

Biodiversity of aquatic and semi aquatic flora in Pakur district with reference to Fabaceae family

Mithilesh Kumar¹ and Prasanjit Mukherjee²

¹University Department of Botany, Sido Kanhu Murmu University, Dumka, Jharkhand, India

²Department of Botany, K.O. College, Gumla, Jharkhand, India

Received : 6th January, 2023 ; Accepted : 2nd February, 2023

ABSTRACT

The present paper deals about range of aquatic vegetation with reference to Fabaceae family in Pakur district of Jharkhand state. Aquatic plants, which have been regarded as water loving plants form footing of limnetic habitat, occupy different ecological niche in aquatic environment. The present work deals about 7 aquatic plants of Fabaceae family under 4 genera. The samples were collected and identified as per BSI guidelines and their taxonomic study was done which includes citation of botanical names, local names, families and important vegetative and floral characters along with their local and therapeutic use.

Key Words - Aquatic plants, Fabaceae, Pakur, Biodiversity.

***Corresponding author** : prasanjitmukherjee701@gmail.com

INTRODUCTION

Biodiversity or biological diversity refers to totality of genes, species and ecosystem of a region. It includes all life forms with their manifold variety that occurs on the earth. It encompasses not only ecosystems population and species but the different subunits of species, each possessing unique characteristic attributes.

There is great diversity of life in nature. Biodiversity is the variety and variability of all animals, plants and microbes found in all kinds of habitat on earth. Organisms differ from each other due to different genetic makeup. Diversity of organisms can be seen at the species level, genetic level and community or ecosystem level. All these are interrelated because living organisms interact with each other in many different ways playing variety of role both for ecosystem and human welfare. It is important not only for aesthetic and cultural values but it is the foundation of ecological balance and other ecosystem services. It makes the environment a self – sustaining and self – regulating system.

Biodiversity is the foundation of ecosystem services and it may be regarded as the sauce of life. It is crucial for the functioning of ecosystems like oxygen, food, fresh water, fertile soil, medicines, shelter, protection from storms and floods, stable climate and recreation.

Aquatic plants can be regarded as hydrophytes occupying different ecological niche in aquatic environment. They grow and complete their major part of life in water. Various water bodies like ponds, pools, ditches, streams, lakes and rivers are dominated with varieties of water loving plant species constituting the primary producers of aquatic ecosystem. Aquatic flora is important to other kinds of biotic components in aquatic habitat by converting solar energy into chemical energy by the process of photosynthesis. Water bodies can have living status as they support various life forms ranging from microscopic phytoplankton to higher angiospermic vascular plants.

According to Cook (1996), "Aquatic plants are the plants whose photosynthetically active parts remain permanently, or at least, for several months in a year partly or wholly, remain submerged in water or which float on the surface of water".

The present paper deals about range of aquatic plants under Fabaceae family found in limnetic habitat in Pakur. The Fabaceae family is a large family of the plant kingdom, including several economically important plants. The family Fabaceae is also known as Leguminosae or Papilionaceae, since it belongs to the pea or legume family. There are around 20,000 species of dicotyledonous Fabaceae plants widely distributed all over the world.

The members of this family have racemose type of inflorescence; complete, bisexual, zygomorphic and hypogynous flowers having five petals and sepals, diadelphous & dithecous androecium, legume fruit having one or more non – endospermic seeds.

MATERIALS & METHODS

Pakur district is situated in the north east corner of Jharkhand State. It is located at 23°40' to 25° 18' latitude and 86° 25' to 87° 57' E. longitude, being part of Chhotanagpur plateau. It is situated on the north-eastern corner of Jharkhand state, being dominated by tribal communities and aquatic habitats with fabulous treasure of aquatic vegetation. The present work includes regular visit of the sampling sites for collection and identification of plants. The samples were collected and identified as per BSI guidelines and their taxonomic study was done. Taxonomic study includes citation of botanical names, local names, families and important vegetative and floral characters along with their local and therapeutic use.

RESULT & DISCUSSION

The present work includes study of seven aquatic plants under Fabaceae family which have been discussed as follows with suitable identification key.

Key to the Genera

1. Pods often one or many indehiscent; one seeded segments.

Leaves ex-stipulate, pinnate...

Aeschynomene

Leaves stipulate...

Alysicarpus

2. Pods mostly more than one seeded; non segmented; always indehiscent.

Racemes not slender, pods spiral or sickle shaped.....

Medicago

Racemes slender, pods sub-globose....

Melilotus

Aeschynomene Linn.

