



## Improved Mulberry Varieties

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Mulberry is a fast-growing deciduous woody perennial plant. It has a deep root system. The leaves are simple, alternate, stipulate, petiolate, entire or lobed. The number of lobes varies from one to five. Plants are generally dioecious. Inflorescence is catkin with pendent or drooping peduncle bearing unisexual flowers. Inflorescence is always auxiliary. Male catkins are usually longer than the female catkins. Male flowers are loosely arranged and after shedding the pollen, the inflorescence dries and falls off. These are four persistent perianth lobes and four stamens implied in bud. Female inflorescence is usually short and the flowers are very compactly arranged. There are four persistent perianth lobes. The ovary is one-celled and the stigma is bifid. The chief pollinating agent in mulberry is wind. Mulberry fruit is a sorosis, mainly violet black in colour.

Most of the species of the genus *Morus* and cultivated varieties are diploid, with 28 chromosomes. However, triploids ( $2n=(3x)=42$ ) are also extensively cultivated for their adaptability, vigorous growth and quality of leaves.

### Species and Varieties under Cultivation

There are about 68 species of the genus *Morus*. The majority of these species occur in Asia, especially in China (24 species) and Japan (19). Continental America is also rich in its *Morus* species. The genus is poorly represented in Africa, Europe and the Near East and it is not present in Australia.

In India, there are many species of *Morus*, of which *Morus alba*, *M. indica*, *M. serrata* and *M. laevigata* grow wild in the Himalayas. Several varieties have been introduced belonging to *M. multicaulis*, *M. nigra*, *M. sinensis* and *M. philippinensis*. Most of the Indian varieties of mulberry belong to *M. indica*.

In China there are 15 species, of which four species, *Morus alba*, *M. multicaulis*, *M. atropurpurea* and *M. mizuho* are cultivated for sericulture. In the former Soviet Union *M. multicaulis*, *M. alba*, *M. tartarica* and *M. nigra* are present.

Though mulberry cultivation is practised in various climates, the major area is in the tropical zone covering Karnataka, Andhra Pradesh and Tamil Nadu states, with about 90 percent. In the sub-tropical zone, West Bengal, Himachal Pradesh and the north eastern states have major areas under mulberry cultivation. The details of the mulberry varieties under cultivation in different states of India is given in Table 1.

**Table. 1 Mulberry varieties in India**

Variety	Region	Developed at	Origin
Kanva-2	South India Irrigated	CSRTI, Mysore	Selection from natural variability
S-36	South India Irrigated	CSRTI, Mysore	Developed through EMS treatment of Berhampore Local

S-54	South India Irrigated	CSRTI, Mysore	Developed through EMS treatment of Berhampore Local
Victory-1	South India Irrigated	CSRTI, Mysore	Hybrid from S30 x Berc 776
DD	South India Irrigated	KSSRDI, Thalaghattapura	Clonal selection
S-13	South India Rainfed	CSRTI, Mysore	Selection from polycross (mixed pollen) progeny
S-34	South India Rainfed	CSRTI, Mysore	Selection from polycross (mixed pollen) progeny
MR-2	South India Rainfed	CSRTI, Mysore	Selection from open pollinated hybrids.
S-1	Eastern and NE India Irrigated	CSRTI, Berhampore	Introduction from (Mandalaya) Myanmar
S-7999	Eastern and NE India Irrigated	CSRTI, Berhampore	Selection from open pollinated hybrids
S-1635	Eastern and NE India Irrigated	CSRTI, Berhampore	Triploid selection
S-146	N. India and Hills of J and K Irrigated	CSRTI, Berhampore	Selection from open pollinated hybrids
Tr-10	Hills of Eastern India	CSRTI, Berhampore	Triploid of Ber. S1
BC-259	Hills of Eastern India	CSRTI, Berhampore	Back crossing of hybrid of Matigare local x Kosen with Kosen twice
Goshoerami	Temperate	CSRTI, Pampore	Introduction from Japan.
Chak Majra	Subtemperate	RSRS, Jammu	Selection from natural variability
China White	Temperate	CSRTI, Pampore	Clonal selection

### Improved mulberry varieties in India

**Victory 1:** Commonly known as V1, this variety emerged from controlled pollinated hybrids of S-30 and Ber. C-776 in the late 1990s. It features erect branches with a greyish stem colour. The leaves are thick, succulent, large, entire, and ovate with a truncate base, displaying a smooth and glossy surface. Victory 1 is noted for its high rooting ability, rapid growth, and substantial yield, producing around 60 MT/ha/year under irrigated conditions with recommended practices. It has been proven superior for silkworm rearing through bioassay and chemo assay tests.

