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STUDY OF MORPHOLOGY OF SOME AQUATIC PLANTS OF MADHUBANI DISTRICT (BIHAR)

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ABSTRACT

Vascular aquatic plants are grown by seeds, tubers, bulbs and rhizoids. In certain cases, aquatic plants like *Hydrilla* and *Najas* species, the fragments of stems and leaves are capable to develop into new plants. In some cases, seeds and fruits of aquatic plants are dispersed with water and wind from one place to another. As for example Typha species are very common aquatic plants which disperse their fruits along with wind. Seeds and fruits of many aquatic plants are carried out through water currents. Some of these seeds and fruits posses special floating devices while others float just because of their light weight. Heavy seeds of water hyacinth (*Eichhornia crassipes)* sink in water and settle down on the surface of hydrosoil. These seeds disperse later with back water or with bottom mud to new places. Man has brought some alien aquatic species across oceans for their attractive flowers. Water hyacinth *(Eichhornia crassipes)* is one of the most gregarious growing aquatic species in 52 tropical and sub – tropical countries of the world including India. This aquatic species is native of south America and firstly introduced in Bengal (India) in 1980 as ornamental pond plant from Brazil. Today this aquatic species spread as an aquatic weed through out India and Bangladesh.

Present day water hyacinth covers approximately two million hact. Of water area in India also maximum water bodies of Madhubani District. A rapid vegetative growth through its offsets during monsoon sea form a massive mat anf stop even large boats and ships. Water hyacinth plants has been recorded to grow into 1200 offspring in 120 days. The optimum temperature for its growth was observed in different water bodies of Madhubani District to be 28 – 30 C.

INTRODUCTION

Madhubani District is located in the north zone of Bihar. It is bounded by hilly region of Nepal from North, Darbhanga district from South, Supaul district from East and Sitamardi district from West. (Map of Madhubani District) It is approximately quadrilateral shaped in the north – east corner of the confluence of two important rivers Kamla and Koshi. This district extends between 25-27 E and 85-87 N longitude and latitude

respectively. Madhubani District is divided into five subdivisions – 1. Madhubani sadar 2.Benipatti 3. Jhanjharpur 4. Phulparas 5. Jaynagar s. Including 21, blocks viz. 1. Rahika 2. Pandaul 3. Rajnagar 4. Babubarhi 5. Kaluahi 6. Khajauli 7.Jaynagar 8.Ladania 9. Basopatti 10. Benipatti 11. Bisfi 12. Harlakhi 14. Jhanjharpur 15. Andharathadi 16. Lakhnaur 17. Madhepur 18. Phulparas, 19. Ghoghardiha 20. Khutauna 21. Laukhi

This district is world famous for its paintings called "Mithila painting ". Most of the rivers viz. Kamla, Koshi, Bhutahi Balan, Trishula and Jeevachh and low water areas are the main water bodies for aquatic plants in the district. Makhana and singhara are the main cash crops of the district. Thousands of mauns are the habitat of aquatic plants. Besides these, government and private tanks, numerous chaurs and wetlands inundated under water permanently or temporarily are inhabited by many aquatic which may be categorised as follows :

A) Free – floating aquatic plants
B) Attached floating aquatic plants
C) Suspended aquatic plants
D) Attached submerged aquatic plants
E) Emergent amphibious aquatic plants.

Material And Methods

Aquatic plants are collected from rivers, their tributes, mauns, chaurs and wetlands of the district. The methodologies of Santapau (1955), Fobsbery & Schet (1965) and Jain & Rao (1977) were followed for the collected aquatic plants and herbarium of these plants were prepared. The above mentioned 21 blocks were identified as collection centres of the aquatic plants. These centres were visited in different seasons of the year at regular intervals and specimens were collected during 2015 to 2019.The plant specimens have been identified with the help of various floras viz. The Botany of Bihar and Orissa (Haine's 1961), Flora of upper Gangetic plain (Duthie 1903 - 1929) Bengal plants (Prain, 1903), Flora of Delhi (Maheshawari, 1963), Aquatic Angiosperm (Singh and Singh, 1972) and doctoral thesis of aquatic flora of Vaishali district, Bihar.

OBSERVATIONS

1. *Ranunculus sceleratus* Linn. (Family – Ranunculaceae)

Annual, perennial aquatic herb, 30-60 cm long erect, branched, pubescent leaves alternate, petalid or sessile. Sepals caducous, petals – 5, yellow gland stamens, long filament, anther basifixed, local name Jaldhania.

2. *Nymphaea nouchali* (Family – Nymphaeceae)

Aquatic herbs, large leaves 30×20 cm ovate, margin sharply toothed. Flowers axillary solitary, pale yellow, sepals 4, numerous petals, Fl. & Fr. – Nov. -. Dec.

3. *Nelmbo nucifera* (Family – Nelmbonaceae)

Attractive perennial herb, creeping rhizomes, milky juice present in leaves. Leaves glaucous, orbicular floating. Flowers solitary, long armed pedicel. sepals, petals and stamens spirally arranged. Sepals – 4, petals – many, carpel many, seeds spherical, smooth and black in colour.

