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DIVERSITY AND PERSPECTIVE OF MEDICINAL MACROPHYTES IN THE WETLANDS OF NORTH BIHAR, INDIA

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ABSTRACT

The wetlands of North Bihar (India) harbour 31 species of common medicinal macrophytes belonging to 27 genera and 19 families of angiosperms. Out of these, less than 70 percent macrophytes are used by the native folk in the treatment of various ailments. Some macrophytes such as brahmi (*Centella asiatica*), talmakhana (*Hygrophila auriculata*), kamal *(Nelumbo nucifera*), bhent *(Nymphaea nouchali)* and sorkha (*Nymphaea* sp.- a probable hybrid) are frequently used into medication in the region. Beliefs/myths appear to hinder the incorporation of common and medicinally potent macrophytes in the primary health care system of local people. The avoidance of beliefs/myths, mass awareness of benefits and tackling of other negative facets of macrophytes can promote exploitation of such valuable medicinal resource in the flood prone areas of North Bihar (India).

Figure : 00 References : 23 Table : 01
KEY WORDS : Beliefs, Diversity, Medicinal Macropytes, Myths, Perspective, Wetlands.

Introduction

North Bihar abounds in varied wetlands as *chaurs* (swamps), ditches, lakes, ponds, pools, marshes, *etc.*[6,13,15]. These wetlands support the luxuriant growth of diverse macrophytes which form a valuable natural resource of the flood plains of the region. Out of these, several macrophytes are utilized as food, fodder, medicine, *etc.* by the native folk [9, 10, 16, 17, 20]. However, there is no comprehensive account of medicinal aspects of macrophytes of this flood prone region. Therefore, the present investigation has been envisaged to explore the diversity and perspective of medicinal macrophytes growing in the wetlands of North Bihar (India).

Study Area

North Bihar, situated at 25^0 13' 46" - 27^0 31' 15" NL and $83^0$50'00" - $88^0$17'40" EL, covers a large geographical area (56,960 km^2) with its 14.45 percent land under waterlogging. It suffers from recurrent waterlogging on both perennial and temporary scales due to its bowl-shaped physiography, location near the Himalayan foothills and moderate annual rainfall. The overall consequence witnesses as the regular occurrence of innumerable natural wetlands mainly in the form of *chaurs*/swamps (land depressions), lakes, marshes, *etc.* scattered throughout its surface. The lakes are perennial whereas the *chaurs* and marshes are seasonal in nature. The *chaurs* hold shallow water for about eight months of a year and usually get dried up during summer but the marshes contain water saturated sediments with no or little standing water along the vegetation[14, 15, 19].

Materials and Methods

The human inhabitations surrounding two lakes (Kawar lake, Begusarai and Gaurdah - Kusmi lake, Saharsa), three *chaurs* (Kachna Dumri *chaur*, Khagaria; Dabkal *chaur*, Samastipur and Kusheshwarasthan *chaur*, Darbhanga) and two marshes (Mlikichack marsh, Darbhanga and Thathopur marsh, Darbhanga) were selected for ethnomedicinal studies of macrophytes growing naturally in the region. Furthermore, other smaller wetlands like ditches, ponds, pools, marshes, *chaurs*, etc. adjoining the main seven larger ones, were also explored intensively from ethnomedicinal point of view for augmentation and cross verification of data. All these sites were visited frequently in every season for over a period of ten years to procure information about macrophytes used by the rural people in the treatment of various ailments. The ethnomedicinal information on macrophytes were gathered through conversations, interviews and discussions with local herbal practitioners (famous as *Vaidyas/Hakims*) and elderly knowledgeable persons

