

Arboreal species of Bhopal which deserve immediate *in / ex situ* conservation & propagation-I

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Abstract

Bhopal, the capital city of Madhya Pradesh harbours a rich floristic heritage. The flora predominantly belongs to angiosperms. During the last few decades, owing to various reasons, there has been a rapid change in the floristic scenario of this beautiful city which is studded with several water bodies & hillocks. The number of several arboreal species, has drastically declined and many of them are on the verge of extermination from this area, such species include, wild, planted as well as exotics. Some of these species are : *Acacia farnesiana*, *Kleinhovia hospita*, *Dolichandrone falcata*, *Cananga odorata*, *Artocarpus chaplasha*, *Sterculia foetida* and *Melaleuca leucadendron* etc.

In the present paper only 6 arboreal species, which desparately need conservation have been dealt with. These include-*Acacia farnesiana* (L.) Willd., *Acrocarpus fraxinifolius* Wight ex Arn. *Adansonia digitata* A.L., *Couroupita guianensis* Aubl., *Crataeva nurvala* Buch.-Ham. & *Kleinhovia hospita* L.

Due to its strategic location, Bhopal is one of the green capitals of India. Despite a number of deforestation activities for industrialisation, urbanization and widening of roads, it still can boast of having more or less 1000 species of angiosperms. The local flora is an assemblage of wild, planted as well as exotic species. A number of workers have contributed research papers pertaining to the floristics of Bhopal and its adjoining areas. Some of these workers are : Brandis², Hole⁶, Joseph⁷, Tiwari³⁰⁻³², Tiwari & Maheshwari^{33,34}, Subramanyam & Henry²⁹, Wood³⁵, Panigrahi & Arora²⁴, Panigrahi *et al.*,^{25,26},

Panigrahi & Prasad²⁷, Pandeya²³, Narayanaswani & Rao²⁰, Mooney¹⁹, Oommachan & Billore²², Khan, M.A.W⁸, Oommachan²¹, Chaghtai & Ahmad³, Chaghtai & Garg⁴, Ahmad and Chaghtai¹, Chaghtai *et al.*,⁵, Khan⁹⁻¹¹, Khan & Chaghtai^{12,13}, Khan *et al.*,¹⁴⁻¹⁶, Khan and Malhotra¹⁷.

Some of these species are discussed hereunder :

1. *Acacia farnesiana* (L.) Willd. :

Syn. *Vachellia farnesiana* var.

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farnesiana (L.) Willd., *V. farnesiana* var. *guanacastensis* H.D. Clarke *et al.*, *A. farnesiana* var. *farnesiana* (L.) Wight *et Arn.*, *A. acicularis* Humb. & Bonpl. ex Willd., *A. densiflora* (Small) Cory, *A. farnesiana* var. *lenticellata* (F. Muell.) Bailey, *A. indica* (Poir.) Desv., *A. minuta* subsp. *densiflora* (Alexander ex Small). R.M. Beauch, *Mimosa acicularis* Poir, *Pithecellobium minutum* M.E. Jones. *Poponax farnesiana* (L.) Raf.

Common names:

Mimosa wattle, Dead finish, Perfumed wattle, Opoponax, Sponge flower, Sweet Acacia, Prickly Mimosa bush, West Indian blackthorn, Honey-ball. Gandh babool (Fig. 1).

Family- Mimosaceae

Botanical diagnosis :

A. farnesiana grows to a height of 4.5-9 meters, it produces multiple trunks. Bark light brown. Leaves twice pinnate with a small gland on petiole and sometimes one on each rachis near top of pinnae. Pinnae 2-8 pairs, leaflets 10-12 pairs, glabrous, leathery. Flowers in axillary pedunculate heads, calyx and corolla glabrous, scented. Pods indehiscent, straight or curved 4-7.5 cm long, about 1.5 cm wide subterete and turgid with longitudinal striations at maturity. Seeds chestnut brown.

Flowering & fruiting : March-July

Global distribution :

Tropical America, Rhodesia Mozambique, Australia.

Indian distribution :

Found wild as well as grown

throughout India.

Location at Bhopal :

Badabagh and Nishatpura.

Uses :

The flower heads yield perfume. The mature trees are reported to have an yield upto 1 Kg of flowers per season. Southern France (Grasse and Cannes) is the main producer of cassie flower perfume. India also produces perfume from the flowers of this tree for local use. The wood is used as fuel.

