

Original Research Article

Sauromatum horsfieldii Miquel (Araceae-Araeae): An Addition to the Flora of Arunachal Pradesh

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Abstract: The Araceae family is one of the largest families of phanerogams (flowering plant) and is unexplored only few taxonomic studies have been done in Arunachal Pradesh. Family araceae is unexplored and less studied in Arunachal Pradesh and India as whole. A first hand survey and documentation for the species under this family has been conducted in Arunachal Pradesh from May, 2014 to December, 2018. The phytogeography of Arunachal fall under tropical to temperate region, altitude ranges from 150 to 3500m above means sea level, with high rainfall and different forest type which is favorable for luxuriant growth of aroids plants, this favors and highly expected finding of new species. During botanical field exploration the one aroid species is collected from Mebo, a village of East Siang district. The plants is commonly growing in tropical degraded or secondary forest, altitudinal range between 282 to 450m (msl). Critical analysis of taxonomic and literature study, the plant is recognized as *Sauromatum horsfieldii* genus *sauromatum* schott belong to family Araceae. The species is undescribed taxa in Arunachal Pradesh and reported to be new species and added to the flora of Arunachal. Out of twenty five districts of Arunachal, *Sauromatum horsfieldii* Miquel, is found in two districts only. The plant is also reported from Nagaland one of the north eastern state of India. The species is not reported from rest of India, it concluded tha species is endemic to north eastern states till further report from part of India. A detailed description, drawing and living color photographic illustration, GPS record is provided along with key to species of Arunachal *Saroumatum schott*.

Key words: Araceae family, Arunachal Pradesh, Nagaland, *Sauromatum horsfieldii*

Introduction

Heinrich Wilhelm Schott (1832) was pioneer and established the genus *Sauromatum* schott (Araceae - Araeae) to place *S. pedatum* (Link & Otto) Schott (basionym *Arum pedatum* Link & Otto) and *S. guttatum* (Aiton) Schott (basionym *Arum guttatum* Aiton). Genus *Arum* L., *Biarum* Schott and *Typhonium* Schott. are placed under Subtribe *Euaroideae*. Genus *Sauromatum* was separated from *Arum* and *Biarum* by having groups of staminodes below male flower and from *Typhonium* by connate spathe base, two ovule in every, leaf appearing after the inflorescence, leaf pedate and very short

peduncle (Hettterscheid and Boyce 2000; Cusimano et al. 2010). The preliminary phylogenetic studies of *Typhonium* and *Sauromatum* species, Hettterscheid and boyce (2000) both genus merged into one genus *Typhonium*. Later on *Sauromatum* and *Typhonium* were classified as separate genus by Cusimano et al. (2010) on the basis of chloroplast and DNA sequence studied. The genus *Sauromatum* consists of 09 species (www.theplatlist.org) and one species each published recently by Talukdar et al. (2014) and Atek Nangkar and Hui Tag (2018) are not yet cited in the Plant List. The four species

reported in India viz. *Sauromatum brevipes* (Hook.f.) N.E.Brown, *Sauromatum diversifolium* (Wall. ex Schott) Cusimano & Hett., *Sauromatum meghalayense* D.K.Roy, A.D.Talukdar, B.K.Sinha & M.Dutta Choudhury, *S. venosum* (Dryand. ex Aiton) Kunth (Talukdar *et al.* 2014) and *Sauromatum nangkareense* Atek Nangkar and Hui Tag (2018).

Arunachal Pradesh is considered as one of the eighteen biodiversity hotspot of world. The 5000 species of flowering plants out of this 238 are endemic to the state. The 58 aroids species are reported so far. Out these, 3 species are *Sauromatum* species. The entire hilly and mountainous tract of the state fall within a geographical coordinates between 26°28' N to 29°30' N latitude and 91°30' E to 97°30' E longitude, altitude 100-3500m asl. Tropical to alpine forest with abundant rainfall which is favorable to luxuriant growth of aroids plants. Aroids plants are generally abundantly found in Tropical and sub-tropical region.

The morphological characters of the collected aroid plant viz. leaves pedatisect, pink stripes along the midrib, spathe tube connate, lower staminodes clavate, upper staminodes arrow or spear shape, tube persistent. It revealed that this plant belongs to species of the-genus *Sauromatum*. The critical analysis of the specimens and literature citation (Hooker 1884; Hetterscheid and Boyce 2000; Hetterscheid *et al.* 2001; Cusimano *et al.* 2010; Heng and Hetterscheid 2010; Talukdar *et al.* 2014; Atek Nangkar and Hui Tag (2018). This aroids plant is identified as *Sauromatum horsfieldii* Miq., a hitherto unrecorded species in Arunachal Pradesh.

