

Aquatic/semi-aquatic plants used in herbal remedies in the wetlands of Manipur, Northeastern India

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This paper reports on aquatic/semi-aquatic plants from the wetlands of Manipur valley in Northeastern India, which are used to cure various diseases. Empirically formulated and accepted prescriptions by the various ethnic communities of Manipur for curing 45 ailments by using 43 aquatic/semi-aquatic plant species are presented along with method of preparation, prescribed doses and administration, which were recorded from the local healers and responses obtained by the patients. Out of the 43 aquatic/semi-aquatic medicinal plants recorded, 20 plants are regularly used as vegetables in Manipur and among them 13 are sold in the market. Some of the healers sell their formulated herbal products in the market.

Keywords: Aquatic/semi-aquatic medicinal herbs, Edible, Wetlands, Manipur

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Manipur mainly comprises of hilly terrain (92%), surrounding a centrally located saucer shaped valley (1856 km²). There are 9 administrative districts in the state in which 4, namely, Imphal West, Imphal East, Thoubal and Bishnupur forms the centrally located Imphal valley. The water bodies and wetlands of Manipur are lakes/marshes/swamps/canals (24,804 ha), rivers/streams (13,888 ha) and low-lying wetlands (9,219 ha) covering a total area of 47,911 ha. There are 13 major lakes (wetlands) in Manipur in which Loktak lake (42,672 ha) is the biggest and is one of the Ramsar sites of global significance (Fig. 1). The wetlands in Manipur are drying up rapidly mainly due to land use/cover change. Marginal paddy cultivation in most of the wetlands of Manipur is largely responsible for depletion and shrinkage of wetlands and the loss of aquatic biodiversity they support. Therefore, it is important to document the economic plant wealth of the wetlands.

The study of ethnobotany in Manipur is limited to certain aspects¹⁻⁸. Ethnobotanical reports especially of aquatic/semi-aquatic medicinal plants in Manipur are scanty. More than 30 ethnic communities with a total population of about 23 lakhs, mainly depending upon

their cumulative knowledge and surrounding resources for their day-to-day healthcare, inhabit different parts of the state. Due to various reasons, the knowledge on the plant-lore, its importance and practice are limited mainly to the older generations. The present communication deals with the documentation of aquatic/semi-aquatic medicinal herbs occurring in the wetlands of Manipur.

There are limited healthcare centres and doctors in the state of Manipur. Population served per medical centre is 4213; 954 persons per hospital bed and 2517 persons per doctor (Fig. 2). Most of the medical institutions and healthcare centres in Manipur are concentrated in Imphal (state capital) and the medical facilities in the remote areas are very limited. On the other hand, local healers (locally called as *Maiba* for male and *Maibi* for female) have considerable role and reputation in village healthcare. They volunteer their service with a nominal charge. Over 90% of villagers consult these traditional healers before attending healthcare centres. Most of the families in Manipur traditionally maintained a few medicinal herbs in their home garden, ponds, etc. Some of the local healers sell their products in the local market (Fig. 9).

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Table 1—Various species of aquatic/semi-aquatic plants from the wetlands of Manipur used in herbal remedies

