Litchi

A report by Pierre Gerbaud

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Sales of litchis on the European markets seem to be marking time. The Indian Ocean export season is still the high point of the distribution of this fruit in Europe, with supplies being smaller and purchases less enthusiastic during the rest of the year. Is this a passing phenomenon or a deep-seated change? It is still difficult to judge this recent trend but a few signs highlight the cracks forming in evolution that was hitherto more dynamic. Without having disappeared completely, a few marginal and occasional sources of litchi did not show much sign of life in 2008. The small Australian season that follows exports from the Indian Ocean was nonexistent. Quality problems and shortage of fruits were mentioned to account for this. The sporadic shipments from Mexico in June also stopped whereas sulphur-treated fruits were shipped for the first time to address the recurrent keeping problems experienced in recent years. And the sale of litchis from China through traditional channels seems to have dwindled to almost nothing—to the benefit of more informal channels closely focused on the ethnic market. Although Israel covered summer supplies with a season equivalent to that of 2007, Thai shipments seemed to have decreased slightly in volume and market presence in spite of greater segmentation of the range. Might this be a slump for litchi after several seasons of growth and a concentration of sales in the final months of the year? Because the quantities of litchis handled during the Christmas period increased yet again.

Litchi from Madagascar

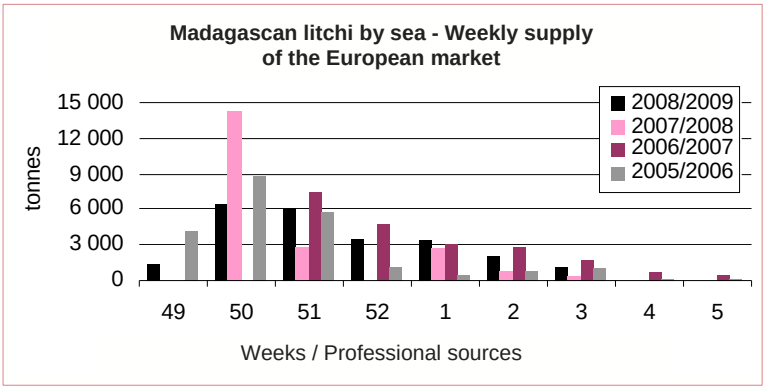
The Madagascan paradox

Photos © Clio Delanoue

Production was substantial and above all very early in the 2008-09 season. The first shipments by air were at the end of October/ beginning of November and the first ship from Madagascar docked in Europe in the first week of December. After starting hastily, the season also finished quickly at the beginning of February after fourteen weeks of sales.

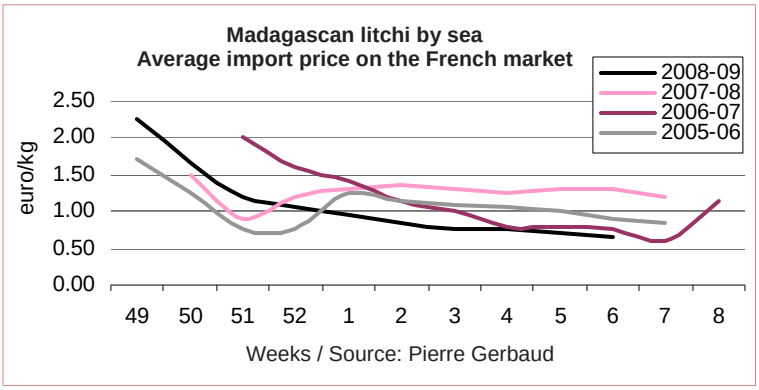
Air litchis cold-shouldered

With an estimated volume approaching 24 000 tonnes during the season, Madagascan exports smashed the previous record of 22 4000 tonnes in 2005-06. Although shipments by air were equivalent to those of the previous season at about 450 tonnes, the volumes of fruits shipped by sea increased again, making up for the unexpected decrease in South African exports. The early start to the season meant that sales could start a week sooner than in the previous season. But this earlier start does not appear to have facilitated sales of fruits shipped by air, with volumes increasing rapidly, coinciding with arrivals from rival sources and coming up against a market that was not particularly receptive at the beginning of the season. The first batches sold quickly, benefiting from the 'novelty' factor, but the accumulation of tonnage and poor retail sales soon made the market less fluid. Prices weakened markedly in the second week of sales and continued to fall until the arrival of the first batches transported by sea. More worrying still was the observation of the lowest prices for four seasons. This poor trend even caused several operators to suspend their supplies. Fruits shipped by air have long been considered as a way to get the marketing season for Indian Ocean litchi off to a good start. This year, the prices at the retail stage in a context considered as 'worried' by the media may have had a negative effect on consumers. The concentration of litchi purchases during the Christmas and New Year season has been observed for a number of years, forging an image of the festive fruit par excellence. Releases on the market well ahead of Christmas may account for the consumer reserve seen this season; people have become used to paying less for this fruit during the weekends before Christmas.



Arrivals of sea litchis well staggered

Like the fruits arriving by air, the first sea shipments reached the European markets at an early date, with the first ship docking at the beginning of December. The season for litchi carried in conventional vessels started under good auspices. The experience of the two previous seasons seemed to have resulted in wisdom among sector operators. Reducing the tonnage imported before Christmas and carefully adjust-



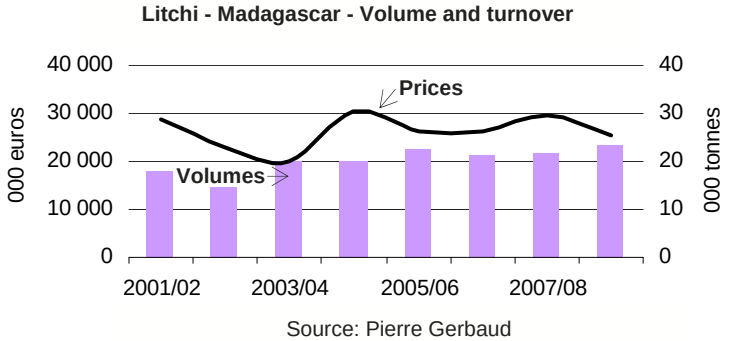
ing logistics led to thinking that sales would be calmer and more profitable. Two vessels chartered by a single group of operators, each putting in twice alternately in southern Europe and northern Europe, made the distribution of volumes more rational. But this apparently optimum plan did not come up to expectations. And it is certainly not the some thousand tonnes arriving in containers between two conventional ships and imported for a specific marketing programme that changed the character of the first part of the season!

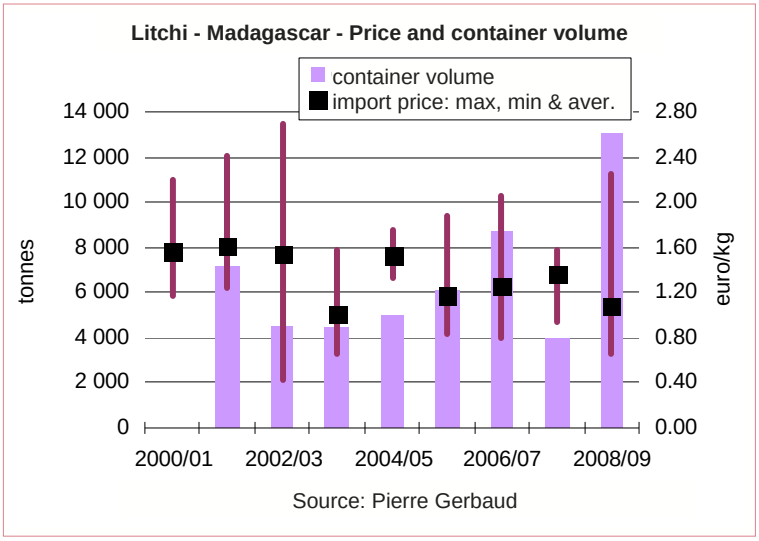
But sales did not follow

Everything seemed to be proceeding satisfactorily but the price of litchis lost more than 50 euro cents per kg between the sale of the first batches to arrive and the second delivery by the first ship. Prices then continued to fall by an almost equivalent amount. And this was only the first ship! The price trend had set in and, unfortunately, did not change until the end of the season. It would be wrong or too easy to blame the trend just on the economic downturn and consumers switching back to more traditional fruits. There is a degree of commercial incoherence here, especially as sales increased at the same time and the marketing of litchis intensified. Did operators suffer a kind of panic in the face of the volumes still to come, the fairly late response of retail distributors and the mediocre quality of the fruits? The explanation probably lies in a combination of these factors. But the result is still disappointing for all the stakeholders in the litchi sector.

