

A Taxonomic and Ethno-Medicinal Study of Species from Moraceae (Mulberry) Family in Bangladesh Flora

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Abstract Taxonomy and ethno-medicinal investigation on the family Moraceae growing throughout the Rajshahi city, Bangladesh was carried out during September 2012 to August 2013. A total of 9 species under 7 genera belonging to the family Moraceae were collected and recorded for their use in various ailments. Herbal medicines have a strong traditional or conceptual base and the potential to be useful as drugs in terms of safety and effectiveness, leads for treating different diseases. The present article gives an account of such a medicinally important family Moraceae which comprise both wild and cultivated species. Out of the total number of species *Artocarpus heterophyllus* Lamk., *Artocarpus lacucha* Buch-Ham., *Ficus benghalensis* L., *Ficus hispida* L., *Ficus racemosa* L., *Ficus religiosa* L., *Morus alba* L. were very common and *Ficus elastica* Roxb ex Hornem. and *Ficus pumila* L. were rare species in the study area. Thus a survey was carried out, to record the traditional health care remedies currently practiced by the local people.

Keywords: Moraceae, Taxonomy, Ethnobotany, herbal medicine

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1. Introduction

Plants are used medicinally in different countries and are sources of potent and powerful drugs [15]. Over the centuries, the use of medicinal plants has become an important part of daily life despite the progress in modern medical and pharmaceutical research [9]. A wide range of medicinal plant parts are used as raw drugs as they possess varied medicinal properties thus herbal drugs constitute a major part in all traditional system of medicines [10]. In many countries the use of medicinal plants ranges from 4 to 20 percent about 25,00 species of medicinal plants are being traded globally [17]. World Health Organization has made an attempt to identify all medicinal plants used globally and listed more than 20,000 species [12]. According to the WHO more than 80 percent of the World's population relies on traditional herbal medicine for their primary health care [18]. Plants continue to serve as possible sources for new drugs and chemical derived from various parts of plants [16].

The Moraceae often called the mulberry family or fig family — is a family of flowering plants comprising about 40 genera and over 1,000 species. Most are widespread in tropical and subtropical regions, less so in temperate climates. The only synapomorphy within Moraceae is presence of laticifers and milky sap in all parenchymatous tissues, but generally useful field characters include two carpels sometimes with one reduced, compound inconspicuous flowers, and compound fruits.

Moraceae, the mulberry family of the rose order (Rosales), with about 40 genera and some 1,000 species of deciduous or evergreen trees and shrubs, distributed mostly in tropical and subtropical regions. Plants of the family contain a milky latex and have alternate or opposite leaves and small, petalless male or female flowers. The fruits of many species are multiple because fruits from different flowers become joined together.

Some genera produce edible fruits, such as the mulberry (*Morus*), fig (*Ficus carica*), breadfruit and jackfruit (*Artocarpus*), and affon, or African breadfruit (*Treculia*). Others, such as *Antiaris*, *Ficus*, and *Castilla*, are important for their timber and latex. The latex of the upas tree (*Antiaris toxicaria*) of Java is used as an arrow poison; the latex of the cow tree (*Brosimum utile*) of tropical America is sweet and nutritious. *Ficus*, the largest genus in the mulberry family, contains the banyan and the India rubber tree. The bark of the paper mulberry (*Broussonetia*) has been used for the manufacture of cloth and paper products. Among the ornamentals in the family are paper mulberry and Osage orange [7].

The present research work is to work on medicinal uses of plants belonging to the family Moraceae from the local people. A preliminary survey was done along with the local people/person about the different species of the family that are being used in that area to treat different diseases.

2. Materials and Methods

The present study is based on the intensive field of the area during the period of September 2012 to August 2013. A total of 9 species under 7 genera belonging to the family Moraceae were collected and identified. The methods employed during the study were designed with the sole purpose of eliciting the precious wealth of information on the ethno-medicinal uses of plants practiced by the local people. Detailed survey has made in gathering information regarding use of medicine has been documented. Usually, the survey in each locality started with the interview of elderly and experienced members, locally known as Hakims. Besides, this the common people of the surveyed localities who themselves have used these plant-based for health treatments were interviewed to prove veracity of the curative features of plants. Ethno-medicinal uses and data about the treatment of various ailments based on the information gathered by using questionnaires are given subsequently.

The collected specimens were identified studying related taxonomic books and booklets from the library of Rajshahi University. The major collected materials were identified and described up to species with the help of [1], [2], [14], [8] and [5] were consulted. For the current name and up to date nomenclature [6], [1] and [13] were also consulted. All the collected plant specimens were kept in the Herbarium, Department of Botany, and University of Rajshahi, Bangladesh.

