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Taxonomy and Traditional Medicinal Uses of Apocynaceae (Dogbane) Family of Rajshahi District, Bangladesh

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ABSTRACT

Taxonomy and traditional medicinal uses on the family *Apocynaceae* growing throughout the Rajshahi district has been made. A total of 14 species under 12 genera belonging to the family *Apocynaceae* were collected and identified. Out of the total number of species *Allamanda cathartica* Linn, *Alstonia scholaris* (L.) R.Br. *Carissa carandas* Linn, *Catharanthus roseus* (L.) G. Don, *Ichnocarpus frutescens* (L.) R. Br., *Nerium oleander* Linn., *Plumeria alba* Linn., *Plumeria rubra* Linn., *Rauvolfia serpentina* Linn., *Tabernaemontana divaricata* Linn., *Thevetia peruviana* (Pers) K. Schum. were common and *Cerbera odollam Gaertn*, *Holarrhena antidysenterica* Linn, *Rauvolfia tetraphylla* Linn were rare species in the study area. For each species English name, botanical name, local name, status of occurrence, flowering season, distribution, voucher number and traditional medicinal uses have been mentioned. This information will be beneficial in public health, research and providing lead to plants that can be useful in drug discovery.

INTRODUCTION

Apocynaceae, dogbane (Gentianales), trees, shrubs, vines, family usually have milky, often poisonous juice; smooth-margined leaves; and flowers in clusters (rarely solitary). Asclepiadoideae, fruit berry. Trees, shrubs, or vines, rarely subshrubs or herbs, with latex or rarely watery juice. Leaves simple, opposite, rarely whorled or alternate, pinnately veined; stipules absent or rarely present. Inflorescences cymose, terminal or axillary, with bracteoles. Flowers bisexual, 5- [or 4]-merous, actinomorphic. Calyx 5- or rarely 4-partite, quincuncial, basal glands usually present. Corolla 5- or rarely 4-lobed, salverform, funnellform, urceolate, or rarely rotate, lobes overlapping to right or left, rarely valvate. Stamens 5 or rarely 4; filaments short; anthers mostly sagittate, free or connivent into a cone adherent to pistil head, dehiscing longitudinally, base rounded, cordate, sagittate, or prolonged into an empty spur; pollen granular; disc ringlike or cup-shaped, 2-5-lobed, or absent. Ovaries superior, rarely half-inferior, connate or distinct, 1- or 2-locular; ovules (1 or) 2-numerous per locule. Style 1; pistil head capitate, conical, or lampshade-shaped, base stigmatic, apex 2-cleft and not stigmatic. Fruit a berry, drupe, capsule, or follicle. Seeds with or without coma; endosperm thick and often horny, scanty, sometimes absent; embryo straight or nearly so, cotyledons often large, radicle terete.

The importance of studying local floristic diversity and medicinal uses has been realized and carried out in Bangladesh by [1-33]. The main objectives of the present study are to explore, identify, medicinal aspects and document the family *Apocynaceae* of Rajshahi district, Bangladesh.

MATERIALS AND METHODS

The present study is based on the intensive field of the area during the period of July 2013 to August 2014. A total of 14 species under 12 genera belonging to the family *Apocynaceae* 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 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. Medicinal uses and data about the treatment of various ailments based on the information gathered by using questionnaires are given subsequently.

The plant specimens were identified by consulting different Floras and literatures, viz, and by comparing with the herbarium specimens available at the Herbarium, Department of Botany, Rajshahi University [1-3,34-59]. For updated nomenclature of the species [60-62]. Voucher specimens are deposited in the Herbarium, Department of Botany, Rajshahi University.

