Journal of Threatened Taxa

The international journal of conservation and taxonomy

www.threatenedtaxa.org

ISSN 0974-7907 (Online) | ISSN 0974-7893 (Print)

SHORT COMMUNICATION

STATUS ASSESSMENT OF THE SADDLEPEAK DEWFLOWER (*MURDANNIA SADDLEPEAKENSIS* RAMANA & NANDIKAR: COMMELINACEAE): AN ENDEMIC SPIDERWORT PLANT OF ANDAMAN ISLANDS, INDIA

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26 December 2016 | Vol. 8 | No. 14 | Pp. 9643–9647
10.11609/jott.2363.8.14.9643-9647

Journal of Threatened Taxa | www.threatenedtaxa.org | 26 December 2016 | 8(14): 9643–9647

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ISSN 0974-7907 (Online)
ISSN 0974-7893 (Print)

OPEN ACCESS

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Abstract: The current distribution and threat assessment of *Murdannia saddlepeakensis* Ramana & Nandikar (Commelinaceae), an endemic plant of Saddle Peak National Park, northern Andaman is presented here. The data available from field surveys indicate that this species is Critically Endangered according to the 2011 IUCN Red List Categories and Criteria.

Keywords: Critically Endangered, IUCN Red List Criteria, *Murdannia saddlepeakensis*, Saddle Peak National Park, status assessment.

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 (Morrone 1994). 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 (Brummitt et al. 2008).

Endemic species with limited geographical ranges are more susceptible to extinction than widely ranging species. Hence, an effective conservation strategy for endemic species requires detailed knowledge of their population status and distribution. Most of the floristic databases lack crucial data pertaining to distributional range and population size of endemic species, and the data for many species are just carried forward from past works without comprehensive field work. Very few studies have been published on population numbers and status assessment for some endemic plants in India (Rao et al. 2010, 2011, 2012; Panda 2013; Baig et al. 2014; Salamma & Rao 2014; Pethe et al. 2015).

Endemism is the principal criterion to determine hotspot status as the endemic species are entirely

DOI: http://dx.doi.org/10.11609/jott.2363.8.14.9643-9647

Editor: Ravi Prasad Rao, Sri Krishnadevaraya University, Anantapuramu, India. **Date of publication:** 26 December 2016 (online & print)

Manuscript details: Ms # 2363 | Received 20 December 2015 | Final received 12 November 2016 | Finally accepted 01 December 2016

Citation: Tagore, J.K., S. Soosairaj, M.V. Ramana, M. Sanjappa & K.N. Ganeshaiah (2016). Status assessment of the Saddlepeak Dewflower (*Murdannia saddlepeakensis* Ramana & Nandikar: Commelinaceae): an endemic spiderwort plant of Andaman Islands, India. *Journal of Threatened Taxa* 8(14): 9643–9647; http://dx.doi.org/10.11609/jott.2363.8.14.9643-9647

Funding: The authors (JKT & MVR) acknowledge Department of Biotechnology, Government of India, for the financial assistance under the project 'QAMPRA&N'.

Conflict of Interest: The authors declare no competing interests.

Acknowledgements: The authors are thankful to Dr. P. Singh, Director, BSI, Kolkata and Dr. C. Murugan, Scientist-D and Principal Investigator, BSI, ANRC, Port Blair for facilities. Also grateful to PCCF, DFO and other forest officials of the Andaman and Nicobar Forest Division, Department of Environment and Forests, for their permission and cooperation during the field surveys.

