

## TAXONOMY, POLLEN MORPHOLOGY AND CONSERVATION OF *Amomum cannicarpum* (WIGHT) BENTH. EX BAKER (ZINGIBERACEAE): AN ENDEMIC SPECIES IN WESTERN GHATS, INDIA

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### ABSTRACT

*Amomum* Roxb. is the second largest genus after *Alpinia* Roxb. with about 150-180 species. Taxonomic studies on endemic species *Amomum cannicarpum* was carried out with detailed description, distribution, etc. Pollen morphology was studied using SEM. Voucher specimens were prepared and deposited at CATH and accessions were conserved in the germplasm conservatory of Catholicate College Botanical Garden, Pathanamthitta.

**KEYWORDS:** *Amomum*, Conservation, IUCN, Pollen, Taxonomy, Western Ghats.

*Amomum* Roxb. is the second largest genus in the ginger family with about 150–180 species, widely distributed in Southeast Asia (Xia *et al* 2004). The genus is characterized by having radical inflorescences, an absence of involucre of sterile bracts, reduced lateral staminodes and well-developed anther crests (Thomas *et al* 2016). In India, where the genus is represented by 22 species, it is mainly distributed in Peninsular India, on the Andaman and Nicobar Islands and with a centre of distribution in northeastern India (Thomas and Sabu 2012; Thomas *et al* 2010). Sabu (2006) reported six species of *Amomum* from South India. Thomas *et al* (2012) reported the rediscovery of *A. cannicarpum* from Western Ghats. Pollen morphology is regarded as of significance in understanding the taxonomy and phylogeny of the complex order Zingiberales (Dahlgren, 1977; Dahlgren and Clifford, 1982; Kress and Stone, 1983). Present study discuss the taxonomy, distribution, pollen morphology and conservation of *A. caanincarpum*.

### MATERIALS AND METHODS

Live specimens of *A. cannicarpum* were collected and noticed from different parts of Western Ghats viz. Melur of Nilgiri Hills, Chembra Hills, Elival forest and Silent Valley. Taxonomic studies were carried out in the laboratory, detailed descriptions were made and photographs were taken. Anthers were taken from flowers at mature stage and stored in 70% ethanol. The samples were passed through an ethanol dehydration starting with 10-15 min in 90% ethanol with three subsequent changes in absolute alcohol at 10 min each. The pollen were then mounted on SEM stub using doublesided sticky tape and sputter-coated. Photographs were taken with scanning

electron microscope machine at SAIF, STIC, Cochin University, Kerala, India. The voucher specimens were prepared and deposited Catholicate College herbarium (CATH) and the live specimens were conserved in the Catholicate College Botanical Garden, Pathanamthitta.

### RESULTS AND DISCUSSION

*Amomum cannicarpum* (Wight) Benth. ex Baker in J.D. Hooker, Fl. Brit. India 6: 240. 1892.

*Elettaria cannicarpa* Wight, Icon. Pl. Ind. Orient., 6: 17, t. 2007. 1853 ('cannaecarpum').

*Cardamomum cannicarpum* (Wight) Kuntze, Revis. Gen. Pl. 686. 1891.

**Lectotype:** Tamil Nadu, Coonoor, Huliculdroog, R. Wight s.n. (K!).

Rhizomatous perennial herbs. Leafy shoots 100–350 cm tall, robust. *Leaves* 10–20 per shoot; lamina lanceolate to elliptic-lanceolate, base cuneate, margin ciliate, apex acuminate, glabrous. Ligule bilobed, lobes unequal, 0.5–2.4 cm long, chartaceous, apex acute, pubescent. Inflorescence arise from the rhizome; peduncle 2–10 cm long. Bract broadly lanceolate to oblong, red, coriaceous to chartaceous, wrinkled at centre, margin glabrous, apex rounded, pubescent on both surfaces. Bracteole tubular, 2-lobed, red, pubescent externally, glabrous. Flower 3.5–5 cm long, yellow. Calyx 3-lobed, pink, unilaterally split, pubescent towards apex, puberulous externally, glabrous internally. Corolla tube cream with pink tinge towards base, c. 0.5 cm wide at mouth, pubescent externally, villous towards mouth within; dorsal corolla lobe ovate-oblong, yellow, pale towards base, margin ciliate, hooded and sub-cuspidate, pubescent externally,

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puberulous internally; lateral corolla lobes oblong, margin ciliate, pubescent externally. Labellum obovate, unlobed, uniformly creamy-white, slightly clefted at apex, margin wavy. Lateral staminodes small or reduced. Stamen 1.2–1.5 cm long creamy-white, pubescent within; connective puberulous, produced into a crest; crest truncate to lobed, creamy-white; anther thecae oblong, creamy-white, base

rounded, apex nearly acute, glabrous, rarely puberulous near base; dehiscent throughout their length. Epigynous gland split at one side, apex slightly lobed, glabrous. Ovary oblong, densely pubescent; ovules many on axile placentae. Capsule globose, densely echinate, dark maroon, calyx persistent. Seeds many, angular, black, aromatic, arillate; aril white.