RESULTS AND DISCUSSION

In the present survey, a total of 14 species under 12 genera of the family Apocynaceae were recorded for Rajshahi district. For each species, the nomenclature has been brought updated and the local name, taxonomic description, habit, status of occurrence, traditional medicinal uses, flower colour, flowering season distribution and one representative specimen have been provided. Based on this study, a preliminary list of the family Apocynaceae at Rajshahi district, Bangladesh conducted during July 2013 to August 2014. The collected information is comparable with the result of other studies in Bangladesh. A total of 3 species belonging to 3 genera were recorded in Comilla district [38]. A total of 6 species belonged to 6 genera are documented in Khagrachhri district [39]. A total of 5 species belonging to 4 genera are recorded in Tekhnaf [30]. No published information recorded on the family Apocynaceae at Rajshahi district, Bangladesh.

GOLDEN TRUMPET

Botanical name: *Allamanda cathartica* L.

Local name: Allokananda

Status of occurrence: Common

Flowering season: Almost throughout the year

Distribution: A native of tropical America largely grown as ornamental and sometime naturalized in the moist zone including Bangladesh India Myanmar, Nepal Pakistan and Sri Lanka. In Bangladesh it is found throughout the country.

Taxonomic description: A woody much-branched stragling shrub. Leaves obovate-lanceolate, entire, 8-11 cm long, glossy, acuminate, 4 in a whorl, occasionally 2 or 3. Flowers in axillary cymes, large, yellow, about 12 cm across, tube funnel-shaped, about 7.5 cm long; calyx about 1.5 cm long, sepals 5, ovate, acuminate.

Traditional Medicinal Uses: The bark acts as a hydragogue in ascites. The leaves are a valuable cathartic in moderate doses. The root is used as a remedy for snake-bites. Alcoholic and aqueous extract of root is hypertensive. Leaf extract showed antifungal and anticancer properties.

Voucher number: MA 10; 02.01.2014; Rajshahi University Campus (**Figure 1**).



Figure 1. *Allamanda cathartica* L.

DITA BARK TREE

Botanical name: *Alstonia scholaris* (L.) R. Br.

Local name: Chatim

Status of occurrence: Common

Flowering season: November-May

Distribution: Africa, Australia, Bhutan, China, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan and Sri Lanka. In Bangladesh, it is cultivated throughout the country, and occurs naturally in the forests in eastern parts of the country.

Taxonomic description: A medium-sized, sometimes very tall, evergreen trees with copious white latex; branches whorled. Leaves 10-20 cm long, coriaceous, oblong-lanceolate, whorled. Flowers small, greenish white, in many flowered capitate cymes.

Fruits 30-60 cm long, narrow, cylindrical follicles, pendulous in clusters. A medium-sized, sometimes very tall, evergreen trees with copious white latex; branches whorled. Leaves 10-20 cm long, coriaceous, oblong-lanceolate, whorled. Flowers small, greenish white, in many flowered capitate cymes. Fruits 30-60 cm long, narrow, cylindrical follicles, pendulous in clusters.

Traditional Medicinal Uses: The bark is astringent, tonic, anthelmintic, laxative, febrifuge, alterative and antiperiodic. It is a valuable remedy in chronic diarrhea and the advanced stages of dysentery; also useful in catarrhal fever, skin diseases and malaria. The milky juice is applied to ulcers and mixed with oil in earache. Sap, gum and roots are used in cancer.

Voucher number: MA 11; 02.11.2013; Katakhai (**Figure 2**).



Figure 2. *Alstonia scholaris* (L.) R. Br.

CHRIST'S THORN

Botanical name: *Carissa carandas* L.

Local name: Karamcha

Status of occurrence: Common

Flowering season: March- November

Distribution: India, Malaysia, Myanmar, Pakistan, Saudi Arabia and Sri Lanka. In Bangladesh, it is grown in most parts of the country.

Taxonomic description: large armed shrub, with long, stout, sharp, horizontal spines at the base of the branchlets. Leaves 3.8-7.5 cm long, coriaceous, elliptic or obovate, obtuse. Flowers white, in terminal corymbose cymes. Fruit 1.3-2.5 cm long, ellipsoid, fleshy, black when ripe.

Traditional medicinal uses: The root is antiscorbutic, stomachic and anthelmintic. Decoction of the leaves is useful in early stages of remittent fevers. Unripe fruit is astringent, appetizer and antipyretic. Ripe fruit is cooling and acid; useful in bilious complaints. Root paste is insect repellent; paste of root bark is useful in diabetic ulcer.