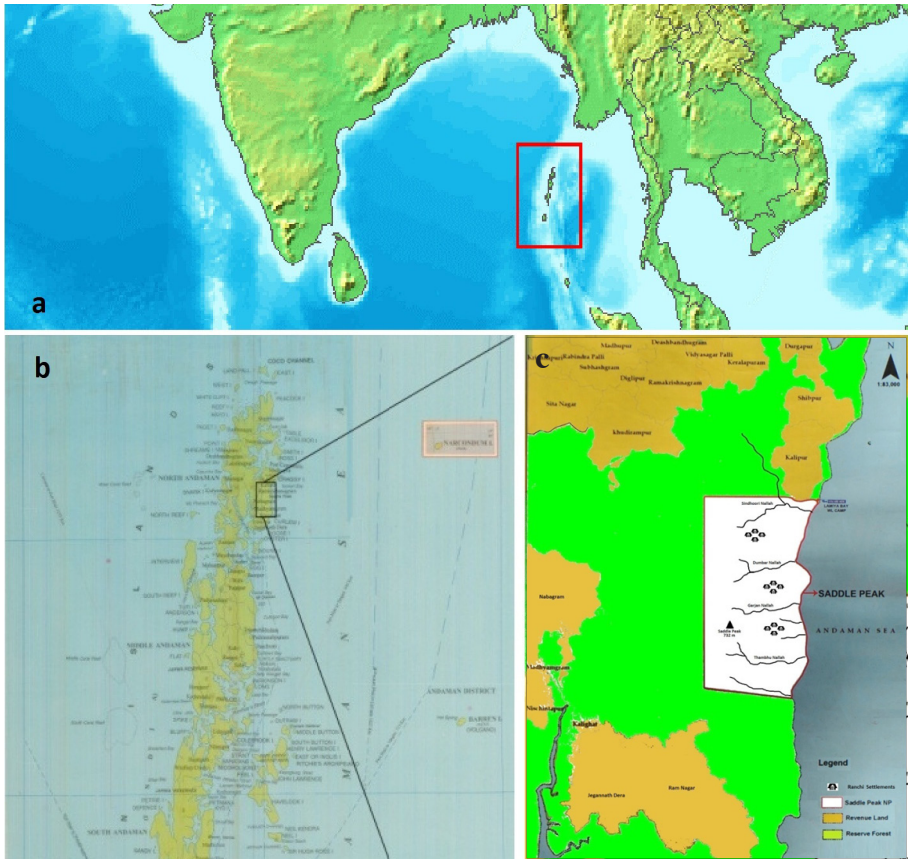

Figure 1. a - Location map; b - Andaman Islands; c - Study area.

dependent and are restricted to a particular geographic area for their survival, and are often the most vulnerable (Myers et al. 2000). The geographical area can be defined by political boundaries, such as country endemics, or by ecological boundaries. The degree of endemism for an area is often cited as a measure of the uniqueness of the flora, and consequently is an important criterion for prioritizing a site for conservation (Myers et al. 2000). It should be noted that the confinement of endemic species to a single habitat renders them extremely vulnerable to environmental change.

Study Area

The Andaman & Nicobar Islands popularly known as 'Emerald Isles' are a 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^{0}45'–13^{0}41'N & 92^{0}12'–93^{0}57'E, covering 8,249km^2 geographical area with a coastline of 1,962km. These islands stretch north–south in direction and simulating an arc stretching over a length of about 912km and with maximum width of 57km. The Andaman group of islands have a total area of 6,408km^2, comprising a total length of 467km and width of 52km.

The Saddle Peak forests (13^{0}15'–13^{0}41'N & 92^{0}37'–93^{0}7'E; Fig. 1) was declared a National Park in 1979. The total area of the Saddle Peak National Park is 32.4km^2 and is located in Diglipur forest division of northern Andaman. As it comes under Category II of IUCN protected area categories (Stolton et al. 2013), trekking is possible with permission from the 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 & Seth (1968) classified the vegetation type as southern hilltop evergreen forest (1A/C3).

Murdannia saddlepeakensis Ramana & Nandikar (Image 1)

This species is an erect herb of about 40–60 cm high, glabrous perennial with a basal rosette of leaves; roots fibrous. Leaves: basal rosette leaf sheaths 0.5–1 cm