Propagation :

Propagated mainly from seed & stem cuttings. Seeds germinate readily and the young plants are quite hardy and do not require much cultivation practices, watering & care.



Fig. 1. *Acacia farnesiana* (L.) Willd.

2. *Acrocarpus fraxinifolius* Wight ex Arn.

Syn. *A. combretiflorus* Teijsm & Binnend, *Mezoneurum grande* Miq.

Common names : Shingle tree, Indian ash, Kenya Coffeeshade, Pink cedar, red cedar, Belanjic. Kurangan, Silichal, Delimas (Fig. 2).

Family : Fabaceae (Caesalpinioideae)

Botanical diagnosis :

A tall deciduous (upto 40 m) tree with a round straight trunk (90-200 cm) in diameter devoid of branches over most of its height, having large, thick buttresses and deep roots. Leaves bipinnate, pinnae 3-5 pairs, 20-30 cm long paripinnate, glabrous stout, leaflets 10-16 per pinna, opposite, elliptic lanceolate apex acuminate. Flowers in dense axillary racemes, deflexed, pedicels short, bracts caducous, calyx campanulate, sepals 5, equal, petals 5, subequal stamens 5, exserted, crimson, anthers versatile ovary half inferior. Fruit a pod 12×2 cm, flat ligulate. seeds 5-10, oblique & compressed.

Flowering & fruiting-February-July

Global distribution :

India, Thailand, Sumatra, Nepal, Bangla Desh, Bhutan, China, Laos, Myanmar and Thailand.

Indian distribution : Kerala, Maharashtra, Madurai, Nilgiri.

Location at Bhopal : Beside Motilal Nehru Stadium, near Lal Parade Ground.

Best suited for degraded areas which are not protected from cattle grazing. It is one of the food plants for endangered lion tailed macaque (*Macaca silenus*) during the period of fruit scarcity.

Propagation :

According to Rai²⁸, pretreatment of

seeds with conc. H₂SO₄ for 10 minutes promotes germination upto 90%.

Uses :

The wood is used in indoor construction, fence posts, furniture, packing cases, veneer and plywood and as fuel. The leaves are used as fodder. Also grown for shade in tea and coffee plantations.



Fig. 2. *Acrocarpus fraxinifolius* Wight ex Arn.

3. *Adansonia digitata* A.L.

Syn. *Adansonia bahobab* L., *A. baobab* Gaertn., *Baobabus digitata* (L.) Kuntze *Ophelus sitularius* Lour.

Common names :

Baobab, Monkey bread tree, Cream of Tartar tree, Lemonade tree, Mowana, Upside down tree, Gorakh Imli, Khurasani imli (Fig. 3).

Family : Bombacaceae

Botanical diagnosis : It is regarded

as the largest succulent plant in the world. The main stem of large baobab trees may reach gigantic proportions of upto 28 m in girth. They seldom reach 25 m in height. The squat cylindrical stem is massive and gives rise to thick tapering branches resembling a root system and hence often called as upside down tree. The stem is covered with a bark, which is some times as thick as 50-100 mm. The bark is greyish brown and normally smooth but can often be variously folded due to years of growth. The leaves are digitate and divided into 5-7 finger like leaflets. The leaves fall off during winter months and reappear in early summer.

The flowers are large (upto 20. cm in diameter) pendulous, white and sweetly scented. They bloom in late afternoon on long drooping stalks from July to September. The flowers fall off within 24 hours, turning brown and smelling quite unpleasant. The flowers have polyadelphous stamens and are pollinated by fruit bats at night.

Global Distribution :

A. digitata is native to the African continent. Some of the places where it is commonly met with are Burkina Faso, Ghana, Togo, Benin, Eriterea, Annobon island. Sudan, Namibia, Angola, Oman, Yemen Penang, Senegal, Ethiopia, Cameroon Zimbabwe, Jamaica and in many parts of India, it grows as an exotic entity. There are many trees in Mandav in M.P.

Location at Bhopal :

It can be seen at 45 bungalows. Arera Colony, Near 2nd no. bus stop in T.T. Nagar, however, the oldest tree can be witnessed at

Berasia, about 25 Kms from Bhopal City.