Too many containers in the second part of the season

The last straw—which made the downward price movement last for the rest of the season—came at the end of the year. Totally unexpectedly, particularly large quantities were shipped in sea containers. For the first time in 10 years, the volumes shipped in containers were larger than those carried by conventional vessels at the beginning of the season. This is a strange strategy if one examines preceding seasons when it was clear that litchi sales slow distinctly from January onwards. Indeed, the sector seems to function with a knock-on effect in which a measured season of litchis carried in conventional ships is followed by a plethoric 'container' season and vice versa. There is something irrational here, as if the potential for the production and treatment of fruits were more important than the capacity of the destination markets. If the volumes of rejects (for quality problems) totalling several hundred palettes and those sold at less than cost are deducted from the total exported by Madagascar, the final figure would probably be more like 18 000 tonnes than the 22 000 or 24 000 tonnes shipped in recent years. The increase in the number of consignees for the 'container' litchi season means that there is no longer any control of the market. But this broader opening seems to have been stimulated by shippers who saw an opportunity to satisfy the quantitative megalomania that is difficult to understand





Source: Pierre Gerbaud

in the present economic situation. Observation of the evolution of the sale of Madagascan litchis leaves one puzzled. Each time a coherent strategy appears (reduction and better spacing of deliveries this season), it seems inevitable that something goes out of control (huge arrivals of fruits in containers and a paroxysm of competition). The litchi business was born with difficulty, is growing up with conflicts of interests and cannot manage to get past its difficult adolescence. Nevertheless, structuring factors have gradually become anchored in the sector. This might deserve a smile if litchi production and export were not extremely important for the Madagascan economy.

The litchi sector of Madagascar, dominating international trade in this fruit at the change of the calendar year, is unusual. A glance at the last ten seasons confirms this. No two are the same and so it seems very difficult to establish a typology. One of the reasons may be the number of factors involved. The scale of production, the shortness of the season, fruit quality, an early or late start of the season, joint or differentiated logistics, the systems used to fund the seasons, the exaggerated competition between operators on destination markets, etc., all contribute to this unusual character. Their combination never gives the same result. Indeed, analysis runs up against this profusion of factors that are difficult to appraise and are sometimes contradictory. It is not possible to compare simple and hence incomplete hypotheses to try to explain this specific character. Comparing volume/theoretical results for past seasons clearly shows the irregularity of seasonal performances. However, the evolution over about ten seasons shows a gradual decrease in returns even though fluctuations are chaotic. The correlation between 'container' volumes and selling prices (minimum, maximum and medium) also confirms that the more substantial the container season, the lower the price of fruits. The downward curve would be even steeper if we were able to add rejects.

The evolution of sales of litchis from Madagascar is far from satisfactory for sector stakeholders. The worsening of the situation year after year should generate fresh thinking. Continuing the race for tonnage might satisfy the pride of producers and exporters but it does not seem to result in a proportional increase in income. Limiting quantities is not what slogans are made of at the moment but it would seem to be the first action to envisage to halt not only the decrease in financial returns but also the worsening image of the sector ■

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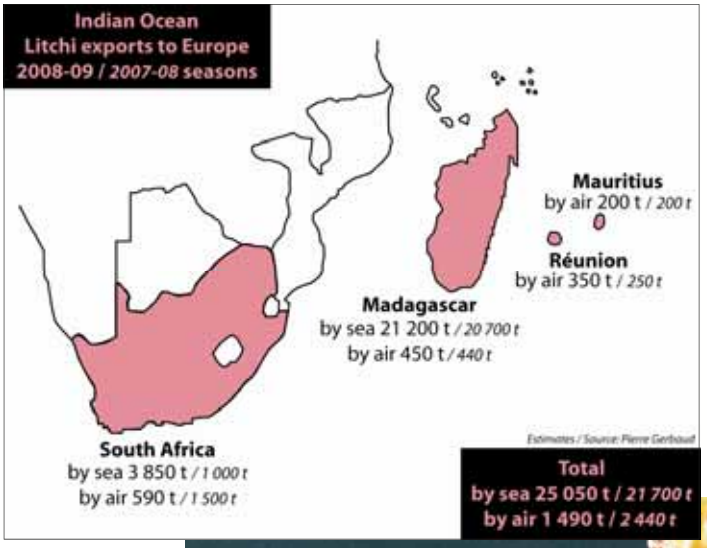
Indian Ocean litchi season

Earliness which did not come up to expectations

In the 2008-09 season, according to the latest estimates, the Indian Ocean zone shipped 25 650 tonnes of litchis to the European market. This performance was in line with the preceding years in spite of a slight decrease in comparison with 2007-08 when 26 500 tonnes arrived from November to March. This slight dip would hardly seem to modify the weight of this region, which accounts for nearly 90% of Europe's annual litchi supply. The problem of this fruit lies more in the economic results than the capacity of exporting countries to ship large quantities. The decrease is mainly the result of the drop in shipments from South Africa as heavy rain in the production zones limited export potential. However, the marked decrease was partially compensated by the unstoppable growth of Madagascan exports.

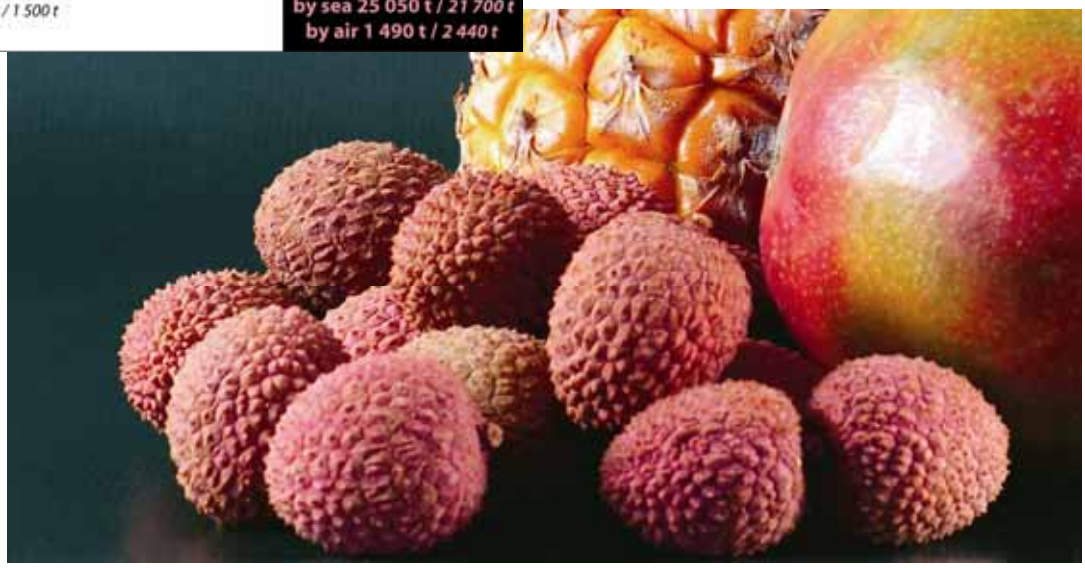


First arrivals at the end of October

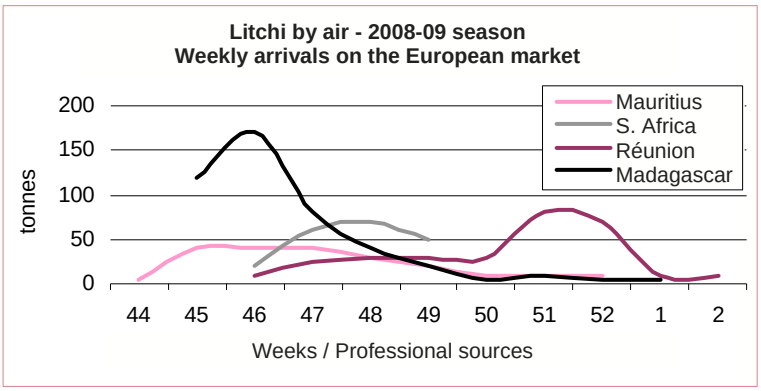
The 2008-09 Indian Ocean litchi season started in Week 44 with the arrival of fruits on the branch and sulphur-treated fruits from Mauritius. As in previous years, they sold at high prices given their 'early' status. The other sources in the zones also started shipping early.

However, sales of air litchi were difficult from the beginning of the season onwards. Indeed, tropical fruits have move to the background in household consumption in the context of the economic downturn. In addition, it seems that all the litchi production areas in the Indian Ocean had good weather conditions this season, leading to abundant crops. Thus the cumulated shipments from the various sources encountered lack of demand on the European market and stocks formed from the very beginning of the season. As a result, strong pressure was applied to the export markets—mainly European.

The season for litchi exported by sea opened officially on 14 December in Madagascar. The



Photos © Régis Domergue



Hansa Visby and the *Comoros Stream* started loading on 14 and 18 November respectively. A total of some 11 000 tonnes of fruits arrived in Europe before Christmas in comparison with 17 000 tonnes during the same period in 2007. The ships arrived over a period of two or three weeks as the season had started early.

