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Taxonomic study and traditional medicinal practices on important angiosperm plant species in and around Rajshahi metropolitan city

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Abstract
Taxonomic study and traditional medicinal practices on important angiosperm plant species in and around Rajshahi metropolitan city was carried out from September 2014 to October 2015. A total of 8 species under 8 genera belonging to 7 families were collected and identified. For each species English name, botanical name, synonyms, local name, status of occurrence, habit, habitat, flowering and fruiting time, chromosome number, distribution, taxonomic description and traditional medicinal uses have been mentioned. Through questioner method more than 51 interviews were made on random basis from local people, herbalists and hakims. The medicinal data collected about these plant species were recorded, preserved and documented which revealed that they are quite effective remedies for different diseases such as asthma, bronchitis, cough, cold, dysentery, diarrhea, dyspepsia, headache, rheumatism, piles, stomachic, eczema, chicken pox, scabies, skin diseases, toothache, wound and others.

Keywords: Taxonomy, Medicinal plants, Traditional Uses, Rajshahi, Bangladesh

1. Introduction
Human beings from ancient times are dependent on medicinal plants directly or indirectly. It has been reported that 35,000 to 70,000 plant species are used in folk medicine worldwide [6, 13]. Even today, traditional medicine is still the predominant means of health care in developing countries where about 80% of their total population depends on it for their well-being [12]. World Health Organization (WHO) estimates that 70% of populations from many countries are using traditional of folk medicine to cure various ailments [79]. The total numbers of plants with medicinal properties in the subcontinent are present stands at about 2000. About the 450 to 500 of such medicinal plants name so far been enlisted as growing or available in Bangladesh [15].
In Bangladesh so far a number of floristic, ethno-botanical and medicinal researches have been carried out [5, 9, 19, 75-78, 24-73, 8]. The aims of the present investigation were to record medicinal knowledge of plants by the local people in and around Rajshahi metropolitan city.

2. Materials and Methods
2.1 Study area
Rajshahi district is a district in north-western Bangladesh. It is a part of the Rajshahi division. The metropolitan city of Rajshahi is in Rajshahi district. The Rajshahi district is bounded by Naogaon district to the north, Natore district to the east, and Chapai Nawabganj district and the river Padma to the south. The Rajshahi district has a sub-tropical monsoon climate, typical of Bangladesh, which falls within a low rainfall zone of the country. 75 percent rainfall occurs during June-September. The annual rainfall is 1350 mm. Temperature of the area is low in January varies from 9.0 °C to 14.1 °C. From February an increasing trend of temperature is found up to April and thereafter temperature start to decline. In April temperature varies from 22.6 °C to 36.9 °C. The mean relative humidity is found to be low in March (65%) and high in July-September (88-89%) [10].

2.2 Methods of the Study
The present study in based on the intensive field of the area during the period of September 2014 to October 2015. Regular field studies were made in the study area during the period. The information about the plants used for various diseases was gathered through interviews and discussion with the elderly people, medicine men and traditional medical practitioners were consulted. Plant specimens with flowers and fruits were collected and processed using standard herbarium techniques [7]. Herbal plants referred by these people were authentically identified with the help of [1-4, 16, 18, 20, 22-23]. The voucher specimens are stored at the Herbarium, Department of Botany, Rajshahi University for future reference.

3. Results and Discussion
Taxonomic study and traditional medicinal practices on important angiosperm plant species in and around Rajshahi metropolitan city was carried out from September 2014 to October 2015. A total of 8 species under 8 genera belonging to 7 families were collected and identified. For each species English name, botanical name, local name, status of occurrence, habit, habitat, flowering and fruiting time, chromosome number, distribution, taxonomic description and traditional medicinal uses have been mentioned. During the studies eight medicinal plants of the area were found to be different ailments such as anthelmintic, alterative, appetite, alopecia, astringent, body pain, bronchitis, constipation, chicken pox, cough, cold, dyspepsia, dysentery, digestive, emetic, eczema, fevers, flu, gonorrhea, heart disease, high blood pressure, hepatitis, headache, indigestion, insecticide, inflammations, jaundice, liver pain, leprosy, menses, paralysis, piles, psoriasis, ring worm, rheumatism, stomachic, swellings,

skin disease, snake venom, scabies, tumors, tonic, wound and worm. These findings with similar uses were documented by [5, 15, 80].