**S36:** Characterized by short internodes, semi-erect growth habit, medium branching, and a greyish-pink stem, S36 has unlobed, cordate, glossy, pale-green leaves with a smooth surface. Under irrigated conditions and with the recommended practices, it yields 35-45 MT/ha/year. Its high succulence and nutritional quality make it ideal for young silkworm rearing.

**S13:** Developed from open pollinated hybrids of Kanva-2 in 1986, S-13 is noted for its short internodes and prolific branching. The leaves are thick, green, unlobed, and smooth. This variety is suited for rainfed areas with red loamy soils and water-scarce conditions in Andhra Pradesh. It yields 12-15 MT/ha/year under rainfed conditions.

**S34:** Originating from cross-pollinated hybrids of S-30 and Ber. C-776 in 1986, S-34 is a fast-growing variety with a deep, extensive root system, thriving under soil moisture stress. The leaves are medium to large, unlobed, dark green, and high in moisture content with excellent retention capacity. It produces 12-15 MT/ha/year under rainfed conditions and is recommended for black cotton soils.

**Sahana:** Developed from cross-pollinated hybrids of K2 x Kosen in 2000, Sahana features medium branching, fast growth, and slightly spreading pinkish-grey branches with short

internodes. The leaves are large, unlobed, thick, cordate, glossy, and dark green. It performs well under limited shade and can be intercropped with mature coconut plantations, yielding 25-30 MT/ha/year with recommended practices under irrigated conditions.

**RC1 (Resource Constraint-1):** RC1, derived from cross-pollinated hybrids of Punjab local x Kosen in 2005, is a fast-growing variety with medium branching, slightly spreading pinkish branches, and short internodes. The leaves are large, predominantly lobed, thick, cordate, glossy, and dark green. It thrives under reduced fertilizer and irrigation, yielding 23-25 MT/ha/year with 50% of the recommended inputs and up to 45-50 MT/ha/year under optimal conditions.

**RC2 (Resource Constraint-2):** Evolved from cross-pollinated hybrids of Punjab local x Kosen in 2005, RC2 is similar to RC1 but features predominantly unlobed leaves. It is a fast-growing variety with medium branching, slightly spreading pinkish branches, and short internodes. It performs well with reduced fertilizer and irrigation, yielding 21-23 MT/ha/year with 50% of the recommended inputs and up to 45-50 MT/ha/year under optimal conditions.

**AR12 (Alkaline Tolerant):** Developed from cross-pollinated hybrids of S-41 (4x) x Ber. C-776 in 2000, AR12 is a fast-growing variety with high rooting ability even in alkaline soils. The bushes are slightly spreading with medium branching and greyish color, featuring short internodes. The leaves are unlobed, large, cordate, thick, dark green, and slightly rough. It is suitable for alkaline soils with a pH range of 8.0-9.4, yielding about 25 MT/ha/year under irrigated conditions with recommended practices.

**G2:** Introduced in 2003, G-2 is a selection from controlled pollinated hybrids of *M. multicaulis* and S-34. The variety is distinguished by its large, entire, cordate leaves with a smooth, glossy, dark green surface and slightly wavy margins. It yields 36-38 MT/ha/year of chawki leaves in an 8-crop schedule per year (alternating leaf picking and shoot-let harvest). It is ideal for young age silkworm rearing and recommended for exclusive chawki gardens.

**G4:** Developed in 2003 from cross-pollinated hybrids of *M. multicaulis* and S-30, G4 features open-type bushes with fast growth and high branching. The branches are straight, greyish, with short internodes, and the leaves are dark green, unlobed, cordate, thick, and wavy. With high rooting ability, it yields 65 MT/ha/year under assured irrigation and recommended practices. It is well-suited for late age silkworm rearing.

## Conclusion

The mulberry plant, a vital resource for sericulture, exhibits a diverse range of species and varieties adapted to various climatic conditions and soil types. From the 68 species of *Morus*, cultivated varieties in India and other regions have been selectively bred to optimize growth, yield, and quality of leaves. Varieties such as Victory-1, S-36, and S-34 highlight advancements in achieving high yields and suitability for different environmental conditions, including rainfed and irrigated areas. Additionally, varieties like RC1 and AR12 demonstrate resilience under resource constraints and alkaline soils. The ongoing development of improved mulberry varieties, with specific traits for silkworm rearing, ensures sustained productivity and adaptability in sericulture. The continued focus on breeding and cultivation practices will be crucial for meeting the evolving demands of the silk industry while enhancing the ecological and economic benefits of mulberry cultivation.

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