Waiting game during the transition from air to sea

In Week 48, the fruits that had accumulated since the start of the season sold slowly. The multiple sources made the market difficult to decipher and the situation was unclear in spite of an apparent easing off of arrivals. Retail distribution channels seemed reluctant to start selling litchis early—especially those that had travelled by air and were still expensive at the retail stage, with a risk of putting customers off litchi. The waiting game played by the retail chains was explained by the forecast first arrival of litchis by sea from Madagascar, available at a more attractive retail price.

The arrival of the ships or delivery staggering

Week 49 was marked by the arrival of the first conventional vessel from Madagascar. The *Hansa Visby* docked in Vado (Italy) in the morning of Tuesday 2 December. Unloading started in the afternoon, allowing the first deliveries at the end of the day. Fruits were thus available on several European markets on 3 December. This first delivery limited to a third of the ship's cargo was shifted quickly in accordance with the programmes set with retail distributors. The ship then sailed to Vlissingen-Flushing (Netherlands), arriving on 9 December and completing unloading in the afternoon of 10 December to supply northern European countries via a large fleet of lorries.

This distribution of volumes was aimed at better distribution of Madagascan litchi on the European markets and was allowed by the early start to the season.

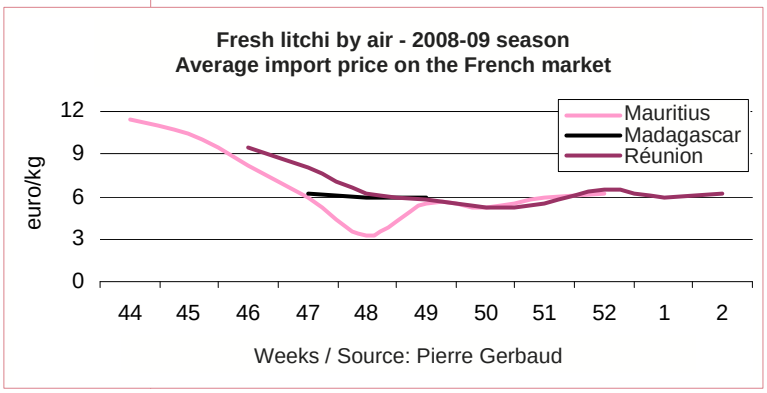
The *Comoros Stream*, the second conventional vessel, put in at its first port of call, Saint Nazaire, on 12 December. It sailed again during the night for Vlissingen-Flushing.

The increase in the volumes available meant that it was now the peak season for sales of litchis from Madagascar. Prices decreased, with extent of the fall differing in the various European markets. Strong competition between operators, the sudden increase in volumes and the uneven quality of the fruits received combined to trigger a downward price war.

Full season in an economic downturn: gloomy Christmas

The *Comoros Stream* finished unloading in Vlissingen at the beginning of Week 51. This new delivery made re-supply smooth.

Meanwhile, a container ship docked carrying fruits that increased the amount of goods available. It is true that demand was increasing but not strongly enough to match the quantities available. Practically all the European markets suffered from inadequate demand before the Christmas period.



As Christmas Day was on a Thursday, litchi sales to supermarket chains were strongly concentrated at the end of Week 51. Indeed, people did their Christmas shopping during the weekend of 20 and 21 December. Demand also increased on most European markets at the beginning of the week, further accentuating the effect of the concentration of consumption at Christmas that had been seen in preceding years. Retail prices behaved fairly well, avoiding slides that would have then been difficult to correct.

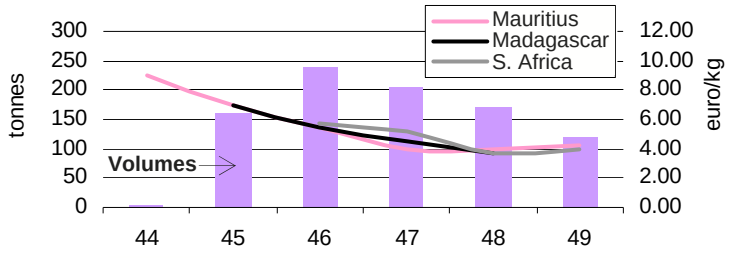
However, although sales were substantial, they seemed less so than in 2007, mainly as a result of the 6 000 tonnes less that arrived in conventional ships. The continuity of supply achieved by arrivals in containers did not result in any change in prices. The trend remained a downward one.

Demand slowed between Christmas and New Year's Day. Prices held as a whole for fruits of satisfactory quality. In contrast, the number of batches of fruits from Madagascar displaying quality defects increased distinctly. These fruits that had been stored for too long or were from poor container batches weighed on transactions and hence on the results of sales.

Marked worsening at the end of the season

The fall in prices in Week 2 helped to maintain the volume of sales but prices lost ground more rapidly on certain European markets. During this period, time was working against litchis from Madagascar. The fragility of the fruits from this source resulted in more and more problems of quality—fruits far from fresh, fungal attacks, etc. The context was one of decreasing demand and worsening quality made sales even poorer.

Sulphur treated litchi by air - 2008-09 season
Volumes and average import price on the French market



Weeks / Source: Pierre Gerbaud

The volumes shipped were disproportionately large in comparison with the capacities of the European markets which, to make matters worse, were suffering a downturn. This rekindles discussion about the better matching of supply and demand for a fruit increasingly considered as festive. Operators therefore had to juggle with the disparity of fruit quality and the various sales channels. Price ranges broadened.

The renewed interest in litchis from Madagascar for the Chinese New Year was slight and short-lived.

The end of the season was particularly difficult. Batches of uneven quality were still available; these required systematic sorting to separate the goods that were still saleable from a significant proportion of rejects.

The season ended in Week 6. The decline in fruit quality meant that a market price could no longer be set, especially as demand was non-existent.

Overall, the 2008-09 sales season for litchi from Madagascar seems to have been morose. Quantities were too large for European market potential, the quality of the fruits was mediocre as a whole, the economic downturn affected consumption and operators competed with each other. All these factors strongly disturbed the sale of this produce ■

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Photos © Clio Delanoue

2008-2009 litchi season

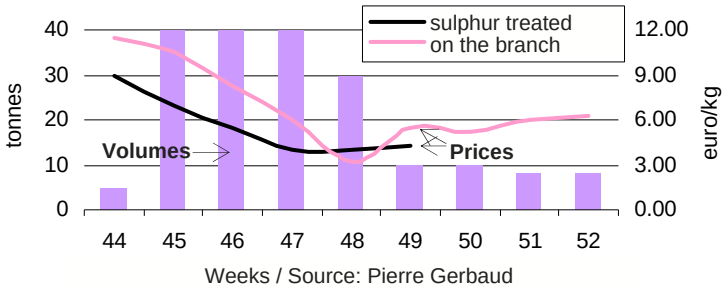
The other sources

Mauritius

A stable season

As in the preceding years, Mauritius opened the litchi season on the European markets. The first batches were delivered mainly to the French market in Week 44. Consisting of fresh fruits on the branch and sulphur-treated fruits, the small quantities shipped sold with no particular difficulty in spite of the high prices (from EUR 10.00 to 12.00 per kg). This situation did not last for very long. The increase in supply from Week 45 resulted in a marked, lasting fall in prices. Favouring the shipment of sulphur-treated fruits, Mauritian exporters then switched and shipped fruits on the branch for the Christmas period. Their shipments finished at the end of the year with prices recovering because of less competition from the other sources shipping fruits by sea. Shipping some 200 tonnes, Mauritius consolidated its position as the second supplier of the European market. Its exports are always in a delicate position as regards timing, squeezed by an early season and strong competition from neighbouring producer countries. The quantities shipped are also limited by the constraints of air freight as available capacity must be shared between the various export products: litchis, 'Victoria' pineapples, flowers, etc. As regards quality, both sulphur-treated fruits and fruits on the branch displayed acidity at the beginning of the season but this subsequently decreased. Mauritian fruits are on an even footing with those from the other sources in the run-up to Christmas and the New Year.

