

# FR*ui*TROP

English edition

## Rambutan

The hairy cousin  
from the tropics

## Southern Hemisphere kiwi

Already brighter in  
New Zealand

## Banana in Europe

A structural or  
cyclical increase?

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# Rambutan

The hairy cousin from the tropics



It certainly is hairy! And thanks to this trait it is easily distinguished from its smooth cousin the litchi. In the fields, the rambutan does not fear the competition from its relative, since it flourishes in hot wet climates, where the litchi will bear only leaves and not the smallest fruits! Conversely, the litchi barely leaves it any room on the market, which is a great pity...



fruits or syrup (probably less than 10 000 t in total).

The rambutan is a fine-looking tree with a fairly straight trunk, which can reach a height of 10 to 15 metres. Its leaves comprise 2 to 4 leaflets, with a dark green shiny topside, and a paler underside. The inflorescences bear abundant green-red coloured flowers.

Two types of trees can be found: males (inflorescences bearing only male flowers, and so not producing any fruits) and hermaphrodites. The inflorescences of the latter bear two types of flower: functionally female hermaphrodite flowers (well-developed pistil, non-functional short-filament stamens), and functionally male hermaphrodite flowers (developed but non-functional pistil, and functional, well-developed long-filament stamens). Certain varieties bear both these types of hermaphrodite flowers, but not simultaneously on the same inflorescence. Thus rambutans require cross-pollination to ensure a good harvest. Ultimately, it is an abundant flowering, but low-producing species. It takes thirteen to sixteen weeks between fruit-setting and harvest.

It is a non-climacteric fruit, which must be harvested fully mature (when the fruit changes from green to yellow or red, depending on the variety). If picked green, it will not continue to

## The tree, its ecology and cultivation

The rambutan (*Nephelium lappaceum* L.) is a tree of the Sapindaceae family, just like the litchi or longan. Probably native to Malaysia, it is exploited throughout the wet Asian tropics. Recently introduced everywhere else, it is cultivated in particular in the American tropics, but also in Africa, Australia as well as Madagascar. While it is uncommon in the French West Indies and very rare on Reunion, in French Guyana, it is cultivated in the village of Cacao by a community originating from Laos, supplying the markets right across the region. Worldwide production is difficult to evaluate, since nearly all of it is for self-consumption. Thailand is without question the biggest producer, with its production reportedly approaching 450 000 t. Then come Malaysia and Indonesia, which reportedly produce 60 000 and 100 000 t respectively. The Philippines, Australia, Sri Lanka, Central America, South Africa and the United States (Hawaii and Porto Rico) are also producers, but on a smaller scale. Finally, the international trade involves only a few thousand tonnes of fresh



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mature, and will be acidic and flavourless. The fruits come in bunches of 10 to 20, each weighing between 20 and 50 g. They are oval to globular in shape. The outer colour varies from yellow to red, and to deep crimson when mature. The skin is covered with sorts of soft curved spines, hence it is also known as the "hairy litchi". This tough skin conceals an abundant translucent white flesh, which adheres to the brown stone to a greater or lesser extent. There are a host of rambutan varieties, distinguished by the shape of the fruits, their colour, the length of their "hair", stone adhesion, their flavour, etc.

The rambutan is a species for purely tropical climates. It can be cultivated from sea level to 500 m in altitude, but not above. An annual rainfall of between 2 000 and 3 500 mm is required, which limits its cultivation to hot and wet tropical ecological zones. However, a short drier period is essential for ensuring good production because, without this hydric stress (of approximately one month), it has erratic flowering. However, in the fruit swelling stage, the tree must not suffer any water shortage. It can adapt to numerous soil types in the pH range 4.5 to 6.5. However, it is averse to asphyxiating soils and is sensitive to iron and zinc deficiency (highly marked chlorosis, yellow foliage).

The traditional (and easy) method of reproducing the rambutan is by sowing its seeds. However, this technique must be reserved for



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producing rootstocks. In fact, given the highly particular floral characteristics of the species, the quality of the plants obtained from seeds varies greatly. So vegetative reproduction is preferable. Overhead layering is possible, but separating the plants, which root together fairly easily, is a tricky job. Approach grafting is a good technique, but is a lot of work. So this is reserved for reproducing delicate varieties.

The "Modified Forket" grafting technique seems to give very good results. It is no more or less than a bud graft, in which the rootstock bark strips are retained: two parallel vertical incisions are made in the rootstock bark, 3 cm in length and spaced 1 cm apart (15-20 cm from the crown). A horizontal incision in the middle of these 2 vertical incisions is used to carefully lift the bark in 2 strips, and create a window. The graft is housed in this window, with the two strips then folded back onto the graft before tying. The graft is taken from young branches (approx. 9 months old), stripped 15 days before being cut, in order to stimulate budding. After 20 to 25 days, the tie is removed and the rootstock cut down if the graft is successful.