Uses :

The wood is used for fuel and timber. Leaves eaten fresh, because they are an excellent source of protein, minerals, Vitamin A & C. The leaves are also dried, milled and sieved to make a powder, that is used to flavour sauces and drinks. The fruit powder minus seeds is tangy and rich in vitamin C and B₂ and added to drinks and sauces. It is beneficial for pregnant women and said to have antipyretic properties. The black seeds are used to thicken soups or fermented to be used as flavouring agent or roasted to be eaten as snacks by the natives.



Fig. 3. *Adansonia digitata* A.L.

4. *Couroupita guianensis* Aubl.

Synonyms : *Couratri pedicellaris* Rizzini, *Couroupita acrensis* R. Kunth., *C.*

antillana Miers, *C. froesii* R. Knuth., *C. guianensis* Var. *surinamensis* (Mart. ex Berg.) Eyma, *C. idolica* Dwyer, *C. peruviana* O. Berg., *C. surinamensis* Mart. ex Berg. *C. venezuelensis* R. Knuth., *Lecythis bracteata* Willd., *C. saintcroixiana* R. Knuth.

Common names :

Cannonball tree, Macacarecula, Coco sachapura, Topegola, Nagamalli, Nagalinga Ful., Nagalinga Pushpa, Shivlingi etc. (Fig. 4).

Family - Lecythidaceae

Distribution : It is native to tropical forests of Central & South America. Found in Brazil, Colombia, Costa Rica, Ecuador, French Guiana, Guiana, Panama, Peru, Suriname, Venezuela and in many parts of India.

Location at Bhopal :

Hamidia Arts & Commerce College (Formerly M.L.B. Girls College) and Kilol Park.

Botanical Diagnosis :

C. guianensis is arboreal in habit and may attain a height upto 35 metres under favourable conditions. The leaves occur in clusters at the ends of branches, are often 8-30 cms long, but sometimes may attain a size as high as 57 cms. Inflorescences cauline, usually unbranched racemes, sometimes branched and paniculate, pedicel/hypanthium 1.2-6.0 cm long. Flowers zygomorphic, 5-6 cm in diameter, calyx lobes 6, broadly ovate, the bases slightly imbricate, the margins ciliate. Petals 6 most commonly yellow toward apices

and pink to red toward bases abaxially, pink to red except for white bases adaxially. Androecium prolonged on one side into flat hood, with stamen free area between staminal ring and hood proper. The hood white or pale yellow the anthers and the staminodes are often white at very base, pink for most of length, yellow at apex, ovary hexa locular. Fruits indehiscent, globose, 12-25 cm in diameter. The supracalyx zone rounded, the infracalyx zone rounded to base falling from tree at maturity. Seeds embedded in the pulp oxidizing bluish green when exposed to air. The testa with trichomes, embryo with 2 foliaceous cotyledons. One tree can hold as many as 1000 flowers per day. The flowers are strongly scented and are especially fragrant at night and in the early morning.

Flowering, fruiting :

November-May.

Uses :

Grown as an ornamental, The fruit pulp is used to feed chickens, muscovy ducks, turkeys and pigs, but sometimes also consumed by human beings. The hard shells are used as containers and flowers in perfumery.

It is reported that native Amazonians use extracts of several parts of the tree to treat hypertension, tumors, pain and inflammation. It is also used to treat common cold, stomachache, dermal conditions and wounds, toothache and malaria.

Propagation :

The propagation can be achieved

through woody stem cuttings as well as through seeds.

Conservation status :

A multipurpose threatened species.



Fig. 4. *Couroupita guianensis* Aubl.

5. *Crataeva nurvala* Buch.-Ham.

Synonyms : *C. lophosperma* Kurz., *C. religiosa* var. *nurvala* (Buch.-Ham.) Hook. f. & Thomson

Common names :

Bonna, Borun, Barun, Pithagola, Varun, Three leaved caper, Holy Garlic pear, Adhiraaja, Varno, Nervol, Barnahi. (Fig. 5).

Family - Capparaceae

Global Distribution : It is basically native to

Japan, Australia, much of Southeast Asia and Several South Pacific Islands. It is found wild as well as grown in many parts of India and African continents and Bangla Desh. It is widespread from India to Southeast Asia, South of China. It occurs on forest edges near rivers and other water bodies.

Location at Bhopal : V.I.P. Road near Karbala and towards Shirin Nadi, Shyamla Hills, behind Regional Institute of Education's hostel.

