***Sauromatum nangkarensense* (Araceae : Areae) – a new species from Arunachal Himalaya, India**

Atek Nangkar and Hui Tag¹

Plant Systematics and Ethnobotanical Research Laboratory, Department of Botany, Rajiv Gandhi
University, Rono Hills, Doimukh-791112, Arunachal Pradesh, India.

¹Corresponding author, e-mail: huitag2008rgu@gmail.com

[Received 22.05.2018; Revised 19.06.2018; Accepted 23.06.2018; Published 30.06.2018]

Abstract

Sauromatum nangkarensense A. Nangkar & H. Tag, a new species of *Sauromatum* Schott, (Araceae) from Kimin, Papum Pare District of Arunachal Pradesh, India, is described and illustrated with photographs of living specimens. The new species resembles *Sauromatum brevipes* and *S. hirusutum* with their staminodes short and curved downward and the spathe-tube is convoluted. The new species differs from these in having subcylindric tubers, pinnate leaves, with male zone blonde, cream, sterile flowers clavate, pink, stipitate and curved downward covering female zone partially. Detailed description and a range of photographs have been provided.

Key words: *Sauromatum nangkarensense*, New species, Araceae, Kimin, Arunachal Pradesh, India

INTRODUCTION

Sauromatum Schott, (Araceae; Areae) is a genus with nine accepted species (www.theplantlist.org). Genus *Sauromatum* and *Typhonium* Schott are overlapping genera as many species are sometimes placed in both of these by different workers. Hetterscheid and Boyce in 2000 clearly circumscribed these two distinct genera. The genus *Sauromatum* is distributed in South, Southeast and East Asia and extends throughout the pacific area to Australasia. In India the genus is represented by four species, viz. *Sauromatum brevipes* (Hook.f.) N.E. Brown, *S. venosum* (Dryand. ex Ait.) Kunth, *S. diversifolium* (Wall. ex Schott) Cusimano & Hett. (Cusimano *et al.* 2010), and one recently published species *S. meghalayense* D.K. Roy, A.D. Talukdar, B.K. Sinha & M. Dutta Choudhury (Roy *et al.* 2014).

During intensive floristic survey in Arunachal Pradesh, India, the authors collected one interesting specimens from the Kimin area of Papum Pare district. The plant was also observed growing in tropical belts of Siang and Kameng belts of the state, mostly occurring in tropical forest along the low altitude foothills, up to 400 m amsl. The significant morphological characters of the mature plant i.e. pedatisect leaf blade, inflorescence appearing along with developing leaf, short peduncle, spathe tube with convoluted margins, sterile-zone with structure of staminodes, stipitate appendix cone or knife shaped, and tube persistent. These morphological characters showed that collected plant is a species *Sauromatum* Schott. But, the morphological characters of its tuber, leaf blade, petiole, spathe tube, spadix, structure of staminodes, male and female zone, stipitate appendix, and bifid pointed stigma made it is distinct from the so far known species of the genus (Hooker 1894; Cusimano *et al.* 2010).

So, the plant is now recognized as a new species of *Sauromatum* Schott for which description, illustration, colour photographs, distributional details, and type specimen are provided below.

This taxon is quite close to *S. venosum* but differs in having short inflorescence appearing alongside first developing leaf, spreaded limb with truncate apex, two types of staminode, appendix conic and stipitate. The new species can also be distinguished from *S. brevipes* in having stipitate and conic appendix, dark purple-brown peduncle; from *S. hirsutum* (S.Y. Hu) Cusimano & Hett. and *S. brevipilosum* (Hett. & M. Sizemore) Cusimano & Hett. in having glabrous petiole and leaf blade; purple brown spot on petiole, stipitate appendix, bipid with pointed stigma; from *Sauromatum meghalayense* D.K.Roy, A.D.Talukdar, B.K.Sinha & M. Dutta Choudhury. In having, erect peduncle, dark purple brown spot on petiole, bipid pointed stigma, subcylindric tuber, berries green, A comparison of the morphological characters of *S. nangkarens* with *S. brevipes*, *S. hirsutum*, and *S. meghalayense* is given in Table 1.