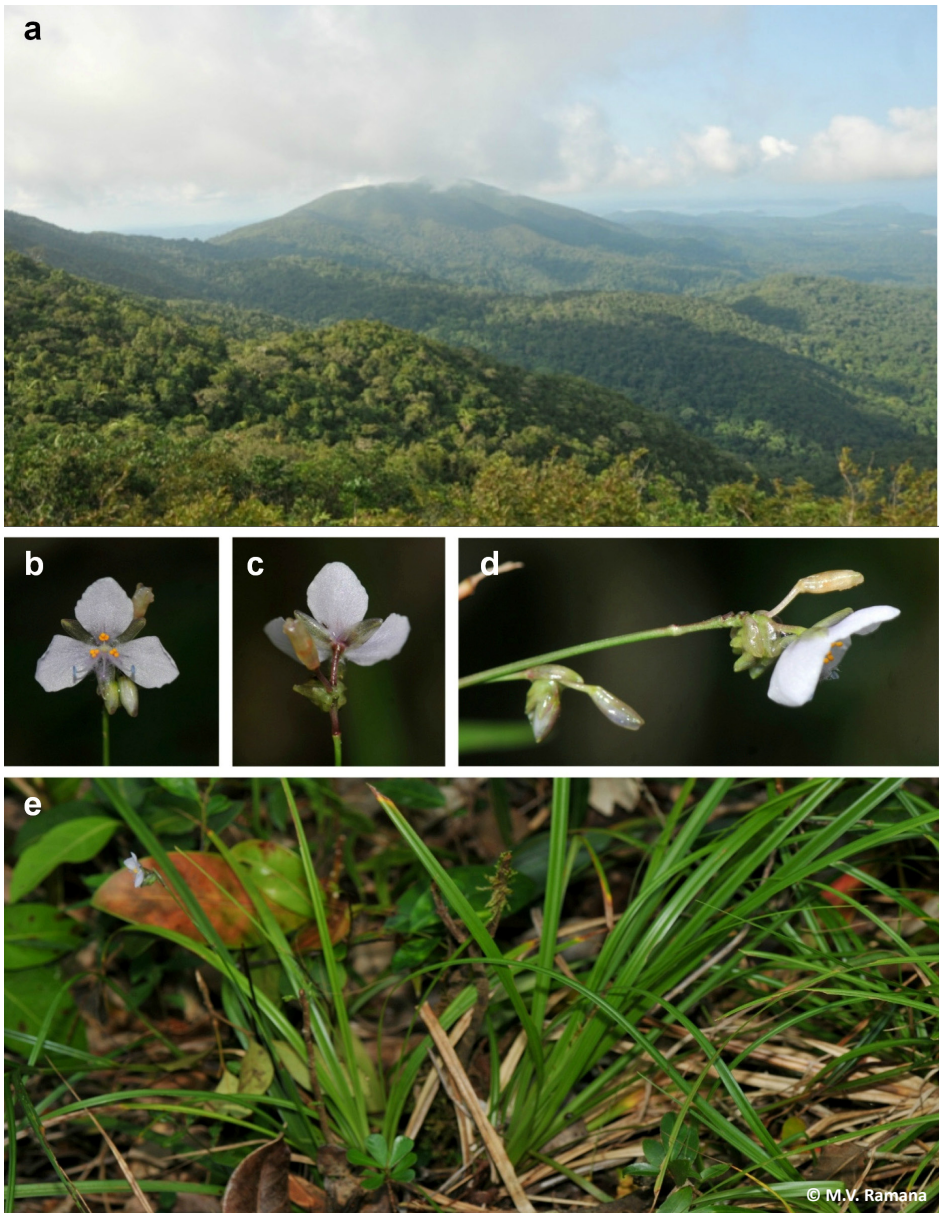

Image 1. *Murdannia saddlepeakensis* Ramana & Nandikar
a - habitat; b,c,d – flower; e - habit

long, lamina narrowly linear, 20–60 cm long, 4–8 mm wide, acuminate at apex, rounded at base merged into the sheath, margins entire; cauline leaves with sheaths 0.2–2 cm long, glabrous, narrowly lanceolate to linear, 10–25×2–5 mm, rounded at base, acute to acuminate at apex, entire at margin, glabrous, often scabrid; central flowering shoot erect, 20–40 cm long, unbranched or rarely branched from apically reduced cauline leaves (a bract). Inflorescence terminal and axillary (from uppermost foliaceous bract) of peduncled cincinni; peduncles 2–7 cm long, glabrous, cincinni to 2cm long, few-flowered, bracteoles ca. 5mm long, caducous. Flowers bisexual, ca. 1.5cm wide; pedicels (2–)3–5 mm long; sepals elliptic to oblong-elliptic, 5–6 mm long, pale white to green; petals ovate to obovate, lilac to pale lavender; stamens 2, filaments densely bearded, (3–)4mm long, anthers elliptic, ca. 1mm long; staminodes 3, antepetalous with glabrous to sparsely bearded filaments, antherodes tri-lobed, yellow; one rudimentary stamen, antisepalous with densely bearded filament ending with sterile knob; ovary glabrous; style recurved towards staminodes, (3–)4 mm long; stigma simple. Capsule subglobose, 4–5×3 mm, locules 1-seeded. Seeds elliptic or rarely ovoid, testa surface scorbiculate, the depressions often partially uniting on the dorsal surface, forming a little larger, irregular depressions,

