University of the Virgin Islands
Cooperative Extension Service

GROWING MANGOES

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INTRODUCTION

The mango (*Mangifera indica*) originated in the Indo-Burma region and has been cultivated in India for more than 4,000 years. Its distribution gradually spread from this region and the fruit is now grown throughout the tropical world including the Virgin Islands where it is one of our most popular fruits. The mango belongs to (*Anecardiaceae*) the same family of plants as the cashew, the local plums and the golden apple. The tree itself is tough, fire-resistant, drought tolerant and makes an excellent shade tree in the landscape.

The mango is probably a more important fruit in the tropics than is the apple in the temperate zone and is universally considered one of the finest fruits in the world.

Young mango fruits ripen in warm St. Croix sun

DESCRIPTION

The mango is a medium to large evergreen tree with small pinkish-white flowers borne in inforescent clusters usually from December to April. Although the size and shape of the fruit is variable, most are either greenish, yellow or red in color. The fruits can ripen on the tree but to avoid damage from the feeding of birds and bats or falling to the ground, they should be harvested as soon as they are mature. This is usually indicated by fruits changing color from green to yellow.

VARIETIES

There are numerous varieties, the most popular local ones being the Kidney, Julie, Manzano and some of the Florida varieties. Fruit and tree characteristics are summarized in TABLE 1.

SOILS AND CLIMATE

Mango grows and fruits best on a deep, well-drained fertile soil but will grow and produce on a wide variety of soil types. The plant has a strong vigorous rooting system which will penetrate a large area to obtain nutrients. There may be some problem in soils containing caliche or calcium carbonate (lime) as occurs in the Virgin Islands, but these can be overcome with treatment with minor elements, e.g., Iron, Zinc, Manganese (see Fertilizing). The plant will thrive in rainfall ranging between 30 to 100 inches per year, but for maximum fruit production a prolonged and severe dry season is necessary. Climatic conditions in the Virgin Islands are therefore ideal for good production. Mangoes are very prone to irregular or biannual bearing and this habit varies between varieties. Although no cause or solution has yet been found for this climatic conditions appear to have considerable effect on this characteristic. The longer and more severe the dry season, the more regular is the cropping habit. Potassium nitrate sprays (see fertilizing) can be used to over come the biennial bearing problem in susceptible cultivars (e.g. Haden).

PLANTING

A hole about 2x2x2 feet is dug at the planting site taking care to remove all large stones. The soil is mixed with an equal volume of rotted manure or peat moss and the young plant is planted to the same stem level as it was in the container, using the amended soil packed firmly around the roots of the young plant. It is not necessary to form a large mound around the plant, but the soil should be fumed so as to prevent collection of water around base of the plant. In the dry season newly planted trees should be watered twice per week or more often until they are established with about 4-6 gallons per week. Dried vegetation can be used as a mulch which benefits even large mature trees. In windy areas young transplants should be staked. Mangoes do not need windbreaks. However, they do provide a most effective windbreak for other crops and give a valuable economic return as well.

FERTILIZING

During the first year, young trees should receive fertilizer every 2 months beginning with 1/4 lb. and gradually increasing to 1 lb./tree. After the first year 3-4 applications per year in amounts proportionate to the increasing size of the tree are adequate. Fertilizer mixtures containing 6 to 10 % nitrogen, 6 to 10 % available phosphorus, 6 to 10 % potash and 4 to 6 % magnesium give good results with young trees (see Fact sheet #16 for details on fertilizer labels). For bearing trees, potash should be increased to 9 to 15 % and available phosphorus reduced to 2 to 4 %. Large bearing trees should be fertilized immediately after the fruits are off and again when the trees start to bloom. About 1/4 lb. of fertilizer per inch of tree trunk diameter is a good application. Fertilizer should be scattered well away from the trunk and out as far as the limbs of the tree extend.