Materials and methods

The 85 plus botanical field exploration were conducted 2014-2018 in 22 districts of Arunachal Pradesh, *Sauromatum* species is collected from degraded forest floor of Mebo village of East Siang District, Arunachal Pradesh. The field and herbarium method suggested by Rao & Jain (1977) and Croat (1985) were followed. The freshly collected whole plants or parts were brought to station (RGU) and then pressing and herbarium preparation of three herbarium specimens were made and deposited to RGU herbarium centre for feature

study and reference for student, taxonomic researcher and scholars visitors. Description of morphological characters and measurement of each plant parts are based on living materials, Photographs with Cannon Power Shot SX500 IS.

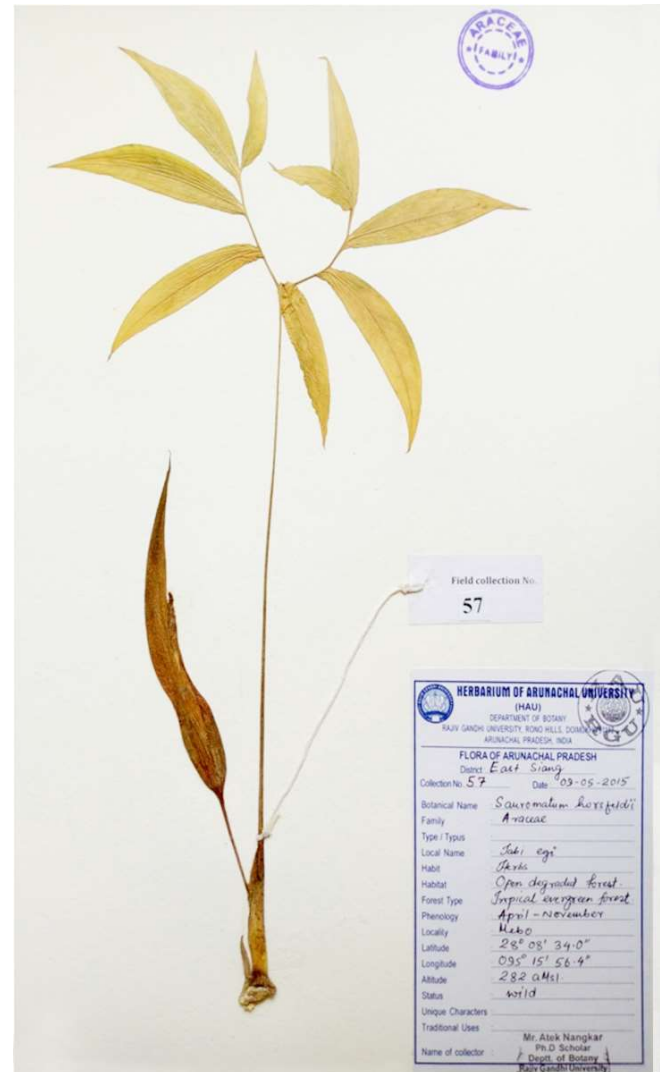


Fig. 1. Herbarium No. 57 *Sauromatum horsfieldii* Miquel.

Key to the Arunachal species of *Sauromatum* schott

In Arunachal, the genus comprises two species represented by *S. nangkareense* and the new record, *S. horsfieldii*.

1a. Peduncle pale green, dark purple brown, tube convolute, 2.5-5cm long dark purplish to violet outside inside pale green to pinkish*S. nangkareense*.



Fig. 2. 1. Plant habit in in-situ. 2. Plant with young inflorescence. 3. Uprooted entire plant, roots, tuber and mature inflorescence. 4. Wrinkle globous white tuber with white thick roots. 5. Young inflorescence. 6. Spadix, distal zone is female, sterile middle zone with staminodes, male part below appendix and above middle sterile zone and distal part is appendix. 7. Young fruit.

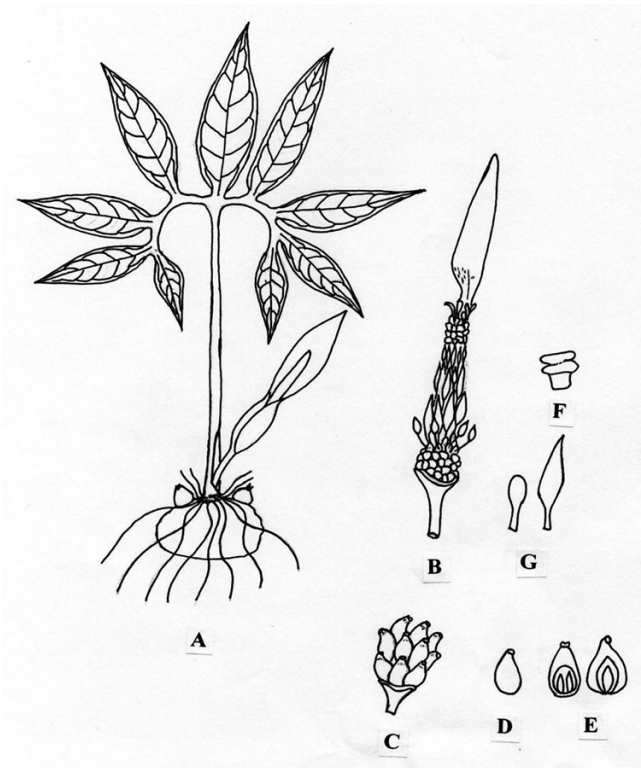


Plate 3. *Sauromatum horsfieldii* Miquel. A. Flowering plant. B. Spadix. C. Fruit. D. Ovary. E. L.S of ovary. F. Synandrium. G. Staminode.

