

Hydrophytic flora of Assam – I: five new records

S. Hazarika¹ and S. K. Borthakur

Department of Botany Gauhati University, Guwahati 781014, Assam, India

¹Corresponding author: Department of Botany, A. D. P. College, Nagaon 782002, Assam, India

E-mail: sonjirahazarika@gmail.c

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Abstract

The present paper records for the first time the occurrence of five species of aquatic angiosperms viz., *Hydrocera triflora*, *Myriophyllum tuberculatum*, *Potamogeton nodosus*, *Trapa maximowiczii* and *Utricularia gibba* subsp. *exoleta* from Assam.

Key words: Hydrophytes, Angiosperms, New records, Assam

INTRODUCTION

Wetlands are the hotspot of biological diversity and invaluable to sustainable living. Throughout the globe almost all the wetlands are rich sources of human sustenance and culture. The value of wetlands and their resources have been accepted over the ages and there has been significant international effort to conserve wetlands (Ghose 2005). Wetlands generally support diverse aquatic vegetation, also called hydrophytic plants or hydrophytes, and are plants those have adapted to live in aquatic environments. Wetland and aquatic plants comprise highly divers groups of plants viz. algae, ferns, fern allies and angiosperms, which together forms a very rich gene pool and are the major producers in aquatic food chain. These plants are the dwelling places for many aquatic insect, molluscs, leaches and amphibians and are the nesting and roosting grounds for many water fowls. Thus wetland habitats harbour a rich biodiversity and protect a rich gene pool. Unfortunately there are sporadic works on taxonomy and distributions of hydrophytic plants of Assam.

In Assam there is no systematic study on aquatic hydrophytes and most of the works are parts of general floristic studies. For this reason information on aquatic plants of Assam are not only scanty but also scattered. Except the general work of Kanjilal (1901), Rao & Verma (1970, 1971, 1972, 1976), Hajra & Jain (1996), and Jain & Hajra (1978), there is no information available on hydrophytic flora of Assam. However, works on certain small areas in some districts of Assam have been published either as part of floristic studies or as ecological and other studies (Satyanarayana 1962; Baruah 2000, 2003; Barooah & Mahanta 2006; Sharma & Borthakur 2009; Sharma & Saikia 2010). These works were devoted to the flora in general and not exclusively to the hydrophytic flora of the state and hence a study was undertaken since 2009 to document the floristic diversity of wetland habitats of Assam. The present communication is an outcome of the above study and includes five new records of aquatic angiosperms from Assam.

Assam is one of the north-eastern states of India that lies between 24^o to 28^o N latitude and 90^o to 96^o E longitude. Assam contains 3513 wetlands covering an area of about 101231.60 ha. (Baruah *et al* 1997). The climate of the state is warm and humid and is influenced by south-west monsoon extending from the month of April to September. The wetlands of Assam are either oxbow or compact types, which are locally known as

“Beel”. These beels harbour a wide variety of aquatic flora and fauna. Several of the water-bodies in Assam become vulnerable due to natural and anthropogenic factors. Hence scientific study and documentation of biodiversity of the wetlands of Assam need to be taken up urgently as these data are required in planning proper scheme to protect them from further deterioration. In recent years Gogoi (2003, 2006) have made significant contribution in this regard on Deepar Beel, a Ramsar site, near Guwahati in Kamrup district of Assam.

MATERIALS AND METHODS

The present communication is a part of the exploration work undertaken to document the floristic diversity of aquatic vascular plants of Assam. Extensive field work has been carried out during 2009 – 2011 covering different wetlands of the state for the collection of wetland and aquatic plants. For the collection and processing of specimens the conventional herbarium techniques as suggested by Jain & Rao (1977) have been followed. The identity of the voucher specimens were established by consulting relevant literature and by consulting the Herbarium of Botany Department, Gauhati University and AS-SAM Herbarium at Shillong. The voucher specimens on which this study is based have been deposited in the Herbarium of Botany Department, Gauhati University (GUBH).

