

## COLLECTIONS AND *EX SITU* CONSERVATION OF PLANT SPECIES OF *MORACEAE* IN NBRI BOTANIC GARDEN IN LUCKNOW (INDIA)

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### SUMMARY

*Moraceae* is an important family which includes trees, shrubs, climbers and herbs having botanical, ornamental and economic importance. A good number of germplasm collections of *Moraceae* has been built up in the NBRI Botanic Garden under *ex-situ* conservation programme. The papers gives an account of different genus, species / cultivars available in collections with their salient diagnostic characters.

### INTRODUCTION AND IMPORTANCE

*Moraceae* Link., commonly known as 'Mulberry Family', includes about 53–75 genera and 1,400–1,850 species of trees, shrubs, climbers and herbs widely distributed in the tropics and subtropics of the world. In addition to the ornamentals and plant species of botanical interest, the family includes economically important plant species yielding timber, edible fruits, rubber, dyes, medicine and even food for silkworm (Bailey and Bailey, 1976). Therefore, the family is important from botanical, horticultural and economic point of view. The cultivated genera belonging to the families are – *Antiaris*, *Artocarpus*, *Brosimum*, *Broussonetia*, *Castilla*, *Cecropia*, *Chlorophora*, *Cudrania*, *Dorstenia*, *Ficus*, *Maclura*, *Morus*, *Treculia*.

*Ficus* is the largest genus of this family having about 800 species. The genus is remarkable for the growth habit and forms a large part of the ecosystem. It includes some of the gigantic trees like 'Banyan' (*Ficus benghalensis*), 'Peepal' (*F. religiosa*) and 'Indian Fig' (*F. carica*) besides small wiry creeper like *F. pumila* and *F. scandens* (Anonymous 1976, Everette, 1980). In India about 65 species of *Ficus* are found. *Morus* and *Artocarpus* are other two genera, which are important for their edible fruits.

### COLLECTIONS AND CONSERVATION IN NBRI BOTANIC GARDEN

Considering the botanical and ornamental importance of this family, germplasm collections have been built up in this Botanic Garden under *ex-situ* conservation programme. Most of the plant species are well grown specimen existing in the arboretum and by the side of the circular road of the Botanic Garden. The genera, which have large number of representation, are – *Ficus*, *Morus*, *Artocarpus*. Special care is taken regarding their cultural requirements by providing congenial microclimate, multiplication and maintenance of a sizeable population. Some of the species, which have ornamental importance, have been put into horticultural trade through plant sale outlet so that these species are well conserved.

The collection consist of genera like *Ficus* having 35 species and cultivars; *Artocarpus* – 2 species and *Morus* – 3 species.

### BOTANICAL DESCRIPTION AND HORTICULTURAL SIGNIFICANCE OF THE SPECIES UNDER COLLECTIONS

The present study gives an account of different species/ cultivars of the family *Moraceae* with their salient vegetative and floral characters besides usages, which are under *ex-situ* conservation in NBRI Botanic Garden (Bailey, 1942; Graf, 1981 and Menninger, 1962).

*Ficus altissima*, Blume 'Lofty Fig' or 'Council Tree' (India-Malaya, Philippines)

An evergreen large spreading tree (20 m) with aerial roots found in Assam and eastward in the forest tract. A good choice for roadside plantation for shade purpose.

*F. benghalensis*, Linn. 'The Banyan Tree' (India)

A very large tree with spreading branches, forms aerial roots which becomes secondary trunk; leaves ovate, elliptic to 20 cm long, dark green; fruit round, red when ripe; used as shade tree. This is one of the oldest trees growing in the Botanic Garden with an estimated age of 220 years.

*F. benghalensis* '**Krishnae**', in India and mythologically connected with Lord Krishna; leaf base folded into a cup-shape, curious, suitable for ornamental purpose and specimen plant.

*F. benghalensis* '**Variegata**' (Hort. cultivar)

A variegated form of *Ficus*, may be trained into a small tree like rubber plant; leaves variegated irregularly with light green at the center and dull pink along the margin at young stage which on maturity turn dark green at the center; yellowish-green at the margin; may be grown as specimen plant in the garden; suitable for pot culture for decoration purpose.

*F. benjamina*, Linn. 'Weeping Fig' (India, Malaya)

A dwarf tree with pendant habit, foliage dense; leaves 6–8 cm long, deep green in colour, glossy and attractive; suitable for plantation as 'Accent Plant' in the ornamental gardens.

*F. benjamina* '**Nuda**', (Miq.) Barret. (India, Malaya)

Medium tree having multiple trunks, often roots are visible above ground level; leaves elliptic, 8.0–8.5 x 3.0–3.5 cm, dark green above but dull back side with an elongated leaf tip suitable for planting in parks and gardens, ornamental.

