Annona cherimola

Mill

Annonaceae

LOCAL NAMES
Creole (cachiman la Chine); English (custard apple,cherimoya); French (anone,cherimolier); Portuguese (graviola,graveola,grabiola); Spanish (chirimorrinon,cherimolia,anona poshte,chirimolla,chirimoya,cherimoyer); Swahili (mtopetope,mtomoko)

BOTANIC DESCRIPTION
Annona cherimola is a fairly dense, fast-growing, evergreen tree, erect but low branched and somewhat shrubby or spreading; ranging from 5 to 9 m in height; and its young branchlets are rusty-hairy.

The attractive leaves are single and alternate, 2-ranked, with minutely hairy petioles 6 to 12.5 mm long; ovate to elliptic or ovate-lanceolate, short blunt-pointed at the apex; dark green and slightly hairy on the upper surface, velvety on the underside; 7.5-15 cm long, 3.8-8.9 cm wide.

The fragrant flowers are borne solitary or in groups of 2 or 3, on short, hairy stalks along the branches, have 3 outer, greenish, fleshy, oblong, downy petals to 3 cm long and 3 smaller, pinkish inner petals.

The compound fruit is conical or somewhat heart-shaped, 10-20 cm long and up to 10 cm in width, weighing on the average 150-500 g but extra large specimens may weigh 2.7 kg or more. The skin may be smooth with fingerprint like markings or covered with conical or rounded protuberances. The fruit opens to expose the snow-white, juicy flesh, of pleasing aroma and delicious, subacid flavor; and containing numerous hard, brown or black, beanlike, glossy seeds, 1-2 cm long.

BIOLOGY
A problem with the cherimoya is inadequate natural pollination because the male and female structures of each flower do not mature simultaneously. Few insects visit the flowers. Therefore, hand-pollination is highly desirable and must be done in a 6-8 hour period when the stigmas are white and sticky. It has been found in Chile that in the first flowers to open the pollen grains are loaded with starch, whereas flowers that open later have more abundant pollen, no starch grains, and the pollen germinates readily. Partly-opened flowers are collected in the afternoons and kept in a paper bag overnight. The next morning the shed pollen is put, together with moist paper, in a vial and transferred by brush to the receptive stigmas. Usually only a few of the flowers on a tree are pollinated each time, the operation being repeated every 4-5 days in order to extend the season of ripening. The closely related A. senegalensis, if available, is a good source of abundant pollen for pollinating the cherimoya, that of the sugar apple is not satisfactory. Fruits from hand-pollinated flowers are normally superior in form and size.

The leaves are briefly deciduous (just before spring flowering). The flowers appear with new growth flushes in April to mid-summer and fruits ripen from October to May in California.

Ripening fruit (Trade winds fruit)

fruit and foliage (Trade winds fruit)

Ripening fruit (Trade winds fruit)

ECOLOGY
The cherimoya is subtropical or mild-temperate and does not succeed in the lowland tropics. It requires long days. In Colombia and Ecuador, it grows naturally at elevations between 1 400-2 000 m where the temperature ranges between 17-20 deg. C. In Peru, the ideal climate for the cherimoya lies between 18-25 deg. C in the summer and 18-5 deg. C in winter. In Guatemala, naturalized trees are common between 1 200-2 500 m though the tree produces best between 1 200-1 800 m and can be grown at elevations as low as 900 m. The tree cannot survive the cold in the Valle de Mexico at 2 195 m. In Argentina, young trees are wrapped with dry grass or burlap during the winter. The cherimoya can tolerate light frosts. Young trees can withstand a temperature of –3 deg. C, but a few degrees lower severely injures or kills mature trees.

The tree prefers a rather dry environment as in southern Guatemala where the rainfall is 127 cm and there is a long dry season. The tree should be protected from strong winds that interfere with pollination and fruit set.

BIOPHYSICAL LIMITS
Altitude: 700-2 400 m.

