

TRADITIONAL EDIBLE MACROPHYTES OF IKOP LAKE

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Abstract

Traditional use of wild edible, aquatic plants (macrophytes) as food has been in practice since time immemorial. But it has been increasingly neglected due to the socio- economic changes and modernisation of life styles. Hence, the present study has been taken up to bring forth the idea of indigenous usage of various aquatic edible plants. Macrophytes are being consumed by a larger section of the global population and ensures both affordable food and nutritional security. The present study has been done in context to Manipur, where an enormous diversity of such aquatic plants constitute a significant part of rural diet of the inhabitants of Ikop Lake. The Ikop Lake is a freshwater, saucer shaped, natural lake. It is situated in the South- eastern part of Imphal at a distance of about 40 km with an area of 13.5 sq. km. in the Thoubal District, Manipur. It lies at an intersection of 93° 52' to 94°05' E longitude and 24°31' to 24 °40' N latitude and it is situated at an altitude of 772 m above the mean sea level. Adhering to the topic of the present study, eleven (11) macrophytic species were shortlisted describing the mode of consumption.

Key words: Ikop Lake, Indigenous, Macrophytes, Saucer-Shaped, Traditional

Introduction

“**All flesh is Grass**”, a quote from the ‘Old Testament of the 17th century’ is the real truth that everything and anything we consume are the direct and indirect products and produce of the grasses (plants). In a food chain, plants are the producers which manufacture food through the process of photosynthesis by capturing sunlight. It is therefore eventually all organisms depend on plants for their food directly or indirectly. Solar energy reaches the living organisms, stocks them in the form of chemical energy through food chain. Hence, food is basically plant origin indispensable to man for survival. Plants provide a meal in itself with miraculous natural healing power.

Wild edible plants play an important role in the livelihood of people inhabiting in rural areas. Even today in most of the remote areas, people depend on plants which are available in their natural surroundings for food, medicines and shelter. The collection and consumption of wild edible vegetation has been a way of life to supplement dietary requirements for many rural population. [Ghorbani *et al*, 2012]

Due to social change and acculturation process, traditional knowledge about the use of wild edible species is declining and even vanishing. The loss of traditional knowledge has also been recognised as one of the major factors that have negative impacts on the conservation of biological diversity. Thus, there is an urgent need to document and revitalize traditional knowledge of wild edible plants to preserve them for future generation.

Primitive man through trial and error has selected many wild aquatic plants which are edible and subsequently domesticated them. Modern man neither domesticated nor has identified any new food plants in recent times. Aquatic plants provide the same function as the terrestrial plants. Plants are the producers in an ecosystem since they produce their own food as well as food for the consumers of the ecosystem. Besides supporting the livelihood and income of a larger section of society, aquatic plants play a very important role in supplementing human diet and nutrient balance. Human beings depend on plants for their survival and to satiate their hunger.

Food and nutrition is the centre for human biological and socio-cultural existence providing energy. Plants have served as a source of food and medicine for the human beings since life started its existence in this universe.

The idea of wild food plants or rather wild edible aquatic plants came as an alternative to food source during the time of natural disasters viz. severe famine, drought, flood, etc. Certain wild food plants were collected and consumed in a traditional mode during famine. *Zizania lattifolia*, *Eleocharis dulcis*, *Euryale ferox*, *Trapa natans*, etc are some of the most important food substitute used by the inhabitants during famine.

Edible aquatic plants with its enormous diversity constitute a significant part of rural diet as an affordable food with nutritional security. In the present study, significance of the aquatic macrophytes of Ikop lake have been assessed based on the traditional ethnics patterns of the parts used. The Lake Ikop is a freshwater, saucer-shaped natural lake. It is situated in the South-eastern part of Imphal, Manipur at a distance of about 40 km with an area of 13.5 sq. km. in the Thoubal District, Manipur. It lies at an intersection of 93°52' to 94°05' E longitude and 24°31' to 24°40' N latitude and it is situated at an altitude of 772 m above the mean sea level.