Litchi from Mauritius - Volumes and average import prices on the French market in 2008

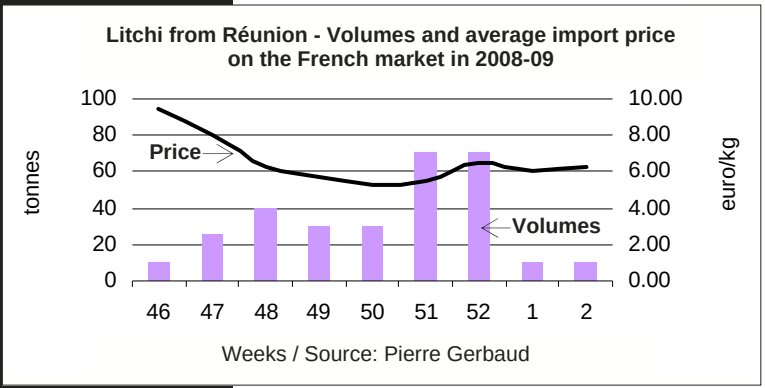


Weeks / Source: Pierre Gerbaud

Réunion

A more difficult season

As in preceding years, the Réunion export season started in mid-November (Week 46) and continued until mid-January, a week of sales shorter than in the previous season. Shipments of fresh litchis loose or on the branch—a speciality of the island—are estimated to have totalled some 300 tonnes, about 50 tonnes more than in 2007-08. After hovering at around EUR 8.00-9.00 per kg for two weeks, the price fell as a result of poor sales at the beginning of the season causing tonnage to be carried over from one week to the next. The worsening of fruit quality (oxidation) even obliged some operators to perform clearance sales at low prices to try to shift the volumes available. High retail prices were a significantly adverse factor until mid-December. Prices stabilised at about EUR 5.00-6.00 per kg as the Christmas holiday approached while deliveries increased and peaked. Prices firmed in the last two weeks of the season, swinging back above EUR 6.00 per kg as a result of the strong decrease in deliveries. The fragility of the quality of fruits from Réunion in the context of an early season with substantial volumes made sales particularly difficult this season. In spite of a sluggish atmosphere and demand more specifically centred on the Christmas period, operators still wished to propose a broader range. In addition to the traditional litchis on the branch or loose, packed in 5 to 6 kg boxes in bags for longer keeping, a few batches of fruits in bunches were also available. These products for high-quality retailing were developed this season. Their attractive presentation often made it possible to sell them at a higher price (as much as EUR 0.50-1.00 per kg more). A few shipments in 1 kg plastic bags (5 bags per box) also favoured broader market segmentation.



South Africa

Small season

In contrast with expectations, the South African export season was very limited in volume. The main reason seems to have been heavy rainfall in the production zones. These poor weather conditions also affected fruit quality, considered to be poorer overall than in previous years. The 1 200 tonnes shipped during the season (200 tonnes by air and 1 000 tonnes in sea containers) was far short of the 3 850 tonnes exported during the 2007-08 season. The shortage of fruits and strong competition from Madagascar meant that South African fruits were just scattered thinly over the European market. Concentrated in Weeks 46 to 49, deliveries by air reached the markets at the same time as the fruits from other sources; this was hence a the period when prices displayed a distinct downward trend. The fragile quality of the South African fruits made them even more difficult to sell. Up against competition from Madagascar, shipments by sea sold sporadically with varying degrees of success. The best sales were certainly those right at the beginning of the sea shipment season and then in the run-up to the Chinese New Year when the even grading of the fruits was preferred by buyers in traditional sales channels. The season finished at the same time for South Africa and Madagascar. However, a few batches of 'Red MacLean' litchis were seen occasionally on the market in the first half of March and sold at between EUR 1.50 and 2.00 per kg.

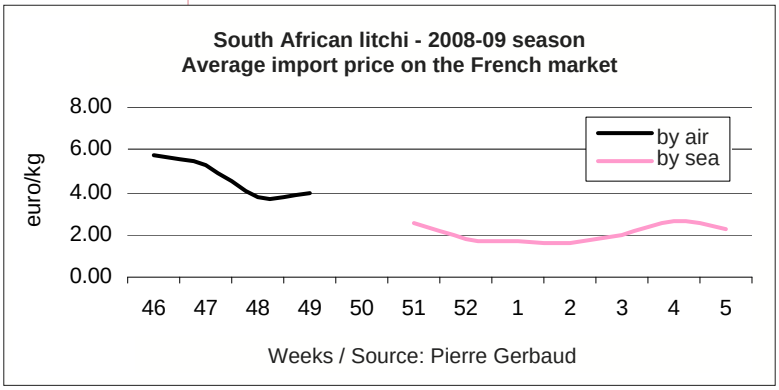
Thailand

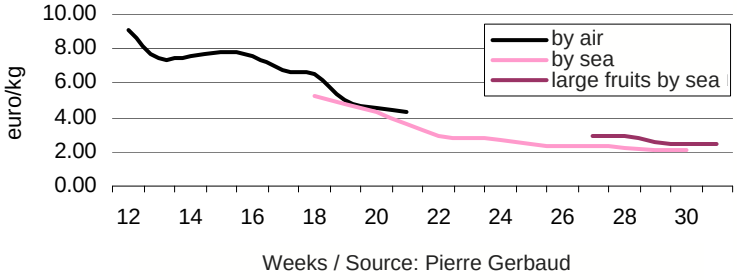
A steady season

Thailand traditionally exports about 2 000 tonnes of litchi to the European markets each season. It seems that the quantity was smaller in 2008. The first exports by air started fairly early at the beginning of April and finished in mid-May. Fruits transported by sea took over from the end of April to the end of July. The season also finished early as it usually continues into August. The flows of goods were mainly to the Netherlands, from where they were distributed to the various European markets. The French market was supplied later in 2008—starting in May. In preceding years Thai litchis had been delivered to the various markets simultaneously.

After being fairly high in April, the price of Thai litchis shipped by air fell until mid-May. The simultaneous presence of both air and sea fruits doubtless contributed to this trend. However, those transported by sea sold at prices close to those of air litchis. Prices started to weaken gradually at the end of May and the trend continued until the end of the season. The movement accelerated in July when Israeli fruits—picked more recently—came on to the market at the same time.

In addition to the variety 'Mauritius', 'Chakrapat' and 'Emperor' were shipped from Thailand during the last four or five weeks of the season. These fruits are about the same size as plums and sold steadily at prices that moved downwards but were slightly higher than those of classic fruits. This is an innovation for Thailand. 'Chakrapat' is not unknown on the European markets as a few batches are sold every year. These fruits are generally shipped by air and aimed at the quality retail trade, given their originality and the small quantities available. This year, Thai operators seem to have aimed at making these fruits more democratic by increasing the volumes shipped, gaining access to sea transport.





Spain

A patchy season

The 2008 Spanish litchi sales season totalled particularly modest volumes. The fruits came little by little in September and October. The first batches reached the French market in Week 37 and were offered at about EUR 9.00 per kg. Sales were difficult in the face of competition from Israel, whose fruits sold at much lower prices (EUR 3.50 per kg). Prices were around EUR 8.50-9.00 per kg until Week 39. With supplies from Israel dwindling, the price of the few hundred kg of fruits from Spain increased to EUR 13.00 and 14.00 per kg until Week 42, the date of the last shipments. A few batches were also sold on the Dutch market in the second half of October at high prices (EUR 8.50-10.00 per kg). To within about a fortnight, Spanish litchis covered the period until the Indian Ocean sources started shipping ■

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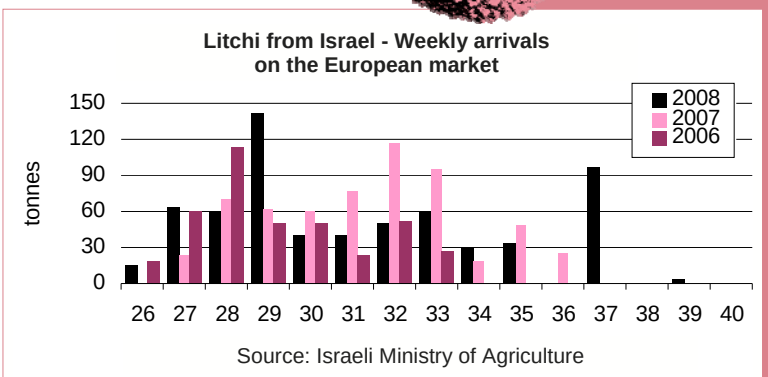
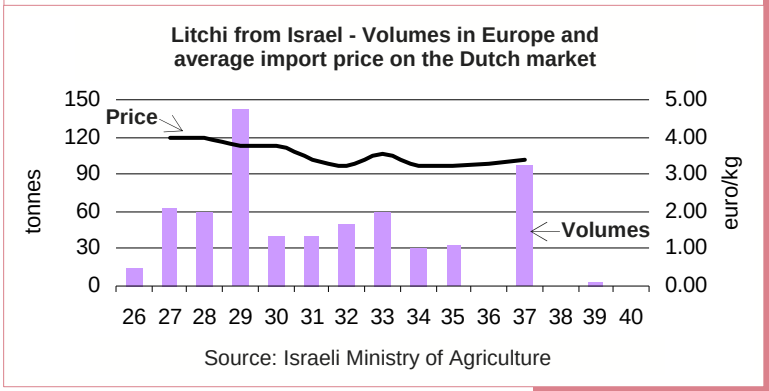
Israel

A smooth season

With 630 tonnes exported to the European market in 2008, Israel has stabilised its position as a 'summer' litchi supplier. Indeed, the sales season was similar to that of 2007 when 600 tonnes had been shipped. However, the small increase is a positive feature and probably reflects the desire of Israeli operators to return to more substantial scores, as in the seasons prior to 2006 when the total was 800 to 1 000 tonnes.