The planting densities vary between 100 (10 x 10 m) and 285 (5 x 7 m) trees per ha. The species is rather hardy, and requires no specific



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## Packing and sizing

Rambutans are generally packed in 2 kg net weight boxes. They are either packed in two layers in a telescopic or flap box measuring some 300 x 400 mm or pre-packaged in 1 kg punnets covered with film, like the produce from Thailand. The punnets are then packed in the shipping box in pairs.

There are no specific size categories. Reference is made to the Codex standard.

## Regulations

Rambutan is covered by Codex Alimentarius Standard 246/2005.

## Nutrition

Rambutan is less rich in potassium than litchi but contains more vitamin C.

Rambutan — Nutritive value (pulp/100 g)	
Energy	63 Kcal
Carbohydrate	14.5 g
Vitamin C	17 to 32 mg

maintenance, except for annual maintenance pruning (removing dead branches). Seed-grown rambutans produce at an age of around 5-6 years, while grafted or layered trees produce from 3 years.

To ensure good productivity, it is preferable to mix several varieties within the orchard and even plant some male trees to facilitate entomophilous cross-pollination. Despite these precautions, in Asia, yields observed are low, varying from 2 to 20 tonnes of fruits per ha. That is why, in certain countries such as Thailand, growth regulator sprays are used to boost production of functionally male flowers within the inflorescences.

Rambutan is prone to various bio-aggressors. It is attacked by powdery mildew in particular during flowering and fruit-setting. The fruits are colonised by scale insects, mites, thrips and even ants, which cause often irreversible damage to the fruit skin. Rambutans also host various fruit fly species (*Ceratitis capitata* and *Bactrocera dorsalis*), and so require specific treatments due to the quarantine organism status of these insects, when exporting fruits from a contaminated region to an uncontaminated region.

## Pre and post-harvesting, and some factors affecting quality

In cultivation, high hydric stress conditions, particularly during the fruit swelling phase, directly affect the quality (flesh development). Once picked, the rambutan does not keep well. At ambient temperature (25°C), the visual quality of rambutans declines very quickly after 2 to 3 days. This is manifested by browning of the skin hairs. Conservation temperatures of around 8 to 12°C and a high relative humidity of around 90-95 % can slow this deterioration. Under these conditions, rambutans can be kept for around two weeks.

However, after 7 days' conservation, they can be affected by more than ten different pathogens, leading to fruit rot, such as anthracnose (*Colletotrichum gloeosporioides*). The contamination phase by these pathogens generally occurs in the orchard, but the disease is expressed during this prolonged conservation. There are various possible control measures for these pathogens: chemical treatments, hot water treatments, essential oils, biopesticides, etc. Furthermore, the shelf life of rambutans (and their visual quality) can be increased by means of conservation techniques in a modified and/or controlled atmosphere.



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## Use

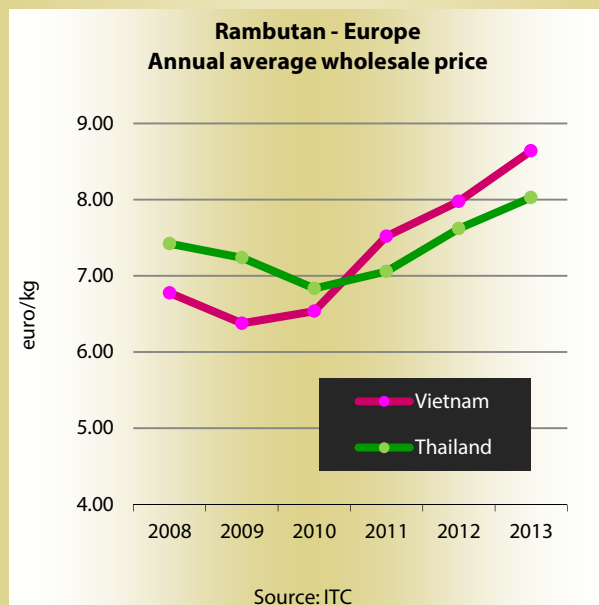
Rambutans are mainly consumed fresh, as they are. They are sold whole, and rarely fresh-cut, since the stone, which is hard to detach from the flesh, does not lend itself to this operation. In Asia, the rambutan is extremely popular. It can also be prepared in tinned fruit and jam form, but the pulp loses its flavour. Fruits of the more acidic varieties are stewed. Infusions of the roots, leaves and bark are used in traditional medicine, particularly for treating fever. The seeds are edible grilled, but are bitter and narcotic. Finally, the wood is also used in construction.