*F. benjamina* '**Nuda Variegata**'

Vegetative characters are alike to *F. benjamina* Nuda but with variegated leaves, wavy at the margin, ornamental; suitable for pot growing.

*F. benjamina comosa*, Karz. (*F. glomerata*, Roxb.) 'Cluster Fig' (Malayan peninsula)

A medium sized tree with spreading habit; leaves ovate-lanceolate or elliptic, dark green; fruits clustered on leafless branches, pear or top shaped, 2.5–5.0 cm in dia., red when ripe.

*F. benjamina tsiela*, Roxb. (Tropical Asia)

Large tree, with prop roots coming down from the old branches; leaves 11.5–12.0 x 6.0–7.0 cm, dark green; fruits globose, about 1 cm in diameter, light green in colour, borne on the branches in opposite direction.

*F. brandegeei* (Mexico)

A curious species with beige trunk originating on a swollen base, bottle-like; stem grayish-

green; leaves leathery, broad and ovate with light pinkish veins, ornamental.

*F. carica*, Linn. 'Common Fig' (Tropical Asia) A small to medium tree (5–8 m); leaves broad, 3–5 lobed, rough above and pubescent below; fruits axillary pear shaped, vary in size and colour, edible.

*F. elastica*, Roxb. 'Indian Rubber Plant' (India, Malaya)

A common pot grown house plant but grows up to 10–15 m if allows to grow in the ground; leaves leathery, shining, ornamental.

*F. elastica* '**Decora**' 'Wide Leaf Rubber Plant' Leaves larger, broader, 25–35 cm long, deep glossy green with depressed veins, ideal as potted ornamental plant.

*F. elastica* '**Doescheri**' (New Orleans) 'Variegated Rubber Plant'

Leaves variegated with striking range of green-grey, white, creamy yellow but midribs and leaf stalk are pink; an outstanding variety for pot culture.

*F. elastica* '**Variegata**'

A very good variety for ornamental purpose, leaves leathery, variegated with grey and edge creamy yellow.

*F. elastica* '**Rubra**' (Hort. Cultivar) 'Black Prince'

Young plant has attractive maroon red foliage with red mid rib; leaves broad, oval, short, pointed; suitable for pot plants for interior decoration.

*F. 'Citation'* (Hort. Cultivar)

Dwarf tree, stem cuttings; leaves semi-folded inward from the midrib, curled towards the petiole, leaf tip terminated in a short claw, 4.0–4.5 x 3.0–3.5 cm, glossy green; suitable for pot plant for ornamental purpose.

*F. hispida*, Linn. f. (*F. oppositifolia*, Willd.) Asia, Tropical Australia

Dwarf tree, hispid-pubescent; leaves opposite, entire or toothed, rough, hairy; fruit borne in cluster on old wood.

*F. 'Long Island'*

A dwarf tree with elegant canopy; leaves ovate-oblong, thick, 3.0–3.5 x 2.5–3.0, glossy green above, dull under side; fruits small light greenish, 0.5–0.7 cm in diameter; suitable for pot culture and bonsai; ornamental.

*F. infectoria*, Roxb. (*F. lacor*, Buch.-Ham.) 'Pakar' (India)

A medium tree, deciduous; leaves membranous, 10–12 cm long, ovate-oblong; fruits

borne in axil, sessile, globose, about 0.6 cm in diameter, whitish flushed with red; good for avenue plantation.

**F. 'Lipstick'** (Hort. Cultivar)

Dwarf tree, young stem light-greenish; leaves 5.2–5.5 x 3.0–3.5 cm, light-greenish on maturity, young leaves contains a light pink splash on the tip; suitable for potted plants as ornamentals.

**F. lyrata** (*F. pandurata* Hort.) 'Fiddle Leaf Plant' (Tropical West Africa)

A small to medium tree (12 m); leaves large, 30 to 40 cm long, dark green, fiddle-shaped, apex rounded, margin wavy, ornamental; suitable for shade purpose.

**F. macrocarpa**, Wight. (India)

A climbing shrub; leaves about 12 cm long, broadly ovate, membranous; fruit 2.5–6.0 cm, spotted, globose.

**F. mysorensis** (India, Mynamar)

A large tree having tomentose twig, becoming glabrous; leaves leathery, rich green, ovate, about 30 cm long, glossy with pale yellow veins; fruit orange-red.

**F. 'Nerifolia'** (Hort. Cultivar)

Dwarf tree with drooping branches; leaves long 20–22 x 2.5–3.0 cm long, little folded from the mid rib upward, dark green upper with dull green lower; suitable for growing as potted plants for ornamental use.