TAXONOMY

Sauromatum nangkarens A.Nangkar & H.Tag, sp. nov. [Figures 1 – 4]

Herbs, terrestrial tuberous herbs, monoecious. tubers globose to subcylindric, annulate, 4 cm long, 3 cm wide. *Roots*: adventitious, terete, white, arise from near the base of petiole/pseudostem. *Cataphylls* 2, dark purple to pinkish, lanceolate, acute to acuminate, 9 cm long and 5 cm wide. *Leaves*: solitary, occasionally 3; petiole green, dark purple spotted, 20 – 40 cm long, 1 – 2 cm wide; Leaf blade: pedatifid, segments 5 – 7, green, simple, oblong or oblanceolate or elliptic, entire, acute to acuminate, central segments large, 14 – 20 x 8 – 10 cm, lateral two leaflets smallest, 7 – 12 x 3 – 5 cm, gradually smaller toward the distal end of rachis, first two lateral veinlets acts as end vein collector, 2 – 3 line of end vein collectors on leaf margins united at the apex. *Inflorescence*: solitary, arise along with leaves. *Peduncle*: green, dark purple brown spotted, 2.5 – 5 x 0.5 cm. *Spathe*: convolute at base. Tube: subglobose, glabrous, slightly constricted, dark purplish violet, margins overlap each other to make tube, ovoid or ellipsoid, 3.7 – 5 cm long and 4 cm wide, pinkish inside, female flowers closed inside the tube, tube persistent; limb 9 cm long, 16 cm wide, spreading like elephant ear, both sides light green with purple, later on white, fall off in later stage. *Spadix*: sessile; female part 3.2 cm long, 2.5 cm wide, conic, ovaries green, generally 1-loculed, rarely 2-loculed, stigma white, subsessile, apex pointed. 1st sterile zone: 0.6cm long, white to pink, proximal part covered with staminodes, distal part groove and naked. *Staminodes*: thick, purple, 2.2 cm long, 0.3 cm wide, curved downward to covered almost 80 – 90% of the female zone, clavate, and emarginate, apex v-shape, arise from centre of ridge. Male zone yellow, blonde, cylindrical, 2 cm long, 0.5 cm wide. *Appendix* (2nd sterile zone): stipitate, white-daisy, slightly conic or knife shaped, apex obtuse, 7 cm long, 0.6 cm wide at base. Stipe 0.7 cm long, 0.3 cm wide, daisy, pink. Berries crowded, subglobose to banana shaped, young green to mature dark purple.

Flowering & Fruiting: March – September

Phenology: seeds germinate in the month of April, generally 80 – 90 % seeds germinate; in the first year eophyl with one leaf with sagittate blade to trifoliate with shallow lobes appear; takes 2 – 3 years to mature. Generally flowers in the 4th year march – April; leaves wither during August – September when fruits also found to ripe.

Type: INDIA, Arunachal: Kemin, Papum Pare District. Kemin, 28.04.2015, Atek Nangkar & Hui Tag 055 (Holotype: ASSAM; Paratype: HAU).

Figure 1. *Sauromatum nangkarenses* A.Nangkar & H.Tag, *sp. nov.* **A.** whole plant with lower part of spathe in fruiting stage; **B.** pedately divided leaf; **C.** plant with inflorescence; **D-E.** Inflorescence in close-up view; **F.** tuber with roots - lower part shows the last year's degrading part and upper part is the current year's.

Figure 2. *Sauromatum nangkarenses* A.Nangkar & H.Tag, *sp. nov.* **A.** spadix; **B.** male flower zone; **C.** female flower zone; **D.** staminodes; **E.** infructescence; **F & G.** isolated fruits

Figure 3. *Sauromatum nangkarens* A.Nangkar & H.Tag *sp. nov.* **A.** whole plant with leaves and inflorescence; **B.** Spadix; **C.** Fruits; **D.** Seed; **E.** ovary with stigma; **F.** T.S of ovule show single and double loculed; **G.** Staminalodes

Distribution: Kimin: Papum Pare District and also observed from five district of Arunachal Pradesh, India; endemic.

Habitat: Grows in tropical evergreen broadleaved forest floor, secondary degraded forest, open wet area and grassland at an altitudinal range of 150 – 400 m.

Conservation status: seen to grow in tropical broadleaved evergreen forest, secondary degraded forest, open wet area and grassland in five districts of Arunachal Pradesh. Following IUCN (2001), criteria this taxon should therefore be treated as Data Deficient.

Etymology: The specific epithet *nangkarens* indicates the dynasty of the first Author and after the name of his father late Kuyang Nangkar, belongs to Adi tribe of Arunachal Pradesh, India.

Note: An artificial key to identify the Indian species of *Sauromatum* Schott has been prepared. The differences of *S. nangkarens* from its close allies *S. brevipes*, *S. hirsutum*, and *S. meghalayanse* is presented in Table 1.

Figure 4. Herbarium specimens *Sauromatum nangkaarens*. A. Whole plant with separate spathe & spadix. B. Whole plant with inflorescence.

Table 1. Comparison of diagnostic morphological characters of *Sauromatum nangkaarens* and its related species.