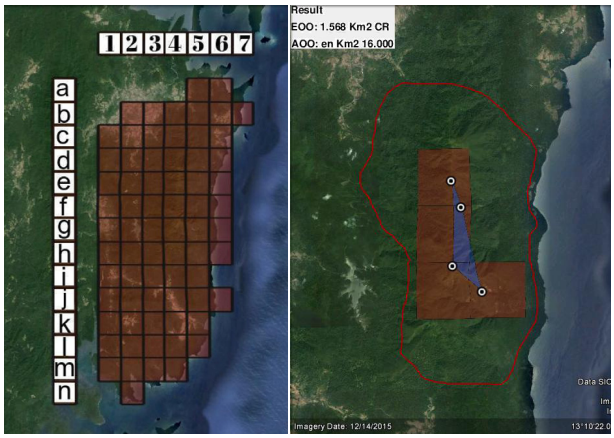

Figure 2. Area surveyed for the occurrence of target species. Minimum Convex Polygon - Polygon Area: 1.8km², Perimeter 8.6km (Blue - EOO; Red - AOO)

dark brown, hilum linear or oblong-linear, embryotega dorsal-semidorsal, farinose sparsely in all depressions and around the embryotega. Flowers and fruits from October to February.

The Assessment

Under the project 'Quantitative Assessment and Mapping of Plant Resources of Andaman & Nicobar Islands', extensive surveys were conducted throughout the islands of the Andaman & Nicobar group from Landfall Island to Indira Point, including the remote volcanic islands of Narcondum and Barren islands. The entire topography of the islands was surveyed by undertaking field trips to the different parts of the study area spanning all administrative boundaries of the Andaman & Nicobar Islands. As far as the study area is concerned, standard IUCN sampling methodology (2011) was used for determining the area of occupancy. Accordingly, the whole terrain of the study area, Saddle Peak National Park was stratified into 70 grids with 2km cell width each (4km² grids) for this purpose and were given numbers for identifying the location easily (Image 2). Within each grid, occurrence of the endemic plants listed was surveyed based on the sampling procedure mentioned.

For the threat assessment *Murdannia saddlepeakensis* under Criterion B, GeoCAT (http://geocat.kew.org/), an open source browser-based tool was used to perform the rapid geospatial analysis for Red Listing the taxa of interest. This tool was developed to utilize spatially referenced primary occurrence data for the analysis of two aspects of the geographic range of a taxon: EOO and AOO. In Google Maps and Google Earth, GeoCAT can quickly and easily combine data from multiple sources. Analysis can be done and visualized instantly, providing an indication of the Red List threat rating, subject to meeting the full requirements of the criteria (Bachman et al. 2011).

Table 1. Distribution of *Murdannia saddlepeakensis* at Saddle Peak National Park

Localities	GPS Coordinates	Elevation	Grids
Saddle Peak	13°11'8.12"N & 93°0'20.95"E	610m	e4
Way to Saddle Peak	13°10'37.46"N & 93°0'30.44"E	393m	f4
450m from 2nd view point	13°8'58.28"N & 93°0'56.70"E	478m	g5
Saddle Peak Hill Top	13°9'28.88"N & 93°0'23.40"E	645m	g4

Since the discovery of *M. saddlepeakensis* from Saddle Peak National Park, northern Andaman Islands in 2011, it is claimed to be endemic to this protected area. A thorough survey for the occurrence of this species was intended to estimate the population and distribution of this species at Saddle Peak National Park and its adjoining forest region to ascertain the threat status. Accordingly, the whole terrain of Saddle Peak National Park was surveyed for locating and estimating the populations of *M. saddlepeakensis*. The population of this species was located in four points at close proximity and each site was observed to be populated with ca. 25–30 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 not found in the interior forests and appears to prefer open scrub forest of rocky landscape at an elevation range of 450–600 m.

Results and Discussion

Murdannia saddlepeakensis was categorized as Data Deficient earlier (Ramana et al. 2013). Based on the recent field observations made periodically, the conservation status of the species has been re-evaluated following the latest IUCN Red List Criteria (Version 3.1; IUCN 2001). Of the five criteria (A–E) pertaining to threat categories, the species qualifies for criterion B1 (EOO) as *M. saddlepeakensis* is restricted to a single location - Saddle Peak National Park.

Criterion B1: The EOO of *Murdannia saddlepeakensis* is estimated to be 1.8km². A continuing decline of population is observed and inferred (sub-criterion 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 push this species to extreme. Thus, the species is categorized Critically Endangered with geographical range being less than 100km^2 and satisfies sub-criterion b(iii). Hence, it is certain that the assessment for *Murdannia saddlepeakensis* is Critically Endangered [B1ab(iii)].

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Journal of Threatened Taxa

OPEN ACCESS

ISSN 0974-7907 (Online); ISSN 0974-7893 (Print)

December 2016 | Vol. 8 | No. 14 | Pages: 9597–9688
Date of Publication: 26 December 2016 (Online & Print)
DOI: 10.11609/jott.2016.8.14.9597-9688
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