Plants growing in high calcium soils (caliche) often show zinc, copper and manganese deficiency symptoms. These problems can be corrected by applying trace element mixes (see Gardeners Fact sheet #16). Encouraging results have been obtained in the Virgin Islands with foliar sprays of Kocide 101, a copper fungicide, which can correct copper deficiency besides giving good protection from leaf spots, scab and blight diseases. In conjunction with stem (soluble trace element mix), this treatment is recommended for trees affected by the mango decline problem.

PRUNING

Periodic inspections of the newly planted tree are necessary to insure that growth from the stock region does not grow up and weaken the scion (see Gardeners Fact sheet#14). This is most likely to occur during the first year*s growth. All growth originating below the graft union must be gradually removed. Little pruning of young trees is necessary except for the removal of dead or dying branches; when removing branches, cut cleanly back to the branch origin without leaving a stub. Some pruning paint or tar should be used over the cut surface to protect the wound from rotting and insure good healing. Deflowering of young newly-planted grafted trees, particularly Julie, is recommended as a stress-removal procedure.

TABLE I

CHARACTERISTICS OF SEVERAL MANGO CULTIVARS GROWN IN THE VIRGIN ISLANDS

MANGO	CHARACTERISTICS OF FRUIT							CHARACTERISTICS OF MATURE TREE			
Cultivar	Maturity Season	Color When Ripe	Size (lbs.)	Fiber	Flesh Texture	Embryo Type	Recommended Use	Size	Rate of Growth	Foliage	Fruit Production
EARLY											
Edwards	M,J,JL	pink, yellow	¾-1½	None	Medium	Mono	H	Medium	Moderate	Dense	Low
Florigon	M,J,JL	green, yellow	½-1	None	Soft	Poly	H	Medium	Moderate	Dense	Moderate
Manzano	M,J,JL	red, pink, yellow	1-2	Little	Medium	Poly	H	Large	Fast	Dense	Heavy
MID-SEASON											
CarrIe	J,JL	yellow	¾-1	None	Soft	Mono	H	Dwarf	Moderate	Dense	Moderate
Haden	J,JL	red, orange, yellow	1-1½	Very little	Firm	Mono	H	Large	Fast	Dense	Moderate to Heavy
Irwin	J,JL	red, pink, yellow	¾-1	None	Soft	Mono	C, H	Dwarf	Slow	Semi open	Heavy
Julie	J,JL	pink, yellow	¾-1	None	Soft	Mono	C, H	Dwarf	Very slow	Dense	Heavy
Kidney	J,JL	yellow	½-¾	Very fibrous	Soft	Poly	H	Very large	Fast	Dense	Heavy
Tommy AtkIns	J,JL	red, pink, yellow	1-1½	Very little	Firm	Mono	C, H	Large	Moderate	Dense	Heavy
LATE MID SEASON											
Graham	J,JL,A	yellow	1¼-2	Very little	Soft	Mono	C, H	Medium	Moderate	Dense	Moderate
Jakarta	J,JL,A	orange-yellow (orange-red blush)	1¼-2	Very little	Medium-soft	Mono	C, H	Med. to large	Moderate	Dense	Moderate
Parvin	JL,A	greenish-yellow with dark red blush	1-1¾	Little	Firm	Mono	C, H	Medium	Vigorous	Dense	Moderate
Sensation	JL,A	red, pink, yellow	¾-1	Very Little	Soft	Mono	H	Medium	Fast	Semi open	Heavy
Smith	JL,A	yellow-orange (crimson blush)	1¼-2	Medium	Firm	Mono	H	Large	Vigorous	Dense	Moderate
SprIngfels	JL,A	pink, yellow	2-4	Very Little	Medium	Mono	H	Small	Very slow	Semi open	Moderate to Heavy
Valencia Pride	JL,A	yellow with pink to dark-red blush	¾-2	Little Fiber	Firm	Mono	C, H	Large	Vigorous	Open	Moderate
LATE SEASON											
Keitt	JL,A,S	pink, yellow	1½-4	Very Little	Medium	Mono	C, H	Large	Moderate	Open	Heavy
Kent	JL,A,S	red, pink, yellow	1½-2	None	Soft	Mono	C, H	Large	Moderate	Dense	Moderate to Heavy
Palmer	JL,A,S	red/yellow	1-1½	None	Medium	Mono	C, H	Large	Moderate	Semi open	Heavy

