Fruits for the Future
Mangosteen

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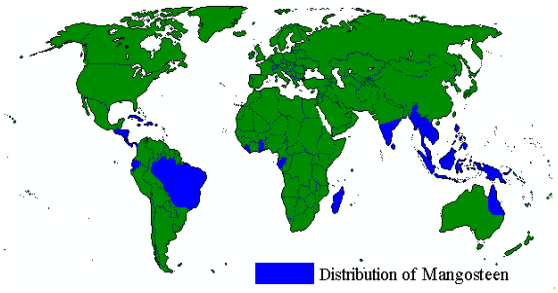
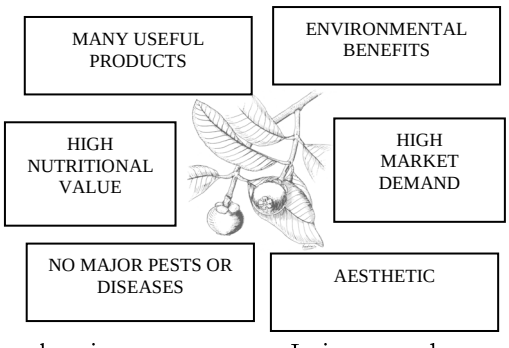
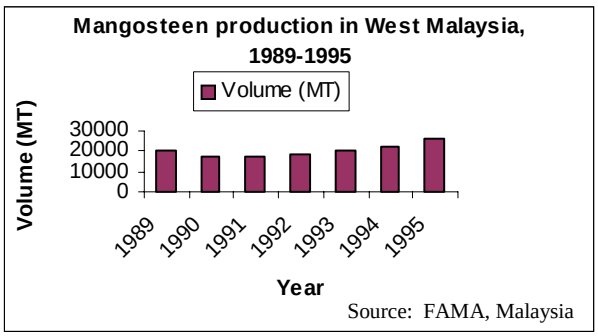
What is mangosteen? – *Garcinia mangostana* L. of the family Guttiferae is a fruit tree of the humid tropics native to the Malay Archipelago. It is an evergreen tree with a dense pyramidal crown that grows up to 8-10 m tall. The leaves are opposite, thick and leathery. The flowers are 4-5 cm in diameter, fleshy and may be male or hermaphrodite on the same tree. Male flowers are in clusters of 3-9 at the branch tips, with 4 sepals and 4 fleshy petals, green on the outside and yellow-red on the inside with numerous stamens. The hermaphrodite flowers are borne singly or in pairs at the tips of young branchlets, the petals are red with a yellowish green edge and are shed quickly. The fruit is round and approximately 3.5-7 cm in diameter and weighs about 75-150 g. It has a smooth, thick and firm rind 6-8 mm thick, pale green when immature and dark purple or red-purple when fully ripe. Inside the fruit there are 4-8 white segments that are sweet, juicy and faintly aromatic when eaten. The fruits may be seedless or contain 1-5 seeds, each capable of producing more than one seedling. Technically, the so-called seeds are not true seeds as they are not produced by fertilization of male and female gametes. Mangosteen is known as an 'obligate apomict' and reproduction is completely asexual. Variation amongst offspring is therefore very limited and because of this, propagation by seed is very common. Mangosteen is a very slow growing and shallow-rooted tree, however, it can be productive for over 50 years.



Where does mangosteen grow? – Mangosteen is thought to have originated from Peninsular Malaysia and early cultivation of the crop was limited to Indonesia, Papua New Guinea, Philippines, Peninsular Malaysia, Thailand, Burma (Myanmar), Vietnam, and Cambodia. During the last two centuries, the crop has spread to other tropical areas including Madagascar, Sri Lanka, India, Honduras, Brazil, and Australia. Today, mangosteen can be found in home gardens and orchards in many warm and frost free-countries between 10^0-19^0 latitude. Mangosteen thrives well in warm and humid places with: elevation of up to 1000 meters above sea level; temperature of 25°C to 30°C; annual rainfall of 2000 mm evenly distributed in six to ten months, and with a dry period of one to two months. It grows best in slightly heavy to light, deep, and moist but well-drained soils, slightly acidic and rich in organic matter. It can also grow in sandy soil with moderate fertility if adequate organic fertilizer and irrigation are provided.



