Indescribable flavour… but perishable

An amazing flavour resembling a subtle mix of strawberry and pineapple with a hint of citrus means that soursop is highly appreciated in many countries. Unfortunately, it is highly perishable at ambient temperature and can only be kept for a few days (4 or 5 at a maximum) which considerably limits trade. In spite of this, Annona muricata is the most commonly grown Annona species in the world.

Summary

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The annonaceae grown for their fruits include the custard apple (Annona squamosa), the bullock’s-heart (A. reticulata) and the cherimoya (A. cherimolia). The ylang-ylang (Cananga odorata) is also grown for its flowers. Although soursop originated in tropical America, it is now found as an import in many parts of the world: Africa, India and South-East Asia. It is also very common in the Caribbean islands. However, world production is concentrated in a few South American countries like Venezuela, Brazil and Colombia. Although there are no recent production or sales statistics for these countries, soursop nevertheless has a major position on the markets of Central America, the Caribbean and Asia. It is generally eaten close to production zones as its short post-harvest life and the absence of suitable packing and transport methods do not encourage trade in this fruit.
The tree, its ecology and cultivation

The tree grows to a height of 3 to 8 metres. It has an erect habit initially and then becomes globular as it grows older. The dark green shiny, leathery leaves are elongated. They release a pleasant characteristic smell when crushed. The flowers are bell-shaped and appear either at the tip of a shoot or grow directly on an older branch. The fruits are large, elongated and covered with soft bristles. Fruit weight can attain 4.5 kg and depends mainly on pollination; poor pollination results in small, irregular fruits. When the fruit is mature it loses its shine and has a greyish hue. However, the fruits of some varieties remain completely green, even when ripe.

Soursop likes hot, humid climates. It is indifferent to soil quality as long as drainage is good. Planting density is usually about 300 trees per hectare. Training pruning is rarely necessary as the trees form well naturally. The first harvest starts three or four years after planting. Harvests are generally small and irregular for lack of good pollination. The problem of fertilisation is addressed by using artificial pollination.

Although they are hermaphroditic, the flowers of the annonaceae cannot self-fertilise. They are dichogamous and the stigma (the female part of the flower) is receptive before the stamens (the male part containing pollen) reach maturity. This floral feature, together with low attractiveness to insects, often results in very poor pollination and hence low productivity. The few pollinisers interested in these flowers include small beetles of the Nitidulidae family (Carpophilus and Uroporus spp.), ants and thrips.

In the light of all these features, different steps can be taken to improve the yields of these species:

- make natural fruit setting conditions more favourable by using sprinklers to increase the moisture of fields that are too dry;
- enhance the presence of pollinators, in particular by reducing pesticide applications;
- increasing the fruit setting rate artificially.

As regards the last point, different experiments around the world have proved to be effective. In practice, pollen is taken from the flowers at their male stage and used to pollinate flowers at the female stage. All that is needed is a brush and a small jar. The brush is used to help pollen fall into the jar and also to pollinate flowers. A pollen-coated brush is inserted between the partially open flower petals to reach the stigma. This is a well-mastered technique that gives high setting rates of 80 to 100% and allows a considerable increase in yields as there are more, larger fruits. Soursop fruits twice a year in the southern hemisphere—first from April to June during the flowering period for the second fruiting, and then from October to December. Flowering and fruiting alternate practically all the year round in the tropical part of the northern hemisphere.

Pests

Soursop is attacked by various pests including two pyralids (Nephoterix beharella and Spatulipalpia pectinatella) that can wipe out the whole harvest. Preventive treatments based on Bacillus thuringiensis (an entomophagous bacterium specific to Lepidoptera) reduce their impact. Several species of scale, including in particular the redoubtable hibiscus scale, can also cause serious damage especially if they are not controlled naturally by beneficials. A borer (Bephratelloides paraguayensis) considered as one of the most serious pests of soursop is also observed on fruits and seeds in the Caribbean (especially in the Dominican Republic), Mexico and Central America. The female lays eggs on young fruits and the larvae and pupae then develop in the seeds. The adults subsequently bore a gallery to leave the fruit. Pricked fruits are unsuitable for sale. Finally, anthracnose causes damage to fruits by staining the skin, making them unattractive.
Soursop pulp is fibrous, very juicy and has a sweet and acid flavour. It is particularly suitable for making juice used as a base for the preparations of cold drinks, sorbets, syrup and yogurt. It is used fresh or after freezing. The pulp has a high sugar content (18%, mainly glucose and fructose) and contains a significant amount of fibre (1%) and vitamins B1, B2 and C. Green fruits can also be roasted or sliced and fried.

Soursop is reported to have numerous medicinal virtues. The juice is considered to be tonic and have vermifuge properties. The leaves and buds are sedative and effective against coughs and fever. A bath becomes relaxing when a handful of fresh leaves has been thrown into the water. This preparation is often recommended in the West Indies for soothing babies. The seeds and bark are toxic and should not be used internally. Powdered seeds are used in particular for preparing an insecticide. Although, overall, soursop has fairly positive effects on health, recent research conducted in the Caribbean has nonetheless demonstrated a negative impact. Indeed, consumption of the fruits and/or infused leaves and especially the annonacin that soursop contains, might potentially lead to an atypical form of Parkinson’s disease.

A small ethnic market supplied mainly by the West Indies

The European soursop market is extremely limited, to the extent that it does not appear in the catalogues of a fair proportion of importers specialised in tropical fruits! Soursop supply still caters for the ethnic market. It is particularly appreciated by West Indians and also by Asians, which broadens the potential consumption base. The main source of supply for the European market is the West Indies, but other sources exist, such as Kenya and Vietnam for example. Fruits from the West Indies are often packed in boxes of the type used for bananas. Smaller packaging (4 to 5 kg) is also used. It is purchased all the year round and in particular during the Christmas period and the Chinese New Year, when it forms part of the celebration rites.

Development slowed by many features, benefiting the other annonaceae

Many features slow the development of the soursop market. West Indian production is limited and sold mainly for domestic consumption, leaving only small quantities for export. In addition, the size and fragility of the fruit make it difficult to manage. Its tortured physiognomy and its often large weight and size form constraints for packing and packaging. Banana boxes do not show off the produce and increase risks of impacts and crushing. Soursop also ripens fast and can only be shipped by air on condition that the fruit is picked at a stage at which it can stand transport and handling.

Its high price also limits commercial development. It is considered that buyers avoid produce costing more than EUR 3.50 to 4.00 per kg at the wholesale stage and air freight is very costly because the fruit is heavy. This feature seems to be the reason for the small scale of imports from Kenya, the traditional supplier of soursop. As soursop is not regularly available on the European markets, consumers often buy cherimoyas instead as this substitute is more frequently available from Spain, Portugal, etc. and is cheaper (from EUR 1.80 to 2.50 per kg at the wholesale stage in France). However, there would seem to be a potential market for soursop, but development requires overcoming the obstacles mentioned above.