Material And Methods:

The present work was based on a field survey. Local people inhabiting around the lake were interviewed and group discussions were conducted to understand the type of plants, parts of plants, used as food, vegetables and medicines. Semi-structured interviews were conducted among a wide array of farm labourers, women vegetable vendors, local herbal medicinist to obtain maximum information related the present study. The trade of wild edible aquatic plants has been considered an alternative source of income mainly done by womenfolks. The villagers also sell a large variety of wild edible plants in the local markets to earn their livelihood.

The aim of the study was not only to document community knowledge on wetland plants but also to draw inferences for improving livelihood of communities from these plants along with their conservation. [Jain *et al*]

Eleven macrophytic species were found to be the most popularly used edible plants in the present study. Local names, families and parts used were noted. The morphometric and bathymetric characters of the lake were determined as described by Sharma and Pant, 1979.

Results And Discussion:

Lake morphometry: Morphometry and bathymetric characters of the lake (Table 1) revealed saucer shaped basin with gentle slope and silted bottom. The shore line of the lake measured 27.5 km which according to Moss (1989) is indicative of the productive nature of the lake. It is obvious that the mean depth(0.58) are indicative of the macrophytes with possibilities of high magnitude of production in the Ikop lake.

Table 1. Morphometry of Ikop lake, Manipur.

Maximum length(km)	7.5
Maximum breadth(km)	1.8
Surface area (sq. km.)	13.5
Maximum depth(m)	1.58
Minimum depth(m)	0.27
Mean depth(m)	0.93
Mean depth/maximum depth ratio	0.58

Basin shape	Saucer
Basin slope	Gentle
Volume of lake(km ³)	0.013
Development of volume	1.75

In the present study, eleven edible macrophytes which are conventionally and consistently used by the inhabitants of Ikop lake are *Eleocharis dulcis*, *Enhydra fluctuans*, *Euryale ferox*, *Ipoemoea aquatica*, *Nelumbo nucifera*, *Neptunia oleracea*, *Nymphaea alba*, *Oenanthe javanica*, *Sagittaria sagittifolia*, *Trapa natans* and *Zizania latifolia* respectively and are highlighted in the figures A – K. Table 2 gives a summary of the macrophytes in the present study.



Fig. A *Eleocharis dulcis*

Family: Cyperaceae

Edible parts & Usage: Edible plant found growing in and around the Ikop lake. It is commonly known as Chinese water chestnut. It is often as a substitute crop of rice. It is a tufted, perennial plant with underground runners that form tubers at the apex in the form of corms. Corm size varies from 1-2 cm in diameter, clothed with purple-brown to black-brown scales. The edible parts is the tuber or corm. It is considerably popular as an aquatic 'root' vegetable (strictly speaking as a stem vegetable). Small rounded corms with crisp white flesh are eaten raw or slightly boiled. People of Manipur consume it in a traditional way by stewing it in jaggery and served as snacks with a slight sweet taste. Fully ripe corm has a sweet nutty flavour and starchy.



Fig. B *Enhydra fluctuans*

Family: Asteraceae

Edible parts & Usage: It is a common gregarious marshy plant. The leaves, shoots, flower buds are commonly used vegetables in the preparation of local curries, salads and chutney (fresh/boiled). This herb is known to be used by local folklorist to induce sleep and decoction of young shoots as antidotes in food poisoning.



Fig. C *Euryale ferox*

Family: Nymphaeaceae

Edible parts & Usage: It is a perennial species of Nymphaeaceae propagated from seeds. It has sharp spines on its stems, leaves and fruits. It is an important income generating plant. The spiny fruit contains more than 10 to 20 seeds/nuts with a soft pulpy covering which gives the flavour of the fruit. It may be consumed in the raw form (as singju/salad) or boiled with other ingredients in making chutney (iromba). Tender shoots and petioles are known as ‘Khayon’ and are eaten raw by removing the spiny skin in curries and salads. Nowadays, it is very widely cultivated for the generation of income.



