MATERIALS TOWARDS A MONOCOT FLORA OF ASSAM
(HYDROCHARITACEAE & BURMANNIACEAE)

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ABSTRACT

Preliminary taxonomic studies on 2 (two) families of the Monocotyledons of Assam (Hydrocharitaceae and Burmanniaceae) are presented here. These studies will form the materials for a Monocot Flora of Assam.

INTRODUCTION

Flora of Assam, Kanjilal et al. in five volumes (1932-1940) has remained incomplete. The published volumes, as also the Assam forest herbarium, reflects the natural preoccupation of the forester with woody plants. The work is somewhat lopsided due to a neglect of the herbs. Since, excepting for the palms, the monocotyledons mostly include herbaceous plants, a somewhat casual cursory collection of these plants in the old Assam forest herbarium is not surprising. Only Dr. N. L. Bor with his special interest in the grasses, took pains to make his own representative collections and contributed his account of the Poaceae (Gramineae) forming the last volume and the only monocot family in the published Flora of Assam. With the plants of the other monocot families poorly represented in the herbarium, no further publication was then possible. In 1956, the Botanical Survey of India inherited with the Assam Herbarium this task.

A satisfactory representative collection of the monocotyledonous plants covering adequately their diversity and distribution in the Assam area was the prime objective of the Botanical Survey of India along with its general programme of plant exploration and collection. Accordingly, Panigrahi (1955, 1966) has outlined the earlier background and published some preliminary account. A few more papers relevant to the monocot families have also been published (see references). Pending examination of historical material and comprehensive collection affording adequate data, essential for writing up a modern flora, it is considered useful to bring together, the presently available information.

These outline accounts of the monocot families in the sequence of Bentham and Hooker, closely follow the style of Kanjilal et al. Flora of Assam. However, these include complete citation of the correct name and basionym, if any, with only a few other selected common synonyms. A reference to J. D. Hooker's Flora of British India is made only in case of name changes and other differing opinions. The descriptions are concise and the distribution data, unless otherwise required are provided according to major political units including now Arunachal Pradesh formerly North East Frontier Agency (N.E.F.A.). The plates include selected figures, highlighting, as the case may be, habit and/or other organs, considered helpful for easy identification.

HYDROCHARITACEAE A. L. de Juss., Gen. 67, 1789

Aquatic, usually submerged, sometimes floating, annual or perennial, monococious or dioecious herbs. Stems slender or absent. Leaves radical or cauline, simple, sessile or petioled. Flowers subtended by a pair of more or less connate segments (spathe), actinomorphic, bisexual or unisexual with sometimes rudiments of the other sex; sepals 3, petaloid; petals 1-3 or absent; stamens 1-12, in one or more trimerous whorls, often some reduced to staminodes; anthers basifixed, 2-celled; ovary inferior, 1-celled; ovules many; placenta parietal or intruded, sometimes almost meeting in the axis; styles 1-2. Fruits usually indehiscent, sometimes irregularly dehiscent; seeds few-numerous, exalbuminous.

1a. Stems present. Leaves cauline.
2a. Leaves opposite and in whorls of 3-8
2b. Leaves alternate

1b. Stems absent. Leaves radical.
3a. Leaves sessile, all linear.
4a. Flowers unisexual; female scapes coiled in fruits; ovary oblong
4b. Flowers bisexual; stamens never coiled; ovary with long filiform beak

3b. Leaves petioled. Mostly ovate, oblong or suborbicular

Hydrillo-1.
Bjosa-3.

Valliseria-2.
Bjosa-3.
Ottelia-4.
Hydrilla \[ \text{L. C. Rich. in Mem. Inst. Paris 12. 2: 9, 65, 73. t. 2. 1872.} \]


Submerged, stoloniferous, dioecious, copiously branched. Leaves usually lower opposite, upper sessile or pedately whorled, linear-oblong, 3-8 mm long, entire or serrulate.