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

1. *Calotropis procera* R. Br.

Synonyms: *Asclepias procera* Aiton. *Calotropis wallichii* Wight.
Family name: Asclepiadaceae.
English name: Crown flower, Rooster tree, Apple of Sodom.
Local name: Akanda.
Status of occurrence: Frequent.
Habit: Shrub.
Habitat: Dry moist areas, roadsides, Railway lines.
Flowering and fruiting time: February to September.
Distribution: Widely distributed in tropical and subtropical Africa, Asia including Middle East, the West Indies and Mascarene Islands. In Bangladesh, it occurs in greater Rajshahi district [1].

Chromosome number: 2n = 22 [11].
Taxonomic description: An erect shrub, up to 2.4 m high; bark soft, corky, spongy, much branched at the base. Leaves sub-sessile, usually 5.7-15 cm long, broadly ovate, ovate-oblong, elliptic or obovate. Flowers white, in umbellate cymes. Follicles 7.5-10 cm long, subglobose, ellipsoid or ovoid.

Traditional Medicinal Uses

Roots: Root bark is useful for treating chronic cases of dyspepsia, flatulence, constipation, loss of appetite, indigestion and mucus in stool. It is also used as alterative, tonic and emetic. The root bark is very useful in acute dysentery. The powdered root used in asthma, bronchitis, and dyspepsia.
Latex: The milky juice is used as remedy for leprosy.
Leaves: Leaves are used against worms. The fresh leaves are used as muscles pain. The leaves are useful in the treatment of paralysis, swellings, and intermittent fevers.
Flowers: Flowers are useful in asthma. The flowers are bitter, digestive, astringent, stomachic, anthelmintic, and tonic.

Fig 1: *Calotropis procera* R. Br.

2. *Catharanthus roseus* (L.) G. Don.

Synonyms: *Vinca rosea* L., *Ammocallis rosea* (L.) Small, *Lochnera rosea* (L.) Rchb.
Family name: Apocynaceae.
English name: Madagaskar periwinkle or Rosy periwinkle.
Local name: Nayantara.
Status of occurrence: Very common.
Flowering and fruiting time: Flowering almost throughout the year.
Chromosome number: 2n = 16 [21].
Distribution: A native of Madagascar widely cultivated and naturalized in the tropics and subtropics of both hemispheres. In Bangladesh, it is grown in many gardens as an ornamental plant and also cultivated for medicinal use [1].

Taxonomic description: A bushy annual or somewhat suffruticose plant, 0.3-0.6 cm high. Leaves 7-9 cm long, polished, ovate or oblong. Flowers white or deep rose-coloured, usually paired in the leaf axils. Follicles linear, 2.3 cm long.

Traditional Medicinal Uses

Whole plant: The plant has been used as a folk remedy for diabetes.
Leaf: Leaf juice is applied to wasp-sting; the leaves infusion s given for dyspepsia and indigestion. Leaves are given for blood dysentery and piles and rheumatism.
Latex: latex is used for blood dysentery and piles.
Root: The root is considered tonic and stomachic.
Flowers: an extract of the flower was commonly administered as eyewash for the eyes of infants.

Fig 2: *Catharanthus roseus* (L.) G. Don.

3. *Lantana camara* L.

Synonyms: *Lantana aculeata* L., *Lantana scabrida* Soland ex Ait.
Family name: Verbenaceae.
English name: Bush Lantana, Prickly sweet-sage or Cherry Pie.
Local name: Chotra.
Status of occurrence: Common.
Habit: Shrub.
Habitat: In waste lands, roadsides, railway tracks and gardens.
Flowering and fruiting time: Throughout the year.
Chromosome number: 2n= 22, 36, 72 [21].
Distribution: India, Pakistan, Sri Lanka and tropical Africa. In Bangladesh, it is found in most areas of the country [4].
Taxonomic description: A large scrambling evergreen shrub, 1.2-2.4 m high with many recurved prickles on stems. Leaves opposite, 2.5-7.5 cm long, ovate, subacute, crenate-serrate, scrabrid on both sides. Flowers small, 6 mm across, variously coloured in heads, 2.5 cm across. Fruit rotundate, smooth, size of a pea, black.