Fig. D *Ipomoea aquatica*

Family: Convolvulaceae

Edible parts & Usage: It is a trailing, fast growing stoloniferous perennial macrophyte growing on the shallow areas of the lake. The plant is a popular leafy vegetable. Young shoot tips are harvested and consumed raw in salad or it can be stir-fried, steamed, boiled for a few minutes and made into soups or lightly fried in oil and eaten in various dishes. They are often mixed with hot papers and garlic and prepared in savoury dish.

Fig. E *Nelumbo nucifera*

Family: Nymphaeaceae

Edible parts & Usage: It is a perennial macrophyte growing from a tuberous rootstock lying the mud at the bottom of the lakes. Its flower is a sacred flower for the Hindus and also designated as the National flower of India. Different parts of the lotus plant are used in various traditional forms. Offering of lotus flower in religious rituals is a tradition. Young folded leaves(Thamna lakon/Thamna khenjong) is a delicacy for the Manipuris along with a hot chutney. The rhizomes or pseudo-stems of the lotus plant are very delicious and is very economically important part of the plant. These stem may be consumed raw or boiled or stewed. Chutneys/pickles can be prepared. The mature leaves of lotus are used for packing cooked food items in some specific ceremonies especially during the Rathyattra(Kang) in packing khichhdi. Thamchet(local name of the fruit) the so called fruiting body of the lotus plant is the thalamus which contains 15-30 nuts/seeds which are very soft and tasty on maturity. The petals and stamens can dried and made into a fragrant herbal tea. Very recently, 'BRIGHT LOTUS TEA'(organic) has been processed from the lotus petals and has been marketed. Amidst the lockdown, Bidyashanti Tongbram, a 27 year old girl started a very enterprising unique venture by spinning yarn from lotus stalks in the Bishnupur district, Manipur. She is a student of Botany and has involved many womenfolks of her locality in making various products of the yarn with a great enterpreunership skill.

Fig. F *Neptunia oleraceae*

Family: Fabaceae

Edible parts & Usage: It is a common perennial floating, prostrate macrophytes growing in still and slightly moving water. Young floating leaves and stems are consumed raw in vegetable salads or cooked as stir fries and curries. In Manipur, Neptunia oleraceae is traditionally grown(cultivated) for sustainable crop production and it is available in most of the local market during rainy season.

Fig. G *Nymphaea alba*

Family: Nymphaea

Edible parts & Usage: It is a perennial macrophytes growing more actively during rainy season. The tender leaves, flower buds, peduncles(stem tube) are generally served as vegetables in salad raw or boiled, stewed with fish. The lily bears a prominent capsular fruit locally known as “Thembung” which has numerous miniature seeds called Chamu. This chamu is roasted and made into tasty snacks with jaggery called Chamu kabok, one of the ethnic edibles which are used commonly by the inhabitants of the lake. Not only this, it also bears globular tubers at the root nodes in clusters known as Lemphu which is consumed by steaming or boiling or frying. It has a specific slightly bitter taste.

Fig. H *Oenanthe javanica*

Family: Apiaceae

Edible parts & Usage: It is a wild macrophyte growing gregariously in the shallow shorelines of the lake. The plant has creeping stolons by which it spreads vigorously often forming large clumps. Young leaves and shoots along with tender stems are commonly eaten as raw in salad(singju) and chutney(iromba). It has a unique specific aromatic taste and flavour. It is a perennial macrophyte.



Fig. I *Sagittaria sagittifolia*

Family: Alismataceae

Edible parts & Usage: It is a perennial wetland macrophyte bearing arrow-shaped leaves at the terminal end of the petioles. Edible starchy stoloniferous tubers(corms) are found at the base of the long slender leaves. The tubers give an excellent taste when roasted. It is starchy with a distinct flavour. The skin is somewhat bitter and is best removed after the tubers have been steamed. Pakoda(Koukha bora) made with these tubers along with *Allium odoratum* is a special snack of the people of Manipur.

Fig. J *Trapa natans*

Family: Trapaceae

Edible parts & Usage: It is a floating annual macrophyte that invades shallow to deep zones of the lake forming a dense mass of floating mats. It bears an ornately shaped fruits that resembles the head of a bull, each containing a single large starchy seed. It has been cultivated in Manipur since time immemorial as an income generating plant. The starchy fruit can be eaten raw or boiled. It has been used as a substitute to rice during famine. Young and tender petioles are eaten either raw(in salad-singju) or boiled(in chutney).