Cultivated in aquaria. May be used as manure, if abundant.

ASSAM: Darrang Kamrup. MEGHALAYA: K. & J. Hills; Lakhimpur. MANIPUR. TRIPURA.

Vallisneria \[ \text{L. Sp. Pl. 1015. 1753 et Gen. Pl. 446. 1754.} \]

V. spiralis \[ \text{L. Sp. Pl. 1015. 1753.} \]

Submerged, stoloniferous, dioecious. Leaves 6-40 x 0.3-0.6 cm, entire or serrulate, 5-nerved. Male spathes on 1-2 cm long scape, ovate, ca 5 mm long; flowers many, shortly pedicelled, white, ultimately detaching and floating on the water-surface; sepals broadly ovate, ca 0.3 mm long; petals 1, rudimentary; stamens 2; staminode 1. Female spathes on long slender scape, cylindrical, ca 1 cm long; flowers solitary, white; sepals ovate, ca 2 mm long; petals 3, rudimentary; ovary ca 1.5 mm long; styles 3. Fruits subcylindrical, ca 3 x 0.3 cm; seeds numerous.

Fls. & frts.: Nov.-July. Common in ponds and lakes; 100-1700 m.

Cultivated in aquaria.


Blyxa \[ \text{Noronha ex Thouars, Gen. Nov. Madag. 2: 4. 1868.} \]

Submerged, stoloniferous, monocious (or dioecious). Stems present or absent. Leaves cauleine or radical, spiral, linear. Spathes sessile or peduncled, tubular, bidentate, with 6 longitudinal ribs. Flowers bisexual (or unisexual); sepals 3, linear-lanceolate, green, persistent; petals 3, linear, white, fringed, plicate in bud; stamens 3; anthers 2-celled, laterally dehiscent; ovary linear with a long filiform beak, raising the rest of the flower just above the water-surface; styles 3. Fruits linear-lanceolate; seeds 10 or more, ovate, elliptic or fusiform, sometimes tailed.

1a. Stems present. Leaves cauleine ... B. japonica-3.
1b. Stems absent. Leaves radical.
2a. Seeds spiny, both ends long tailed ... B. echinosperma-1.
2b. Seeds tubercled, both ends obuse or apiculate ... B. echinosperma-2.

Leaves 10-100 x 0.5-1 cm, 5-7-nerved. *Scape* solitary or more. 5-50 cm long; *spathe* 4-10 cm long, 1 (rarely 2)-flowered. *Flowers* bisexual; *sepals* ca 7 x 1 mm, 1-3-nerved; petals ca 12 x 1.5 mm; *filaments* ca 5 mm long; *anthers* ca 1.5 mm long; ovary equaling the *spathe* with 4-12 cm long beak; styles compressed, ca 7 x 0.5 mm. *Seeds* numerous, ovate-elliptic, 1.5-2 x 0.7-1 mm, with 8 longitudinal rows of blunt spines; both ends with 1-5 mm long filiform tail.

*Fls. & frts.*: Aug.-Sept. In stagnant water; 1000-1500 m.

**MEGHALAYA**: K. & J. Hills.


Leaves 10-50 x 0.5-1 cm, 5-9-nerved. *Scape* solitary or more, 10-40 cm long; *spathe* 4-7 cm long, 1-flowered. *Flowers* bisexual; *sepals* 5-8 mm long, 1-nerved; petals 10-20 mm long; *filaments* ca 5 mm long; *anthers* 1-2 mm long; ovary equaling the *spathe* with 3-8 (- or more) cm long beak; styles compressed, ca 8 x 0.5 mm. *Seeds* numerous, ovate-elliptic, 1-2 mm long with 8 longitudinal, tubercled ribs.

*Fls. & frts.*: Aug.-Sept.