Botanical diagnosis : *C. nurvala* is a moderate sized deciduous small spreading tree. with trifoliate leaves, aromatic when bruised. It has terminal corymbs, flowers large. white to light yellow and purple, 2.5-5.00 cm in diameter, stamens purple, indefinite adnate to the base of gynophore, ovary on a slender stalk, fruit a fleshy globose berry 2.5-5.00 cm in diameter, many seeded.

Uses :

The stem bark and roots are attributed with diuretic and lithotriptic properties. Said to be efficacious in cases of internal inflammations. The extract of root bark mixed with honey is given in scrofulous enlargement of glands under lower jaw. The powdered bark of stem is used as appetiser, in kidney and urinary problems. The bark collyrium is used in ophthalmic problems. Leaf juice is effective in the treatment of rheumatism, whereas stem bark mixed with fresh leaves is reported to act as rubefacient and effective in controlling rheumatic pain. A paste of the leaves is applied to soles of feet to relieve swelling and burning sensation.

Propagation : The tree is normally propagated

by root suckers, which restrict its distribution. Seed germination is also reported. For best results the seeds should be collected and sown when they have just ripened. *C. nurvala* plants have also been raised through tissue culture technique using nodal explants. Hence, concerted and sincere efforts are required by private and government agencies to seve and propagate these species, which enrich the local flora by their diverse presence.



Fig. 5. *Crataeva nurvala* Buch.-Ham.

6. *Kleinhovia hospita* L.

Syn. *K. serrata* Blanco, *Grewia meyeniana* Walp.

Common names :

Guest tree, *Timanga tree*, *Bhola*, *Bola* (Fig. 6).

Family : Sterculiaceae

Global Distribution : *K. hospita* L. is an evergreen, tropical tree, native to Indonesia, Malaysia and other parts of Tropical Asia, Cambodia, Veitnam, Philippines Australia, New Guinea, & West Pacific. It is reported from many parts of India.

Location at Bhopal : Govt. Hamidia Arts & Commerce College (Formerly M.L.B. Girls College), Bhopal. Only a Single living specimen of this tree can be witnessed near *Melaleuca leucadendron* and *Dillenia pentagyna*.

Botanical diagnosis : *K. hospita* is a bushy tree but can reach upto 20m in height. It has a dense rounded crown. Leaves are simple, alternate, stipulate (Stipules ensiform to linear), Petioles 2.5-3.0 cm long. The leaves are ovate to cordate, glabrous with acute apex. There is panicle inflorescence. The flowers are terminal in loose panicles protruding from the crown. The flowers are small, about 5 mm wide, coloured pale pink. Bracteoles lanceolate, 2-4 mm long, pubescent, Sepals 5, linear lanceolate, 6-8 mm long, pink tomentose. petals 5, inconspicuous, the upper one being yellow, The androecium consists of 15 stamens, monadelphous, 8-15 mm long, staminal tube broadly campanulate, adnate to the gynandrophore, 5 lobed, each lobe with three anthers and alternating with staminodes, the anthers are sessile and extrose. Pistil with a 5 chambered, pilose ovary, one style and a capitate 5-lobed stigma.

The fruits of *K. hospita* are rounded, 5 lobed, thin walled, membranous capsules, 2-2.5 cm in diameter, each locule has 1-2 seeds.

Uses :

The wood is light and fine textured and used for making furniture. The leaves and bark are reported to contain cyanogenic compounds that are assumed to kill ectoparasites such as lice. The leaves show antitumor activity against sarcoma in mice. The bark and leaves are used as hair wash for lice. Young leaves are eaten as vegetable

& bast fibres for making ropes.

Propagation : *K. hospita* is usually propagated through seeds, which are often available throughout the year. Stem cuttings/branches often fail to produce root because of the presence of an uninterrupted sclerenchyma band in the pericycle.

Conservation : As only one living specimen of *K. hospita* is available at Bhopal, its *in situ* conservation is the need of the hour. Apart from this, efforts should be made to raise the plants through seeds and transplant the saplings in various areas of the district.



Fig. 6. *Kleinhovia hospita* L.

In this brief writeup, only 6 species of arboreal nature belonging to different taxons have been dealt with. Apart from these species which deserve immediate *in situ* conservation as well as propagation, there are scores of other species, which shall be highlighted in a series of publications. If not protected or saved, the said species shall be exterminated and vanish from the floristic scenario of this area.

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