A little earlier than in 2007, the 2008 Israeli season started at the end of June/beginning of July and finished later at the beginning of October. Although the tonnages shipped in the last three weeks of the season were marginal, they enabled Israel to remain present on the market and lengthen the sales period by nearly a month. Facing competition from Thailand in July, Israel was the only supplier of litchis to the European market in August and September, as the quantities shipped by Spain at this time were very small. Sales of Israeli litchis stayed on the northern European markets before being more widely extended to the others. The season started with shipments by air. These fruits commonly sold at between EUR 4.00 and 4.50 per kg before shipments by sea soon replaced them, with the first batches selling at around EUR 4.00 per kg. The increase in supply, modest demand and varied quality (size and flavour) caused prices to weaken in the second half of July; they then stabilised until the end of the season. As in preceding years, Israel mainly shipped the variety 'Mauritius'. Diversification with seedless varieties ('Nomaïtchi') or varieties that are greener but have a high sugar content concerned only small quantities. These varieties illustrate market segmentation, but the small volumes and high prices mean that they are exceptional products.





Producer country sheet

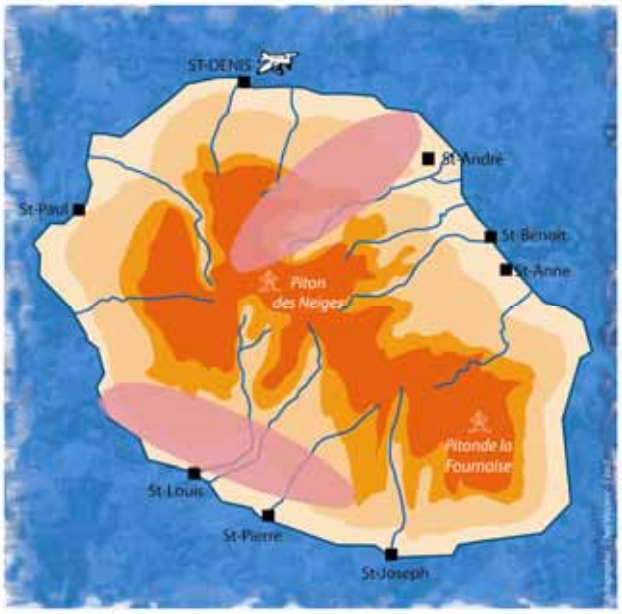
Litchi in Réunion

The litchi originated in southern China. Introduced in the island of La Réunion in 1764, it is now one of the main tropical fruit crops, whereas it used to be sold on the domestic market only. Litchi growing developed strongly in Réunion from 1980 onwards. Thanks to public aid for planting, this traditional 'gathering' crop has become mastered and export-oriented.

Sources: Chambre d'Agriculture de la Réunion, FRCA Réunion, PRPV, Odeadom

Production zones

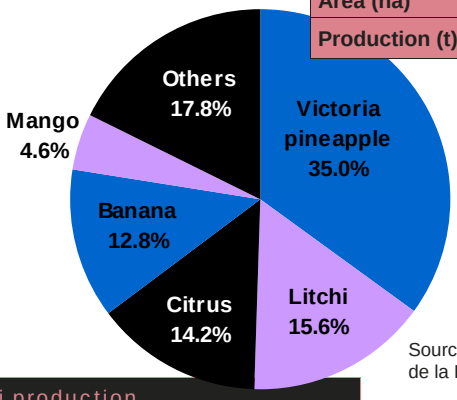
Litchi is grown in Réunion at an altitude of 100 to 600 m. This results in a harvest lasting for two to three months—from November to January. Litchi is well acclimatised to the geographical conditions of the island. The large production areas are mainly in the east from Sainte Suzanne to Sainte Rose and in the south from Saint Philippe to Etang Salé.



Production

More than 1 000 ha of litchi has been planted since the 1980s with aid from the Réunion Council within the framework of an Export Plan programme. The orchards, totalling 677 ha in 2008, are now in full production. Litchi is a complementary source of income for most farmers. It is seasonal and the crop is very uneven, depending on the weather and alternate bearing. Floral induction requires a short period of stress in April and May when the weather is dry and/or cool. Réunion's island status means that litchi does not suffer from viral diseases. The Plant Protection Service has set up preventive measures for all imported plant material to prevent the accidental introduction of pests that are not present in the island today.

Réunion - Fruit production	2005	2006	2007
Area (ha)	2 620	2 332	2 157
Production (t)	46 660	41 041	47 531



Source: Chambre d'Agriculture de la Réunion

Réunion - Litchi production	2001	2002	2003	2004	2005	2006	2007	2008
Area (ha)	950	900	950	850	776	744	744	677
Production (t)	8 550	8 100	8 550	7 650	6 984	7 440	7 441	6 093

Varieties

'Kwai mi' is the main litchi cultivar in Réunion. Various clones of this variety have developed over the years: 'litchi toupie', 'litchi blanc', etc. Fruit production is late, starting five years after planting. Full production potential is attained after ten years. The vegetative cycle takes 12 months.

Outlets

The crop does not use traditional sales channels in Réunion. Hardly any litchis are to be found in supermarkets and very little in catering. Sales are mainly handled on a roadside basis or in the streets in front of shops or supermarkets. The traditional 'bazaar' system is still used, that is to say that the fruits are not sold by the farmers but by middlemen. Of the annual 7 500 tonnes produced recently, only 200 to 300 tonnes is exported—all to metropolitan France. A few hundred tonnes is processed locally.

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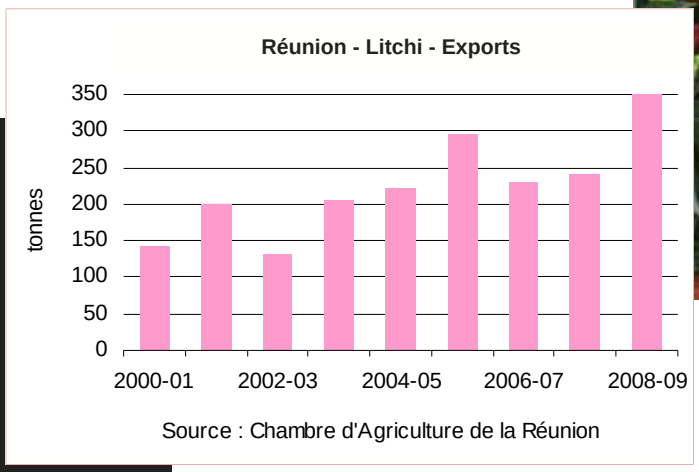
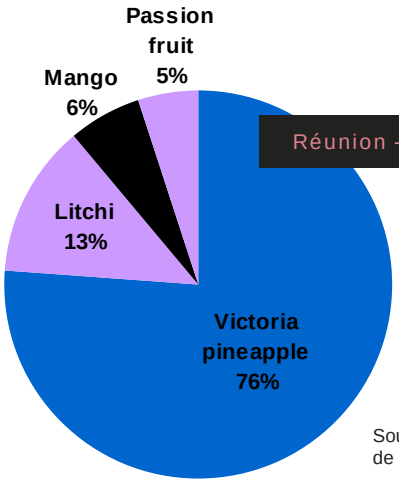
Total exports

The annual exports of some 200 to 300 tonnes have hardly changed in the last 15 years. The litchi sector benefits from EU aid via the Programme of Options Specifically Relating to Remoteness and Insularity (POSEI). It is aimed at providing financial support for Réunion exports, for example by compensating the high cost of air freight. The Réunion department and the Réunion region also contribute to maintaining and developing the sector.

The fruits are of high quality and packed mainly in bunches or loose (destemmed or on the branch in 5-kg boxes. The volume of fruits packed in 250 to 450 g punnets is fairly small and varies according ot the state of the market.



