One new species of *Colocasia* Schott (Araceae: Colocasieae) from Arunachal Pradesh in the Eastern Himalayan Region, India

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Abstract

During the search of aroids in Arunachal Pradesh, one aroid plant was recorded from a place about 10 km away from Boleng town of Siang district, Arunachal, at an altitude of 430 m AMSL, with geographical location: 28° 18' 24.83" N Longitude and E; 094° 56' 86.73" E Latitude on 27th May 2014. On critical analysis of morphological characters and survey of literature revealed that the collected plant is a hitherto unnamed species of the genus *Colocasia* Schott. It is named here as *Colocasia adiana* sp. nov. This new species has resemblance with *Colocasia boycena* R. Gogoi & S. Borah and *Colocasia fontanesii* Schott. The detailed description and illustration were made from living plant materials. The color photograph, reference to Type specimen and some drawings are provided. An artificial Key has been prepared to identify the species of *Colocasia* found in NE India.

Key words: *Colocasia adiensis*, New species, Arunachal Pradesh, India

INTRODUCTION

The genus *Colocasia* Schott, includes 8 accepted species as recorded in www.theplantlist.org and is mainly confined to tropical and subtropical regions of Asia (Li & Boyce 2010). The genus include some economically significant and widely cultivated species like *Colocasia esculenta* (L.) Schott but, however, taxonomically the genus is poorly explored. India is the home to several wild species of *Colocasia* and are abundant in their wild habitat with numerous highly overlapping forms. Only exhaustive field and laboratory works together can recognize them properly. While exploring Araceae in Arunachal Pradesh, during 2014 – 2018, one plant of the genus *Colocasia* collected from Boleng in Siang District of Arunachal Pradesh. After critical analysis of morphological characters and study of relevant literatures (Schott 1854; Hooker 1893, 1900; Karthikeyan *et al.* 1989; Mayo *et al.* 1997; Li & Wei 1993; Li & Long 1998, 1999, 2000; Cao & Long 2003; Long & Liu 2001; Yin *et al.* 2004; Cai *et al.* 2006; Li & Boyce 2010) the plant was recognized as a hitherto unidentified species of the genus. Now, the the plant is described and named here as *Colocasia adiana* A. Nangkar, A.P. Das & H.Tag, - an addition to the aroid flora of the world.

MATERIALS AND METHODS

During survey for aroids in Arunachal Pradesh in May 2014 one unknown species of *Colocasia* Scott was collected from a place about 10 km from Boleng town in the Siang District of Arunachal Pradesh. The specimen was processed into mounted herbarium sheets following Jain & Rao (1977) and Croat (1985). The freshly collected whole plants or plant parts were also brought to Plant Taxonomy Laboratory of Rajiv Gandhi University for

detailed observation of its morphological characters. Type specimens will be deposited in ASSAM and HAU (Herbarium of the Botany Department, Rajiv Gandhi University) after its publication. For photography a Cannon Power Shot SX500 IS camera was used.

TAXONOMIC TREATMENT

Colocasia adiana A.Nangkar, A.P. Das & H.Tag, *sp. nov.*

The new species resembles *Colocasia fontanesii* Schott (a dark purple species commonly grown as ornamental) but can be readily distinguished by its wild occurrence with purple cataphyll and densely hairy male flower zone, though both the species lacks an appendix. The new species *Colocasia adiana* is also closely resemble with *Colocasia boyceana* R. Gogoi & S. Borah (Gogoi & Borah 2013) and the morphological different of the species from this are given below in tabular form (Table 1).

Type: INDIA, Arunachal Pradesh, Siang district, Boleng, *Atek Nangkar 118*, dated 27.05.2014 (Holotype: ASSAM; Isotype: HAU). [PLATE I, A – K]

Figure 1. *Colocasia adiana*. **A.** Plant habit with inflorescence; **B.** inflorescence with reflexes spathe; **C.** spadix, female lower part, sterile middle part, Male upper part, no appendix; **D.** Fruit; **E.** ovary & V.S. of ovary showing ovules.