Mean annual temperature: 18-26 deg. C

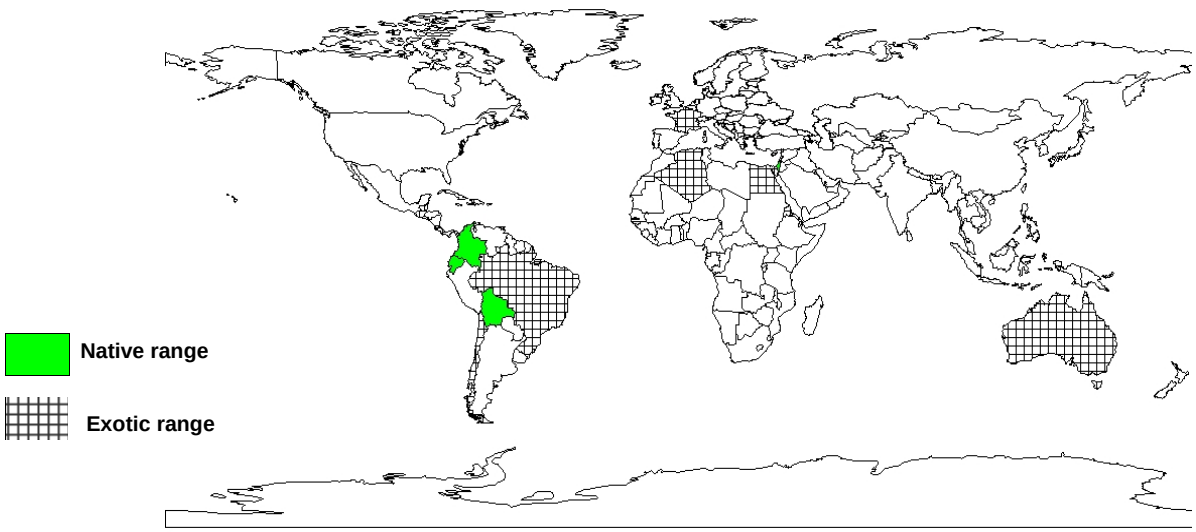
Mean annual rainfall: 1250-2500 mm

Soil type: The cherimoya tree performs well on a wide range of soil types from light to heavy, but seems to do best on a medium soil of moderate fertility. In Argentina, it makes excellent growth on rock-strewn, loose, sandy loam 60-90 cm above a gravel subsoil. The optimum pH ranges from 6.5-7.6. A greenhouse trial in sand has demonstrated that the first nutritional deficiency evoked in such soil is lack of calcium.

DOCUMENTED SPECIES DISTRIBUTION

Native: Bolivia, Colombia, Ecuador, Israel

Exotic: Algeria, Australia, Belize, Brazil, Chile, Costa Rica, Egypt, El Salvador, Eritrea, France, Guatemala, Haiti, India, Italy, Jamaica, Libyan Arab Jamahiriya, Mexico, Peru, Singapore, Somalia, Spain, US, Venezuela



The map above shows countries where the species has been planted. It does neither suggest that the species can be planted in every ecological zone within that country, nor that the species can not be planted in other countries than those depicted. Since some tree species are invasive, you need to follow biosafety procedures that apply to

your planting site.

PRODUCTS
Food: The white flesh of the ripe cherimoya is sweet, juicy and very fragrant. It is most commonly eaten out of-hand or scooped with a spoon from the cut open fruit. In Mexico, sometimes people add a few drops of lime juice. Occasionally it is seeded and added to fruit salads or used for making sherbet or ice cream. Colombians strain out the juice, add a slice of lemon and dilute with ice-water to make a refreshing soft drink. In Jamaica, the dried flowers have been used as flavoring for snuff.

Alcohol: . The fruit is fermented to produce an alcoholic beverage.

Poison: The seeds are crushed and used as insecticide. Blindness can result from the juice of the crushed seeds coming in contact with the eyes. The seeds contain several alkaloids: caffeine, (+)-reticuline, (-)-anonaine, liriodenine, and lanuginosine. Human ingestion of 0.15 g of the dark-yellow resin isolated from the seeds produces symptoms resembling the effects of atropine. . Mixed with grease, powdered seeds are used to kill lice.

The twigs possess the same alkaloids as the seeds plus michelalbine. 8 alkaloids have been reported in the leaves: (+)-isoboldine, (-)-stepholidine, (+)-corytuberine, (+) nornantenine, (+)-reticuline, (-)-anonaine, liriodenine, and lanuginosine.

