

## **Status assessment of *Centotheca ganeshaiahiana* (Poaceae), an endemic of Saddle Peak National Park, Andaman and Nicobar Islands, India**

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### **ABSTRACT**

*The threat assessment of Centotheca ganeshaiahiana (Poaceae), an endemic of Saddle Peak National Park, North Andaman is presented here. The data available from field surveys indicated that this species is Critically Endangered according to the 2011 IUCN Red List Categories and Criteria.*

**Keywords:** Status Assessment, *Centotheca ganeshaiahiana*, IUCN Red List Criteria, Critically Endangered, Saddle Peak National Park.

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### **INTRODUCTION**

With so many species at risk of extinction in the near future, efforts to conserve plant biodiversity are unfortunately hindered by the lack of a comprehensive inventory due to lack of sufficient data for assessment of the threat status of each species [1]. The most widely used system to estimate risk of extinction, the International Union for the Conservation of Nature (IUCN) Red List, provides conservation assessments for about 20,500 species from Plant Kingdom of which 18,500 belongs to flowering plants [2]. A large number of the world's plant species are threatened by several factors such as habitat loss, exploitation, biological invasions, industrialization, pollution and accelerated climate change.

The Global Strategy for Plant Conservation established five broad aims with 16 result-oriented targets intended to stop the current and continuing loss of plant diversity [3]. Though there was some progress, none were completely achieved by their proposed 2010 deadline. The revision of 2010 then modified the targets and extended the deadlines to 2020 [4] and broadened Target Two as 'Assessment of the conservation status of all known plant species, as far as possible, to guide conservation action.' A comprehensive study on species of concern would help plan conservation and develop strategies for their survival.

Endemic species with limited geographical ranges are more susceptible to extinction than widely ranging species. Very few studies have been published on population numbers and status assessment for some endemic plants in India [5, 6, 7, 8, 9, 10, 11]. An effective conservation strategy for endemic species requires detailed knowledge of their status and distribution. The degree of endemism for an area is often cited as a measure of the uniqueness of the flora, and consequently is important for prioritizing sites for conservation [12]. It should be noted that the

confinement of endemic species to a single habitat renders them extremely vulnerable to environmental change. The geographical area can be defined by political boundaries, such as country endemics, or by ecological boundaries.

## MATERIALS AND METHODS

The Andaman and Nicobar Islands popularly known as 'Emerald Isles' are the Union Territory and the largest archipelago system in the Bay of Bengal, consisting of 306 islands and 206 rocks and rock outcrops (islets). It is situated between 6°45'–13°41' N and 92°12'–93°57' E, covering 8,249 km<sup>2</sup> geographical area with a coastline of 1,962 km. The topography of these islands, geologically, is a part of land mass belonging to South-east Asia, including Malaysia, North-east India, Burma, Thailand and Indonesia. These islands stretch North–South in direction and simulating an arc stretching over a length of about 912 km and with maximum width of 57 km. The terrain of Andaman Islands (part of Indo-Burma Biodiversity Hotspot) that has been formed due to volcanic activity is in contrast to the Nicobar Islands (part of Sundaland Biodiversity Hotspot), which were formed from the fragments of a continental land mass [13]. The Andaman group of islands have a total area of 6,408 km<sup>2</sup>, comprising a total length of 467 km and width of 52 km.

### 1. The study area

The Saddle Peak forests (13°15' to 13°41' N and 92°37' to 93°7' E) was declared as a National Park in 1979. The total area of the Saddle Peak National Park is 32.4 sq. km and is located in Diglipur forest division of North Andaman. As it comes under Category II of IUCN protected area categories [14], trekking is possible only with permission from the Islands' Forest Department. The climate is typically oceanic. Temperature usually varies between 20–30°C. The months, June to October are characterized by heavy precipitation. The Saddle Peak National Park is surrounded by moist deciduous vegetation as well as tropical evergreen forest and possesses several endemic species. Champion and Seth [15] classified the vegetation type as Southern Hilltop Evergreen Forest (1A / C3).

### 2. *Centotheca ganेशaiahiana* (Fig. 1)

This species is a tufted annual herb of 20–30 cm high with erect glabrous culms. Leaf sheaths 3–5 cm long, with densely ciliate margins; ligule ciliate, membranous, ca. 1 mm long; leaf blades lanceolate, 6–12 × 0.6–1.0 cm, symmetrical at base, glabrous on both surfaces, tessellately nerved. Inflorescence a spreading panicle, 10–15 × 2–3 cm; rachis scabrid; lateral branches erect, 3–6 cm long, scabrid, single or binate at nodes with 1–3 spikelets; spikelets 5.0–5.5 × 1.5 mm; fertile florets 2; pedicels 1.5–13.0 mm long, scabrid. Glumes similar to fertile lemma in texture, keel scabrid; mid-nerve distinctly mucronate; lower glumes ovate, 2.8–3.0 × 1.0 mm, 5–7-nerved; upper glumes oblong, 3.5 × 1.0 mm, 5–7-nerved. Fertile florets 2. Lemmas 3–4 × 1.0 mm, emarginate with bulbous-based hairs at middle of the margins; hairs retrorse at maturity. Palea 2.5–3.5 × 0.5 mm. Anthers 1 mm long. Caryopsis brownish when dry, ca. 2 mm long. Flowers and fruits from October to March.