Key to the species

1. Stem spongy; calyx hispid; joints of pods echinate.

Aeschynomene aspera

2. Stems not spongy; calyx glabrous; joints of pod smooth.

A. indica

1. *Aeschynomene aspera* Linn., Sp. Pl. 713. 1753; Fl. Brit. Ind. 2: 152. BBO. Rep ed. 266. 1961 Naskar, Aq. & Sem. Aq. Pl. of Ganga.113. 1990; Cook, Aq. & Wet. Pl. of Ind. 207. 1996; Singh, et. al. Fl. Of Bihar 120. 2001; Mukherjee, Fl. St. on Aq. & Semi Aq. Angio. Jhar. 2020.

An aquatic erect, branched herbs or under shrubs, 23-90 cm in height. Stems spongy. Leaves sensitive, imparipinnate; leaflets 16-35 pairs, tapering towards tips, linear-oblong, 1-1.6 cm long; stipules setaceous. spongy pith in stems, white. Flowers 2-4, in axillary corymbose raceme. Calyx bilipped. Corolla yellow, hairy, Pods joints 6-9, muricate.

Local name: Shola

Flowering & Fruiting: September – January

Field notes: Oftenly grow in shallow water, pond, ditches and river banks.

2. *Aeschynomene indica* Linn., Sp. Pl. 713. 1753; Baker in Fl. Brit. Ind. 2: 151. 1876; BBO. rep. ed., 265. 1961; Sald. & Singh in Fl. Kar. 1: 416. 1984; Ellis, Fl. Nalla 1: 129. 1987; 1996; Pulla & Chenna., in Fl. A.P. 1: 237. 1997. Naskar, Aq. & Sem. Aq. Pl. of Ganga.113. 1990; Cook, Aq. & Wet. Pl. of Ind. 208. 1996; Singh, et. al. Fl. Of Bihar 120. 2001;

Mukherjee, Fl. St. on Aq. & Semi Aq. Angio. Jhar. 2020.

An aquatic, erect 35-90 cm long, herbs or under shrubs. Leaves sensitive, compound; leaflets 10-23 pairs, nearly equal; stipules not setaceous. Flowers axillary, 1 - few. Calyx small. Corolla yellowish pink. Pods slightly curved, joints 4-8, to 3.5 x 0.5 cm long.

Local name: Kat shola

Flowering & Fruiting: August – November

Field notes: Mostly found in marshy places.

***Alysicarpus* Desv. nom. cons.**

Key to the Species:

1. Corolla pink; joints of pod not ribbed

A. buplerifolius

2. Corolla purplish red; joints of pod transversely ribbed

A. rugosus

3. *Alysicarpus buplerifolium* (Linn.) DC., Prodr. 2: 352. 1825. Baker in Fl. Brit. Ind. 2: 158. 1876; BBO. rep. ed., 269. 1961; Sald. & Singh in Fl. Kar. 1: 417. 1984; Sax. & Brahm., Fl. Or. 1: 449. 1994; Pulla & Chenna., in Fl. A.P. 1: 238. 1997. Naskar, Aq. & Sem. Aq. Pl. of Ganga.114. 1990; 1996; Singh, et. al. Fl. Of Bihar 120. 2001; Mukherjee, Fl. St. on Aq. & Semi Aq. Angio. Jhar. 2020.

Hedysarum buplerifolium Linn., DC., Prodr. 2: 352. 1825 Baker in Fl. Brit. Ind. 2: 158. 1876; BBO. rep. ed., 269. 1961; Sald. & Singh in Fl. Kar. 1: 417. 1984; Sax. & Brahm., Fl. Or. 1: 449. 1994; Pulla & Chenna., in Fl. A.P. 1: 238. 1997.

Hedysarum buplerifolium Linn., Sp. Pl. 745. 1753.

An ascending or diffuse, annual herbs. Leaves unifoliate; leaflets 3-7 cm long, linear-lanceolate or elliptic-orbicular, shortly petiolate. Flowers in axillary raceme, pink. Pods 4-6 jointed, moniliform, covered with minute, hooked hairs.

Local name: Sauri

Flowering & Fruiting: August – November

Field notes: Mostly grow in wet lands.

4. *Alysicarpus rugosus* (Willd.) DC., Prodr. 2: 353. 1825; Baker in Fl. Brit. Ind. 2: 159. 1876; BBO. rep. ed., 270. 1961; Verde. In Kew Bull. 24: 67. 1970;

Sald. & Singh in Fl. Kar. 1: 420. 1984; Pulla. & Chenna, in Fl. A.P. 1: 248. 242. 1997; Mukherjee, Fl. St. on Aq. & Semi Aq. Angio. Jhar. 2020.

Hedysarum rugosum Willd., Sp. Pl. 3: 1172. 1803.

H. violaceum Forssk., Fl. Aeg.-Arab. 136. 1775, non lin., 1753.

var. *heyneanus* Baker in Hook. f. Fl. Brit. Ind. 2: 159. 1876; BBO. rep. ed., 270. 1961.

