RESEARCH ARTICLE

CYCAS ANDAMANICA (CYCADACEAE): A NEW SPECIES FROM ANDAMAN ISLANDS, INDIA

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ABSTRACT

Cycas andamanica is described as a new species from Andaman Islands, India and this new species belonging to subsection Rumphiae. It’s closely affinities with C. edentata and C. zeylanica are discussed and also provides detailed description, distribution, conservation status and photographs.

Key Words: Cycas, Rhumphiae, Andaman and Nicobar Islands, C. zeylanica, C. edentata

INTRODUCTION

Cycas L., a gymnospermous genus belongs to subclass Cycadidae and order Cycadales and family Cycadaceae (Christenhusz et al., 2011b; Christenhusz et al., 2011). The genus Cycas comprises ca 100 species, distributed in Madagascar and East Africa, India, Indo-China, Malesia, Japan, extending to Micronesia and Polynesia, (De Laubenfels and Adema, 1998; Lindstrom et al., 2009) and represents 10 species in India (Lindstrom and Hill, 2007; Singh and Radha, 2008; Singh et al., 2015).

Part of the ongoing research project in Andaman Islands, we could locate a unique interesting population of Cycas, along the seacoast of the Middle and North Andaman Islands. Critical examination of the collected specimens revealed that the seed character confers its position to the subsection Rumphiae Hill of the section Cycas. A thorough perusal of literature revealed that the characters of the specimens cannot be matched with any of the known species in the subsection Rumphiae and hence recognised as a new species. The novel species is similar to Cycas edentata and Cycas zeylanica and differ in many respects which are tabulated here under.

MATERIALS AND METHODS

The description is based on measurements of living plants taken within the field and examination of herbarium specimens. Field observations and specimen’s examinations were conducted using a microscope with dried material or specimens preserved in FAA solution and measurements are taken carefully.

RESULTS

Cycas andamanica K. Prasad, M. V. Ramana, Sanjappa & B. R. P. Rao, sp. nov. (Fig. 1 & 2)

Type

INDIA, Andaman Islands, North Andamans, Ramnagar littoral forest, sea level to 10 m, 10 January 2011, K. Prasad & M. V. Ramana 1288 (holotype CAL!, isotypes SKU!)

Diagnosis

Distinguishing characters of Cycas andamanica: stems 20–120 cm diameter; longer leaves; young leaves bluish-green; leaflets 128–170; median leaflets strongly falcate, midrib raised both surface; cataphylls linear, 8–10 cm long; pollen cones narrowly ovoid; microsporophylls dorsiventrally thickened, 4.5–6.5 cm long, with apical wings; megasporophylls with six ovules, semi-orbicular at ovule bearing area; sterile lamina triangular at apex, margins entire or obscurely undulating, with or without two lateral spines, acumen spine 4–6.2 cm long; sclerotesta apically crested.

Description

Stems arborescent, ca. 10 m high, 20-120 cm diam., branched or unbranched, bark light grey, corky or rough or smooth.
Leaves numerous in crown, pinnate, dark green and semi-glossy above, light green below, young leaves bluish-green, 2-2.68 m long, with 128-170 leaflets, flat (not keeled) in section (opposite leaflets inserted at 180° on rachis), tomentum shedding as the leaf expands, rachis consistently terminated by a pair of leaflets; petiole 60-80 cm long, glabrous, spinescent for most part of its length; spines short, curved, to 3-4 mm long; basal leaflets not reduced to spines, slightly falcate, linear, 10-21 cm long; median leaflets fleshy, strongly falcate, linear, 28-34 × 1.6-1.8 cm, decurrent for 1-1.5 cm, narrowed to 5-6 mm at base, 1.5-1.8 cm apart on rachis; margins undulate, slightly recurved; acute or spinescent at apex; midrib raised on both surface; apical leaflets paired, never reduced into spines, straight, 16-18 × 8-9 mm. Cataphylls densely orange-brown pilose, pungent, linear, 8-10 cm long, broadest at base (7-12 mm), persistent. Male cones orange-brown or orange, shortly stalked, narrowly ovoid, 30-35 cm long, 16-20 cm wide; microsporophyll lamina firm, dorsiventrally thickened, 4.5-6.5 cm long, 1.2-1.6 cm wide, fertile zone 3.8-5.6 cm long, sterile apex 2.7-9 mm long, with apical wings; apical spine prominent, sharply upturned, 1.5-2 cm long.

**Phenology:** Male and female cones: December–July

**Distribution:** Endemic to Andaman Islands (North and Middle Andaman Islands).

**Habitat and distribution:** Humus-rich black soils in littoral vegetation from the sea level–20 m.

**Etymology:** The specific epithet refers to the name of the locality (Andaman Islands) from where the species is described.
### Table 1. A comparison of *Cycas andamanica* with *C. edentata* and *C. zeylanica*