Traditional Medicinal Uses
Whole plant: Lantana oil is used externally for leprosy and scabies. Plant extracts are used as medicine for the treatment of cancers, chicken pox, measles, asthma, ulcers, swellings, eczema, tumors, high blood pressure, bilious fevers, catarrhal infections, tetanus, rheumatism, malaria and abdominal viscera.
Leaf: Leaves are used for the treatment of measles, malaria and tetanus. The leaves are used to relieve itching. Other uses are against flu, colds, coughs, fevers, yellow fever, dysentery and jaundice.
Root: The roots are used for gonorrhea.

Fig 3: *Lantana camara* L.

4. *Leucas aspera* (Willd.) Link.
Synonym: *Phlomis aspera* Willd.
Family name: Lamiaceae.
English name: Wild ocinum.
Local name: Shetodron.
Status of occurrence: Common.
Habit: Herb.
Habitat: Waste places, roadsides and wheat fields.
Flowering and fruiting time: Throughout the year.
Distribution: Throughout the Indian subcontinent, extending from the Punjab to Assam and southwards up to Peninsular India. In Bangladesh, it is found all over the country [2].
Chromosome number: 2n = 22 [14].
Taxonomic description: A diffusely branched, annual herb, 15-45 cm high; branches quadrangular, hispid. Leaves subsessile, 2.5-7.5 cm long, linear-oblong or oblong-lanceolate, obtuse entire or crenate, hairy. Flowers white, sessile or subsessile in terminal and axillary whorls, up to 2.5 cm diam., corolla 1 cm long.

Traditional Medicinal Uses
Whole plant: The plants are believed to be antidote for snake venom; used as an insecticide.
Leaf: The leaves are useful in chronic rheumatism. The juice of leaves is applied in psoriasis and other chronic skin eruption.
Flower: The flowers are given to children with warm honey to cure cough and cold.

Fig 4: *Leucas aspera* (Willd.) Link.

5. *Persicaria hydropiper* (L.) Spach.
Synonym: *Polygonum hydropiper* L.
Family name: Polygonaceae.
English name: Pepperwort.
Local name: Bishkatali.
Status of occurrence: Frequent.
Habit: Herb.
Habitat: Aquatic Waste places.
Flowering and fruiting time: August to April.
Distribution: Afghanistan, China, India (Assam, Kashmir, Khasia, Kumaon and Madras), Indonesia, Japan, the Philippines and Sri Lanka. The Plant is also common in Europe, North Africa, North America and Australia. In Bangladesh, it occurs almost throughout the country [3].
Chromosome number: 2n = 20, 22 [14].
Taxonomic description: A stoutish annual, stem decumbent at base and ascending, 30-50 cm long. Leaves linear-lanceolate, 3.8-8 cm long, subsessile; stipules glabrous, with few and usually deciduous bristles mostly under 2.5 mm long. Flowers white, small, in rather lax, very slender or filiform racemes which are erect, flexuous, or decurved.

Traditional Medicinal Uses
Whole plant: The plant is stimulant and diuretic. Used principally for obstructions of the menses and amenorrhea. Juice of the plant is a common remedy against the body lice of cattle and sheep and as a repellent of flies. It is reported to be used in enlarged liver, wounds, headache, intestinal worms, skin diseases, body pain, and loss of appetite, toothache, gastric ulcer, dysentery and for premature abortion.
Leaf: Leaves are given for stomach pain. Juice of young tender leaves is a popular remedy of liver pain.
Root: Roots are stimulant and tonic.

Fig 5: *Persicaria hydropiper* (L.) Spach.

6. *Solanum nigrum* L.
Synonyms: Not Known.
Family name: Solanaceae.
English name: Black Nightshade.
Local name: Tit-begun.
Status of occurrence: Common.
Habit: Herb.
Habitat: Moist shady places or open and disturb places.
Flowering and fruiting time: January to December.
Distribution: Throughout India, Pakistan and Sri Lanka. In Bangladesh, it occurs almost throughout the country [4].
Chromosome number: 2n = 72 [74].
Taxonomic description: An annual herb; stem much divaricately branched. Leaves 2.5-9 cm long, ovate-lanceolate, subacute or acuminate, entire or sinuate-toothed. Flowers

small, white, in extra-axillary, subumbellate, 3-8 flowered cymes. Berry 6 mm diam., globose, purplish black when ripe.