Plant name (Family)	Local name	Medicinal uses	Availability
<i>Acorus calamus</i> L. (Araceae)	O-hidak	Rhizome extract is given in cough, stomach ulcer, fever and biliousness. The essential oil extracted from the rhizome is applied to cure bleeding piles. Dried rhizome pieces are worn along with neck chain to cure whooping cough of children. Tender leaf is used as a gradient in the preparation of traditional hair lotion locally called <i>Cheng-hee</i> .	Not so common
<i>Ageratum conyzoides</i> L. (Asteraceae)	Khongjai-napi	Leaf paste is applied in fresh cut and injuries. Fresh leaf and shoot are used in the preparation of traditional hair lotion.	Very common
<i>Alternanthera philoxeroides</i> Griseb (Amaranthaceae)	Kabo-napi	Shoot extract along with little common salt is given to cure dysentery.	Very common
<i>Ammorium aromaticum</i> Roxb. (Zingiberaceae)	Namra	Seed powder is taken to normalize excessive blood pressure.	Very common
<i>Arundo donax</i> L. (Poaceae)	Yengthou	Fresh tender shoot paste mixed with a spoon of honey paste is given to children to cure intestinal worms, typhoid and pneumonia. Tender shoot paste is also applied in wounds for early suppuration.	Very common
<i>Cardamine hirsuta</i> L. (Brassicaceae)	Chantruk-man	Plant is cooked eaten to cure strangury and other urinary complications; also controls the blood pressure level.	Very common
<i>Centella asiatica</i> (L.) Urban. (Apiaceae)	Peruk	Plant juice mixed with sugarcane molasses is taken twice a day for 10-15 days against urinary calculus. The plant boiled with <i>Oxalis corniculata</i> L. and <i>Ocimum sanctum</i> L. leaf in water is taken against dysentery.	Very common
<i>Colocasia cuculata</i> (L.) Schott. (Araceae)	Singjupan	Petiole juice is applied in fresh cut and injuries.	Not so common
<i>C. esculenta</i> (L.) Schott. (Araceae)	Lampan	Petiole juice is applied in fresh cut and injury. Leaf lamina boiled with cattle milk and the liquid is consumed to enhance pregnancy.	Very common
<i>Commelina benghalensis</i> L. (Commelinaceae)	Wangdeng-khoibi	Leaf paste is applied in boils and burns. Plant extract along with little honey is effective in cough; hot fermented plant wrapped in banana leaf is snuff against tonsillitis and applied the lot in muscular sprain as poultice.	Very common
<i>Cynodon dactylon</i> Pers. (Poaceae)	Tingthou	About 20 gm of stolon decocted and soaked in half a litre of drinking water for 2-3 hours, a spoon of honey and is taken in empty stomach twice a day for a week to cure strangury. Hot fomented stolon is chewed in dysmenorrhoea, 10 gm thrice a day for 2-3 days.	Very common
<i>Cyperus haspan</i> L. (Cyperaceae)	Kouthum	Rhizome paste along with honey is given in fever and bronchitis.	Not so common
<i>Drymaria cordata</i> Willd. (Caryophyllaceae)	Tandan-pambi	Hot fomented plant is applied externally as poultice against muscular sprain. Plant extract along with little honey is effective in cough and dysentery. About 20 gm of plant extract in half litre of water daily is recommended.	Very common
<i>Eclipta alba</i> (L.) Hassk. (Asteraceae)	Uchi-sumban	Leaf extract along with little honey is given against cough and fever. Hot leaf paste in the burning charcoal is applied as poultice on jaw against toothache. Leaf extract diluted in lukewarm water in the ratio 1:10 is consumed a glassful daily in empty stomach for 15-20 days for liver and spleen disorders.	Very common
<i>Enhydra fluctuans</i> Lour. (Asteraceae)	Komprek-tujombi	Plant cooked with little water for 15-20 min is eaten to cure calculus twice a day. The whole plant can also be cooked with rice and taken. Shoot extract is given as antidote to food poisoning.	Not so common
<i>Fagopyrum esculentum</i> Moench (Polygonaceae)	Wakha-yendem	Tender shoot is cooked and eaten against diabetes. Seed powder paste mixed with little honeys is taken in early morning against stomach ulcer, twice a day for 3 days.	Common

Contd.

Table 1—Various species of aquatic/semi-aquatic plants from the wetlands of Manipur used in herbal remedies—*Contd.*