Fig. K *Zizania latifolia*

Family: Poaceae

Edible parts & Usage: It is a kind of wild rice growing abundantly in the lakes of Manipur. The part of the plant which is edible is actually neither a fruit nor a flower but a manifestation of smut infected area of the young shoots or booth of the culms of the plant. These infected buds are spindle- shaped and are consumed raw, fried or roasted. It tastes best when stewed with jaggery.

Table 2. Edible Macrophytes of Ikop lake, Manipur.

Botanical Name (Family)	Common Name (Local Name)	Plant Habit	Parts & uses
<i>Eleocharis dulcis</i> (Cyperaceae)	Water chestnut (Kouthum)	Emergents	Small rounded tubers-corms are eaten raw, boiled, grilled and stewed.
<i>Enhydra fluctuans</i> (Asteraceae)	Water spinach (Komprek tujombi)	Emergents	Tender leaves, shoots and flower buds are used in salads.
<i>Euryale ferox</i> (Nymphaeaceae)	Fox nut/Gorgon nut (Thangjing)	Rooted floating	Tender petioles, mature fruits containing nuts may be eaten raw or boiled.
<i>Ipomoea aquatica</i> (Convolvulaceae)	Swamp morning glory (Kolamni)	Emergents	Tender young shoots are used either in salad and even stir fried.
<i>Nelumbo nucifera</i> (Nymphaeaceae)	Lotus (Thambal)	Rooted floating	Flower, petals, young leaves, stem and thalamus with nuts are eaten raw/cooked.
<i>Neptunia oleraceae</i> (Mimosaceae)	Water mimosa (Ikaithabi)	Rooted floating	Young shoots can be eaten raw or cooked.
<i>Nymphaea alba</i> (Nymphaeaceae)	White Water lily (Tharo angouba)	Rooted floating	Flowers and elongated petioles can be consumed raw or cooked.
<i>Oenanthe javanica</i> (Apiaceae)	Water dropworts (Komprek)	Emergents	Shoots and leaves are used in the preparation of Manipuri salad and chutney.
<i>Sagittaria sagittifolia</i> (Alismataceae)	Arrow Head (Koukha)	Emergents	Root-like nodules-corms are deep fried and consumed.
<i>Trapa natans</i> (Trapaceae)	Water caltrop (Heikak)	Rooted floating	Young tender petioles and fruits are edible.
<i>Zizania latifolia</i> (Poaceae)	Wild rice (Kambong)	Emergents	Spindle-shaped smut infected inflorescence at the culms are eaten raw or roasted.

In India, out of 800 species consumed as food plants mainly by the tribal inhabitants, 300 species occur in the north-eastern India (Singh & Arora, 1978; Watt, 1889-99; Kanjilal *et al.*, 1934-40). Based on the plant part(s) eaten, they can be classified in the following group: Tubers, Green leaves/shoots, Flowers, Fruits and Seeds. About 20 plants having edible flowers are reported from the north-eastern region (Arora, 1981) and 36 wild

edible flowers from Indian sub-continent, out of which 10 plants are mainly used during scarcity as famine foods(Singh & Arora, 1978). Thus, among the edible parts of the plant, flowers are also eaten in many forms for their different tastes. Attempts has been made to synthesize information on wild edible plants of Manipur valley by Elangbam(2002).

Various terms of Manipuri culinary have been in use while describing the mode of usage of the macrophyte and its parts which represents the traditional dishes viz. Singju(spicy salad), Bora(Pakoda), Kangou(Fried/stewed), Iromba(Chutney).

Conclusion:

Use of aquatic macrophytes for food, medicines and socio-cultural purposes by the inhabitants of Ikop lake revealed high dependence on these resources. The wetlands of Manipur can provide high income generating opportunities to the local inhabitants. The most preferred wetland edible macrophytes can be domesticated in farmer's field after developing agro-techniques for them and would help in conserving these valuable resources in long-run.

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