ENUMERATION OF THE SPECIES

Hydrocera triflora (Linnaeus) Wight & Arnott, Prodr. 140, 1834; Fl. Brit. Ind. 1: 483, 1875; Subramanyam, Aquatic Angiosperms 12, 1962. *Impatiens triflora* Linnaeus, Sp. Pl. 938, 1753. [Balsaminaceae]

Annual herbs, aquatic, branched; stem fistular; roots long fibrous; leaves linear-lanceolate with glandular leaf bases; flowers bracteate, zygomorphic; sepals 5, petaloid, two outer lateral flat, becoming anterior due to resupination, the posterior produced into a short hollow spur; petals 5, free coloured; stamen 5; carpels 5, ovary superior, stigmas 5; capsule purplish-red, septicidal [Plate 1, Fig. a].

Flowers & Fruits: July – September

Exsiccatae: Assam: Morigaon, Athubhanga Beel, 11.09.2011, *S. Hazarika* 190.

Distribution: Erstwhile Uttar Pradesh, West Bengal, Naga Hills and South India.

Note: Subramanyam (1962) reported the species only from the state of Nagaland in Northeast India. The present authors recorded the occurrence of the species from Athubhanga Beel near Dharamtul in Morigaon District of Assam. In Athubhanga also the plant is very rare and found only three populations of a few plants.

Myriophyllum tuberculatum Roxburgh, Fl. Ind. 1: 451, 1820; Hooker *f.*, Fl. Brit. India 2: 432, 1878; Prain, Beng. Pl. 1: 343, 1903 (Rep. ed. 1963) & Rec. bot. Surv. India 3(2): 210, 1965; Subramanyam, Aquatic Angiosperms. 17, 1962; Majumder, Ind. Agr. 6: 124, 1962; Majumder, Bull. Bot. Soc. Bengal 19(1): 12, 1965; Datta & Majumder, Bull. Bot. Soc. Beng. 20(2): 93, 1966. [Haloragaceae]

Perennial, fresh water herb; leaves whorled, pectinately pinnatifid; spikes raised above the surface of water; flowers small, bisexual or monoecious, sessile in the axils of the leaves, pink; stamens 4, stigma pink, fimbriate; fruits tubercled. [Plate 1, Fig. b]

Flowers & Fruits: Throughout the year.

Exsiccatae: Assam: Nagaon, Morikolong Beel, 17.05.11, *S. Hazarika* 152. Morigaon, Kuji Beel, 1.05.2010, *S. Hazarika* 212.

Distribution: Eastern India, West Bengal, Orissa, Assam, Karnataka.



PLATE I: Photographs of newly recorded hydrophytes for Assam: **A.** *Hydrocera triflora*; **B.** *Myriophyllum tuberculatum*; **C.** *Potamogeton nodosus*; **D.** *Trapa maximowiczii*

Note: Although Naskar (1990) in his *Aquatic and Semi-Aquatic plants of the lower Ganga Delta* mentioned that the species is distributed in the state of Assam but neither any report nor any herbarium specimens could be traced in ASSAM and CAL to authenticate the claim. The present authors recorded the occurrence of the species from Morikolong Beel of Nagaon district and Kuji Beel of Morigaon district of Assam.

Potamogeton nodosus Poiret in Encycl. Meth. Bot. Suppl. 4: 535, 1816; Dandy in J. Linn. Soc. 50: 531, 1937; *P. indicus* Roxburgh, Fl. Ind., ed. Carey, 1: 471, 1820, *non* Roth ex Roemer et Schultes 1818; Subramanyam, Aquatic Angiosperms 95. 1962. [Potamogetonaceae]

Submerged, stoloniferous herbs; stem teret, branching; leaves floating, uppermost opposite, flat, oblong-ovate to elliptic-suborbicular coriaceous, entire, acute-obtuse, base rounded or cuneate; stipules 2 – 15 cm long, free, keeled; spikes 2 – 5 cm long, solitary, densely many-flowered, reddish-brown; stamens 4; carpels 4; drupelets obliquely ovoid. [Plate-1, Fig. c]

Flowers & Fruits: Almost round the year.

