



Research Paper

***Dioscorea esculanta* (LOUR.) BURKILL VAR. *Spinosa* R. KNUTH,
[DIOSCOREACEAE] - A NEW DISTRIBUTIONAL RECORD FOR TRIPURA,
INDIA**

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Abstract

The occurrence of *Dioscorea esculenta* (Lour.) Burkill var. *spinosa* R. Knuth, (Dioscoreaceae) is recorded from the forestfloor and the barren land in Tripura for the first time. The tuber of this plant is mostly popular to all the tribal communities as delicious vegetable. Poultice of tuber paste is applied on swelling. The plant is rare in the state probably due to the habitat loss by rubber plantation.

Key words: *Dioscorea esculenta* var. *spinosa*, Distribution, New record, ethnic uses, Tripura.

INTRODUCTION

Tripura is the third smallest state of India which lies in the north eastern parts of India. It extends between 22°56'N to 24°32'N and 91°09' E to 92°20'. It occupies an area of about 10,491.69 kilometer². Temperature ranges from 6° to 37°C and highest temperatures are recorded in May-June. The average annual rain fall is 2024.40mm. The total forest cover in the State is 6292.681 km² which is approximately 60% of total area of State is under the forest cover comprising of tropical forest trees (including rubber, bamboo and palm oil trees). Due to its tropical geographical position and favourable environmental condition Tripura is too rich in terms of its floral and faunal diversity. The recent change in the forest structure due to speedy explanation of rubber plantation it is very essential to update and revise the existing floral diversity of the state

Dioscorea Linnaeus is a monocotyledonous genus of over 600 species [1] of tuberous herbaceous angiospermic climbers, climbing up to 20 meter on supports. Species of *Dioscorea* are native throughout the tropical, mainly in tropical America, subtropical and warm temperate regions of the world, with only a few species covering into the temperate regions [2,3]. So far 50 species of *Dioscorea* have been reported [4] in India, out of which 30 species are scattered in Arunachal Pradesh [5]. According to Ayensu & Coursey (1972) [6] Asia, South America and West Africa are the major yam growing regions in the world. Deb (1983) [7] reported seven species of *Dioscorea* for the state of Tripura viz. *D. alata* Linnaeus, *D. bulbifera* var. *bulbifera* Linnaeus, *D. bulbifera* var. *sativa* (Hooker f.) Prain, *D. glabra* Roxburgh, *D. hamiltonii* Hooker f., *D. pentaphylla* Linnaeus and *D. pubera* Blume. Recently, Majumder *et al.* (2009) [8] and Paul *et al.* (2014) [9] reported the occurrence of *D. hispida* Dennsted and *D. oppositifolia* respectively in Tripura.

MATERIALS AND METHODS

Fresh and mature plant parts including tubers were collected from the field. Specimens were made into herbarium sheets following Jain & Rao (1977) [10] and identified using literature available viz. Flora of China [11], Taiwan invasive species database [12], National Centre for Biotechnology Information (NCBI) [13] and published paper [14]. The specimens were matched with the Taiwan Biodiversity Information facility [15], specimen number of matched sheet is 030886 and deposited at the Herbarium of the Department of Botany, Tripura University. The collected tubers were planted in the experimental garden at Tripura University campus for further observation.

RESULT AND DISCUSSION

During December 2014 to January 2015 some specimens of *Dioscorea* Linnaeus have been collected from different forest floor of Tripura by the authors which were later on identified as *Dioscorea esculanta* (Lour.) Burkill var. *spinosa* R. Knuth. But, the occurrence of this species and its uses in Tripura was unknown before its present collections. *Dioscorea esculenta* var. *spinosa* is popular to all tribal communities of living in Tripura for its edible tubers which grow over 0.25 to 1 kg when grown in loam soil. The starchy tuber also contains mucilage. According to the different tribal communities of Tripura, it is an amusing dish like *D. alata*, *D. hamiltonii*. The species is well known as 'Mau aalu' by Chakmas and 'Sodoimorok' by Mogs of the state. Our present report is supported by the previous work [16, 17, 18, 19] that the boiled tuber is eaten to increase the low weight. The tubers of *D. esculanta* var. *spinosa* are also used as a poultice on swelling.

Taxonomic observation:

Dioscorea esculenta var. *spinosa* (Roxb. ex Prain and Burkill) R. Knuth in Engler, Pflanzenr. 87(IV. 43): 189. 1924. *Dioscorea aculeata* L. var. *spinosa* Roxb. ex Prain and Burkill, J. Proc. Asiat. Soc. Bengal 10: 20. 1914. *Dioscorea esculenta* (Lour.) Burkill in Gard. Bull. Straits Settl. 1:396. 1917; Knuth in Engl. Pflanzenr. 87(4-43):189. 1924; Brown in Use. Pl. Philip. 392, f.155.156. 1941; Burkill in Fl. Malesiana ser.1.4:307. 1954; Liu, T. S. and T. C. Huang, Bot. Bull. Acad. Sin. 3(2):139. 1962; Walker, Fl. Okinawa and South. Ryukyu Isl. 320. 1976; Edit. Comm., Fl. Hainanica 4:152. 1977; Liu, T. S. and T. C. Huang in Fl. Taiwan 5:105. 1978; Ting, C. T., M. C. Chang and P. P. Ling. in Fl. China 16(1): 78, f.22. 1985.

Common names: Lesser yam, Asiatic yam, Potato yam, Chinese yam, Lesser Asiatic yam, Spiny Yam (English); *Mou alu* (Chakma) *Sodoimorok* by Mogs.