Alysicarpus heyneanus Wt. & Arn., Prodr. 1: 234. 1834.

A. glumaceus (Vahl) DC. var. *heyneanus* (Baker) Raizada, Suppl. FUGP. 47. 1976.

Vigorous, under shrubs, 90-110 cm high, with pubescent stems and leaves. Lower leaves oblong-obovate, up to 6 cm long Racemes. Pods moniliform, 2-5 jointed, transversely ribbed.

Flowering & Fruiting: August – November

Field notes: Mostly found in moist cultivated lands.

***Medicago* Linn. nom. cons.**

5. *Medicago lupulina* Linn., Sp. Pl. 779. 1753; BBO. rep. ed., 246. 1961; Pant, Fl. Corb. Nat. Pack. 61. 1986; Sharma & Dhakre, Fl. Agra, 99. 1998; Singh, et. al. Fl. Of Bihar 148. 2001; Mukherjee, Fl. St. on Aq. & Semi Aq. Angio. Jhar. 2020.

Procumbent or Diffuse herbs, 10-65 cm long. Leaves pinnately trifoliate; leaflets obovate, denticulate. Flowers yellow 1.5 to 3 mm long. Stamens (9) + 1. Pods 2-2.5 mm long, black when ripe. Seeds brown.

Local name: Black medic

Flowering & Fruiting: December – March

Field notes: In moist places and waste lands.

***Melilotus* Mill.**

Key to the Species:

1. Flowers white.

Melilotus albus

2. Flowers yellow.

M. indicus

6. *Melilotus albus* Medik., Encycl. 4: 63. 1796; Baker in Fl. Brit. Ind. 2: 89. 1876; BBO. rep. ed., 246. 1961; Sald. & Singh in Fl. Kar. 1: 476. 1984; Sax. & Brahm., Fl. Or. 1: 555. 1994; Pulla. & Chenna., in Fl. A.P. 1. 299. 1997. Naskar, Aq. & Sem. Aq. Pl. of Ganga.117. 1990; 1996; Singh, et. al. Fl. Of Bihar

149. 2001; Mukherjee, Fl. St. on Aq. & Semi Aq. Angio. Jhar. 2020.

Erect, annual herbs, upto 48 cm long. Leaves 3-foliolate; leaflets obovate or oblanceolate, retuse or emarginated, serrate. Flowers in simple raceme, white, Pods ovoid, indehiscent, brown when ripe. Seeds 1-2.

Local name: Safed Banmethi

Flowering & Fruiting: December – April

Field notes: Oftenly grow in cultivated field and soggy places.

7. *Melilotus indicus* (Linn.) All., Fl. Pedem. 1: 308. 1875 BBO. rep. ed., 245-1961; Ruld. in Rev. Handb. Fl. Ceylon 1: 246. 1980; Sald. & Singh in Fl. Kar. 1: 477. 1984; Sax. & Brahm., Fl. Or. 1: 980.1994; Pulla. & Chenna., Fl. A.P. 1: 299.1997. Naskar, Aq. & Sem. Aq. Pl. of Ganga.117. 1990; Singh, et. al. Fl. Of Bihar 149. 2001; Mukherjee, Fl. St. on Aq. & Semi Aq. Angio. Jhar. 2020.

Trifolium indicum Linn., Sp. Pl. 765. 1753.

Melilotus parviflora Desf., Fl. Atlant. 2: 192. 1798; Baker in Fl. Brit. Ind. 2: 89. 1876.

An annual, erect herbs upto 45 cm long. Leaves 3-foliolate, leaflets obovate or oblanceolate, retuse or marginate, toothed, Flowers in simple raceme, yellow. Pods ellipsoid, compressed, olive green when ripe. Seeds 1-2, brown, oblong-ellipsoid, compressed.

Local name: Metha

Flowering & Fruiting: December – January

Field notes: Found in cultivated fields and near soggy places.

CONCLUSION

On the basis of above discussion, it may be concluded that Aquatic plants constitute important footings of aquatic ecosystem which play important role to maintain biodiversity. Aquatic plants in general and the members of Fabaceae family in particular are economically important too, both in the field of ethnobotany, food and fodder and many more.