Voucher number: M.A 13; 02.03.2014; Rajshahi (**Figure 3**).



Figure 3. *Carissa carandas* L.

RED PERIWINKLE

Botanical name: *Catharanthus roseus* (L.) G. Don.

Local name: Nayantara

Status of occurrence: Very common

Flowering season: Flowering almost throughout the year.

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.

Taxonomic description: A bushy annual or somewhat suffruticose plant, 0.3-0.6 m 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: The plant has been used as a folk remedy for diabetes. Leaf juice is applied to wasp-sting; infusion of the leaves is given in menorrhagia. The root is considered tonic and stomachic. The alkaloids isolated from plant possess anticancer properties, among them vincristine and vinblastine are successfully used against leukemia and Hodgkin's disease. Alkaloids also possess hypertensive, sedative and tranquillizing properties. They also cause relaxation of plain muscles and depression of the central nervous system. Leaves and latex are given for blood dysentery and piles.

Voucher number: MA 14; 09.04.2014; Rajshahi University Campus (**Figure 4**).



Figure 4. *Catharanthus roseus* (L.) G. Don.

GREY MILKWOOD

Botanical name: *Cerbera odollam* Gaertn.

Local name: Dabur, Dhakur.

Status of occurrence: Rare

Flowering season: Flowering: March-July.

Distribution: The coasts of Sri Lanka, India, Malaysia and Indonesia. In Bangladesh, it grows along the coasts of Chittagong and Cox's Bazar districts.

Taxonomic description: A small or medium-sized tree, branchlets whorled. Leaves glabrous, petioles 1.5-4.0 cm long, lamina 18.0-18.5×4.2-5.5 cm, obovate-lanceolate, widest above the middle, much tapering to the base, acute at the apex, slightly coriaceous. Cymes long peduncled, pedicels up to 3 cm long. Flowers glabrous. Calyx lobes 0.8-1.6 cm long, recurved, very acute. Corolla with a yellow eye, tube swollen just above the middle, 1.5-2.0 cm long the lobes 2-3 cm long, filaments short, anthers included. Disc absent. Mericarp 5.5-8.0 cm in diameter, glabrous, green.

Traditional Medicinal Uses: The bark is purgative. The nut is narcotic and poisonous. The seeds are extremely poisonous and contain glucoside cerberine, which has a powerful effect on heart. The kernel when taken internally produces vomiting and purging soon followed by collapse and death.

Specimen examined: MA 15; 02.03.2014; Rajshahi University Botanical Garden (**Figure 5**).

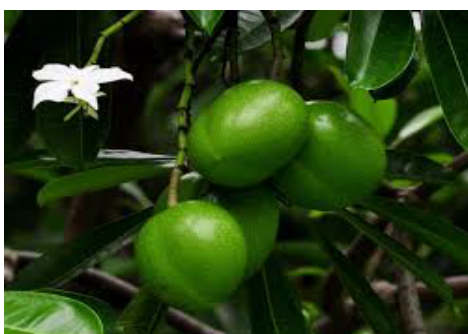


Figure 5. *Cerbera odollam* Gaertn.

BITTER OLEANDER

Botanical name: *Holarrhena antidysenterica* (L.) Wall ex Decne.

Local name: Korchi

Status of occurrence: Rare

Flowering season: April-January.

Distribution: India, Myanmar, Nepal, Pakistan and Sri Lanka. In Bangladesh, it occurs almost throughout the country.

Taxonomic description: A small, deciduous tree. Leaves 10-20 cm long, from broadly ovate to elliptic, obtuse or obtusely acuminate. Flowers white, in terminal corymbose cymes, 7.5-15 cm diam.; corolla tube 4-13 cm long, slightly inflated near the base; lobes about equalling the tube, oblong, rounded at the apex. Follicles 20-38 cm long, cylindrical, often dotted with white spots.