Plant name (Family)	Local name	Medicinal uses	Availability
<i>Hedychium coronarium</i> Koenig (Zingiberaceae)	<i>Loklei</i>	Rhizome paste is appetizer and used in cough and fever.	Not so common
<i>Hedyotis auricularia</i> Roxb. (Rubiaceae)	<i>Langban-koukha</i>	Leaf extracts juice given in jaundice. About 100 gm of the plant is wrapped with banana leaf and hotten up in the burning charcoal and the lot after removing the banana leaf is applied as bandage against muscular sprain.	Very common
<i>Hydrocotyle sibthorpioides</i> Lam. (Apiaceae)	<i>Lei/Lai-peruk</i>	Fresh leaf extract is given in cough, fever and jaundice. About 100 gm of fresh plant is crushed and soaked in 1 litre of lukewarm water and kept it for 1-2 hours. The filtrate is taken a glassful daily to cure cough, fever and jaundice.	Very common
<i>Ipomoea aquatica</i> Forsk. (Convolvulaceae)	<i>Kolamni</i>	Decoction of fresh shoot and leaf is used as droplets against otorrhoea and retinitis.	Common
<i>Iris bakeri</i> Wall. (Iridaceae)	<i>Kombi-rei</i>	Rhizome paste is applied as brain coolant and in hysteria.	Rare
<i>Jussiaea repens</i> L. (Onagraceae)	<i>Ishing-kundo</i>	Fresh leaf paste is applied in boils and burns as coolant. Cooked shoot is eaten regularly in empty stomach against strangury.	Very common
<i>J. suffruticosa</i> L. (Onagraceae)	<i>Tebo</i>	Tender leaf paste along with little common salt is applied in aching gum. Tender shoot is cooked and eaten regularly against strangury.	Very common
<i>Lemanea australis</i> Atkins (Lemnaceae)	<i>Nung-sam</i>	Filaments are roasted in the fire and the filtrate in water is consumed to cure diabetes.	Rare
<i>Marsilea minuta</i> L. (Marsileaceae)	<i>Ishing-yensang</i>	Fresh plant decoction is taken twice a day for 10-12 days against strangury. Fresh root paste is applied on eczema.	Common
<i>Nasturtium indicum</i> L. (Brassicaceae)	<i>Uchi-hangam</i>	The whole plant is cooked and eaten regularly against diabetes and dysentery. Fresh shoot decoction once a day for a week is consumed in empty stomach against strangury.	Very common
<i>Nelumbo nucifera</i> Gaertn. (Nelumbonaceae)	<i>Thambal</i>	Rolled tender leaf are eaten raw or as salad against strangury. Petiole is eaten raw regularly for stomach ulcer. Flowers are useful in vertigo. One spoonful of rhizome paste along with little honey is eaten against diabetes daily for 2 weeks. Seed kernel is eaten raw to enhance eye vision.	Common
<i>Nymphaea stellata</i> Willd. (Nymphaeaceae)	<i>Thariktha</i>	Fresh petiole paste mixed with <i>Cuminum cyminum</i> L. powder, common salt, milk butter and honey is taken against dysmenorrhoea twice a day for 2-3 days.	Not so common
<i>Nymphoides indicum</i> O. Kuntze (Gentianaceae)	<i>Tharo-macha</i>	Plant paste is applied as bandage in cut and injuries as coolant and for early healing. Dried rhizome paste along with little honey is taken in diuresis.	Not so common
<i>Oenanthe javanica</i> (Blume) DC (Apiaceae)	<i>Komprek</i>	Fresh shoot decoction or shoot cooked with rice is taken in diuresis. The filtrate is used as droplets against otorrhoea. Aerial part is eaten as salad in dyspepsia.	Not so common
<i>Pistia stratiotes</i> L. (Araceae)	<i>Kang-jao</i>	Plant paste is applied in boils and burns.	Very common
<i>Polygonum barbatum</i> L. (Polygonaceae)	<i>Yelang</i>	Fresh shoot and leaf is cooked and eaten against stomach disorder and constipation. Seed powder is soaked in water and the liquid is taken regularly against strangury. Leaf paste is applied against cutaneous infection.	Not so common
<i>P. hydropiper</i> L. (Polygonaceae)	<i>Chaokhong</i>	Fresh shoot is crushed and applied as bandage on forehead against fever. Seed powder is soaked in lukewarm water for 3-4 hrs and the liquid is taken to cure strangury, once a day for 15-50 days.	Very common
<i>P. minus</i> Huds. (Polygonaceae)	<i>Chaokhong-macha</i>	Fresh plant shoot decoction is taken against strangury.	Very common
<i>P. molle</i> D. Don (Polygonaceae)	<i>Leibung-tharam</i>	Fresh shoot paste is applied as poultice in wounds and eczema. Occasionally, leaf is used as an ingredient in the preparation of traditional hair lotion.	Common