**MEGHALAYA**: K. & J. Hills.


*Stems* branched, 1-5 dm high. *Stolons* slender, ca 1 mm thick. *Spathes* axillary, subcylindrical, 1-2-2.5 cm long, 1-flowered. *Flowers* bisexual; *sepals* ca 3 x 0.8 mm, 1-nerved; petals ca 8 x 0.7 mm, 1-nerved; *filaments* 1-2 mm long; *anthers* ca 1 mm long; ovary subequaling the *spathe* with 2-3.5 cm long filiform beak; styles ca 3 mm long. *Fruits* subcylindrical, ca 20 x 4 mm; seeds many, fusiform. ca 1.5 x 0.5 mm, smooth.

*Fls. & frts.*: July-Oct. In ponds and puddles; 500-1400 m.


Submerged or partially floating, annual, monocotyledonous herbs. *Leaves* variable, mostly ovate, oblong or suborbicular, 5-22 x 4-21 cm, cordate, truncate or attenuate at the base, rounded, acute or apiculate at the apex, some linear-lanceolate; petioles 5-40 cm long, trigonous, smooth or denticulate. *Peduncles* 1-4 dm long; *spatial* ovate-elliptic, 2-6 cm long, 1-flowered, 5-10-winged; wings up to 1 cm broad, entire or wrinkled, sometimes reduced to ribs. *Flowers* sessile, bisexual; sepals oblong-lanceolate, 10-15 x 2-4 mm, green, persistent; petals obvate, 20-30 x 10-13 mm, white with yellow spotted base; stamens 6 (-9); *filaments* ca 5 mm long, hairy; *anthers* ca 4 mm long, yellow; ovary oblong, subequal with the *spathe* narrowed at top; styles 6 (-10), 5-10 mm long. *Fruits* 2-5 cm long, irregularly dehiscing; seeds many, fusiform.

*Fls. & frts.*: Throughout the year. Common, in sluggish streams and stagnant water; 100-600 m. *Fruits* edible; leaves used as vegetable.

**ASSAM**: Cachar; Darrang; Goalpara; Lakhimpur; Sibsagar, Nagaland. **ARUNACHAL PRADESH**: Tirap. Tripura.

**BURMANNIACEAE** Blume, Enum., Pl. Java. 1: 27. 1847.

Annual or sometimes perennial, saprophytic or autotrophic marsh or moist-loving herbs. *Stems* stout or capillary, simple or branched. *Leaves* simple, sessile, sheathing, few-many in basal rosettes and a few scattered along the stem, linear-lanceolate, acuminate, upper gradually shorter, more distant and appressed to stem, or all reduced to scales. *Flowers* terminal, solitary, fascicled or in cymes, bisexual, actinomorphic; *perianth* tubular, entirely or partially persistent; tube and ovary (ours) 3-winged; lobes 6, small, biseriate; *anthers* (ours) 3, sessile or subsessile, inserted in the perianth-throat, bilocular, dehiscing by transverse slits; connective broad, with two apical crests and a median basal spur; ovary inferior, (ours) 3-celled; placental axile; ovules numerous; style equaling the perianth-tube; stigmas 3, short, obovate or suborbicular. *Fruits* dehiscent or indehiscent; seeds numerous, minute, ellipsoid-oblong; albumen scanty.

CHARACTERS OF THE FAMILY

1a. Autotrophic herbs; stems and leaves green.
2a. Robust herbs. Rosette leaves 2.5-12 cm long. Flowers many in a forked cyme.
2b. Slender herbs. Rosette leaves 0.3-2 cm long, sometimes very few or lacking. Flowers solitary, or few in fascicles.
3a. Flowers 0.3-2 mm long; perianth-lobes margins double.
3b. Flowers 4.5-7 mm long; perianth-lobes margins single.

B. disticha-1.

B. coelestis-2.

B. pusilla-3.

1b. Saprophytic herbs; stems and leaves white.
4a. Stems 5-10 cm high. Flowers 3-7 mm long, white or yellowish white, laterals, when present, on straight branches.
4b. Stems 10-25 cm high. Flowers 6-15 mm long, purplish blue or whitish, laterals, when present, on branches curved like the arms of a candelabrum.