TABLE -1 : Medicinal macrophytes in the wetlands of North Bihar, India

S. No.	Botanical name / Family	Local name	Habit/ Habitat	Parts with medicinal properties or uses
1.	*Acorus calamus* / Araceae	Achhaini/ Bach	WE/ Marshes and margins of lakes	Rhizome is used in skin and speech related problems.
2.	*Alternanthera sessilis* / Amaranthaceae	Sarhanchi	WE/ Marshes	Plant is used in diarrhoea and dysentery.
3.	*Ammania baccifera* / Lythraceae	Dadmari	WE/ Marshes	Leaf is apphrodisiac, appetizer, laxative and stomachic 1, 7, 12, 18 .
4.	*Bacopa monnieri* / Scrophulariaceae	Brahmi	WE/ Marshy and swampy places	Plant is antioxidant, aperient, aphrodisiac, astringent, cooling, diuretic, laxative and tonic1, 5, 12, 18 .
5.	*Centella asiatica* Urb./ Apiaceae	Brahmi	WE/ Marshes and margins of lakes	Leaf powder is mixed in milk and consumed to cure madness.
6.	*Ceratophyllum demersum* / Ceratophyllaceae	Kacher	US/ Chaurs, ditches, lakes and ponds	Plant is antiperiodic, antipyretic, astringent, cooling and laxative12, 18 .
7.	*Colocasia esculenta* Schott./ Araceae	Arvi	WE/ Marshes	Juice of petioles is astringent and styptic12,18 whereas corms are rubefacient and laxative18.
8.	*Cynodon dactylon* Pers./ Poaceae	Doobhi	WE/ Marshes and banks of water bodies	Juice of fresh shoot is taken in indigestion.
9.	*Cyperus iria*/ Cyperaceae	Motha	WE/ Marshes and banks of water bodies	Plant is astringent, stimulant, stomachic and tonic12 .
10.	*Cyperus rotundus* / Cyperaceae	Chichorh/ Mothi	WE/ Marshes and banks of water bodies	Tuber is eaten in flatulence.
11.	*Eclipta prostrata* / Asteraceae	Bhangraiya	WE/ Marshes and margins of water bodies	Plant juice is taken in jaundice. Leaf paste is used as hair tonic.
12.	*Eichhornia crassipes*/ Pontederiaceae	Jalkumbhi/ Kechuli	FF/ Waterlogged areas	Petiole paste is applied on cuts to check bleeding.
13.	*Euryale ferox* / Nymphaeaceae	Makhana	RF/ Chaurs, ditches, lakes and ponds	Perisperm is consumed as tonic and astringent.
14.	*Hydrilla verticillata* / Hydrocharitaceae	Samar	AS/ Water bodies	Plant paste is applied on the body portions infected by skin diseases.

S. No.	Botanical name / Family	Local name	Habit/ Habitat	Parts with medicinal properties or uses
15.	*Hydrolea zeylanica* Vahl/ Hydrophyllaceae	Koliarya	WE/ Marshes	Plant paste is applied on skin portions infected by diseases.
16.	*Hygrophila auriculata*/ Acanthaceae	Gokhura/ Talmakhana	WE/ Shores of ditches and lakes	Root decoction is used in the treatment of jaundice. Leaves are used as greens to increase the level of haemoglobin in blood.
17.	*Hygroryza aristata* / Peaceae	Jangalidal	FF/ Water bodies	Roots and seeds are astringent, cooling, diuretic, emollient, constipatic and tonic1, 12, 18 .
18.	*Ipomoea aquatica* / Convolvulaceae	Karmi	RF or WE/ Lakes, marshes and ponds	Young leaves are cooked and eaten in gastric and intestinal disorders.
19.	*Ludwigia adscendens* Hara/ Onagraceae	Kessara	FF/ Water bodies	Roots are used in fever and stomach disorders.
20.	*Monochoria hastata* / Pontederiaceae	Tikonia	WE/ Marshes and margins of ditches	Plant is cooling and tonic1, 12.
21.	*Nelumbo nucifera*/ Nymphaeaceae	Kamal	RF/ Lakes and ponds	Rhizome powder is taken to cure piles.
22.	*Nymphaea nouchali*/ Nymphaeaceae	Bhent/ Koka/ Kumudini	RF/ Ditches, lakes and ponds	Rhizome powder is taken in indigestion, dysentery, piles etc. Rhizome/ flower is mixed with seeds of black pepper (Piper nigrum L.), pasted and consumed in menstrual disorder; flower is more effective than rhizome in therapeutic action.
23.	*Nymphaea* sp.*/ Nymphaeaceae	Sorkha	RF/ Ditches, lakes and ponds	Rhizome paste is applied as ointment on infected portion and taken along with seed paste of black pepper (*P. nigrum* L.) as antibiotic in carbuncle.
24.	*Pistia stratiotes*/ Araceae	Chhota jalkumbhi	FF/ Chaurs, ditches and lakes	Leaf juice is taken in dysentery.
25.	*Polygonum barbatum*/ Polygonaceae	Mirmiri	WE/ Marshes	Root is astringent and cooling1,12.
26.	*Polygonum glabrum* Willd./ Polygonaceae	Tota	WE/ Marshes and margins of Kawar lake	Plant is antiviral and hypotensive11. Root paste is applied on scabies.
27.	*Polygonum hydropiper* / Polygonaceae	Panimirich	WE/ Marshes	Leaves are diuretic, stimulant, styptic and lithontriptic1,12.
28.	*Ranunculus sceleratus*/ Ranunculaceae	Jaldhania	WE/ Margins of ditches and lakes	Leaf paste is applied on the body portions infected by skin diseases.