*Contd.*Table 1—Various species of aquatic/semi-aquatic plants from the wetlands of Manipur used in herbal remedies—*Contd.*

Plant name (Family)	Local name	Medicinal uses	Availability
<i>P. orientale</i> L. (Polygonaceae)	<i>Chaokhong-angouba</i>	Fresh plant decoction is taken against strangury. Seed powder soaked in water for 10-12 hrs is consumed in cystitis.	Very common
<i>P. perfoliatum</i> L. (Polygonaceae)	<i>Lilhar</i>	Hot fomented plant wrapped in banana leaf is applied in wounds & injuries and also relieves muscular sprain. Seed powder paste is applied as antidote to snakebite.	Common
<i>Ranunculus scleratus</i> L. (Ranunculaceae)	<i>Kakyel-khujil</i>	Plant wrapped with leaf of banana is slightly burnt in the burning charcoal and the lot is applied externally to cure gout. Plant is boiled with little water and the residue is applied in blisters and eczema as antipruritic.	Common
<i>Rotala rotundifolia</i> Koehne (Lythraceae)	Labuk-leiri	Fresh plant decoction is taken once a day for 15-20 days to cure strangury. Dried plant powder paste mixed with little lime is applied externally to cure eczema.	Common
<i>Rumex maritimus</i> L. (Polygonaceae)	<i>Torong-khongchak</i>	Leaf paste is applied in burns and injuries. Stem hotten in fire and the juice after squeeze is applied in ear as droplets against otorrhoea. Fresh leaf extract along with the leaf extract of <i>Verbena officinalis</i> L. mixed in the same ratio is applied regularly to cure leucoderma.	Very common
<i>Sagittaria sagittifolia</i> L. (Alismataceae)	<i>Koukha</i>	About 10-15 gm of fresh root paste is taken along with a spoonful of honey in cough, two spoonfuls daily for 2-3 days.	Not so common

Table 2—Important aquatic/semi-aquatic medicinal herbs from the wetlands of Manipur

Plant name	Part (s) used	Mode of use
<i>Ammomum aromaticum</i> Roxb.	Rhizome	Boiled along with potato and smashed with fermented fish
<i>Cardamine hirsuta</i> L.	Shoot	Cooked as vegetable
<i>Centella asiatica</i> (L.) Urban.	Whole plant	Boiled along with potato and smashed with fermented fish
<i>Colocasia cuculata</i> (L.) Schott.	Corm	Cooked with fermented soybean
<i>C. esculenta</i> (L.) Schott.	Leaf lamina	Leaf cooked with other vegetables and little edible soda
<i>Commelina benghalensis</i> L.	Shoot	Cooked along with other vegetables and little edible soda
<i>Cyperus haspan</i> L.	Root	Steamed with sugar or prepared <i>pakora</i> with <i>besan</i>
<i>Fagopyrum esculentum</i> Moench	Shoot	Cooked as vegetable
<i>Hedychium coronarium</i> Koenig	Rhizome	Boiled along with potato and smashed with fermented fish
<i>Hedyotis auricularia</i> Roxb.	Shoot	Leaf cooked with other vegetables and little edible soda
<i>Ipomoea aquatica</i> Forsk.	Shoot	Cooked as vegetable
<i>Jussiaea repens</i> L.	Shoot	Cooked as vegetable
<i>Lemanea australis</i> Atkins.	Whole plant	Burnt in fire and smashed along with chilli that taste fishy
<i>Nelumbo nucifera</i> Gaertn.	Flower, tender leaf, root, fruit	Raw or cooked
<i>Nymphaea stellata</i> Willd.	Flower, root, petiole	Raw or cooked
<i>Oenanthe javanica</i> (Blume) DC.	Shoot	Taken as vegetable salad
<i>Pistia stratiotes</i> L.	Leaf, Shoot	Leaf cooked with other vegetables and little edible soda
<i>Polygonum barbatum</i> L.	Shoot	Boiled along with potato and smashed with fermented fish
<i>P. molle</i> D. Don	Leaf, shoot	Cooked as vegetables
<i>Sagittaria sagittifolia</i> L.	Root	Steamed with sugar or prepared <i>pakora</i> along with <i>besan</i>

Methodology

Some of the herbal practitioners/healers ($n=18$) were visited and details were recorded. All the 13 major wetlands in Manipur were visited on monthly basis and herbarium specimens were collected for their proper identification. Voucher specimens were also collected as identified by the healers and the user

groups. The collected samples were botanically identified with the help of relevant scientific literature^{6,7,9,10}. The vernacular names, parts used, methods of preparation and administration and approximate doses were also recorded. The plants are arranged in alphabetical order by their botanical name along with their families and vernacular names. Out

of the 42 plant species recorded, 13 are used as vegetables.