Why should you grow mangosteen? – Mangosteen bears fruits in a biennial cycle and even with minimal or no input, a mangosteen tree can produce 500 to 800 fruits during an 'in year' and 100 fruits during an 'off-year'. However, when provided with a high amount of fertilizer and adequate pruning and irrigation, a tree can bear fruit twice a year and annual fruit yield can be as much as 2,000-3,000 fruits per tree. Mangosteen pulp contains high amounts of energy and vitamins and minerals including calcium, phosphorus, iron, thiamine, riboflavin, niacin, and ascorbic acid. Thus, it can greatly improve food quality of low-income rural households especially children. Aside from being a source of fresh and processed food, mangosteen has other important uses. It is a good source of cash through sale of fruits and other value added products. Moreover, because of its beautiful crown, mangosteen is an excellent landscape material. Mangosteen does not have any major pests or diseases and it can be grown in a wide variety of soil types provided water is available.



Economics of mangosteen – Mangosteen is an economically important species. The demand for the fruit in the domestic and export markets is tremendous thus the fruit fetches a good price. In 1994, the price of fresh mangosteen fruit per kg was US$ 2.23 in Hong Kong, 0.90 in Singapore and 6.75 in the United Kingdom. Thailand and Malaysia are the major commercial producers and suppliers of mangosteen to the United Kingdom, Hong Kong, Singapore, Taiwan and Japan. In 1993, Thailand and West Malaysia produced 90,932 and 20,220 MT of mangosteen fruits. Also in 1993, Thailand exported 2,640 MT of fresh and processed fruits with an export value of US$ 2.8 M while Malaysia exported 1,813 MT of fresh fruits with an export value of US$ 0.9 M. It is very likely that Thailand and Malaysia will continue to be the major suppliers of mangosteen in the world market as both countries are still expanding their mangosteen production areas.

How do you grow mangosteen trees? – The tree can be grown from seed or by vegetative propagation, however it is most commonly propagated from seeds. Seeds weighing 1 gram or heavier are selected from fully ripe fruits immediately after opening as the percentage germination is directly related to the weight of the seed. After extraction, the seeds are cleaned, air-dried for a few hours and sown immediately. Once removed from the fruit, the seeds lose viability after 5 days. The seeds are sown about 1 cm deep and 4-5 cm apart in a moist seedbed with 50-60% shade. Germination usually occurs 30-40 days after sowing. After about 60 days, the seedlings have 2 mature leaves and can be transplanted into individual polyethylene bags (7" x 11" or 8" x 12") and provided with 50% shade. To promote rapid growth and thus shorten the juvenile stage of the seedlings while in the nursery, the seedlings are re-transplanted into bigger polyethylene bags (12" x 16" or 16" x 16") and allowed to grow up to 5-7 ft tall or for a further 24-36 months. Prior to field planting, the seedlings may be gradually exposed to direct sunlight. When establishing in the field, better results are achieved when seedlings are grown underneath shade trees for the first 2-4 years and planted 7 x 7 m or 8 x 8 m apart. With care, trees begin to flower 3-4 years after field establishment and fruits are harvested 110-113 days after flower set. With small trees, only ripe fruits are hand picked during harvest to avoid damage to the rind while with tall trees, a long pole with a hook and a basket is used to prevent fruits from falling to the ground. Harvested fruits are carefully placed in small baskets or wooden boxes of 20-25 kg capacity and either sold immediately or refrigerated. Conventional vegetative propagation of the mangosteen is difficult and is used very little, except in propagating the seedless mangosteen type where grafting is used.

What are the uses of the mangosteen tree? – Mangosteen is noted for its nutritious and delicious fruit which is commonly consumed fresh and as a source of candy, nut, preserve and topping for ice cream and sherbets. Many parts of the tree are used for medicinal purposes for example, the leaves, bark, and rind are used as herbal remedies for thrush, chronic intestinal catarrh, dysentery, diarrhea, cystitis, gonorrhea, eczema, and other skin disorders; extracts from the leaves are also used to clean and treat wounds and as an astringent, and decoctions from the roots can be taken to regulate menstruation. The fruit rind contains 7-14% catechin tannin and is used for tanning leather. It also produces a natural black dye. The wood is heavy and moderately durable; old and unproductive trees are harvested for their wood and used to manufacture spear handles, rice pounders, houses and cabinets. Mangosteen twigs are also used as chew sticks.

Further Reading

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