3. Results and Discussion

The present research work is based on the indigenous knowledge of most commonly used medicinal plants of Moraceae family. Each Medicinal plant species is provided with its scientific name, local name, chromosome number [3], plant parts (Such as leaf, root, stem, fruit, latex, whole plant, seed, inflorescence and bark) mostly used and uses.

In essence, the ethno-medicinal knowledge about the biodiversity reflects many generations of experience and problem solving by the indigenous communities. It represents an immensely valuable database that provides the baseline information for the commercial exploitation of bioresources. Also the information could be useful for the industry, pharmacologists, physicians. Phytochemists, botanists, and alike interested in the development of alternative therapies [4,11].

The result obtained in the investigation need to be rigorously subjected to pharmacological analysis in order to validate their authenticity and future prospects. The paper has only documented the herbal health remedies presently in vogue in the region and does not prescribe or recommend for their use till further determination by the pharmacologist.

By examining the plant materials collected from the study area using the identification methods and medicinal information was accumulated and described below.

3.1. *Artocarpus Heterophyllus* Lamk

Taxonomic description: A medium-sized to large evergreen tree, with rather short trunk and large, dense, rounded crown. Leaves 10-20 cm long, elliptic, entire, thickly coriaceous. Flower heads embraced by spatheaceous, deciduous, stipular sheaths; male cylindrical,

5-15 cm long. Fruits large, 30-75 cm long, round to oblong, tubercled.

Local name: Khanthal.

Habit: Tree

Flowering season: February-July.

Chromosome number: $2n = 56$.

Ethnobotanical uses:

Fruits: Well developed young fruits are cooked as vegetables. Pulp of ripe fruits is eaten fresh, sometimes made into various delicacies. The rind of the fruit is also a good cattle feed. The unripe fruits are astringent, carminative and tonic; the ripe fruit is laxative, oleaginous, tonic, fattening and aphrodisiac.

Leaf: Leaf ash is useful in healing ulcer and young leaves are used to treat skin diseases, asthma and diarrhea. Leaves are considered a very good feed for goats. The young leaves are used in skin diseases.

Roots: Roots are used internally in diarrhea.

Seeds: The seeds are cooked as vegetables, eaten after boiling or roasting. The seeds are diuretic, aphrodisiac and constipating. Roots are used in diarrhea.

Latex: The latex of the plant is applied externally to glandular swelling and abscesses to promote suppuration.

Inflorescence: In the villages dried up inflorescence are collected from the ground and burnt into ashes, which are used as a detergent.

3.2. *Artocarpus Lacucha* Buch-Ham

Taxonomic description: A medium-sized, deciduous tree with large dense spreading crown. Leaves 10-30 cm long, coriaceous, oblong, elliptic or subovate, entire. Flowers in axillary globose, shortly pedunculate heads. Fruit 5-7.5 cm across, lobulate, yellow when ripe.

Local name: Dewa, Bonkanthal.

Habit: Tree

Habitat: Moist deciduous and evergreen forests.

Flower color: Yellow.

Flowering season: April-June.

Chromosome number: $2n = 56$.

Ethno-botanical uses:

Fruits: Fruits are edible.

Leaf: Alcoholic extract of the leaves possesses good antibacterial properties.

Seeds: Seeds are popular as a purge. In case of breast-feeding babies, 3-4 seeds are made into paste and mixed with mother's milk, and administered to cure constipation.

Roots: A yellow dye is obtained from root.

Bark: An infusion of the bark is applied for small pimples and cracked skin. The bark finely powdered is applied to sores to draw out the purulent matter.

3.3. *Ficus Benghalensis* L.

Taxonomic description: A large spreading, evergreen or semi-deciduous tree of low stature (trunk), sending down many aerial roots from the branches. All parts contain white latex. Leaves coriaceous, 10-20 cm long, ovate or elliptic, entire. Receptacles about 2 cm diam., sessile, in pairs, axillary, globose, puberulous, red when ripe.

Local Name: Bot, Botgach.

Habit: Tree

Habitat: Plain lands.

Flower color: Green when very young then red.

Flowering season: January to December.

Chromosome number: $2n=26$.

Ethno-botanical uses:

Whole plant: The tree is worshipped by the Hindus in various parts of the Indian sub-continent. The young maids worship the tree for getting good husband. The numerous hanging roots are considered symbolic other matted hair of long departed Guru. The ethnic people of Bangladesh also consider the tree sacred and as an abode of their gods.

Latex: Latex of the plant is aphrodisiac, tonic, vulnerary and maturant; used in toothache, dysentery, diarrhea, piles and diabetes; applied externally to cracked or inflamed soles, to alleviate rheumatic pains and lumbago. It lessens inflammations.

Roots: The aerial root is styptic and aphrodisiac. Tips of the hanging roots are given for obstinate vomiting.

Bark: An infusion of the bark is tonic; used for the treatment of diabetes. Bark extract is anti-diabetic in rabbit; decoction showed strong anti-fertility activity in man and women.