Tubers usually 4-8, produced from apical branches of rhizome; cork light yellow in colour, thorny roots present in rootstock, obovate to globose, sometimes cylindrical. Stem twining to left, with T-shaped, soft hairs, proximally prickly, distally so only at nodes. Leaves alternate, simple; petiole 4-9cm; *lateral nodal spine* present; leaf blade broadly cordate, to 12 × 16 cm, with T-shaped hairs especially abaxially, basal veins 9-3, base cordate, apex acute. Male flowers: usually solitary, rarely in cymes of 2-4, stamens 6. Female spike solitary, pendent, Capsule very seldom maturing, base truncate, apex slightly emarginated. Seeds inserted near middle of capsule.

Flower: April onwards. **Fruit:** June onwards.

Habitat: Forest edges, river banks; and sandy loam soil,

Distribution: India, Malaysia, Papua New Guinea, and Thailand.

Medicinal use: Poultice of tuber is applied on swelling

Exsiccates: Uttar Devipur, South Tripura, *C Paul 0497*, December 20, 2014 (23°23'32.23"N 19°35'36.58"E; ±83 m);

Status: Locally rare.



Plate 1: Figure A- Plant of *Dioscorea esculanta* var. *spinosa*, B-Upper surface of leaf, C- Lower surface of leaf, D- Spine in petiole, E- Tubers with thorny roots, F- Stem with hairs

CONCLUSION

The present study revealed the traditional uses of *Dioscorea esculanta* (Lour.) Burkill var. *spinosa* R. Knuthby different tribal inhabitants of Tripura. This species is very important from the food security as well as from medicinal points of view at least this remote North-East Indian state. The collection of the species from the state is an addition for the flora of Tripura state. The species need to be studied for its nutritional qualities and for its cultivation.

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References

- [1]. Ayensu, E.S. (1972) Anatomy of the monocotyledons, Vol. VI. *Dioscoreales*. Oxford Press, Oxford. Pp. 182
- [2]. Caddick, L.R.; Rudall, P.J.; Wilkin, P.; Hedderson, T.A.J. & Chase, M.W. (2002) Phylogenetics of Dioscoreales based on combined analyses of morphological and molecular data. *J. Linn. Soc. (Bot.)*.138: 123 – 144.
- [3]. Seikh, N., Kumar, Y., Misra, A.K. & Pinokiyo, A. (2009) Status documentation of *Dioscorea* L. (Dioscoreaceae) in Meghalaya: an approach towards food security. *Pleione*.3(1): 74 – 82.
- [4]. Prain, D. & Burkill, I.H. (1936) An account of the genus *Dioscorea* in the East. *Annals of the Royal Botanical Gardens, Culcutta*. Longman, London.
- [5]. Saikia, B., Rawat, J.S., Huitag & Das, A. (2011) An investigation on the taxonomy and ecology of the genus *Dioscorea* in Arunachal Pradesh, India. *J. Frontl. Res.*1: 44 – 53.
- [6]. Ayensu, E.S. & Coursey, D.G. (1972) Guinea yams: the botany, ethno botany, use and possible future of yams in West Africa. *Econ. Bot.* 26: 301 – 318.
- [7]. Deb, DB. (1983) The Flora of Tripura state, Today & Tomorrows' Printers and Publishers, New Delhi. 2. Pp. 417 – 422.
- [8]. Majumder, K., Saikia, B. & Datta, B.K. (2009) A new recorded for Tripura, India (*Dioscorea hispida* Dennst.) *Pleione*. 3(2): 224 – 226.
- [9]. Paul, C., Debnath, A. and Debnath, B. (2014) *Dioscorea oppositifolia* Linnaeus [Dioscoreaceae] - a new distributional record for Tripura, India. *Pleione* 8(1): 184 - 187.
- [10]. Jain, S.K. & Rao, R.R. (1977) A Handbook of Field and Herbarium Methods. Today and Tomorrows' Printers and Publishers, New Delhi.
- [11]. Wu, Z. Y. & P. H. Raven, eds. (2000) Flora of China. Vol. 24 (*Flagellariaceae through Marantaceae*). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis.
- [12]. http://www.efloras.org/florataxon.aspx?flora_id=102&taxon_id=200028105
- [13]. National Center for Biotechnology Information (NCBI): NCBI Taxonomy. Accessed via <http://www.gbif.org/species/103263655> on 2015-08-11
- [14]. Ghosh, A. The genus *Dioscorea* L. (2014) In Andaman and Nicobar Islands, India. *Indian Journal of Plant Sciences*. Vol. 3 (3) pp.7-14
- [15]. [http://tai2.ntu.edu.tw/TAlimage/image/38 Dioscoreaceae/Dioscorea esculenta var. spinosa/030886.jpg](http://tai2.ntu.edu.tw/TAlimage/image/38_Dioscoreaceae/Dioscorea_esculenta_var.spinosa/030886.jpg)
- [16]. Barukial, J., Sarmah, JN. (2011) Ethno botanical plants used by the people of Golaghat District, Assam, India. *Int J Med Arom Plants*. 1(3):203-211.
- [17]. Patiri, B., Borah, A. (2011) Wild edible plants of Assam. Edn 1, Geetakhi Printers and Publishers, Guwahati, 1- 65.
- [18]. Choudhury, K., Singh, M., Pillai, U. (2008) Ethno botanical survey of Rajasthan- An update. *American-Eurasian journal of Botany*. 1(2):38-45.
- [19]. Poornima, GN., Rai, RV. (2009) Evaluation of phytonutrients and vitamin contents in a wild yam, *Dioscorea belophylla* (Prain) Haines. *African Journal of Biotechnology*. 8(6):971-973.