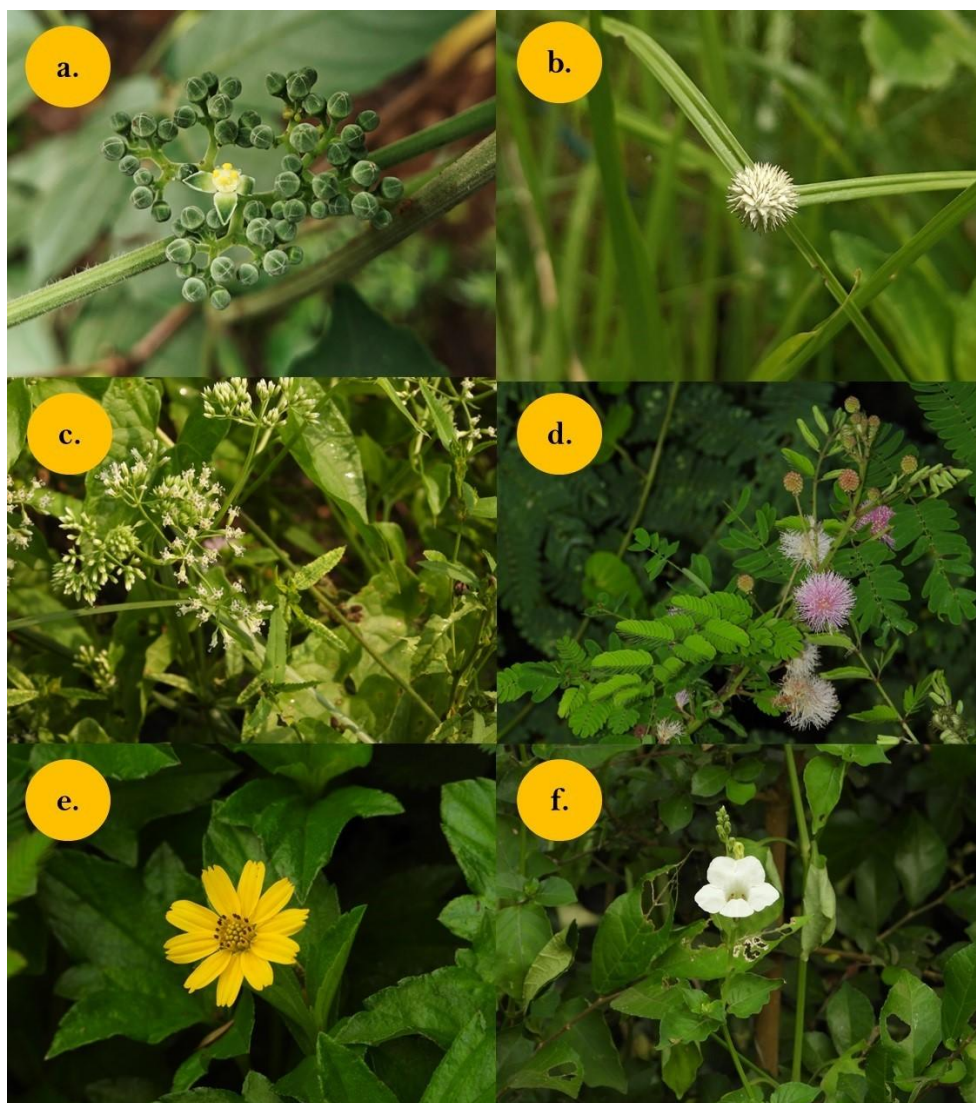


Plate 1: Some associated plants of *Globba marantina* a) *Cayratia pedata*, b) *Cyperus mindorensis*, c) *Mikania micrantha*, d) *Mimosa pudica*, e) *Sphagneticola calendulacea*, and f) *Asystasia gangetica*

The presence of certain plant species, such as *Chromolaena odorata* (Siam weed) and *Mikania micrantha* (Bitter vine), may also indicate that conservation of *G. marantina* is important as they are degrading the habitat. The conservation implications of this species association with this diverse plant community are also important to consider. Protecting *G. marantina* may require preserving the

surrounding plant community, which could have broader benefits for biodiversity conservation. Further research is needed to fully understand the ecological significance along with associated plant species.

Conclusion

The study revealed a diverse array of plant species associated with *G. marantina*, comprising 17 species from 12 families. The findings provide valuable insights into the ecological characteristics of *G. marantina* and its habitat preferences. The results also highlight the importance of conserving the associated plant community, which is crucial for maintaining the ecological balance and biodiversity of the ecosystem. Further studies are recommended to explore the ecological relationships between *G. marantina* and its associated plant species, and to develop effective conservation strategies for this species and its habitat.

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