Leaf: The leaves are vulnerary; useful in biliousness; warm leaves are applied to abscesses. An infusion of the young buds is useful in diarrhea and dysentery.

Seeds: Seeds are cooling and tonic.

3.4. *Ficus Elastica* Roxb ex Hornem

Taxonomic description: A medium to large evergreen tree with milky latex. Trunk and young shoots glabrous, crown very dense, branches spreading, with or without narrow aerial hanging roots. Leaves simple, alternate, petiolate, petioles 3-6 cm long, lamina oblong 22-25 by 14-16 cm, thick glossy above, base cuneate to obtuse, margin entire, apex shortly acuminate, lateral nerves almost parallel, stipules large, rosy or pinkish brown when young. Male flowers small pedicellate, sepals 3-4 ovate, stamen 1. anthers 2. Female flowers sessile, sepals 4. Free ovary with subterminal long styles.

Local name: Rubber Gachh, Attah Bar.

Habit: Tree

Habitat: Usually planted as shade and ornamental tree. It does not tolerate water logging.

Flower color: Rosy or pinkish-brown.

Flowering season: March-April.

Chromosome number: $2n=36$.

Ethno-botanical uses:

Latex: The latex contains rubber, which can be used for tires, foot wears, toys, gloves. This latex is also an irritant to the eyes and skin and can be fatal if taken internally. Latex used for parasitic worms.

Leaf: The very young leaf tips have been eaten as vegetables.

Root: Decoction of aerial rootlets used for wounds, cuts and sores.

Bark: Bark is astringent and used as styptics for wounds.

3.6. *Ficus Hispida* L.

Taxonomic description: A very hispid small deciduous tree. Leaves 10-30 cm long, membranous, ovate, oblong or subobovate, apiculate or shortly and abruptly acuminate, the lower surface hispid-pubescent, the upper

hispid-scabrid. Receptacles 1.3-2.5 cm across, turbinate, obovoid or subpyriform, hispid, yellowish when ripe.

Local name: Dumur, kakdumur.

Habit: Small tree/ large shrub

Habitat: Hedges, thickets and village surrounding and dilapidated walls.

Flower color: greenish-yellow.

Flowering season: April-September.

Chromosome number: $2n=26$.

Ethno-botanical uses:

Whole plant: All parts of the plant are cooling, astringent to the bowels and antidiysenteric; useful in ulcers, biliousness, psoriasis, anemia, piles, jaundice, hemorrhage of the nose and mouth.

Fruits: Fruits are astringent, tonic, emetic and lactagogue. Fruits are prescribed for diabetic patients. Fruits are also cooling and astringent. To stop menstrual hemorrhage, root juice along with rice-soaked water.

Bark: Barks are purgative and emetic, lactagogue and tonic.

Seeds: Seeds are purgative and emetic, lactagogue and tonic.

3.5. *Ficus Pumila* L.

Taxonomic description: A climbing perennial, much branched, young shoots hairy. Leaves simple, alternate, petiolate, lamina ovate-oblong. 4-10 by 2.5-6.0 cm. Hypanthodia usually solitary, axillary, sessile or shortly pedunculate, usually obovoid-turbinate, greenish-yellow. Male flowers numerous, in whorls, sepals 4-6, stamens 2-3. Female flower: sessile or pedicellate, ovary sessile, styles, lateral. Figs obovoid-turbinate, 3-7 cm long.

Local name: Lata Dumur, Dewall Dumur

Habit: Climbing

Habitat: Cultivated as a creeper on walls.

Flower color: Greenish yellow

Flowering season: October-March

Chromosome number: $2n=26$

Ethno-botanical uses:

Leaf: The leaves are used for carbuncle, dysentery, hematuria, piles; dried leaves and stems for boils, rheumatism, sore throat.

Fruit: Fruits are edible. Decoction of the fruit for hernia.

Stem: latex used for skin disease; stem or fruit peel for backache, cancer, hernia, piles, swellings, and tuberculosis of the testicles.

Root: Root is used for bladder inflammation and dysuria.

Whole plant: The plant is regarded as aphrodisiac, or at least strengthening to the male power, used for spermatorrhea, as a lactagogue; eating the plant is said to curb heart pain, anticancer.

3.7. *Ficus Racemosa* L.

Taxonomic description: A medium-sized to large deciduous, sometimes evergreen tree with spreading crown and white latex. Leaves 7.5-15 cm long, ovate-oblong or elliptic-lanceolate, entire, tapering to a bluntish point at the apex. Receptacles shortly pedunculate, on short leafless warted branches which issue from the stem and larger branches, subglobose, pyriform or subturbinate, 3.2 cm across, red when ripe.

Local name: Jagyadumur, Dumur.

Habit: Tree

Habitat: Usually planted in gardens as shade tree.