### 3. Assessment

Under the project 'Quantitative Assessment and Mapping of Plant Resources of Andaman and Nicobar Islands', extensive surveys were conducted throughout all the islands of Andaman and Nicobar groups from Landfall Island to Indra Point, including the remote volcanic islands of Narcondum and Barren Islands. It was observed that *Centotheca ganेशaiahiana* has not been recorded from any part of these islands except the Saddle Peak National park.

Since the first report of *Centotheca ganेशaiahiana* in 2011, it is claimed to be endemic to the Saddle Peak range. A thorough survey for the occurrence of this species at Saddle Peak National Park and its adjoining forest region was intended to estimate the population and distribution of this species to ascertain the threat status. Accordingly, the whole terrain of Saddle Peak National Park was surveyed for locating and estimating the populations of *C. ganेशaiahiana*. The population of this species was located in six points at close proximity and each site was observed to be populated with c. 30 to 45 individuals. The sites of occurrence were recorded by GPS (Table 1) for the estimation of Extent of Occurrence (EOO) and Area of Occupancy (AOO) (Fig. 2). This species was found at an elevation range of 230–550 m.

## RESULTS AND DISCUSSION

*Centotheca ganेशaiahiana*, an endemic to Saddle Peak National Park, North Andaman Islands, is categorised as Data Deficient [16] earlier. Based on the field observations made periodically recently, the conservation status of the

species has been re-evaluated following the IUCN Red List Criteria [17, 18]. The species qualifies for criterion B1 (EOO) and criterion B2 (AOO) as *C. ganेशaiahiana* is restricted to Saddle Peak range.



**Figure 1: *Centotheca ganेशaiahiana* Habitat**

**Criterion B1:** The EOO of *Centotheca ganेशaiahiana* is estimated to be 8.8km<sup>2</sup>. A continuing decline of population is observed and inferred (subcriterion b) in terms of quality of habitats (iii) as there is a constant tourism and trekking activity at the national park which comes under Category II of protected areas pushing this species to extreme. Thus, the species is categorised Critically Endangered with geographical range being less than 100 km<sup>2</sup> and satisfies subcriterion b (iii).

**Criterion B2:** Also, the AOO observed is much less than 1 km<sup>2</sup>, and since this estimate is less than 10 km<sup>2</sup>, the species qualifies for Critically Endangered category under subcriterion b (iii) due to the threats of tourism and trekking activity. Besides, the meandering impact of reclamation of the forest region after the dam construction over Kalpong River also has significant deteriorating effects.

Hence, it is certain that the assessment for *Centotheca ganेशaiahiana* is Critically Endangered [B1ab(iii)+2ab(iii)].

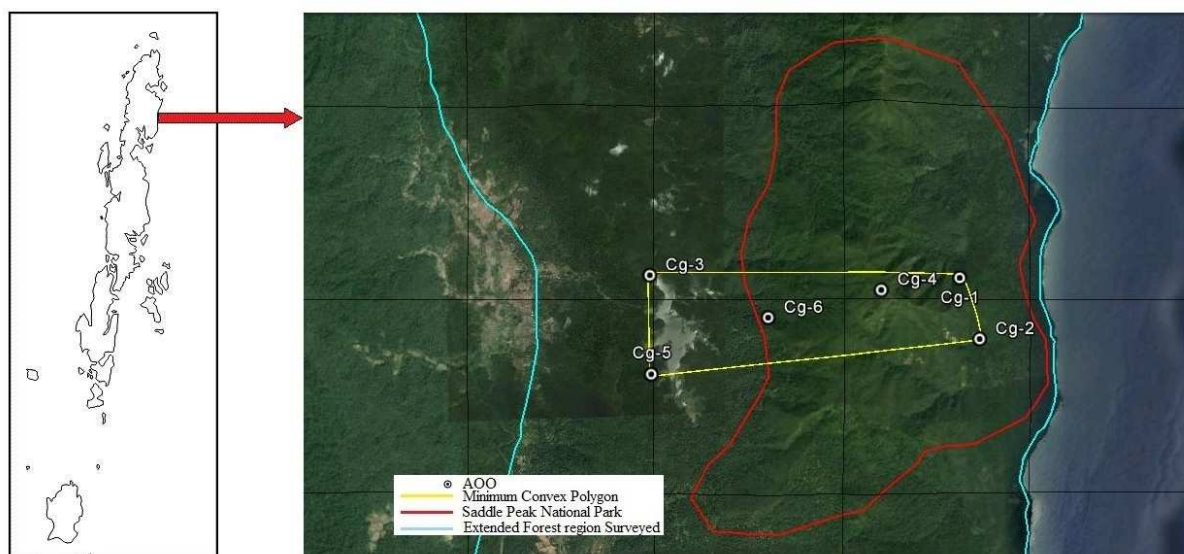


Figure 2: Location Map; Study Area; Minimum Convex Polygon - Polygon Area: 8.8km<sup>2</sup>; Perimeter 15 km; Number of GPS Locations: 6

Table 1: Distribution of *Centotheca ganeshaihana* at Saddle Peak National Park

Localities	GPS Coordinates	Elevation
Way to Saddle Peak	13° 9'35.40"N; 93° 1'9.30"E	370 m
Saddle Peak	13° 9'0.28"N; 93° 1'21.30"E	267 m
Kalpong Dam Catchment Area	13° 9'37.10"N; 92°58'5.80"E	233 m
Saddle Peak Hill Top	13° 9'27.96"N; 93° 0'21.35"E	695 m
Kalpong Dam	13° 8'39.82"N; 92°58'6.67"E	230 m
Way to Saddle Peak	13° 9'12.55"N; 92°59'16.06"E	366 m

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