Traditional medicinal uses: The bark is stomachic, astringent, febrifuge, anthelmintic, powerful antidiarrhetic and antidiarrhoeal; cures dysentery, diarrhea, fevers, piles, leprosy and skin diseases. Leaves are used in chronic bronchitis, lumbago, urinary discharges, boils and ulcers. The flowers are cooling, appetizer, anthelmintic; cure biliousness, diarrhoea and leucoderma. The seeds are carminative, astringent, tonic and febrifuge; given in affections of the chest, asthma, colic and diuresis.

Voucher number: MA 16; 04.05.2014; Rajshahi (**Figure 6**).



Figure 6. *Holarrhena antidysenterica* (L.) Wall ex Decne.

BLACK CREEPER

Botanical name: *Ichnocarpus frutescens* (L.) R. Br.

Local name: Loilata

Status of occurrence: Common

Flowering season: Flowering: April-December.

Distribution: Australia, China, India, Kashmir, Myanmar, Malaysia, Nepal, Sri Lanka, and Pakistan. In Bangladesh it is common throughout the country.

Taxonomic description: A large, much-branched twining shrub, containing white latex in its all parts. Leaves 4.5-7.5 cm long, elliptic-oblong, acute or acuminate. Flowers small, greenish white, numerous, in axillary and terminal rusty-pubescent trichotomous pedunculate cymes. Fruit a follicle, 10-15 cm long, slender, cylindrical.

Medicinal uses: The roots are employed as a substitute for Sarsaparilla; it is cooling, demulcent, alterative, tonic, diaphoretic and diuretic; used in fever, dyspepsia, skin troubles, diabetes and stone in the bladder. A decoction of the stems and leaves is used in fevers. Leaves are applied to headaches, wounds and sore between fingers.

Voucher number: MA 17; 04.04.2014; Rajshahi University Boanical Garden (**Figure 7**).



Figure 7. *Ichnocarpus frutescens* (L.) R. Br.

OLEANDER

Botanical name: *Nerium oleander* Linn.

Local name: Korobi

Status of occurrence: Common

Flowering season: Flowering: January-July

Distribution: China, India Japan and Mediterranean to Persia. In Bangladesh, it is grown in gardens throughout the country.

Taxonomic description: A large, erect evergreen shrub with white latex. Leaves in threes, 10-15 cm long, linear-lanceolate, tapering at both ends. Flowers pink or white, 4 cm across, in terminal cymes.

Traditional medicinal uses: All parts of the plants are poisonous. Leaf decoction is used to reduce swellings. Macerated leaves are used for itch and fall of hair. The flowers are good for inflammations, chronic pains in the muscles and the joints, lumbago, headache, and scabies. Root and root bark are powerful diuretic, cardiac tonic, resolvent and attenuant; used externally as a paste to cancers and ulcers on the penis, chronic pain in the abdomen and pain in the joints. Roots and leaves are used in skin diseases and leprosy.

Voucher number: MA 18; 04.06.2014; North site of Rajshahi University Stadium (**Figure 8**).



Figure 8. *Nerium oleander* Linn.

PAGODA TREE

Botanical name: *Plumeria alba* L.

Local name: Kathgolap

Status of occurrence: Common

Flowering season: May-November.

Distribution: Native of tropical America, cultivated and naturalized in India, Myanmar, Nepal, Paistan and Sri Lank. In Bangladesh, it is planted throughout the country.

Taxonomic description: A small tree. Leaves simple, large, pubescen, beneath, petioles up to 5.5 cm long, lamina 25-30×6-8 cm, linear-oblong, rounded at the base, apex acute or acuminate, margin revolute. Cymes terminal, peduncles 30-35 cm long. Calyx small, eglandular, lobes short, rounded. Corolla salver-shaped. lobes oval-obovate. Folticles linear, smooth, up to 20cm long.

Traditional medicinal uses: The bark, leaves, flower buds and latex are uded in syphilitic ulcers, Excessively planted in gardens and near temples for fragrant and beautiful flowers.

Specimen examined: MA 19; 04.09.2013; Third Science Building, Rajshahi University (**Figure 9**).