Figure 2. *Colocasia adiana*, Holotype, Atek Nangkar 118

Description: Herb, medium to somewhat robust. **Corm** terete, medium, generally erect, slightly decumbent when old, 15 – 40 cm long, 4 – 8 cm in diameter; **roots** many, thick, terete, white. **Offsets** small. **Leaves** 6 – 16; **petioles** 65 – 91 cm long, cannulate, dark purple to dark green, cannulate furrow green, purple lining at margin, sheathed at base; **leaf blade** saggitate, acute to acuminate, 46 – 64 cm long, 20.5 – 36 cm in diameter, glossy, dorsally dark green, ventrally pale green, white spot at the dorsal junction of petiole, lateral veins 5 – 7, raised ventrally, impressed dorsally, marginal lines (vein

PLATE I: *Colocasia adiana*: A. Plant habit in in-situ; B & C. Plants with young & old inflorescence in in-situ condition; D. Closed view of leaves morphology; E & F. V.S & T.S of corms; G. Inflorescence; H. V.S of inflorescence; I. Female zone; J. Male zone with white hairs; K. Fruit.

Table 1. Morphologically distinguishable characters between *Colocasia adiana* sp.nov. and *colocasia boycena* R. Gogoi & S. Borah.

Characters	<i>Colocasia boycena</i>	<i>Colocasia adiana</i>
<i>Habit & habitat</i>	Wild, in massive colony	Wild, medium to somewhat robust, 1.5 m high, no colony formation, 1 – 3 plants in small clusters
<i>Corm</i>	Sub-cylindric, erect to slightly horizontal, 11 – 17 cm long, 4 – 6 cm in diameter	Brown outside, inside purple white, 10 – 22 cm long, 4 – 7 cm in diameter, offsets many
<i>Stolon</i>	Stoloniferous	Stolons absent, but with offsets
<i>Petiole</i>	Glabrous, green, 47 – 82 cm long, 0.8 – 1 cm wide	91cm long (52 cm plus canulated part 39 cm), purple brown to purple green, cannulated, inside green, purple line at top
<i>Leaf blade</i>	Leaves 3 – 6; leaf-blade ovate-cordate, sagittate-cordate, purple at petiole junction, with purple lining along the leaf margin	Leaves 6 – 16; leaf-blade sagittate, acute to acuminate, green to dark green, somewhat wrinkle, marginal vein collectors two; white at petiole junction
<i>Inflorescence, peduncle</i>	Inflorescence 1; peduncle green	Inflorescence 3 – 6, 34 – 48 cm long; peduncle dark purple, base pale green
<i>Spathe</i>	Tube green, limb yellow	Limb 26 cm long, 9 cm wide, reflexed, light green at young; tube 5.5 cm long, 3 cm in diameter, purple to yellow; tube purple
<i>Spadix</i>	Sessile, 7 cm long	15 cm long; stipe short, 0.5 cm long
<i>Female zone</i>	Whitish green, 2 cm long, 0.8 cm in diameter	Green, 2.5 – 4 cm long, 1 – 1.5 cm in diameter; stigma sessile, white, sticky, 3 lobed
<i>Male zone</i>	Creamy, white hairy, 2.5 long, 0.8 cm in diameter	Creamy, yellow, white hairy, 9 cm long, 1.3 cm in diameter
<i>Cataphyll</i>	On stolons, pink	At the inflorescence base, purple, 42 cm long, 3.7 cm in diameter

collectors) two. **Inflorescence** 3 – 6. **Peduncle** terete, shorter than petiole, 34 – 48 cm long, 0.7 – 1.1 cm in diameter, base dark green, distal part dark purple, reddish pink or reddish purple near tube. **Spathe** constricted between tube and limb; **tube** 5.5 cm long, 3 cm in diameter, dark purple or reddish purple, light green at young; **limb** 26 cm long, 9 cm in diameter, reflexed, light green at young turns purple, both surfaces yellow, oblong to lanceolate, acuminate. **Spadix** much shorter than spathe, 15 cm long; stipe short, 0.5 cm long; **female zone** green, cylindric to sub-cylindric, less inter-stiller staminodes, whitish, those seem to be unfertilized ovaries; **ovaries** green, obovoid to ovate, stigma sessile, translucent white, jelly like, sticky, sterile zone between female and male zone yellowish white (creamy); **Male zone** 9 cm long, 1.3 cm in diameter, creamy yellow with white hairs; synandria 4 – 8 androus, creamy with white hairs; appendix absent. Berries green, many seeded.

