

FRUIT PRODUCTION: MULBERRY



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Mulberry: An Introduction

Scientific name of mulberry is Morus Species. White mulberry is known as Morus alba and black mulberry is known as Morus nigra. Mulberry belongs to the family Moraceae. Most of the mulberry species are native to Asia. Common mulberry plants are grown naturally in Sub - Himalayan tracts. Mulberry plants are widely grown in all across Indian subcontinent, Northern Africa, the Middle East and Southern Europe.

Major Species of Mulberry

1. White Mulberry - Morus alba
2. Black Mulberry - Morus nigra
3. Red Mulberry - Morus rubra

Characteristics of Mulberry Plants

- Mulberry plants are deciduous in habit
- Grows up to a height of 4 to 18 meters
- In some parts of the world, mulberry plants are exclusively grown for silkworm rearing (sericulture)
- Mulberry plants are easy to grow and are hardy requiring very little care for growing

Uses of Mulberry Plants

- Mulberry plants are used for silkworm farming
- Leaves are used as cattle fodder
- Mulberry bark is used for paper-making
- Heartwood of mulberry plants are used for making furniture and sports goods

- Roots are used as an astringent
- Mulberry fruits (which contains 8% sugar and 1% acid) are used for making wine, juice and jam
- Fruit juice has medicinal benefits: it cures sore throat, dyspepsia (indigestion), fever and depression

Nutrition in Mulberry Fruits

Nutrient	Unit	Value per 100 g
Water	g	87.68
Energy	Kcal	43
Protein	g	1.44
Total lipid (fat)	g	0.39
Carbohydrate, by difference	g	9.8
Fiber, total dietary	g	1.7
Sugars, total	g	8.1
Calcium, Ca	Mg	39
Iron, Fe	Mg	1.85
Magnesium, Mg	Mg	18
Phosphorus, P	Mg	38
Potassium, K	Mg	194
Sodium, Na	Mg	10
Zinc, Zn	Mg	0.12
Vitamin C, total ascorbic acid	Mg	36.4
Thiamin	Mg	0.029
Riboflavin	Mg	0.101
Niacin	Mg	0.62
Vitamin B-6	Mg	0.05
Folate, DFE	µg	6
Vitamin A, RAE	µg	1
Vitamin A, IU	IU	25
Vitamin E (alpha-tocopherol)	Mg	0.87
Vitamin K (phylloquinone)	µg	7.8
Fatty acids, total saturated	g	0.027
Fatty acids, total monounsaturated	g	0.041
Fatty acids, total polyunsaturated	g	0.207

Growing Mulberry Fruits

Climate: Mulberry plants can be grown up to 800 meter MSL (mean sea level). Ideal temperature for its healthy growth is 24 to 28 Degree Celsius. Plenty of sunlight (up to 12 hours a day) is beneficial for mulberry growth. The plant can withstand drought and frost considerably well .

Soil: No special demand on soil though slightly acidic, clayey loam soils are the best.

Propagation: Propagation is mainly through stem cuttings. Shield budding, ring budding or flute budding may also be practiced for propagation. Inarching is also common in mulberry. Seed propagation is also possible.

Raising Mulberry Planting Materials from Stem Cuttings

Hardwood or semi-hardwood cuttings of 15 to 30 cm length and 10-12 mm diameter, having at least 3 to 5 buds and a slanting cut of 45 degrees at the bottom are used for propagation. Cuttings are prepared from mature, healthy, disease-free and pest-free plants of at least one year old. Currently a power-operated mulberry stem cutting machine is available in the market for easy propagation of mulberry plants.

Nursery Bed Preparation

Choose a convenient location near main planting field for making nursery beds. Apply Farm Yard Manure (FYM) @ 20 t/ha and mix well with the soil to increase soil fertility. Prepare nursery beds of 4m x 1.5m size. Provide adequate drainage and adequate sunlight; avoid shady location.

Preparation of Cuttings Before Planting

Cuttings may be treated with any of the plant growth regulators to induce early rooting. According to Tamil Nadu Agricultural University, keeping the bottom end of the cuttings for 30 minutes in a solution prepared by mixing 1 kg Azospirillum culture in 40 L water induces early rooting.