S. No.	Botanical name / Family	Local name	Habit/ Habitat	Parts with medicinal properties or uses
29.	*Schoenoplectus articulatus* / Cyperaceae	Khobhi	WE/ Marshes and banks of chaurs/ lakes	Pops of seeds are given to the pox patients to speak properly.
30.	*Trapa bispinosa* ./ Trapaceae	Singhara	RF/ Waterlogged areas	Cotyledons are consumed to stimulate the desire to eat.
31.	*Vallisneria spiralis*/ Hydrocharitaceae	Leerh	AS/ Water bodies	Plant is stomachic1,12.

Abbreviations: FF = Free Floating, RF = Rooted Floating, US = Unanchored Submerged, AS = Anchored Submerged, WE = Wetland Emergent.

*A probable hybrid reproducing vegetatively and not flowering at all.

following a well designed questionnaire. Repeated enquiries were made to authenticate the information. Aiming at thorough assessment of medicinal macrophytes of the region, the preventive and curative properties of commonly occurring species of macrophytes which are still unexploited locally for relief from diseases, were obtained by scanning the available literature[1,5,7,11,12,18]. Regardless of their properties and uses, all medicinal macrophytes were collected from their respective wetlands of occurrence and identified properly with the help of standard literature [2,4,8,22,23]. The identified medicinal macrophytes were arranged in alphabetic order with respect to their botanical name followed by family, vernacular name, habit /habitat and plant parts with their medicinal properties or uses.

Results and Discussion

A sum total of 31 species of common medicinal macrophytes belonging to 27 gerera and 19 angiosrperm families have been documented (Table - 1). Out of these, merely 21 species of macrophytes are used in the folklore medicines of diseases prevalent in the inhabitations around different types of wetlands of the area. Some macrophytes such as brahmi (*Centella asiatica*), talmakhana (*Hygrophila auriculata*), kamal (*Nelumbo nucifera*), bhent (*Nymphaea nouchali*) and sorkha (*Nymphaea* sp. - a probable hybrid) are frequently used into medication in the region.

By and large, the exploitation of macrophyts for medicinal purposes is not encouraging in the region. The non-utilization of common and medicinally potent macrophytes in the primary health care system shows apathy just for curse of recurrent flooding. The weltands in general and the macrophytes with hitherto unknown local uses in particular are taken as sorrow of the region. Till today the herbalists also consider the aquatic macrophyets as obnoxious things and adhere themselves to the beliefs in their recommendations of medicaments against the ailments. The herb brahmi (*Bacopa monnieri*) which has the reputation to enhance memory for centuries can be taken to exemplify the fiction. Day by day, it is becoming more popular for its multifarious curative properties and uses at least in the regions of occurrence in India[1,3,5,11,12,18,21]. Even though, this highly valuable medicinal resource is yet to contribute in the medication of people of flood plain areas of North Bihar. Its medicinal application in such areas needs avoidance of beliefs/ myths, mass awareness of benefits and tackling of other negative facets of macrophytes. The adoption of these measures may prove helpful in rendering brahmi (*B. monnieri*) and other potential medicinal macrophytes as herbal drugs of future in the flood plains of North Bihar (India).

References

1. ANONYMOUS (1950-2010) *The Wealth of India, Raw materials*. CSIR, New Delhi.

2. BISWAS, K. AND CALDER, C.C. (1984) *Hand-book of common water and marsh plants of India and Burma.* Bishen Singh Mahendra Pal Singh Dehra Dun, pp.216.