Characters	<i>Sauromatum brevipes</i>	<i>Sauromatum hirsutum</i>	<i>Sauromatum meghalayense</i>	<i>Sauromatum nangkaarens</i>
tuber	Globose, 1–1.5 cm in diam.	Subglobose, 1.5–2.5 cm in diam.	Globose, to 3.5 cm high, 4 cm in diam.	Subglobose-subcylindric, annulate, 4 cm long, 3 cm diam.
petiole	Without hair, pinkish or dull purplish red, 15–30 cm x 2 mm.	Densely hirsute, 15–20 cm long.	Without hair, greenish, to 45 cm long, 1.7 cm in diam	Without hair, touch rough, Petiole pale green with dark purple spot or dark purple brown, 20–40 cm long, 1–2 cm diam.
Leaf blade	Glabrous, 5–9-pedatifid; central lobe linear-lanceolate or narrowly elliptic,	Densely hirsute, 5–7-pedatifid; central lobe elliptic, 7–31 x 2.5–10 cm	Glabrous, 7-pedatifid; central lobe oblanceolate, 33 x 8 cm.	glabrous, 5–7 pedatifid. Central lobe elliptic, oblong to lanceolate, 14

Characters	<i>Sauromatum brevipes</i>	<i>Sauromatum hirsutum</i>	<i>Sauromatum meghalayense</i>	<i>Sauromatum nangkareense</i>
	narrowly elliptic, 6.5–25 x 1–5 cm.			to lanceolate, 14–20 cm long, 8–10 cm wide.
Inflorescence	Inflorescence(s) appearing alongside developing leaves.	Inflorescence appearing alongside first developing leaf.	Inflorescence appearing alongside first developing leaf, curving	Inflorescence appearing alongside first developing leaf, erect (not curved)
Peduncle	Pale green, 2–2.5 cm long.	1–1.5 cm long	Purplish-brown, ca. 5 cm long, 0.6 mm in diam.	green, dark purple brown, 2.5–5 cm long and 0.5 cm diam.
Spathe tube	Yellowish-brown with purple or faint pinkish spots outside, creamy or dark pink inside; margin closed.	Hirsute outside; convolute but 1 cm with fused margin, purplish red inside.	Smooth both side; convolute with open margins, purplish but creamy to white in margins and toward the limp inside.	dark purplish violet inside pinkish, ovoid or ellipsoid, 3.7–5 cm long, 8 cm wide

Keys to the Indian species of *Sauromatum*

- 1a. Leaf blade diversified (often in one plant), entire to pedatisect *S. diversifolium*
- 1b. Leaf blade always pedatisect 2
- 2a. Inflorescence appearing before leaves *S. venosum*
- 2b. Inflorescence appearing along with first developing leaf ‘ ’ 3
- 3a. Peduncle pale green, 2 – 2.5 cm; spathe tube greenish to white inside ... *S. brevipes*
- 3b. Peduncle purplish-brown or with dark purple spots 4
- 4a. Peduncle purplish brown, ca. 5 cm; spathe tube purplish but creamy to white in margins and toward the limp inside; appendix not stipited *S. meghalayense*
- 4c. peduncle dark purple, 2.5–5 cm; spathe dark purplish violet, pinkish inside; appendix stipitate *S. nangkareense*

Acknowledgements

The authors are thankful to UGC New Delhi for funding support through CPEB-II project. Authors deeply acknowledges the valuable technical help rendered by Prof. A. P Das, DBT Visiting Research Professor, Department of Botany, Rajiv Gandhi University during development of this manuscript.

LITERATURE CITED

- Cusimano, N.; Barrett, M.D.; Hetterscheid, W.L.A. & Renner, S. 2010. A phylogeny of the Areace (Araceae) implies that *Typhonium*, *Sauromatum* and the Australian species of *Typhonium* are distinct clades. *Taxon* 59(2): 439 – 447
- Hetterscheid, W.L.A. & Boyce, P.C. 2000. A reclassification of *Sauromatum* Schott and new species of *Typhonium* Schott (Araceae). *Aroideana* 23: 48 – 55.
- IUCN 2001. *IUCN Red List Categories and Criteria: Version 3.1*. IUCN Species Survival Commission. IUCN, Gland, Switzerland and Cambridge, U.K.
- Hooker, J.D. 1894. The Flora of British India. L. Reeve and Co., London. Vol. 6. pp. 488-556.
- Roy, D.K.; Talukdar, A.D.; Sinha, B.K. & Dutta Choudhury, M. 2014. *Sauromatum meghalayense* (Araceae; Tribe: Areace), a new species from Meghalaya, India. *NeBIO* 5(3): 1 – 3.
- www.theplantlist.org