Flower color: Rose-red

Flowering season: March-May and again September-November.

Chromosome number: $2n=26$.

Ethno-botanical uses:

Fruit: The fruits are considered astringent, stomachic and carminative; given in menorrhagia, haemoptysis, bronchitis, dry cough, diseases of kidney and spleen. The unripe fruit is astringent to the bowels, tonic and styptic; allays thirst, useful in leucorrhoea. The ripe fruit is acrid and cooling; useful in biliousness, burning sensation, fatigue, urinary discharges, thirst, leprosy, menorrhagia and nose bleeding. The fresh juice of the ripe fruit is used as an adjunct to a metallic preparation, which is given in diabetes. Mature fruits are used to treat menorrhagia, haemoptysis, bronchitis, dry cough and diseases of kidney and spleen. Fruits are eaten by the local people as vegetable and also taken by diabetic patients.

Bark: Bark is cooling, astringent and galactagogue; useful in asthma, piles and gravid uterus; as an infusion it is given for menorrhagia.

Leaf: The leaves are astringent to the bowels and good for bronchitis and bilious affections.

Latex: Latex is aphrodisiac and vulnerary, useful in inflammations, piles, diarrhea and in combination with sesame oil in cancer. Roots are used in dysentery; sap is tonic and used in diabetes.

3.8. *Ficus Religiosa* L.

Taxonomic description: A large, glabrous, deciduous tree with irregularly shaped trunk and spreading crown. Leaves 10-18 cm long, coriaceous, ovate-rotund, with a long linear-lanceolate tail at the apex. Receptacles in pairs, sessile, in axils of the leaves, depressed globose, 13 mm diam., dark purple when ripe.

Local name: Ashwathwa, Ashwath, Panbot.

Habit: Tree

Habitat: Shrubberries, old walls and also planted along roadsides and near temple.

Flower color: Yellowish-green when young, dark purple when ripe.

Flowering season: March-October.

Chromosome number: $2n=26$.

Ethnobotanical uses:

Fruit: Fruits are digestive, laxative and aphrodisiac; checks vomiting. The dried fruit, pulverized and taken in water for a fortnight removes asthma. The ripe fruit is cooling and alexipharmac; good for burning sensation, foul taste, thirst, biliousness and diseases of the heart.

Seeds: Seeds are cooling, alterative, laxative and refrigerant; useful in urinary discharges. Seeds are colling, alterative and laxative, taken for three days during menses, sterilizes women for long time.

Stem: Stem bark extract is used in diarrhea, dysentery, gonorrhoea, scabies and ulcers. Young shoots are purgative, also used in skin diseases.

Leaf: Leaves and young shoots are purgative and used in skin diseases.

Root: The root is good for gout; root bark is aphrodisiac; useful in stomatitis, lumbago and as an astringent in leucorrhoea.

Bark: Bark is astringent; infusion is given internally in scabies, ulcers and gonorrhoea. The bark extract has relaxant and spasmolytic effects on various smooth muscles in animals. The bark juice is used as a mouth wash for toothache and for strengthening the gums.

3.9. *Morus Alba* L.

Taxonomic description: Small tree or shrubs with milky sap. Leaves simple, alternated, entire, toothed. Inflorescence modifies catkin like and condensed in to a pendulous amentiferous structure. Flower dioecious or monoecious, female spike short, ovoid. Botanically the fruit is not a berry but a collective fruit, in appearance like a swollen loganberry.

Local name: Tut.

Habit: tree

Habitat: Moist places in mountains and thickets along rivers.

Flower color: Green-yellowish.

Flowering season: May-July

Chromosome number: $2n=28$.

Ethno-botanical uses:

Whole plant: Mulberry trees are usually cultivated for their leaves, which are used to rear silkworms.

Fruit: This is a multiple fruit and red ripening to dark purple, edible and sweet with a good flavor. Fruits are cooling and laxative; allay thirst, useful in fevers and burning sensations. Ripe fruits are edible and liked by the village people, especially by children. Tasty edible fruits are highly valued and made into juice, wine, jam etc.

Leaf: Decoction of the leaves is used as gargle in inflammation and thickening of the vocal cords.

Bark: The bark is supposed to be vermifuge and purgative. Roots are considered anthelmintic and astringent.

Root: The root, twigs and fruits are used as restorative, tonic, pectoral, diuretic, and are prescribed to treat cough, asthma, phthisis, dropsy and rheumatism. All parts are considered anti-diabetic.

4. Conclusions

The present study may be a preliminary contribution to the ethno-medicine of this area using standard research methods, focusing on medicinal plants and their local uses for the healthcare. Medicinal plants play an important role in providing knowledge to the researchers in the field of ethno-botany and ethno-pharmacology so this research article will attract the attention of ethno-botanists, phytochemists and pharmacologists for further critical investigation of medicinal plants present in the study area.

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