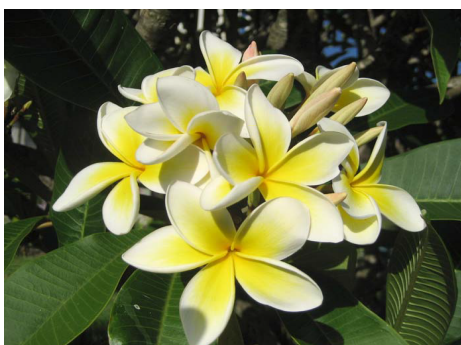


Figure 9. *Plumeria alba* L.

TEMPLE TREE

Botanical name: *Plumeria rubra* L.

Local name: Golapi Kathgolap

Status of occurrence: Rare

Flowering season: May-September.

Distribution: A native of central America from Mexico to Panama. Commonly grown in Bangladesh and throughout the tropics, sometimes found in a semi-wild state as a relict of cultivation. Also grown in India, Myanmar, Nepal, Pakistan and Sri Lanka.

Taxonomic description: A small deciduous tree with thick branches and copious milky juice; bark corky, fissured. Leaves 15-30 cm long, oblanceolate, thick. Flowers 5 cm across, white with yellow centre, in terminal peduncled cymes.

Traditional medicinal uses: Root bark is drastic purgative, stimulant, emmenagogue and febrifuge; used as a cure for gonorrhoea and venereal sores. It is also used in blenorrhagia, diarrhoea and piles. The latex is rubefacient and purgative; used in rheumatism, itch, toothache and carious teeth. Leaves are used as a poultice in swelling; flower heads in ague. The juice extracted from bark is taken for Jaundice.

Voucher number: MA 20; 04.09.2013; Rajshahi University (**Figure 10**).



Figure 10. *Plumeria rubra* L.

SNAKE-ROOT

Botanical name: *Rauvolfia serpentina* (L.) Benth ex Kurz.

Local name: Sarpagandha

Status of occurrence: Common

Flower season: Flowering: April-October.

Distribution: Bhutan, Cambodia, China, India including tropical Himalayas, Laos, Indonesia.

Taxonomic description: A small erect shrub, up to 0.9 m high. Leaves in whorls of 3, 7.5-18 cm long, lanceolate, acute or acuminate, glabrous. Flowers white, in many-flowered irregular corymbose cymes; pedicels and calyx, bright red. Corolla 1-1.3 cm long; tube slender, swollen a little above the middle. Drupes single or didymous, about 6 mm diam., purplish black when ripe.

Traditional medicinal uses: Roots are sedative, tonic and febrifuge. It is a valuable remedy in high blood pressure; used for the treatment of insomnia, madness, painful affections of the bowels, hypochondria and irritative conditions of the central nervous system. Roots have been employed for centuries for relief of various nervous disorders like anxiety, excitement, schizophrenia, insanity, insomnia and epilepsy. Root extracts are also valued in diarrhoea, dysentery, cholera, colic and fever. Decoction is employed to increase uterine contractions and promotes expulsion of the foetus.

Voucher Number: MA 21; 04.11.2013; Rajshahi University Campus (**Figure 11**).



Figure 11. *Rauvolfia serpentina* (L.) Benth ex Kurz.

DEVIL PEPPER

Botanical name: *Rauvolfia tetraphylla* L.

Local name: Sarpagondha

Status of occurrence: Rare

Flower season: April-July.

Distribution: Native of West Indies. Introduced and naturalized in many countries including Bangladesh, India, Myanmar, Nepal Pakistan and SriLanka.

Taxonomic description: A small much-branched woody shrub, 0.6-1.2 m high. Leaves whorled, elliptic. Flowers greenish white or creamy white in umbellate cymes; drupes ovoid, deep purple when ripe; pyrenes rugose, oblong.