B. nepalensis-4.

B. candelabrum-5.

Stems 2-6 dm high. Rosette leaves 2.5-12 × 0.5-1.5 cm. Flowers sessile or sub-sessile, secund on upto 7 cm long branches; bracts lanceolate, 7-10 × 2-2.5 mm; perianth-tube ca 5 mm long; lobes greenish, outer ovate, ca 2 mm long, inner linear-lanceolate, ca 1 mm long; ovary ellipsoidal, 5-7 mm long; wings elliptic, 10-20 × 2-3 mm. Fruits obvoid.

Figs. & frts.: June-Sept. Common in marshy places; 1000-1500 m.

MEGHALAYA: K. & J. Hills. MIZORAM. NAGALAND.

B. coelestis D. Don, Prodr. Fl. Nep. 44. 1825.
Stems 1-2 dm high. Usually simple, sometimes branched. Rosette leaves 3-20 × 1.5-2 mm, 3-nerved. Flowers in fascicles of 2-3 (-6) or solitary, blue or purple; bracts ca 4 × 1 mm; perianth-tube ca 5 mm long; lobes yellowish white, outer ovate, 1.5-2 mm long, inner lanceolate, ca 1.2 mm long; ovary ellipsoid-ovoid, ca 5 mm long; wings elliptic, acute at base and truncate-rounded at apex, ca 10 mm long, 2-3 mm broad. Fruits obvoid, indehiscent.

Figs. & frts.: June-Nov. In moist places; 1000-1000 m.

ASSAM: Lakhimpur. MEGHALAYA: K. & J. Hills. MIZORAM.

Gonyanthus pusilla Miers in Trans. Linn. Soc. 18: 537. t. 38. f. 1841.
Stems 0.5-2 dm high, simple or branched, green. Rosette leaves few, 3.5 × 1.5 mm or sometimes absent. Flowers solitary, blue; bracts 1.2 mm long; perianth-tube ca 4 mm long; lobes yellow, outer broadly ovate, 1.1-5 mm long, inner linear-lanceolate, 0.3-0.5 mm long; ovary ellipsoid-ovoid, 2-3 mm long; wings elliptic or semi-ovate, with an acute base and truncate-rounded at apex, 4.6-3.4 mm. Fruits obvoid, indehiscent.

Figs. & frts.: Aug.-Sept. In moist places; 1200-1600 m.


Stems simple. Rosette leaves reduced to 2-3 sheaths; cauline leaves reduced to a few 2-3 mm long scales with prominent midribs. Flowers usually solitary, sometimes 2-3, white or yellowish white (rarely bluish); perianth-tube ca 2 mm long; lobes yellow, outer lobes ovate, ca 0.8 mm long, 3-lobulated, the lateral lobules involute, rounded, thick-margined; inner lobes obovate-obovoid, ca 0.3 mm long; ovary subglobose, 1-2 mm long; wings broadly semi-ovate, narrowed at base, truncate or cordate at apex, 2.5 × 1.2-2.5 mm. Fruits subglobose, dehiscing by horizontal slits.
F1s. & frts.: Aug.-Oct. On humus-covered soil or rocks, among mosses: 1000-1500 m.


Stems simple or branched. Rosette leaves reduced to 2-3 sheaths; cauline leaves reduced to a few 1-3.5 mm long scales. Flowers solitary or 2-5, usually purplish blue, sometimes whitish; bracts 2-3 mm long; perianth-tube ca 2.5 mm long; outer lobes ovate, ca 1.5 mm long, with a thick fleshy pouch on the inner side parallel to the margin; inner lobes lanceolate, ca 0.5 mm long, fleshy; ovary narrowly obovoid. 4-7 mm long; wings semi-ovovate. 5-10 x 2-3 mm.

F1s. & frts.: Aug.-Nov. 1000-1600 m.


**REFERENCES**