Source : Chambre d'Agriculture de la Réunion



Réunion - Fruits

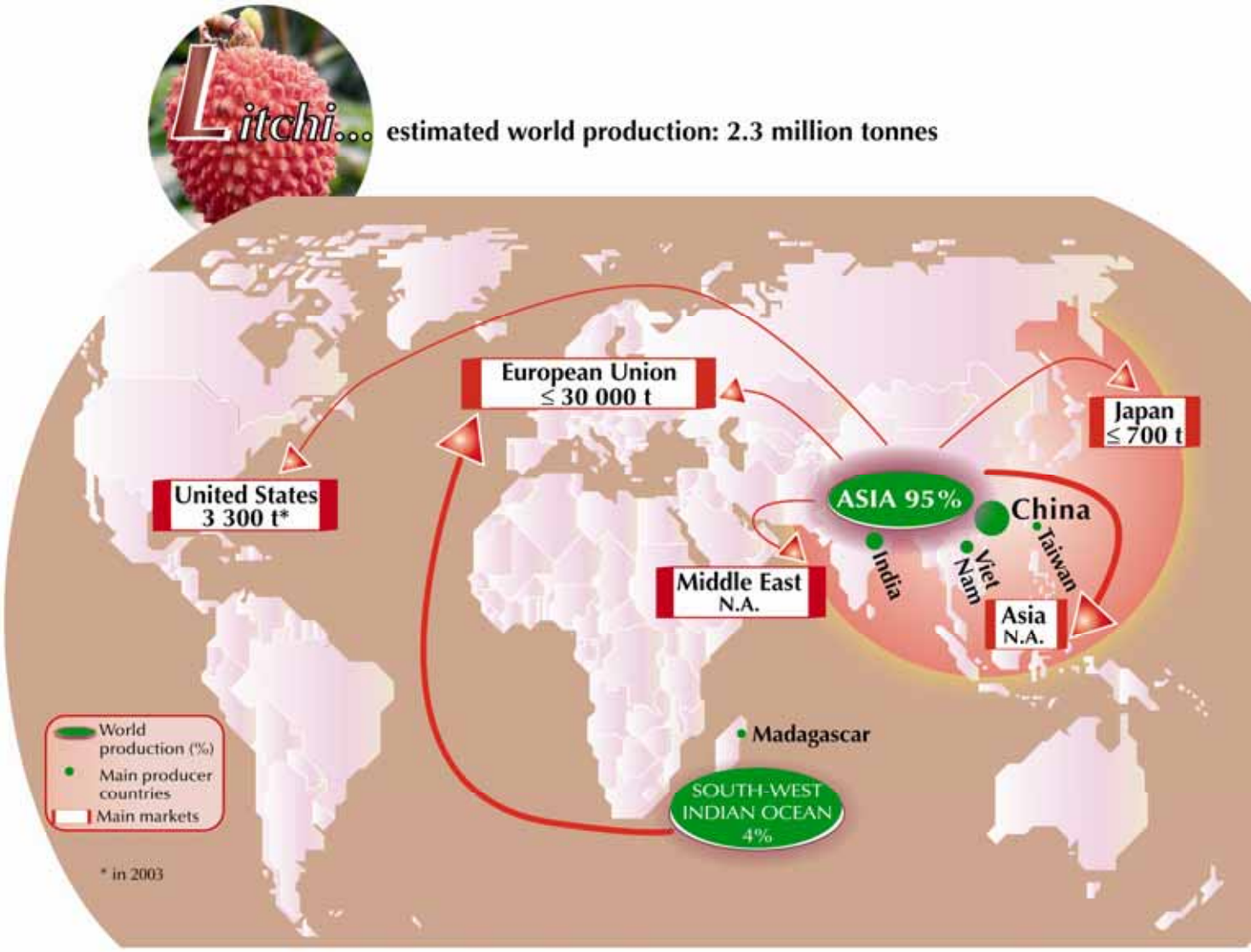
Export distribution

Source: Chambre d'Agriculture de la Réunion

'Label Rouge' Réunion litchi

The Syndicat Qualité Fruits Réunion was awarded a Label Rouge for litchi on 20 November 2006 after devoting many years to structuring the sector. The quality criteria include ripeness, sugar content, size (at least 33 mm in diameter) and freshness. 'Label Rouge' litchis are fine red fruits picked when ripe. The pulp has perfect sweetness and taste. Shipped by air, they are fresh and guaranteed free of chemical treatment (sulphur). 'Label Rouge' litchi are simply 'fruits picked from the tree'. They are harvested very early in the morning, packed in the afternoon and flown to metropolitan France in the evening.

Contact : Yannick Soupapoulle, qualite.suad@reunion.chambagri.fr



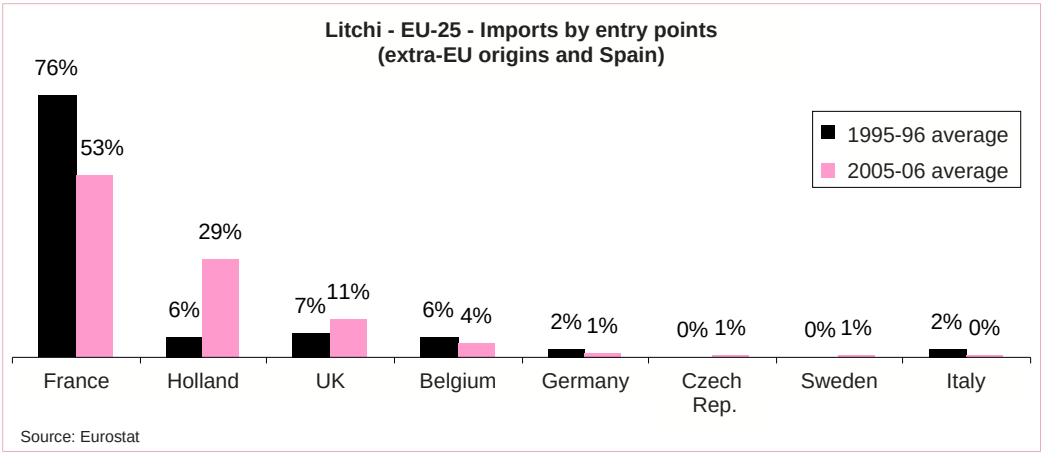
Litchi — World production — Tonnes

Country	Production	Production region	Source
China	1 446 000	South-east (mainly Guangdong, Guangxi and Fujian)	MOA 2006
India	425 000	East and north (mainly Bihar 60 to 70% and western Bengal, 15 to 20%)	Apeda, average 2004-05
Vietnam	156 000	North (mainly Bac Giang, Hai Duong, Quang Ninh)	Professional sources, 2006
Taiwan	80 000	Centre and south	Taiwan Agricultural Research Institute (average 2001-02)
Thailand	43 000	Mainly north (Chiang Mai, Chiang Rai) and centre (Samut Songkhram)	Agricultural Economics Office, 2007
Nepal	14 000	Mainly in the central plain and the west	Ministry of Agriculture Nepal, 1998-99
Bangladesh	13 000	Whole country, mainly along western border	Bangladesh Bureau of Statistics, 1997-98
Pakistan	3 000	Punjab	Ministry of Agriculture, Pakistan, 2005-06
Total Asia	**2 180 000**		
Réunion	10 000	South-east (from Bras Panon to Sainte Rose), south-west (Saint Pierre)	Professional sources
Madagascar	80 000	Mainly Toamasina (between Feonarivo and Brickaville) (Manakara and Fort Dauphin)	Professional sources
Mauritius	3 500	Centre (Plaines Wilhems district), north (Pamplemousse, Flack and Rivières du Rempart districts)	Professional sources
South Africa	4 000	70% Mpumalanga, 24% Limpopo, 5% Kwazulu-Natal	Subtropical Growers' Association, 2006
Total SW Indian Ocean	**97 500**		
Australia	6 000	90% Queensland, 10% New South Wales	Austr. Lychee Growers' Association, 2001
Mexico	4 000	Above all in the centre (San Luis Potossi) and south of the Gulf of Mexico (Vera Cruz, Puebla, Oaxaca)	Professional sources
Israel	1 200	North (between the Sea of Galilee and the coast)	Professional sources
United States	600	Above all in southern Florida (Miami Dade county), Hawaii, California	IFAS, USDA, 2001
Spain	nd	Malaga	
Total others	**11 800**		

Sources: professional sources, FAO, EU customs, Japan, IFAS

Litchi, tamarind, cashew apple, jackfruit, sapotilla — European Union imports													
Tonnes	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total	**13 299**	**10 996**	**13 573**	**19 481**	**23 261**	**21 973**	**25 694**	**29 260**	**30 673**	**30 374**	**27 845**	**37 250**	**36 159**
Total extra-EU, of which	**13 108**	**10 495**	**13 023**	**18 886**	**22 700**	**21 756**	**25 347**	**28 397**	**30 114**	**29 454**	**26 989**	**36 077**	**34 743**
Madagascar	11 178	7 678	10 378	12 448	18 695	16 647	18 178	17 480	20 635	21 121	18 235	28 722	26 295
South Africa	784	1 705	1 645	4 240	2 012	3 044	2 977	7 148	5 042	2 787	3 419	1 542	4 614
Thailand	535	456	280	1 070	1 061	890	1 192	1 534	1 578	2 466	2 618	2 088	2 050
Bangladesh	-	-	-	4	10	3	9	3	43	40	61	578	290
India	7	29	27	21	41	78	380	819	763	607	647	564	83
Pakistan	5	2	-	2	10	4	1 432	86	288	366	532	520	14
Israel	298	187	303	698	551	621	636	489	873	932	428	630	1 066
Mauritius	45	46	114	94	49	143	122	256	117	232	198	185	183
China	1	25	10	105	39	55	77	38	295	333	131	295	148
EU Production Spain	**191**	**501**	**550**	**595**	**561**	**218**	**346**	**863**	**560**	**920**	**856**	**1 173**	**1 416**