M = May, J = June, JL = July, A = August, S = September, Mono = Monoembryonic, Poly = Polyembryonic, H = Home, C = Commercial

PROPAGATION

Mangoes are propagated vegetatively and by seed. Plants produced from seeds vary considerably in their growth habits, disease resistance and fruit characteristics. They usually grow to a large size before flowering and fruiting, e.g., the Kidney mango found throughout the Virgin Islands. These produce vigorous seedlings and are good stock material for producing grafted plants (see Gardeners Fact sheet #14). Most of the desired varieties are propagated by grafting and budding. The side-veneer graft is the most common method used but chip and shield budding are also practiced. The local Manzano produces fruit in 3-5 years from seed.

Grafted trees will begin to bear 3 to 4 years after planting and average yields of 3 to 5 bushels (174 to 290 lbs.) can be expected from mature trees. Propagation by cuttings and air layers have been reported but these are rare and not very practical. Recently, good success with air layering using a 2% NAA Lanolin-based paste has been obtained at UVI Agricultural Experiment Station.

PESTS

Mangoes are relatively free from insect pests. Occasionally there may be some infestation with scales, mites, aphids or thrips. For young trees a thorough washing with mild detergent or application of Malathion or Diazinon plus oil emulsion (Volck oil) is often adequate. When a serious infestation occurs you can contact the University of the Virgin Islands Cooperative Extension Service for more information on control measures.

Anthracnose fungal disease is probably the most serious problem with mango. This fungus causes black spotting of leaves, flowers and fruits. Affected flowers and fruitlets are shed and the entire crop may be lost. Mature fruit may develop tear stains and even fruits which appear clean will develop anthracnose spottingupon ripening. Anthracnose can be avoided by planting the trees in well-drained exposed areas which have free air movement and consistent low humidity during the flowering and fruiting season.

Areas with prolonged and pronounced dry season are favorable for fruiting as well as anthracnose control.

Proper spacing to avoid crowding of trees also assists control. Successful disease control can also be achieved by using Zineb, Maneb and copper fungicides. For more information please contact the UVI Cooperative Extension Service.

Mango scab is also caused by a fungus. Infection spots on leaves are small, angular and dark brown to black in color. On fruits, brown irregular spots appear which become corky and cracked. Scab is not as severe or common on mango as anthracnose. Copper sprays are recommended for scab control.

HARVESTING

Most varieties can be picked several days before ripening and be of good quality. Julie mango must be picked very close to ripening for best quality so that a particular tree should be harvested over a 2-3 day interval. Fruits should be hand-picked and handled gently at all times to avoid bruising. Long handled bags can be used to pick fruits high up on trees. After picking, fruits should be packed in rigid 30 lb. containers (wood or plastic) that are lined with a soft material such as straw or polyfoam. Anthracnose spot- ting of ripe fruits can occur and this renders fruits unsightly and unsalable. This problem can be reduced or eliminated by hot water treatment of fruits after harvesting, at a temperature of 124º to 125ºF (51º to 51.5ºC) for 15 minutes. The temperature and timing for this treatment are critical. If exceeded, fruit injury will result but treatment is also ineffective if the correct temperature and time are not observed. Recent research at UVI Agricultural Experiment Station (AES) indicates that foliar sprays of 4-6% KNO_3 applied from September-November before flowering can produce more uniform flowering and fruiting.

STORAGE

Mangoes may be cold stored before ripening at 50ºF (10ºC) and after ripening from 45º to 50ºF (7.2º to 10ºC). Below these temperatures chilling effects appear which include failure to ripen properly, anthracnose spotting and development of other skin blemishes.

USES

The mango fruit is used in many ways, with fresh consumption being the most important. The pulp is delicious as well as being very nutritious. It is a source of vitamin A and C, contains fair levels of thiamin and niacin and ten to twenty percent sugar. Mangoes can also be frozen, dried, canned or cooked in jams, jellies, preserves, pies, chutney and ice cream.

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