Exsiccatae: Assam: Nagaon, Hanhila Beel, 17. 05. 11, *S. Hazarika* 145. Morigaon, Kuji Beel 04. 06. 2009, *S. Hazarika* 104.

Distribution: Jammu & Kashmir, Himachal Pradesh, Punjab, Erstwhile Uttar Pradesh, Bihar, West Bengal, Sikkim, Assam, Arunachal Pradesh, Manipur, Meghalaya, Orissa, Madhya Pradesh, Rajasthan, Gujrat, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu, Kerala, Andaman.

Note: Rao & Verma (1976) reported the occurrence of the species from Subansiri (Arunachal Pradesh) and Manipur. Kothari (2001) reported the occurrence of the species from Meghalaya. The present authors recorded the occurrence of the species from

Hanhila Beel of Nagaon district and Kuji Beel of Morigaon district. In both the places only a few populations of the plant have been observed.

Trapa maximowiczii Korshinsky in Act. Hort. Petrop. 12: 336, 1892; *T. quadrispinosa* auct. non Roxburgh, Fl. Ind. 1: 430, 1832; Subramanyam, Aquatic Angiosperms 21. 1962. [Trapaceae]

Annual, floating herb; leaves dimorphic, submersed leaves opposite, root-like, pinnatipartite with filiform segments, floating ones rosulate, rhomboidal, less villous beneath, lamina towards the base black-brown or has two dark spots; corolla pale lilac; anthers yellow; nuts with 4 dagger-like thorns, often unequal, straight or curved. [Plate – 1, Fig. d]

Flowers & Fruits: July – January

Exsiccatae: Assam : Nagaon, Kaziranga National Park, near Burapahar Range. 10. 09. 2011, *S. Hazarika* 188.

Distribution: Tripura (Agartala), Southern regions of Bihar.

Note: According to Subramanyam (1962) the species is very rare. He reported the occurrence of the species from Agartala of Tripura state and Southern regions of Bihar only. The present authors recorded the occurrence of the species from the western part of Kaziranga National Park, near Burapahar Range of Nagaon district. Here also the plant is very rare and found two populations of few plants only.

Utricularia gibba Linnaeus subsp. *exoleta* (R. Brown) Taylor in Mitt. Bot. Staatssamml. Muenchen 4: 101. 1961 & in Kew Bull. 18: 204. 1964; Abraham & Subramanyam in Proc. Indian Acad. Sci. 62B: 98. 1965; Hara, Fl. East. Himal. 300. 1966; Rau in Bull. Bot. Surv. India 10: 57. 1968; Ramaswamy & Razi, Fl. Bangalore 547. 1973; Basak in Bull. Bot. Surv. India 17: 100. 1975 (1978); Deb, Fl. Tripura 2: 304. 1983; Janarthanam & Henry, Bladderworts of India (Fl. India Ser.4): 51. 1992. [Lentibulariaceae]

Perennial, submerged or floating herbs; stems very slender, intermingled with other aquatic plants; leaves alternate, 3 – 10 mm, thread like; multipinnate leaves bearing minute ovoid bladders, mouth lateral; flowers 2 – 3 in raceme, yellow; upper lip of corolla broadly ovate, spur more or less straight; capsules globose; seeds few, with broad irregular wing.

Flowers & Fruits: April – July

Exsiccatae: Assam: Nagaon, Noltoli in road side wetland. 02.06.2011, *S. Hazarika* 168; Sibsagar, Janjimukh in roadside wetland. 10.06.2009. *S. Hazarika* 109.

Distribution: West Bengal, Bihar, Madhya Pradesh and Tamil Nadu.

Note: During field work the authors observed that in vegetative stage the plant remain as free floating but in flowering stage the plant always intermingled with *Salvinia*. This indicates that for reproduction *Utricularia gibba* subsp. *exoleta* might need some sort of association with *Salvinia* which is required to be confirmed through further studies.

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