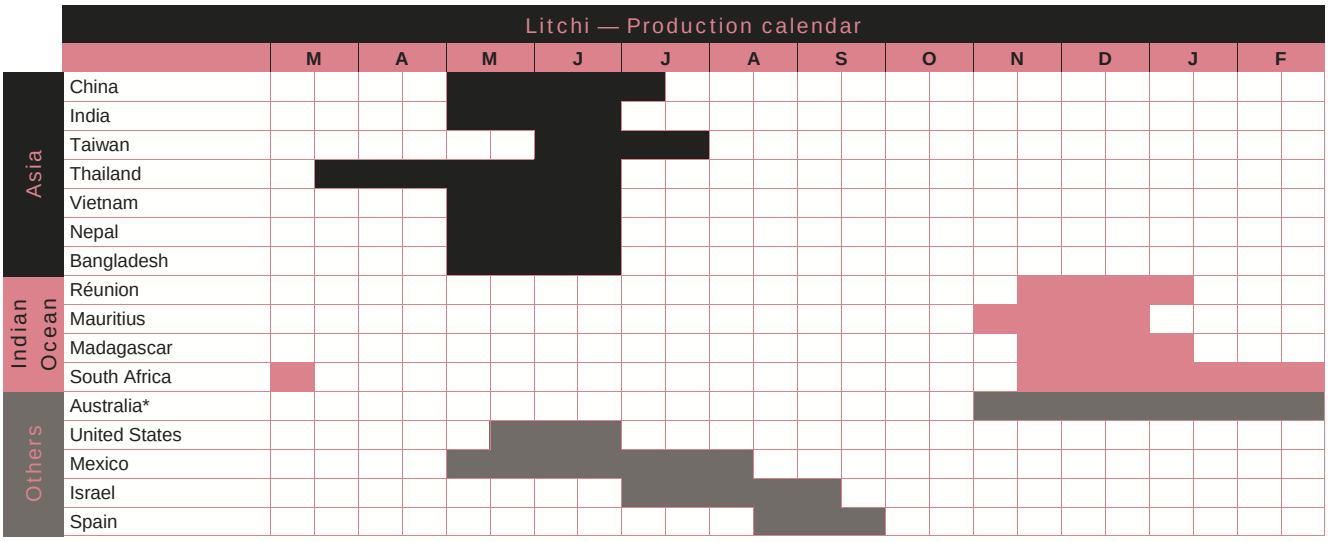
Source: Eurostat - Selection of origins from codes 08109030 (litchi, tamarind, cashew apple, jackfruit, sapotilla), then 08109020 (litchi, tamarind, cashew apple, jackfruit, sapotilla, passion fruit, carambola, pitahaya) from 2008



Source: Eurostat

Litchi, rambutan, carambola, passion fruit — Japanese imports												
tonnes	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Total	**1 196**	**976**	**1 977**	**1 832**	**1 601**	**1 452**	**332**	**891**	**654**	**697**	**581**	**311**
China	6	129	877	1 010	800	1 150	178	689	426	569	445	150
Taiwan	1 011	718	940	576	286	187	33	162	199	108	97	124
Mexico	35	26	11	29	33	19	32	8	8	17	37	35
Thailand	131	97	138	155	349	20	3	0	0	0	0	0
Australia	0	0	0	52	123	75	84	28	21	1	0	0
Others	13	5	11	10	11	2	1	4	1	2	1	0

Source: Japanese customs, code 81090210



* Australia: Queensland from the beginning of November to the end of January and New South Wales from the beginning of January to the end February

Cultivation of litchi

by Christian Didier

Requirements of litchi

Specific climatic conditions are required for litchi growing but the tree is not very fussy about soils. It is also little susceptible to viral diseases.

Cultivation zones

Litchi requires a warm, humid climate. In order to flower, it needs a vegetative resting period induced by a cool, dry season. A slight fall in temperature and relative humidity may induce flowering in some humid zones. A good supply of moisture is essential from the appearance of the flower spikes until harvesting.

Wind-breaks

The position of the land must allow good lighting. Poorly drained low-lying land should be avoided, as should steep slopes that hinder the mechanisation of maintenance work. The land must be sheltered from the prevailing winds and from sea spray near the coast. If there is no natural protection (relief, vegetation), wind breaks are installed around the field and even inside it if it is large or very exposed. Wind breaks consist of fast-growing trees with good anchorage in the ground (filao, shisham, acacia and others) planted in dense rows and require maintenance (fertilisation, irrigation and pruning). They must be allowed sufficient space.

As far as possible, wind breaks should be installed a year before the litchis are planted to give protection from planting onwards. A wind break provides protection for a distance equal to ten times its height. They should be planted closer together in sloping land. They sometimes do not have any effect in extreme cases.

Soils

Litchi adapts to numerous types of soil but prefers slightly acid soils (pH 5.5 to 6.5 and 8 or higher in some parts of India) that are rich in organic matter, deep and well drained. Although it can stand having 'wet feet' temporarily near rivers, prolonged submersion can be harmful. Drainage is all the more important as litchi is grown in zones with high rainfall and often in low-lying areas protected from wind.

Varieties

Litchi sinensis Sonn.
Sapindaceae
Origin: Southern China (Canton region)

A great number of varieties exist around the world. Only those seen on export markets are mentioned here.

Kwaï mi (Mauritius, Tai So)

The fruits are medium-sized (22 to 25 g) and bright red in clusters of 12 to 30. Fruit quality is good. This is the most widespread variety in the Indian Ocean. Production is steady with little alternate bearing. The trees are of medium vigour slender.

Rose scented

The fruits are medium-sized (16 g), globular and heart-shaped. The pulp is very sweet with an aroma of roses, whence its name. The variety is grown mainly in Uttranchal in India.

Haak Yip (Black leaf)

The fruits are medium-sized (20 g), dark red and in clusters of 15 to 25. The peel is smooth and hard. The pits are medium to large. The flesh is good to excellent, sweet and aromatic and forms 70 percent of the fruit. The trees are of medium vigour, compact, straight and bear well.

Shahi (Muzaffarpur)

The fruits are medium-sized (20 to 25 g), bright pink and in clusters. The pulp is sweet. This is the most common variety in Bihar State in India. It is of very good export quality but susceptible to cracking and sun-scorch. The trees are vigorous with steady production (80 to 100 kg per tree).

Chakrapad (Emperor)

A large heart-shaped fruit (32 g). The skin is thin and flexible, dark red with yellow patches. Moderately juicy, the pulp may remain slightly acid. Fairly large stone. The trees are of average vigour with an erect habit, long branches and dense foliage.

The creation of orchards

Soil preparation

Planting in recently cleared land in which stump and root debris enhance the development of root rots should be avoided. If necessary, surface drainage is ensured by levelling and subsoil drainage by a network of ditches. If cultivation can be mechanised, deep subsoiling is followed by ploughing, possibly after the application of manure and phosphate and potassium fertiliser (in the light of the results of soil analysis). When the trees are planted in holes, inputs are applied at this stage.

Plants

Propagation is usually by air layering using trees noted for the quality of their production. The layers obtained during the hot, humid season from branches 10 to 15 mm in diameter and 0.50 to 0.70 m long have a small necrotic root point at the cut that heals quickly. The root system is also better balanced with the aerial part. After separation, the marcots are cultivated in pots in a nursery for 3 or 4 months before being transplanted to the orchard.

Planting density

The litchi tree displays considerable growth. Today, planting distances are 10 x 10 m or 8 x 10 m, that is to say a density of 100 or 125 trees per hectare. Nevertheless, plantation at 8 x 6 m (208 trees per ha) or 8 x 5 m (250 trees per ha) can be envisaged in more intensive cultivation. Annual pruning is necessary in this case. The orchard can be thinned by gradually cutting back the trees when they begin to hinder each other and then, in the absence of an effective pruning method, by felling one tree in two along the row.

Planting

Planting must be performed with a strict layout and perfectly aligned in each direction. If cultivation is not mechanised, a 0.8 x 0.8 x 0.8 m (500 litres) hole must be dug at the position of each seedling. The soil removed is then mixed with about 2 kg potassium sulphate + 2 kg natural phosphate + 25 to 30 kg well-rotted manure. The hole is then refilled with this mixture. A slight mound is formed as a result of the manure application and the expansion of the soil. The plants are installed in the mound and staked.

Marcots are planted inclined in the opposite direction to the wind and staked. They are thus less exposed to the wind and root better. The plants must always be watered abundantly after planting. In cool zones, they must be sheltered during the winter following planting.