1b. Pink color stripe along the midrib, peduncle brownish with pinkish brown spot, to 7-13.5 cm long; tube connate, pinkish brown with spot outside, white inside*S. horsfieldii*

Results

Taxonomic Enumeration

Sauromatum horsfieldii Miquel, *Flora van Nederlandsch Indie* 3: 196 (1856)

Herb, terrestrial, tubers globose, tubers; 2.4cm long, 4cm wide, light brown, 2-3 or more offsets are produced seasonally, **roots**; whitish, cylindrical, arised from near the base of petiole. **Leaf**; 1-2, pedatifid, cataphylls; 1, brownish pink, 10cm long, 1cm wide, oblong, oblanceolate, apex acute. **petiole**, 10-35cm long, 0.2-0.5cm wide, pale green, brownish with or without pink and purple spots, leaf blade; green, central leaflets large, oblong or oblong-elliptic, oblanceolate, apex acuminate; lateral leaflets elliptic gradually smaller toward distal end of rachis, 5-10 leaflets, 18.7cm long, 4.3cm wide, smallest leaflet 9.5cm

long, 2.8 cm wide, marginal vein collection, entire, simple reticulate venation, redish pink patches running both side along the mid-rib, but not reach up to apex. 6-11cm long, 0.2cm wide, without colour patches 3.5-7.7 cm long. **Inflorescence**; solitary, appearing after leaves. **Peduncle**; 7-13.5 cm long, 0.5cm wide, cylindric, pale green with pink brown color spots, few dark purple band. **Spathe**; 9-16.5 cm long, slightly constricted. **Tube**; connate, ridge, 3-5cm long, 5cm wide, brownish yellow or pink, pink spots or band, persistent. **Limb**; spreading, 6-12 cm long, 2.9-4.2cm wide, brownish, pink outside, inside white, lanceolate, obovate, apex acuminate. **Spadix**; sessile, 5.2-9.8cm long, female; 0.7-1.2cm long, 0.5-0.7cm wide, light yellow, cylindric. overy light yellow at young stage, at maturity light yellow with dark purple color spot, one locule, 0.4cm long and 0.2cm wide, overy is banana shape, stigma; sessile, yellow. 1st sterile zone; 3-4.2 cm long, 0.4-0.6cm wide, proximal part covered with staminodes, yellow, groove into box, staminodes arise from middle of box. **Staminodes**; two type, proximal just above the female organ few or countable number of yellow color clavate staminodes, selender narrow part white, 0.4cm long. Numerous jelly whitish knife shape or spear shape, lanceolate staminodes, apex slightly acute, directed upward, covered maximum part of sterile zone, 2.3cm long, distal end jelly whitish naked, 1cm long. **Male**; 1-2cm long, 0.5-0.8cm wide, creamy white to somewhat yellow, cylindric. **Appendix**; stapitate, curved, 0.6cm long, yellow. Apendixs, knife shape, somewhat conic, apex obtuse, rounded, 3.5-6cm long & 0.7cm wide. **Fruit**; berry, berries crowded, conic to subglobose, white yellow with pink spots.

Flowering/fruiting; April- November

Specimen examined: India : Arunachal Pradesh: East Siang district, Mebo, 282 amsl, Latitude (N); 28° 08' 34.0". Longitude (E); 95° 15' 56.4" Atek Nangkar 57; Dated 9th May 2015 (PARATYPUS: HAU)).

Discussion

The *Sauromatum horsfieldii* Miquel, is florished well in secondary/degraded forest in tropical region upto 400m asl

and ecotone biomes, the aroids plants is yet not seen in floor of climax forest and sub-tropical to temperate regions. The *S. horsfieldii* is seem to be very rare species, it is found in some restricted area only, or some particular area with very less individuals. Since the *S. horsfieldii* Miquel was encountered in two localities only, namely Poma, Papum pare district and Mebo, East Siang district but yet not found in rest of 20 districts of Arunachal Pradesh, the *Saruromatum horsfieldii* Miquel is endemic to two districts. In India, aroids species are reported from Tsuengsang district of Nagaland, by Nripemo Odyuo *et al.* (2015), but till date not reported from rest of the state of Indian subcontinent. Westernghats is home of many aroids species but these aroids species are yet to be encountered from this areas, thus, the plant is seem to be endemic to North East India. Globally, the species is commonly distributed to south East Asia namely Cambodia, India, Indonesia, Laos, Myanmar, S China, Thailand, Vietnam. IUCN conservation status of aroids plants is not evaluated, so plants are found abundant in in-situ condition. The two plants were collected for ex-situ conservation and to examine the habit and morphological character of the inflorescence, the collected plant has been introduced in flower pot and growing well.

Acknowledgments

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