Medicine: In Mexico, rural people toast, peel and pulverize 1 or 2 seeds and take the powder with water or milk as a potent emetic and cathartic. Mixed with grease, the powder is applied on parasitic skin disorders. A decoction of the skin of the fruit is taken to relieve pneumonia.

SERVICES
Intercropping: In the early years they are interplanted with corn, beans and potatoes.

TREE MANAGEMENT
The young trees should be spaced 8-9 m apart each way in pits 50-60 cm wide, enriched with organic material. In Colombia, corn, vegetables, ornamental foliage plants, roses or annual flowers for market are interplanted during the first few years. In Spain, the trees are originally spaced 5 m apart with the intention of later thinning them out.

Pruning to eliminate low branches, providing a clean trunk up to 80 cm, to improve form, and open up to sunlight and pesticide control, is done preferably during dormancy. After 6 months, fertilizer (10-8-6 NPK) is applied at the rate of 227 g/tree and again 6 months later at 450 g/tree. In the 3rd year, the fertilizer formula is changed to 6-10-8 NPK and each year thereafter the amount per tree is increased by 450 g until the level of 2.27 kg is reached. Thenceforth this amount is continued each year per tree. The fertilizer is applied in trenches 15 cm deep and 20 cm wide dug around each tree at a distance of 5 m from the base, at first; later, at an appropriately greater distance.

Young trees are irrigated every 15-20 days for the first few years except during the winter when they must be allowed to go dormant-ideally for 4 months. When the first leafbuds appear, irrigation is resumed. With bearing trees, watering is discontinued as soon as the fruits are full-grown.

The cherimoya begins to bear at 3 ½-5 years old and production steadily increases from the 5th to the 10th year, when there should be a yield of 25 fruits/tree (5 000 per ha). In Colombia, the average yield is 25 fruits and in Italy, trees 30-35 years old produce 230-280 fruits annually.

GERMPLASM MANAGEMENT
Cherimoya seeds remain viable for 2-3 years if kept dry and protected from weevils and fungi. At 20 deg. C bottom heat, seeds germinate in about 21 days, but require about 40 days under normal ambient growing conditions.

PESTS AND DISEASES
Caterpillars (Thecla sp. and Oiketicus kubeyi) may defoliate the tree. A scale insect, Conchaspis angraeci attacks the trunk and branches. Prime enemies are reported to be fruit flies (Anastrepha sp.), leaf miners (Leucoptera sp.), which necessitate the collection and burning of affected leaves plus the application of systemic insecticides; and the seed borer (Bephrata maculicollis). The latter pest deposits eggs on the surface of the developing fruits, the larvae invade the fruit and consume the seeds, causing premature and defective ripening and rendering the fruits susceptible to fungal diseases.

The coccid, Pseudococcus filamentosus attacks the fruit in Hawaii, and Aulacaspis miranda and Ceropute yuccae in Mexico. In Spain, the thin-skinned cultivar 'Pinchua' is subject to attack by the Mediterranean fruit-fly, Ceratitis capitata.

Cherimoyas are susceptible to Armillaria (Oak root fungus) and Verticillium sp. and should not be planted in old vegetable gardens, near tomatoes, eggplant or asters.

Stored seeds for planting are subject to attack by weevils. To avoid damping-off of young seedlings, dusting of seeds with fungicides is recommended. The tree may succumb to root-rot in clay soils or where there is too much moisture and insufficient drainage. Sooty mould may occur on leaves and fruits where ants, aphids and other insects have deposited honeydew.

FURTHER READNG

http://www.hort.purdue.edu/newcrop/morton/cherimoya.html

IBPGR. 1986. Genetic resources of tropical and subtropical fruits and nuts (excluding Musa). International Board for Plant Genetic Resources, Rome.

Jackson D. 1986. Temperate and subtropical fruit production. Butterworth Horticultural Books.

SUGGESTED CITATION

Orwa C, Mutua A , Kindt R , Jamnadass R, Simons A. 2009. Agroforestree Database:a tree reference and selection guide version 4.0 (http://www.worldagroforestry.org/af/treedb/)