Papaya

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Papaya tree and fruit, from Koehler'sMedicinal-Plants (1887)
Scientific classification
Kingdom: Plantae
(unranked): Angiosperms
(unranked): Eudicots

(unranked):	Rosids
Order:	Brassicales
Family:	Caricaceae
Genus:	Carica
Species:	C. papaya
Binomial name	
Carica papaya L.[1]	

Description

The papaya is a large, tree-like plant, with a single stem growing from 5 to 10 m (16 to 33 ft) tall, with spirally arranged leaves confined to the top of the trunk. The lower trunk is conspicuously scarred where leaves and fruit were borne. The leaves are large, 50–70 cm (20–28 in) in diameter, deeply palmately lobed, with seven lobes. Unusually for such large plants, the trees are dioecious. The tree is usually unbranched, unless lopped. The flowers are similar in shape to the flowers of the Plumeria, but are much smaller and wax-like. They appear on the axils of the leaves, maturing into large fruit - 15–45 cm (5.9–17.7 in) long and 10–30 cm (3.9–11.8 in) in diameter. The fruit is ripe when it feels soft (as soft as a ripe avocado or a bit softer) and its skin has attained an amber to orange hue.

Carica papaya was the first transgenic fruit tree to have its genome deciphered.

Gaining in popularity among tropical fruits worldwide, papaya is now ranked third with 11.22 Mt, or 15.36 percent of the total tropical fruit production,behind mango with 38.6 Mt (52.86%) and pineapple with 19.41 Mt (26.58%). Global papaya production has grown significantly over the last few years, mainly as a result of increased production in India.[7] Papaya has become an important agricultural export for developing countries, where export revenues of the fruit provide a livelihood for thousands of people, especially in Asia and Latin America. Papaya exports contribute to the growing supply of healthy food products on

international markets. The top three exporting countries accounted for 63.28 percent of the total global exports of papaya between 2007 and 2009, with more than half of those exports going to the United States.

Global papaya production is highly concentrated, with the top ten countries averaging 86.32 percent of the total production for the period 2008–2010. India is the leading papaya producer, with a 38.61 percent share of the world production during 2008–2010, followed by Brazil(17.5%) and Indonesia (6.89%). Other important papaya producing countries and their share of global production include Nigeria (6.79%), Mexico (6.18%), Ethiopia (2.34%), Democratic Republic of the Congo (2.12%), Colombia (2.08%), Thailand (1.95%), and Guatemala (1.85%).

Originally from southern Mexico (particularly Chiapas and Veracruz), Central America, and northern South America, the papaya is now cultivated in most tropical countries. In cultivation, it grows rapidly, fruiting within three years. It is, however, highly frost-sensitive, limiting its production to tropical climates. Temperatures below −2 °C (29 °F) are greatly harmful if not fatal. In Florida, growth is generally limited to southern parts of the state. It also prefers sandy, well-drained soil as standing water will kill the plant within 24 hours.[8]

For cultivation, however, only female plants are used, since they give off a single flower each time, and close to the base of the plant, while the male gives off multiple flowers in long stems, which result in poorer quality fruit.

The fungus Anthracnose is known to specifically attack papaya especially the mature fruits. The disease starts out small with very few signs, such as water-soaked spots on ripening fruits. The spots become sunken, turn brown or black and may get bigger. In some of the older spots, the fungus may produce pink spores. The fruit ends up being soft and having an off flavor because the fungus grows into the fruit.[11]

The fungus powdery mildew occurs as a superficial white presence on the surface of the leaf in which it is easily recognized. Tiny, light yellow spots begin on the lower surfaces of the leaf as the disease starts to make its way. The spots enlarge and white powdery growth appears on the leaves. The infection usually appears at the upper leaf surface as white fungal growth. Powdery Mildew is not as severe as other diseases.[12]

The papaya fruit fly is mainly yellow with black marks. The female papaya fruit fly has a very long, slender abdomen with an extended ovipositor that exceeds the length of its body. The male papaya fruit fly looks like the female with the

differences of a hairy abdomen and no ovipositor. Long slender eggs are laid inside of the fruit by the female papaya fruit fly. The larva are white and look very much like the regular fruit fly larvae. The female is capable of laying up to 100 or more eggs and are laid during the evening or early morning in groups of ten inside young fruit. They usually hatch within 12 days of being in the fruit where they'll feed on the seeds and interior parts of the fruit. When the larvae matures (usually 16 days after being hatched) they eat their way out of the fruit, drop to the ground, and pupate just below the soil and emerge within one to two weeks as mature flies. The flesh of the papaya must be ripe in order for the fly to migrate towards the surface of the fruit because unripe papaya juice is fatal to them. The papaya will turn yellow and drop to the ground if it is infected by the papaya fruit fly.

The two-spotted spider mite is a 0.5 mm long brown or orange-red but a green, greenish yellow translucent oval pest. They all have needle-like piercing-sucking mouthparts and feed by piercing the plant tissue with their mouth parts usually the underside of the plant. The spider mites spin fine threads of webbing on the host plant and when they remove the sap, the mesophyll tissue collapses and a small chlorotic spot forms at the feeding sites. The leaves of the papaya fruit turn yellow, gray or bronze. If the spider mites aren't controlled it can cause the death of the fruit.

The papaya whitefly lays yellow oval eggs that appear dusted on the undersides of the leaves. They eat the papaya fruits leaves therefore damaging the fruit. There, the eggs developed into flies in three stages called instars. The first instar has well-developed legs and is the only mobile immature life stage. The crawlers insert their mouthparts in the lower surfaces of the leaf when they find it suitable and usually don't move again in this stage. The next instars are flattened, oval and scale-like. In the final stage as the pupal the whiteflies are more convex, with large conspicuous red eyes. [11]

Two kinds of papayas are commonly grown. One has sweet, red or orange flesh, and the other has yellow flesh; in Australia, these are called "red papaya" and "yellow papaw", respectively. Either kind, picked green, is called a "green papaya."

Uses

Papayas can be used as a food, a cooking aid and in traditional medicine. The stem and bark may be used in rope production.

Meat tenderizing

Both green papaya fruit and the tree's latex are rich in papain, a protease used for tenderizing meat and other proteins. Its ability to break down tough meat fibers was used for thousands of years by indigenous Americans. It is now included as a component in powdered meat tenderizers.