**F. 'Panda'** (Hort. Cultivar)

An ornamental form, leaves glossy green with elongated tip, 5.5–7.0 x 2.5–3.5 cm., ornamental.

**F. pellucido-punctata**

A large tree reaching up to 25 m; leaves dark green, 16–18 x 8–10 cm, ovate oblong; fruits small, 1.2–1.4 cm diameter, globose, yellowish-green at mature stage; suitable for shade purpose.

**F. racemosa**, Linn. (Syn. *F. glomerata* Roxb.) 'Gular' (India)

A medium to large tree usually found in greater part of India, sometimes cultivated for its edible fruits; leaves ovate-lanceolate or elliptic, dark glossy green, 15–20 cm long; fruits red when ripe, 2.5–5.0 cm, borne in cluster in leafless branches.

**F. religiosa**, Linn. 'The Peepal' (India)

A large tree, deciduous; sometime grows as epiphytic; branches spreading; leaves ovate-rounded, apex protuding into along

tail like appendage; petiole 7.0–10 cm in length; fruits axillary, sessile, in pairs, dark purple, 1.25 cm in diameter. A highly religious tree for the Hindus and Buddhists; a good choice for shade purpose and planting in the greenbelt, arboretum, roadside plantation.

**F. repens**, Hort. (*F. pumila* Linn.; *F. stipulata*, Thunb.) 'Creeping Fig' (China, Japan.)

A climbing shrub with prostrate habit and clinging on the wall; leaves ovate, obtuse, entire or slightly wavy; petiole short; veins prominent below; a good choice for decorating wall with green plants.

**F. retusa** Linn. (*F. nitida*, Thunb.) 'Indian Laurel' (Tropical Asia, Malaya)

A large evergreen tree with glabrous thick-topped canopy and buttress trunk, forming aerial roots; leaves elliptic, 10 cm long, rubbery, waxy green in colour, ornamental; can be grown as potted plants or pruned to shape.

**F. rumphii**, Blume 'Pilkhan' (India)

A medium to large tree, deciduous; leaves oblong-ovate or broadly ovate, acuminate; fruits sessile, in pairs, globose, 1.25 cm in diameter, black when ripe; suitable for shade purpose.

**F. rutelens** (Hort. Cultivar)

A dwarf tree generally used for pot cultivation for ornamental purpose; leaves dark green indefinite in shape, elliptic-ovate, 4.5–5.5 x 1.8–2.0 cm, margin irregular, good for pot plant.

**F. trigona** (*F. triangularis*) 'Tropical Africa'

A dwarf tree, evergreen, known for its curious triangular, thick fleshy dark green leaves, 5 cm long, ornamental; good choice for small gardens.

**F. 'West Land'** (Hort. Cultivar)

Stem wiry; leaves elongated, 4.0–5.5 x 1.8–2.2 cm, variegated with light yellow along the margin while central portion is green irregularly; ornamental, suitable for growing as pot plant, bonsai.

**Artocarpus heterophyllus**, Lam. [Syn. *A. integer* (Thunb.) Merrille.] 'Jack Fruit' (India, Malaya).

A minor fruit tree, reaching about 15 m with straight trunk; leaves elliptic to ovate, dark glossy green; fruits oblong borne on main trunk, ripe fruit juicy and sweet in taste while green fruits as vegetables.

*A. lokoocha*, Roxb. 'Monkey Jack' (India, Myanmar)

A deciduous tree, little taller than *A. heterophylla* (about 20 m) with dense crown; leaves oblong or elliptic 15–25 cm long, pubescent beneath; fruits globose, 7–10 cm in diameter having smooth or wrinkled surface.

*Morus alba*, L., White M. (China) 'Mulberry'

A medium tree reaching about 15–20 m; leaves ovate about 10–15 cm long, coarsely toothed, glossy green above; fruits juicy syncarp, white, pinkish and blackish-purple, edible, ripen during summer months.

*M. australis*, Poir. (*M. indica* Roxb.) (Eastern Asia)

A small tree; leaves acutely serrate, caudate-acuminate, often deeply lobed; fruits of not good quality.

*M. macroura*, Miq. (*M. laevigata* Wallich ex Brandis) (India, China, Myanmar)

A dwarf tree with hairy shoots; leaves sparsely pubescent with rounded or cordate base, about 7.5 to 15 cm long; fruits not tasty.

### CONCLUSION

*Ex-situ* conservation of the germplasm collections is the most focused objective of the botanic gardens at present times. Do-

cumentation of the existing collections with their diagnostic characters is an important step towards this direction. This will help researchers to know about the availability of the germplasm collections and horticulturists to popularize the use of these ornamental plants in our country besides taking appropriate conservation measures.

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