3. CHOPRA, R.N., NAYAR, S.L. AND CHOPRA, I.C. (1956) *Glossary of Indian medicinal plants.* CISR, New Delhi, pp. 330.

4. COOK, C. D. K. (1996) *Aquatic and wetland plants of India*. Oxford University Press, New York, pp.385.

5. DASTUR, J.F. (1962) *Medicinal plants of India and Pakistan.* D.B. Taraporevala Sons & Co. Pvt. Ltd., Bombay, pp.212.

6. DEHADRAI, P.V. (1994) Swamps of North Bihar. *Bull. Nat. Inst. Ecol.* **7**:17-21.

7. DEY, K.L. (1973) *The indigenous drugs of India.* Pama Primlane, The Chronica Botanica, New Delhi, pp.387.

8. GUPTA, O.P. (2001) *Weedy aquatic plants: Their utility, menace and management*. *Agrobios* (India), Jodhpur, pp.274.

9. JHA, V., VERMA, A.B., KUMAR, R. AND JHA, M. (2014) Ethnic and economic aspects of some emergent aquaphytes in Mithila region of North Bihar. *Ethnobotany* **26**:10-15.

10. JHA, V., THAKUR, Y. P. and VERMA, A. M. (1998) Human welfare in relation to diversity of edible aquaphytes in North Bihar. In*: Phytodiversification and Human Welfare* (Eds, ROY, A.K., DOGRA, J.V.V. and VARMA, S.K.). M.D. Publications, New Delhi, 159-174.

11. JAIN, S.K., SINGH, B.K. AND GUPTA, R.C. (1991) *Notable plants in ethnomedicine of India.* Deep Publications, New Delhi, pp.219.

12. KRITIKAR, K.R. AND BASU, D.D. (1975) *Indian medicinal plants*. Vol. I-IV. Bishen Singh Mahendra Pal Singh, Dehra Dun, pp. 2793.

13. MUNSHI, J.D. (1988) Ecology of gangetic plain of Bihar. *Int. J. Ecol. Environ. Sci.* **14**:87-101.

14. MUNSHI, J.D. AND MUNSHI, J.S. D. (1995) *Fundamentals of Freshwater Biology*. Narendra Publishing House, New Delhi, pp.222.

15. MUNSHI, J.S.D. AND MUSHI, J.D. (1985) Nature of freshwater resources of Bihar. In: *Recent Advances in Zoology* (Eds, SRIVASTAVA, C.B.L. AND GOEL, S.C.). Rastogi and Company, Meerut, 127-139.

16. NANDAN, K.B. AND SINGH, C.B. (2004) Useful macrophytes in Kawar lake, North Bihar, India. *Ind. J. For*. **27**: 241-244.

17. NANDAN, K.B. AND SINGH, C.B. (2008) Utilization of macrophytes in North Bihar, India. *J. Econ. Taxon. Bot*. **32** (Suppl): 296-304.

18. PULLAIAH, T. (2002) *Medicinal plants in India*. Vol. I-II. Regency Publications, New Delhi, pp.580.

19. RAI, D.N. AND MUNSHI, J.S.D. (1982) Ecological characteristics of *chaurs* of North Bihar. In: *Wetland Ecology and Management* (Eds, GOPAL, B., TURNER, R.E., WETZEL, R.G., AND WHIGHAM, D.F.). International Scientific Publications, Jaipur, 89-95.

20. SINGH, C.B. (2001) Diversity and perspective of macrophytes in the wetlands of North Bihar, India. *Ind. J. For*. **34**:299-238.

21. SINGH, H.K. AND DHAWAN, B.N. (1997) Neuropsychopharmacological effects of the Ayurvedic nootropic *Bacopa monnieri* Linn. *Ind. J. Pharmacol*. **28**:359-365.

22. SUBRAMANYAM, K. (1962) *Aquatic angiosperms*. CSIR, New Delhi, pp.190.

23. TEWARI, A. AND KUDESIA, R. (2016) Ethnomedicinal study of some naturalized herbs and shrubs growing in Agra district of India. *Flora and Fauna* **22**(2) : 163-167.