## A restricted market, emblematic of the small exotic fruit trade

The rambutan volumes sold in Europe are not known, due to lack of sufficiently precise customs nomenclature. Nonetheless, exotic fruit trade specialists confirm the restricted nature of the market. Although attractive for its originality, especially because of its "hair", the fruit remains little known among the general public. Furthermore, it has an elitist retail stage price, with its air-freight only transport weighing heavily on its cost (import stage price practically constant, at around 7.50 to 8.50 euros/kg). Finally, the product is difficult to handle, and has a short shelf life (of around ten days maximum). Hence sales are limited practically year-round, with the fruit sold mainly through ethnic networks and by some small traders. Two activity peaks help boost sales, the end-of-year holidays and the Chinese New Year, when the rambutan is seen more widely in the supermarket sector.

## Supply practically exclusively from South-East Asia

South-East Asia, the cradle of the crop, provides the majority of the supply to the European market. Thailand, the world's number one producer, remains one of the mainstays of the international rambutan trade, thanks to its orchards situated mainly in the east (Chanthaburi region, the main production area) and in the south (Chumphon, Surat Thani). However, this source no longer dominates the market as clearly as in the past. Small producers, who make up most of the production base, seem to be having difficulties adapting to increasingly strict phytosanitary



regulations, involving costly inspections, especially as the rambutan is not one of the high-production fruits such as the longan, durian or mangosteen. Vietnam has been following a reverse trend, becoming the market's other benchmark source since the late 2000s. As is the case for many other small exotic fruits, rambutan exports are surging, and this fruit has become one of the country's export specialities, though well behind the pitahaya. Indonesia rounds off the supply from South-East Asia, with its production located mainly in west Java. Some batches from Malaysia, from where the fruit originates, are available sporadically.

### Latin America practically absent from the EU, with Madagascar providing a minor top-up

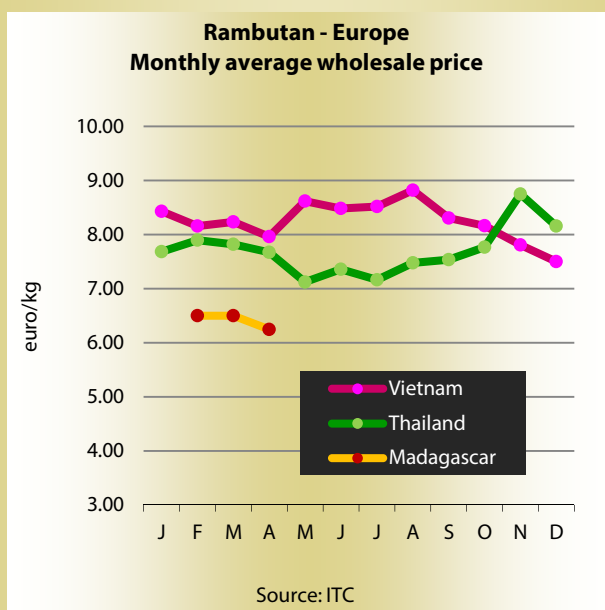
The Latin American producer countries, still present until the middle of the last decade, have practically abandoned the Community market. They have a natural outlet in the United States, where demand is growing, with logistics much less expensive than shipping to the Old Continent. Mexico, which can export its produce by road from Chiapas, reigns supreme on this market, alongside "local" Hawaiian produce. Batches from Honduras, Guatemala and other countries (mainly Central American) round off the supply.



Australia reserves volumes of its small-scale production from Northern Territory and Queensland for its local market. The only non-Asian source to offer significant volumes in Europe is Madagascar. Most of its production is packed into the east of the country, especially around Tamatave.

### Present year-round, with red-peel predominating over yellow-peel

The main production season for South-East Asia runs from April to October, with another more limited harvest period running from December to February. Nonetheless, by switching between sources and microclimates, importers are able to offer a rambutan supply from South-East Asia twelve months a year. It is on the red-peel and green-fibre variety that most of the supply is based, with in particular the Rongrian cultivar very common in Thailand and now in Vietnam. The Si Chomphu variety, with its highly iconic yellow-peel and red-fibre fruits, produced abundantly in Indonesia, is fairly rare in Europe. The shorter Madagascan season takes over from the litchi season, and lasts from late February/early March to late May/early June. The bulk of the supply comprises red-peel varieties, which take over from the first batches delivered, primarily comprising yellow-peel fruit. The 2-kg box, comprising two 1-kg trays, has become the benchmark packaging for all the sources ■



**Fabrice Le Bellec**, CIRAD  
fabrice.le\_bellec@cirad.fr

**Eric Imbert**, CIRAD  
eric.imbert@cirad.fr