Fig.1 Loktak lake

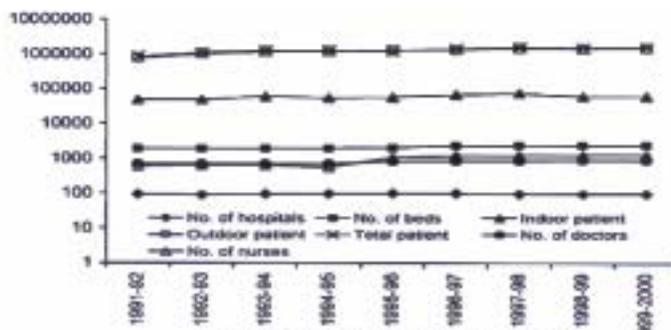


Fig.2 Healthcare centres and services



Fig.3 *L. australis* Atkins



Fig.4 *Acorus calamus* Linn.



Fig.5 *Iris bakeri* Wall.



Fig.6 *Verbena officinalis* Linn.



Fig.7 *Nelumbo nucifera* Gaertn.



Fig.8 *Nelumbo nucifera* Gaertn. root



Fig.9 Herbal products in the local market



Fig.10 *Ipomoea aquatica* Forsk.



Fig.11 *Sagittaria sagittifolia* Linn.



Fig.12 *Cyperus haspan* Linn.

Results and discussion

The present study involves a total number of 42 species of aquatic/semi-aquatic plants under 18 families and 25 genera, which are used as herbal remedies by the ethnic communities of Manipur. Empirically formulated and accepted herbal products generally used for curing 45 different types of diseases are recorded with brief mode of preparation, uses and prescribed doses (Table 1). Out of the 45 plants reported, 20 are generally used as vegetables and among these 13 are sold in the market (Table 2). The availability of wetland plants is seasonal and people relished the respective seasonal vegetables. Some of the plants are very rare in nature due to excessive and unscientific exploitation. A red alga (*Lemanea australis* Atkins) is reported only in Manipur within India that too in a very small pocket (Fig. 3). Although the population of *Acorus calamus* Linn. (Fig. 4) has been declining, the agroclimatic condition of Manipur is suitable for its cultivation. *Iris bakeri* Wall. (Fig. 5) is closely associated with the legends of Manipur but its population has been declining and so it is feared that it will disappear from the state if proper conservation measures are not taken up in time. Before 2 decades, Lamphelpat was famous for *Iris bakeri* Wall. but now the plant has totally been wiped out of the lake. Lotus (Fig. 7) is still cultivated in some wetlands of Manipur. The lotus root (Fig. 8) is a delicacy of Manipuri people. *Verbena officinalis* Linn. (Fig. 6) is a very important folk medicinal herb as it is used to cure leucoderma. *Ipomoea aquatica* Forsk known as swamp cabbage (Fig. 10) is a common vegetable sold in the market of Manipur. The roots of *Sagittaria sagittifolia* Linn. (Fig. 11) and *Cyperus haspan* Linn. (Fig. 12) are also delicacies and expensive traditional food items. Most of the aquatic plants are grown wild and hence people freely collect them. This is a means of livelihood and source of income for the poor and landless people.

It is a well known that global wetlands are shrinking rapidly and hence their resources both

plants and animals are depleting in the same pace. The survival of aquatic species is threatened and hence the study on the aquatic resources especially those having economic value are important. Wetlands not only provide useful resources but are also important in terms of ecology and maintaining the climate of the region. Therefore, conservation of wetlands especially in Manipur needs to be addressed urgently.

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