4. *Cochleria ochlearioides* (Roth) (Family – Brassicaceae)

Annual aquatic herb, erect, 10-30 cm long, leaves 3-6 cm long, radical, rosette alternate. Flowers yellow or white, pedicel – 3 mm, ovary globose, seeds compressed. Local name – Cochleria.

5. *Sesibania bispinosa* (Jacq) (Family – Fabaceae)

Annual aquatic herb, branched, hooked rachi, leaves pari pinnate, leaflets 15-40 pairs, flowers short axillary raceme. Yellowish long pods, glabrous.

6. *Bergia ammannioides* Hyne ex Roth (Family – Elaticaceae)

Annual aquatic herb, branded at base, 10-30 cm long, glandular flowers – axillary clusters, minute. Leaves sub sessile, oblong obviate. Pedicels 1-4 mm long, sepals 4-5, anthers dithecous, carpels 4-6 hairy, styles 4-5, stigma 4-5. Seeds minute, brown – black. Fl. & Fr. – March to May and Nov. To Dec. Local name – Bergia ghaas.

7. *Trapa natans* Linn. Var. *Bispinosa* (Roxb.) Makino (Family – Trapaceae)

Aquatic herbs, floating, roots arising from nodes, submerged or floating leaves, flowers solitary axillary, white in colour, ovary adante to the hypanthium, sepals transformed into two spinous horns, cotyledons unequal. Fl. & Fr. – September – October and November – December.

8. *Glinus lotoides* Linn. (Family – Molluginaceae)

Annual aquatic herbs, branched, stems with long internodes. Leaves – 4-5 unequal, greenish – white. Flowers in axillary clusters of 3-8, perianth – uniseriate, tepals – distinct capsules 3-celled,equal to tepals. Seeds tubercular. Fl. & Fr. – May to August.

9. *Eclipta prostrate* Linn. (Family – Asteraceae)

Annual or perennial aquatic herbs, rooting at nodes, elliptic oblong, heads – white. Ray florets spreading sepals dark brown, 2mm long, Fl. & Fr. Throughout the year.

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10. *Bacopa monnieri* Linn. (Family – Scrophulariaceae)

Hygrophylous herbs annual or perennial. Leaves simple sessile or petaloid, ovate – oblong flowers axillary, solitary, long pedicel, stamens 4, didynamous. Capsules ovoid, glabrous, Fl. & Fr. August to December.

11. *Jussica repens* Linn. Var. Glabrescens. Kuntz. (Family – Onagraceae)

A perennial herbs, dicot floating on ponds, pools and ditches. Stem thick, rooting from lower and middle nodes, branched leaves – alternate oblong, lanceolate flowers beautiful, petals – 4-5,yellow in colour, pedicel present. Fruit cylindrical. Fl. & Fr. – November to January.

12. *Polygonum barbatum* Linn. (Family – Polygonaceae)

Annual or perennial aquatic herbs, erect, branched. Leaves simple, alternate, 6-14 cm long. Flowers small, creamy, panicles of pseudospike pedicels small tapals ovate, nut lets trigonous. Fl. & Fr. – August to January. Seed – May to June.

13. *Rumex dentatus* Linn. (Family – Polygonaceae)

Annual aquatic herbs, branched, glabrous, 10-60 cm long stem – purplish, leaves simple, linear – oblong, glabrous, flowers in whorls, pedicels 3-6 mm long, perianth biseriate, tepals – 6, nuts trigonous, brown in colour. Fl. & Fr. Time – November to March.

14. *Ceretophyllum demersum* Linn. (Family – Ceretophyllaceae)

Submerged aquatic herbs, root less, leaves whorled. Male and female flower solitary axillary, anthers large, pistil with filiform style. Stamens – 10-12, Nutlets compressed, spinous. Fl. & Fr. Time – December to March.

15. *Eichhornia crassipes* (Mart) (Family – Pontederiaceae)

Free floating herb or in mud with offset with profusely rooting and leafing at nodes. Leaves simple rosette upto 50 cm long, spathulate or paddle shaped. Flowers in dense population, petioles – spongy 20-50 cm long simple spike with conspicuous sheath near middle. Perianth 6 lobed, violet upper three lobes large with yellow spots in the centre. Stamens – 6 unequal, ovary – 3 celled with numerous ovules. Capsule oblong. Flowering and fruiting whole year. Local name – Jalkumhi

16. *Euryale ferox* (Family – Nymphaeceae)

Perennial aquatic plant, leaves large and round (more than 3 feet) with a leaf stalk attached with the centre of lower surface. Fruits have hard covering. Fl. & Fr. – may to August. Local name – Makhana.

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Results And Discussion

The present studies were mainly confined to collection of aquatic plants from different research centres of Madhubani District. In this investigation 16 species were collected from different water bodies of Madhubani District. Out of 16 aquatic plants, *Eichhornia crassipes* is very common in water bodies of the district. This aquatic plants acts as indicator of some phytotoxic substances present in the water bodies. It also controls evaporation of water bodies and diminishes heavy metal pollution of Cd, Pb, Cr & Ni in water bodies which are discharged by the industries.

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