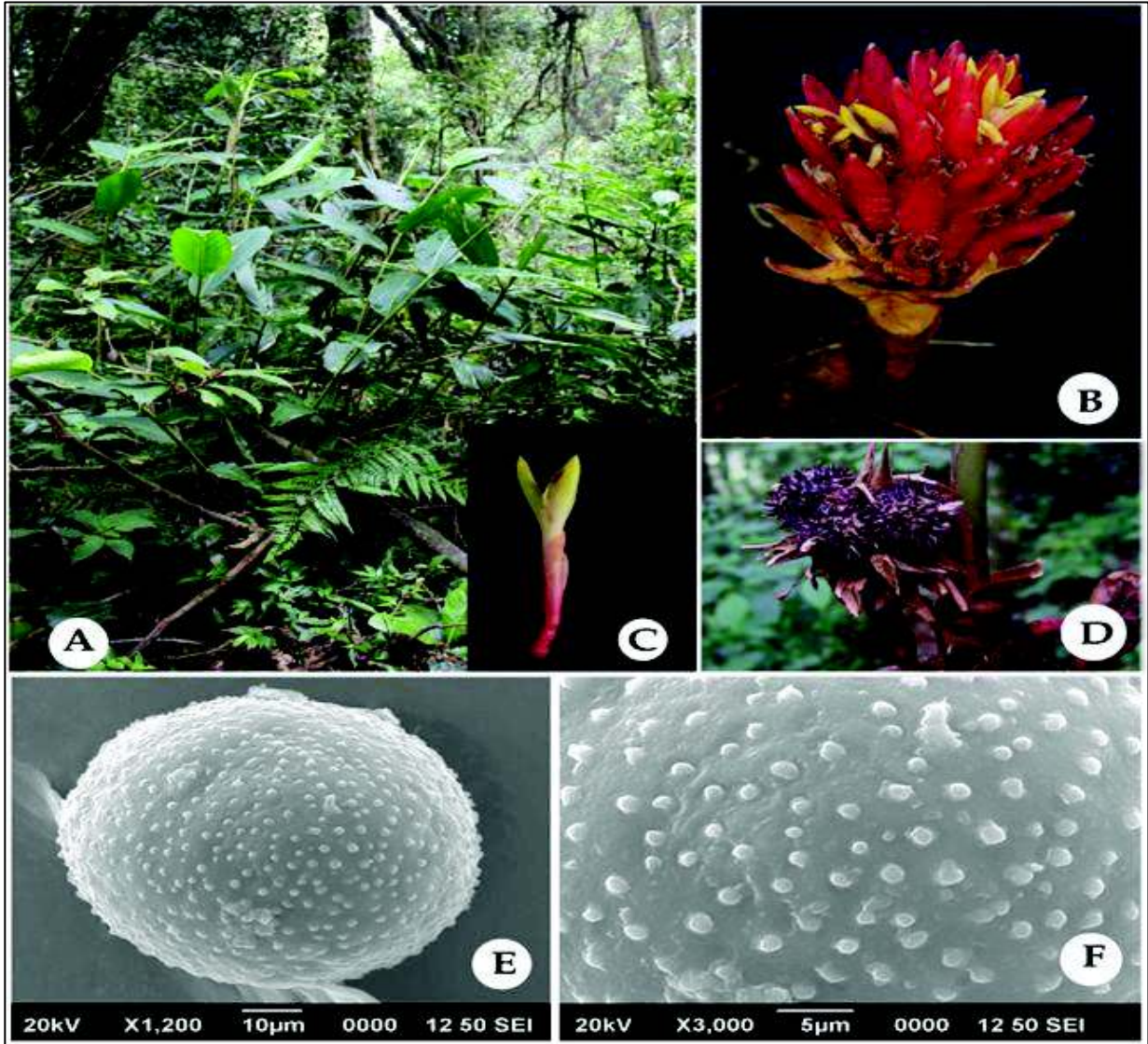


Figure 1: *Amomum cannicarpum*. A. Habit; B. Inflorescence; C. Single flower; D. Fruits; E. SEM view of pollen grain; F. Pollen grain- a portion enlarged

**Flowering & Fruiting.** January –November.

**Distribution.** Endemic to Southern Western Ghats of Kerala and Tamil Nadu, especially in the part of Nilagiri Biosphere Reserve.

**Pollen Morphology:** The SEM results revealed that the pollen grains are spherical, nonaperculate, verrucate and

65-70  $\mu\text{m}$  in diameter. The present study agree with Mangaly and Nayar (1990; Kaewsri and Paisooksantivatana (2007) which reported that the pollen shape of different species of *Amomum* are sub-spheroidal to ovoid and spheroidal.

**IUCN Status.** IUCN status of the taxon has been reported as Endangered EN B1ab (ii, iii) based on IUCN 2001 and IUCN 2012 (Thomas et al 2012). The extent of occurrence was limited to 55 km<sup>2</sup> and known to exist in limited localities (Thomas et al 2012).

**Specimens examined.** INDIA, Kerala, Palakkad Dist.: Siruvani, Muthikkulam, 16 November 2016, V.P. Thomas & Judin Jose 10050 (CATH!).

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