Traditional Medicinal Uses

Whole plant: Plant is alterative, sedative, diaphoretic and diuretic; given in chronic enlargement of the liver, piles and dysentery. Plant is also beneficial against skin diseases and remedy for anthrax pustules.

Fruit: Fruits are tonic and diuretic; useful in heart diseases, hiccup, asthma, fever, diarrhea and bronchitis. Paste of the green fruit is applied to ringworm. Syrup of the fruit is expectorant and diaphoretic; used as a cooling drink in fevers.

Seed: Seeds are laxative; useful in giddiness, gonorrhea, thirst and inflammations.

Leaf: Decoction and also aqueous extract of the leaves is very useful in dropsy for its diuretic action.

Stem: Young stems are given in skin diseases, and are very useful in psoriasis.

Fig 6: *Solanum nigrum* L.

7. *Tridax procumbens* L.

Synonyms: Not Known.

Family name: Asteraceae.

English name: Tridax daisy.

Local name: Tridhara.

Status of occurrence: Common.

Habit: Herb.

Habitat: Dry soil, dry slopes, open fields and road sides.

Flowering and fruiting time: Throughout the year.

Distribution: India and China. In Bangladesh, it is found all over the country [1].

Chromosome number: 2n = 36 [14].

Taxonomic description: Annual or biennial somewhat patently hispid herbs. Stem branched, creeping at base, suberect or trailing above. Leaves ovate-lanceolate, or elliptic-rhomboid, with a cuneate base, obtuse or subacute, coarsely serrate or lobed, patently hispid, 2.5-7 cm long. Heads solitary, 1.2-1.5 cm across, on erect, 10-30 cm long peduncle. Marginal flowers 5-6 with pale yellow, 0.3 cm long ligules; disc flowers bright yellow.

Traditional Medicinal Uses

Leaf: Leaf juice possesses antiseptic, insecticidal and parasiticidal properties. The crushed leaves are applied to arrest bleeding in bruises and cuts. Leaves are also used for the treatment of bronchial catarrh, dysentery, and diarrhea and for the restoration of hairs.

Fig 7: *Tridax procumbens* L.

8. *Wedelia trilobata* (L.) A.S. Hitchc.

Synonyms: *Wedelia carnosa* Rich. *Sphagneticola trilobata* (L.) Pruski

Family name: Asteraceae.

English name: Chinese Wedelia.

Local name: Mohavringoraj.

Status of occurrence: Common.

Habit: Herb.

Habitat: Roadsides, waste places, gardens.

Flowering and fruiting time: March to August.

Distribution: A native of Central America, now widely distributed in the tropics. In Bangladesh, it is found all over the country [1].

Chromosome number: 2n = 22, 44 [14].

Taxonomic description: *Wedelia* forms a low-growing mat mat of foliage with deeply lobed leaves that grows to a height of about 10 in (cm). Blooms profusely with 1" yellow-orange flowers resembling marigolds or zinnias, which are borne singly on the end of each stem. Plant creeps and roots at nodes, making a dense ground cover.

Traditional Medicinal Uses

Whole plant: The whole plant is considered as a tonic and alterative and is useful in cough, skin diseases and alopecia. *W. trilobata* has traditionally been used to treat infections, indigestion and to treat hepatitis.

Leaf: Crushed leaves are used as a poultice; tea is given to alleviate symptoms of colds and flu.

Fig 8: *Wedelia trilobata* (L.) A.S. Hitchc.

4. Conclusion

The result of the study may not generalize to the local people as a whole, due the small-scale opportunistic sampling approach used. In any future study, more respondents should be involved by widening the area of survey. Anyway, it may be necessary to evaluate the safety, efficacy and quality of herbal medicines and their products through randomized, detailed clinical trial studies. Public education programme on the safe

use of herbal medicines may be necessary as a means of minimizing their potential adverse effects on the users.

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