REFERENCES

- Balkhi, M.H., Yosuf, A.R. & Qadri, M.Y. 1987. Hydrobiology of Anchar lake, Kashmir. *Comp.Physio. Ecol.* 12(3): 131 - 139.
- Bentham, G. & Hooker, J.D., 1862-1863. *Genera Plantarum*, 3 Vols. L. Reeve & Co. London.
- Bishwas, D.K. & Maheshwari, J.K., 1980. A contribution to the vegetation of Chaibasa, Singhbhum district in South Bihar. *Bull. Bot. Soc. Bengal.* 25(1&2): 43-51.
- Bishwas, K.P. & Calder, C.C.,1965. Handbook of common water and marsh plants of India and Burma. Health Bull. No. 24 Malasia. Bureau No. 11, Govt. Press, New Delhi. (First Print 1937).
- Chambers, P.A., Lacoul, P., Murphy, K.J. & Thomaz, S.M. 2008. Global diversity of aquatic macrophytes in fresh water *Hydrobiologia.* 595: 9-26.
- Christopher, C., 2006. Study on the diversity of the aquatic vascular plants in Karikkakom, Thiruanantpuram” *Ecol. Env. & Cons.* 12(4): 661-663.
- Cook, C.D.K., 1996. Aquatic & Wetland Plants of India, Oxford University Press.
- Das A. and Mukherjee P. 2011 Floristic studies of ponds of Berhampur subdivision of Murshidabad District, Paschim Bengal; Recent Studies in Biodiversity and Traditional Knowledge in India. pp. 181-185.
- Haines, H.H., The Botany of Bihar & Orissa. London (Reprint edition by Overseas Book Distributors Dehradun), 1921 – 1925, Rev. ed. 1961 & 1978.
- Jha H. K., Singh B. S., Singh A. K. 2015. Biodiversity of aquatic flora in Raja bandh pond of Jamtara district of Jharkhand (India). *Biospectra.* 10 (1):85-90.
- Jha, H. K. 2018. Study of aquatic weeds and their control in and around Jamtara district of Jharkhand state”, Ph.D. thesis, JRU, Ranchi.
- Jha, U. N. 1965. Hydrophytes of Ranchi, *Trop. Ecol.* 6: 96 – 105.

- Mishra, M.K., Panda, A. & Sahu, D. 2012. Survey of wetland plants of South Odhisa, India, *Ind. J. trad. Knowld.* 11 (4): 658 – 666.
- Mukherjee P. 2001. The Floristic and Ecological Studies of Aquatic and Semi aquatic Angiosperm of Loardaga. Ph.D. Thesis, Ranchi University, Ranchi.
- Mukherjee P. 2009. Aquatic Biodiversity of Victoria Lake of Lohardaga (Jharkhand), India. *Biospectra.*4 (2): 417-420.
- Mukherjee P. 2011. Studies on Weed Diversity in Pakur District of Jharkhand; Recent Studies in Biodiversity and Traditional Knowledge in India. pp. 131-143.
- Mukherjee P. 2019. The Floristic Studies of Major Water Bodies of Jharkhand with Special Reference to Their Economic Importance. D.Sc. Thesis Ranchi University, Ranchi.
- Mukherjee P. and Dutta P. 2018. Alien Invasive Flora of Santhal Pargana, Jharkhand (India). National Publishers and Distributors, 36, Saket Nagar, B.H.U., Varanasi (UP).
- Mukherjee P. and Kumar J. 2017. Survey of alien invasive aquatic and semi aquatic plant species of Santhal Pargana, Jharkhand. *The Biobrio.* 4 (1 and 2): 221-224.
- Mukherjee P. and Kumar J. 2019. Studies on the Aquatic and Semi aquatic Angiosperms of Kanke Dam, Rancni, Jharkhand, *Phytotaxonomy.* 18:221-224.
- Mukherjee P. and Kumar P. 2002. Studies on the angiospermic flora of ponds of Ranchi (Jharkhand); Biodiversity: *Taxonomy and Conservation.* pp 65-67.
- Mukherjee P. and Verma S. K. 2010. The Floristic studies of Aquatic and Semi-aquatic Angiospermic Biodiversity of Ranchi, Jharkhand; *Biodiversity: Threats to Conservation.* pp. 294-318.
- Mukherjee P., Chakraborty A. and Jha R. K. 2010. An ecological study of the BC college pond at Asansol (West Bengal). *Biospectra.*5 (1): 61- 64.
- Naskar, K.R. 1990. Aquatic and semi-aquatic plants of lower ganga delta, Daya Publishing House Delhi.
- Shankar & Mishra, 2012. Study of aquatic medicinal plants of Hazaribagh district of Jharkhand India, *IRJP*, 3(4), 405 – 409.
- Sinha, A.K. & Verma, S.K. 1988. Aquatic and wetland angiosperms of Kosi division, *Eco. & Taxo. Botany.* 1: 153 – 162.
- Subramanyam, K., 1962. A systematic account of common Indian aquatic angiosperms.
- Verma, S.K., Pandey, P., Mukherjee, P. & Paul, D.K. 2007. Ethnomedicinal use of some aquatic plants in Jharkhand, *J. Haematol. & Ecotoxicol.* 2(1): 34 – 37.