Harvesting

Traditional harvesting is performed by hand with 'bunches' of fruits of the branch stored in bales or crates containing 10 to 15 kg only so that the fruits at the bottom are not crushed. These hand-made bales conserve good humidity around the fruits, preventing them from drying out. It is better to use slightly ventilated plastic crates to avoid crushing the fruits. The treatment and marketing of fruits are rapid to avoid the peel discoloration resulting from drying. Litchi is not a climacteric fruit and its biochemical characteristics change little after harvesting, except for gradual deterioration. Fruit maturity is generally appraised on the basis of colour, peel texture and tasting. It is considered that a soluble dry matter/acidity ratio of 2.1 to 2.7 corresponds to optimum quality.

Orchard maintenance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Training pruning

As for other fruit species, it is sought to train the tree on a single trunk with horizontally spaced, regularly distributed main branches. Care must be taken in the early years to prevent the forming of shoots on the trunk or the main branches that have a very closed angle, following the natural tendency of litchi. These shoots are extremely weak points during strong wind.

Soil maintenance

The soil must be bare along the rows or under the foliage in the early years. Spontaneous inter-row vegetation must be kept down. Short-cycle, small growth intercrops can possibly be grown during the first three years and managed in such a way as not hinder the trees.

Irrigation

Litchi is very susceptible to water stress throughout the fruit growth period and the vegetative growth period that follows the harvest. Irrigation is necessary in case of shortage of water. Stress during fruit setting causes substantial fruit drop. Different irrigation systems can be envisaged. Microjet irrigation is satisfactory. At least 200 mm water per month must be applied (according to soil type, the age of the trees, the climate, etc.).

Maintenance pruning

The fruits are in clusters at the extremities of the branches. The latter are broken at harvesting. However, this practice does not enable control of the volumes of the trees. The removal of dead wood, of small inner branches and branches that prevent sunshine from entering the tree is recommended.

Litchi growth is fast and soon becomes exuberant. The trees must therefore be controlled. For this, annual pruning is performed just after the harvest. The trees are usually too dense. The aim is to aerate them by allowing as much light as possible on the foliage and to keep them at a suitable height to make harvesting easier. The final result of pruning should be dome-shaped trees.

Fertilisation

Fertilisation is an important factor. It promotes good vegetative growth after the harvest and makes up for the exporting of minerals in the fruits. After the active vegetative growth period of about four months, litchi needs a short period of stress (nutritional, water, heat or other) to allow flower induction.

Litchi - Applications recommended
Grams per tree

Year	N	P	K	MgO
1	50	10	40	15
2	80	10	60	20
3	140	30	105	40
4	210	45	160	55
5	230	65	265	80
6	380	85	345	105
7	470	105	430	125
8	570	125	520	155
9	670	150	610	180
10 and +	920	210	840	240

Doses are modulated according to the date of application:

- after the harvest: 1/2 of the dose;
- at panicle emergence: 1/4 of the dose;
- after 'June drop': 1/4 of the dose.

Fertiliser is applied to the ground beneath and at the limit of the foliage. Trace elements are applied by leaf spraying at fruit setting (boron, calcium).

Litchi quality defects

Photos © Pierre Gerbaud


Ageing fruits – dull appearance – shell browning and drying


Puffy fruits


Fruits picked too early


Ageing fruits – too long a gap between harvesting and sale


Puffy fruits


Unattractive colour resulting from lack of sorting


Oxidation of the shells of non-treated fresh litchis


Aborted and double fruits


Satisfactory colour (for reference)


Uneven colouring resulting from sulphur treatment


Different sizes in the same packaging


Stalk torn off


Moulds (*Penicillium*)


Black rot (*Aspergillus* spp. and *Pestalotiopsis*) and mould


Mould spots (*Penicillium*)


Strong mould attack (*Penicillium*)


Sulphur dioxide burn damage and double fruit


Spread of mould spots (*Penicillium*)


Black rot (*Aspergillus* spp.) and mould


Sulphur burn as the fruits were wet before treatment


Rots and isolated moulds (*Penicillium*)


Black rot (*Aspergillus* spp.)


Burn caused by sulphur treatment and moisture

Pests and diseases

Warning: treatment must be applied in conformity with the regulations in force in the producer country and in the destination country.

C. Peltastica

Main fruit pests

- ***Cryptophlebia peltastica* and fruitfly**

Cryptophlebia lays eggs on immature fruits. The small caterpillars bore into the fruit to the seed for the nymph stage. The wound opens the way for other pests, especially fungi and fruitflies.

Main foliage pests

- **Scales**

Scales can infest fruits, leaves, stems, branches and the trunk. When numerous, they cause the withering of leaves and shoots. Leaves often display yellow spots where they have been pricked. Scale infestation is often accompanied by sooty mould.

Fruitfly

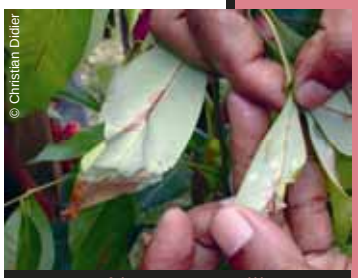
- **Mites: *Aceria litchi* (Erinose mite)**

This is a serious pest in India and China, attacking flowers and leaves. The leaves crinkle and the undersides acquire a brown coating.

Trunk and branch pests

- **Bark-borer caterpillars**

(*Indarbela quadrinotata* and *I. tetroanis*)
Very common in India. Damage is caused by the larvae that bore into bark and trunk, reducing sap movement and affecting growth.



Leaf-borer caterpillar

- **Bark borer: *Salagena* spp.**

The larvae feed on the bark and wood of the tree. The tree does not die but the branches wither. Treatment: these larvae can be controlled by stopping the holes with cotton wool soaked in systemic insecticide.

Bark borers

- **Thrips**

Dolicothrips indicus and *Magalurothrips usitatus* cause damage to flowers. *Selenothrips rubrocinatus*, *Heliothrips haemovoidalis* and *Franklinella cephalica* cause the withering of flowers and leaves.

Diseases

Anthracnosis

- **Root rot**

This is caused by the fungus *Clitocybe tulescens*. Much damage is reported in Florida. *Botryodiplodia theobromae* can cause sudden death of the tree (Australia).

- **Aerial system**

Leaf necrosis caused by *Gloeosporium* spp. This is observed in certain poorly managed orchards.

Post-harvest and sulphur treatment

A feature of litchi is that it does not ripen after picking and so it is essential to harvest the fruit when it is fully ripe. However, it deteriorates very rapidly at ambient temperature. The shell browns, dries and becomes brittle in two or three days. Loss of colour results from the oxidation of anthocyanin pigments, an irreversible reaction. The fruit is then more subject to bursting and secondary contamination by fungi.

To prevent senescence before the fruit is sold, litchi can be fumigated with sulphur dioxide; this inhibits respiration and thus conserves texture and organoleptic qualities for several weeks. Sulphur has a fungicidal, anti-oxidant effect that keeps the shell flexible. This treatment can be applied to destemmed fruits or bunches that are sound, ripe, free of spotting, insects pricking and free of traces of damp on the shell. Sulphur is burned in a closed chamber containing the fruits. It causes the shells to turn yellow, whereas they are naturally pinkish red when the fruits are ripe. The fruits are then sorted again and packed. They remain yellow for as long as they are kept chilled. The colour gradually changes to pink ochre or purplish red when they are under warmer, moist, ventilated conditions allowing the elimination of the sulphur.

Sulphur treatment is the cornerstone of litchi marketing insofar as it lengthens conservation time, giving access to sea transport and hence large-scale exports. The procedure is used for several other fruits such as table grapes and dried fruits and it is also used for wines. The main difference is that litchi shells are not edible. Sulphur treatment is permitted in Europe under certain conditions. Consumer health protection regulations stipulate that the residual sulphur content must not exceed 250 mg/kg in the shell and 10 mg/kg in the fruit pulp. Numerous experiments have been conducted to define treatment procedures so that these limits are respected. Both professionals and the European authorities pay close attention to the question. Numerous control operations are performed throughout the life of the fruit in order to ensure that the regulations are respected. The gradual setting up of certification by operators should enhance product traceability and the mastery of treatment operations.

The continuation of use of sulphur is called into question from time to time. Indeed, with the general evolution of regulations towards the protection of consumer health, there is a great risk of heading towards a reduction in residue levels at best and at the worst the forbidding of treatment. One of the role of the sector us therefore to pay great attention to changes in the regulations concerning this point. A search for new conservation methods can also be an important approach. Unfortunately, litchi does not have sufficient economic weight to mobilise the resources required for such research, as is the case for other fruits.

Temperature during storage and transport is another key component in maintaining fruit quality in time. Indeed, chilling after harvesting, treatment and packing is performed by the transport facilities used. Here, it will be noted that litchi is one of the few tropical fruits that can withstand low temperatures (1°C ± 0.5°C). The combination of sulphur treatment and chilling allows good conservation of litchi. Fast chilling to the heart of the fruit is important for maintaining quality. Chilling must then be maintained to ensure as long a life as possible for the fruits. Any change in temperature may cause fruit deterioration and senescence.