Planting in Nursery Beds

Cuttings are planted in a well-prepared nursery bed in slanting position and up to 15 cm apart from each other. While planting, make sure that at least one active bud is exposed in each cutting. Irrigate the nursery beds twice a week. Best time for planting cuttings in nursery beds in India: December to January. Cuttings become ready for planting in the main field within 3 to 4 months. Transplanting may be done with the onset of monsoon .

Raising Mulberry Planting Materials through Budding

Mature, healthy, disease-free and pest-free mother stems are chosen for budding process. Budding process may be done in the month of March – April. Buds begin to appear within one or two months of budding process (i.e. May – June).

Planting of Mulberry

In pit system, planting is done in pits of size 45 x 45 x 45 cm. Planting may be done in ridges and furrows (row system) also. Plant to plant distance of 6-7.5 meters should be maintained. Watering is done after planting.

Spacing

Planting method	Spacing (cm)	
	Irrigated Crop	Rainfed Crop
Ridges and furrows	60 x 60 No. of cuttings / ha: 27,780	90 x 90 No. of cuttings / ha: 12,345
Pit system	90 x 90 No. of cuttings / ha: 12,345	90 x 90 No. of cuttings / ha: 12,345

Pruning: Pruning is an important practice in mulberry-growing for better fruit and foliage production. All lateral shoots upto a height of about one meter from ground are removed through pruning. Pruning is normally done after leaf fall. Plants for silk worm farming should be given a severe pruning from nearer ground surface to encourage more foliage production

Pruning Method

1. Bottom pruning: Plants are annually pruned at ground/bottom level leaving 10-15 cm stump above the ground
2. Middle pruning: Plant branches are initially pruned at 40-60 cm above the ground level. After bottom pruning, subsequent pruning is done at middle levels i.e. at 45-50 cm height
3. Kolar or Strip system: This is a severe pruning practice and is practised in dense mulberry plantations. Plant branches are pruned at ground level 5 times a year. After strip system of pruning, plant requires heavy fertilization and irrigation

Fertilizer Application-Irrigated Crop (kg/ha)

	Row system			Pit system		
	N	P	K	N	P	K
Recommendation	300	120	120	280	120	120
Split doses						
First crop	60	60	60	60	60	60
Second crop	60	-	-	40	-	-
Third crop	60	60	60	40	-	-
Fourth crop	60	-	-	60	60	60
Fifth crop	60	-	-	40	-	-
Sixth crop	-	-	-	40	-	-

Fertilizer Application-Rainfed Crop (kg/ha)

	N	P	K
Recommendation	100	50	50
First dose	50	50	50
Second dose	50	-	-

Fertiliser Application: Points to Remember

- Determine fertiliser requirement after a soil analysis
- Rainfed crop to be fertilized coinciding with the rains
- First dose of fertilisers to be given within three months of planting
- Using straight fertilisers will reduce cost
- After each harvest of leaves and fruits and pruning, fertiliser application may be done
- Micronutrients may also be required by the plants. Apply them according to the deficiency symptoms noticed in the plants

Irrigation

Ridges and furrows method

- Traditional method of irrigation
- An efficient method of irrigation requiring less water

Drip Irrigation

- Installation cost is high
- Highly efficient and precise way of irrigating the crop
- Most suitable for undulating terrains
- Fertilisers may also be applied through irrigational water. The practice is called fertigation

Harvesting Leaves

Leaves are harvested if plants are grown for sericulture/silkworm farming and leaves should be harvested during morning hours. On an average 3000 to 6000 kg leaves may be harvested in 6-7 harvests from one hectare during March to May. There are three methods of harvesting of mulberry leaves:

1. *Leaf picking*: It starts 10 weeks after bottom pruning and subsequent pickings are done at an interval of 7 - 8 weeks
2. *Branch cutting*: Entire branches are harvested
3. *Whole shoot harvest*: Shoots are harvested after bottom pruning at an interval of 10-12 weeks and 5 to 6 harvests are made annually

Harvested leaves are stored in wet gunny bags

Harvesting Fruits

- Flowering takes place in February and March
- Fruits are ready for harvest by June
- Fruits are harvested by hand picking
- Fruit yield from a single tree may be 10-20 kg



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