Traditional Medicinal Uses: Roots are sedative, tonic and febrifuge. It is a valuable remedy in high blood pressure; used for the treatment of insomnia, madness, painful affections of the bowels, hypochondria and irritative conditions of the central nervous system. Roots have been employed for centuries for relief of various nervous disorders like anxiety, excitement, schizophrenia, insanity, insomnia and epilepsy. Root extracts are also valued in diarrhoea, dysentery, cholera, colic and fever. Decoction is employed to increase uterine contractions and promotes expulsion of the foetus. The dry root bark crushed and administered in small doses in body pain and fever.

Voucher number: MA 22; 04.12.2013; Rajshahi (**Figure 12**).



Figure 12. Rauvolfia tetraphylla L.

WAX FLOWER

Botanical name: *Tabernaemontana divaricata* (L.) R. Br ex Roem.

Local Name: Tagar

Status of occurrence: Rare

Flowering season: May-January

Distribution: Bhutan, India, Nepal, Sri Lanka, Myanmar and Thailand. In Bangladesh, it is found almost throughout the country.

Taxonomic description: A slender, bushy shrub, dichotomously branched, bark greyish-white, lenticellate. Leaves opposite, glabrous, petioles up to 1.5 cm long, lamina 5-12 × 2-3 cm, elliptic-oblong, acuminate, herbaceous, distant lateral nerves slender, 5-6 pairs. Cymes peduncled, dichotomously branched, terminal or axillary, corymbose. Calyx lobes ovate-oblong, obtuse. Corolla white, tube about 2 cm long, narrowly cylindrical, lobes longer than the tube, obliquely ovate, in bud overlapping to the left. Stamens included, anthers subsessile, acuminate. Carpels 2, distinct, stigma bilobed. Follicles divaricate, up to 8 cm long, fleshy, orange-red inside. Seeds rather numerous, without a tuft of hairs.

Traditional medicinal uses: The red pulp around the seed is used as a dye. The root is prescribed for biliousness, epilepsy and paralysis. The root is chewed to relieve toothache; latex is rubbed on the head to cure plain in the eyes the latex is applied to wounds to prevent inflammation.

Voucher Number: MA 23; 04.10.2013; Rajshahi University Campus (**Figure 13**).



Figure 13. Tabernaemontana divaricata (L.) R. Br ex Roem.

YELLOW OLEANDER

Botanical name: *Thevetia peruviana* (Pers) K. Schum.

Local name: Holdekorobi

Status of occurrence: Common

Flowering season: Flowering: throughout the year.

Distribution: Native of tropical America. Cultivated and naturalized in the tropics. In Bangladesh, it is usually cultivated throughout the country.

Taxonomic description: A large, evergreen shrub or small tree, 4.5-6 m high. Leaves 7.5-15.0 cm long, linear, narrowed at both ends, spirally arranged. Flowers about 5 cm across, in few-flowered terminal cymes; corolla yellow, fragrant, funnel-shaped, 5 cm long. Fruit broadly obovate in longitudinal section, 3.2 cm long, somewhat longitudinally constricted, mesocarp bony.

Traditional medicinal uses: All parts of the plant are poisonous. Milky juice of the plant is also highly poisonous. Barks and seeds are cardiac tonic and strong cardiac stimulant. Bark is cathartic, powerful febrifuge and emetic; useful in various kinds of intermittent fevers. Leaves also possess purgative and emetic properties. Seeds are abortifacient; used for suicidal and homicidal purposes. Seed oil is emetic and purgative.

Voucher Number: MA 24; 04.08.2013; Rajshahi University Campus (**Figure 14**).



Figure 14. *Thevetia peruviana* (Pers) K. Schum.

CONCLUSION

Taxonomy and traditional medicinal uses on the family *Apocynaceae* growing throughout the Rajshahi, Bangladesh was carried out during July 2013 to August 2014. A total of 14 species under 12 genera belonging to the family *Apocynaceae* were collected and identified. The present study may be a preliminary contribution of this area using standard research methods, focusing on medicinal plants and their local uses for the healthcare. This detailed information will be helpful for the pharmacognosist, botanist, ethno-botanist and pharmacologist for the collection and identification of the plant for their research work and isolation of plant products benefitting human health.

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