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>C. edentata</em></th>
<th><em>C. zeylanica</em></th>
<th><em>C. andamanica</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem</td>
<td>7 m high and</td>
<td>3 m high and</td>
<td>10 m high and</td>
</tr>
<tr>
<td></td>
<td>15–30 cm</td>
<td>20–120 cm</td>
<td></td>
</tr>
<tr>
<td>Leaves</td>
<td>1–1.8 m long</td>
<td>1.4–1.9 m long</td>
<td></td>
</tr>
<tr>
<td>Young leaves</td>
<td>not blush-green</td>
<td>not blush-green</td>
<td>blush-green</td>
</tr>
<tr>
<td>Leaflets number</td>
<td>160–200</td>
<td>70–100</td>
<td>128–170</td>
</tr>
<tr>
<td>Median leaflets midrib</td>
<td>flat or raised above and strongly raised below</td>
<td>raised above and flat below</td>
<td>raised above and below</td>
</tr>
<tr>
<td>Cataphylls</td>
<td>narrowly triangular, 4–7 cm long</td>
<td>linear, 10–12 cm long</td>
<td>linear, 8–10 cm long</td>
</tr>
<tr>
<td>Pollen cones</td>
<td>ovoid or fusiform, 35–60 cm long</td>
<td>fusiform, to 70 cm long</td>
<td>narrowly ovoid, 30–35 cm long</td>
</tr>
<tr>
<td>Microsporophylls</td>
<td>not dorsiventrally thickened, 3.5–4.4 cm long</td>
<td>not dorsiventrally thickened, 3.5–4.5 cm long</td>
<td>dorsiventrally thickened, 4.5–6.5 cm long</td>
</tr>
<tr>
<td>Microsporophyll apical wings</td>
<td>absent</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>Microsporophyll apical spines</td>
<td>1.2–2.4 cm long</td>
<td>0.3–1 cm long</td>
<td>6 ovulate</td>
</tr>
<tr>
<td>Megasporeophylls</td>
<td>2–8 ovulate</td>
<td>2–5 ovulate</td>
<td>1.5–2 cm long</td>
</tr>
<tr>
<td>Ovules bearing lamina</td>
<td>lanceolate, 4.3–12 cm long</td>
<td>lanceolate, 6–12 cm long</td>
<td>senibicural, 6.5–9 cm long</td>
</tr>
<tr>
<td>Megasporeophylls sterile lamina margin</td>
<td>entire or undulating, rarely with a few weak teeth; acumen spine 3–4 cm long.</td>
<td>obscurely dentate with 6 to 12 lateral bumps or short spines; acumen spine 4–6 cm long.</td>
<td>entire or obscurely undulating, or with 2 lateral spines; acumen spine 4–6.2 cm long.</td>
</tr>
<tr>
<td>Sclerotesta</td>
<td>not crested</td>
<td>not crested</td>
<td>apically crested</td>
</tr>
</tbody>
</table>

**Conservation status**

*Cycas andamanica* is so far known only from North and Middle Andaman Islands and its extent of occurrence (EOO) is less than 100 Sq. Km and the area of occupancy (AOO) is less than 10 Sq. Km and hence categorized as Critically Endangered (B1ab(iii,v) + 2ab(iii,v)) following IUCN Version 11 (IUCN Standards and Petitions Subcommittee, 2014).

**Additional specimens examined**

INDIA. Andaman Islands: North Andamans, Ramnagar littoral forest, 5–10 m, 10 January 2013, Prasad 41601 (paratype PBL!); North Andaman Islands, Ross & Smith Islands, 10 m, 1st March 2013, M.V. Ramana 1257 (CAL!); Middle Andaman, Rani Jansi Marine National Park, sea level, 16 March 2013, B.R.P. Rao & Prasad 44466 (SKU!).

**DISCUSSION**

The *Cycas* subsection *Rumphiae* is characterised by the presence of a layer of spongy tissue within the seed (Hill, 1994). The spongy endotesta causes seeds to be buoyant, and this has been considered as a seed dispersal mechanism (Dehgan and Yuen, 1983). This subsection comprises about 11 species (Lindstrom and Hill, 2002), however one of the species, *C. littoralis* is reduced to a synonym. *Cycas* species of this subsection have wide distribution from Africa to Fiji and Tonga, and from New Guinea north to southern coastal Indochina (Keppel et al., 2008; Lindstrom et al., 2008).

The main centre for the subsection *Rumphiae* is Asia which cover about 60% of the total species, viz., *Cycas edentata* (Endemic to Philippines), *C. falcata* (Endemic to Sulawesi Islands) *C. nitida* (Endemic to Philippines), *C. sundrica* (Endemic to Timor), *C. zeylanica* (Endemic to Andaman & Nicobar Islands and Sri Lanka) and *C. rumphii* (Asia-Indonesia, Java, Borneo, Sulawesi and Molucan Islands and Australia- Papua New Guinea). Countries of the Andaman and Oceania accounts for 4 species viz., *Cycas bougainvilleana* (Endemic to New Britain and Solomom Islands), *C. micronesica* (Endemic to Micronesia) and *C. seemannii* distributed in the south-west Pacific (Tonga west to New Caledonia south). *Cycas thouarsii* is confined to Madagascar, Comoros, Tanzania and Mozambique.

The novel species, *Cycas andamanica* is similar to *C. edentata* and *C. zeylanica* but differs in the characters presented in Table 1.

**Acknowledgments**

Authors gratefully acknowledge Department of Biotechnology, Ministry of Science and Technology, New Delhi (BT/PR12954/NDB/52/146/2009) for financial assistance. We Thankful to Dr. Leonie Stanberg, University of Agricultural Sciences, GKVK, Bangalore, DBT Project Coordinator; Dr. C. Murugan, Scientist ‘C’, Regional research centre, BSI, Port Blair for their help and cooperation and Andaman & Nicobar Islands Forest Department for granting permission to conduct field studies.

**REFERENCES**


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