Etymology. This plant was collected from an *Adi* tribe dominated area, so the specific epithet is given in honour of this community of people in Arunachal Pradesh.

Key to the species of *Colocasia* Scott in NE India

- 1a. Appendix present and more than 2 cm long 2
- 1b. Appendix absent or highly reduced, less than 1 cm long 5
- 2a. Young leaves pinkish, blade 42 – 75 × 40 – 75 cm; spathe pink, tube reddish. purple; spadix deep pink, appendix triangular conic *C. dibangensis*
- 2b. Young leaves whitish green or pale green, blade smaller than 10 – 45 × 10 – 35 cm; spathe yellow or greenish white, or slightly purplish apically (*C. fallax*), tube green; spadix yellow or pale yellowish-green, appendix narrowly conic to cylindric and narrowly conic 3
- 3a. Plant tuberous or rhizomatous, up to 100 cm tall; spathe dull yellow, spreading and open flat, not revolute; infructescence erect *C. esculenta*
- 3b. Plant stoloniferous, less than 75 cm tall; spathe bright yellow, not spreading, revolute; infructescence pendent 4
- 4a. Leaves with dark patches between primary lateral veins; female and male zones contiguous *C. affinis*
- 4b. Leaves usually concolourous green; female and male zone separated by a zone of synandroides *C. fallax*
- 5a. Plant robust, up to 225 cm tall; petiole and peduncle deep purple-red; spathe c. 25 × 11 cm; appendix reduced, less than 1 cm long *C. fontanesii*
- 5b. Plant small to medium, less than 130 cm tall; petiole green or light purple reticulate; spathe less than 17 × 7 cm; appendix absent 6
- 6a. Leaf margin with purple lining; purple spot at ventral junction of petiole; venation impressed; synandria with white hairs *C. boyceana*
- 6b. No purple lining and spot on leaves; venation raised; synandria without hairs 7
- 7a. Male part densely white hairy; lamina wrinkle, white at dorsal junction of petiole, tube purple *C. adiana*
- 7b. Male part not densely hairy; lamina not wrinkled 8
- 8a. Basal lobes of leaf obtuse; petiole green; spathe tube c. 2.5 cm; synandria stellately crenate; sterile zone c. 1.2 cm long *C. manii*
- 8b. Basal lobes of leaf usually acute; petiole light purple reticulate; spathe tube c. 5.5 cm; synandria polygonal; sterile zone c. 3 cm long *C. lihengiae*

Note: The present work established the existence of another wild species of the genus *Colocasia* Schott. The Indian distribution of the genus is much wide, from the Himalayan range to Western Ghats and also extended to neighboring countries like China, Bhutan, Myanmar, Bangladesh etc. The rich but poorly explored flora of Arunachal Pradesh in North East, India is expected expose many more novel elements. Different species of *Colocasia* now growing in NE India are *C. adiana*, *C. esculenta*, *C. boyceana*, *C. affinis*, *C. dibangensis*, *C. fallax*, *C. fontanesii*, *C. manii* and *C. lihengiae* (Gogoi & Borah 2013). The existence of so many species in this region indicates that the genus has a long and complex history in the Himalayan region with active processes of differentiation and evolution. It is now essential to explore the region intensively and that may lead to the discovery of new species of *Colocasia* and, ofcourse, for many other taxonomic groups.

The *Colocasia adiana* sp.nov, is a wild species, that does not form a colony, grwing with hardly 1 – 4 individual plants in the vicinity. It prefers to grow in tropical forests, upto an altitude of 600 m AMSL. The species is restricted to few districts only with IUCN status not evaluated.

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