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Pineapple

Full steam ahead!

Counter-season tomato:

Abandoning the standard round, and yet...

Madagascan litchi:

A new start for 2018-19

Côte d'Ivoire mango:

2018 campaign review

European mango market:

Supply heading for a reshuffle

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Editorial



Reduction in all its forms.

The Jivaroan people were fervent devotees of head shrinking. Indeed, it was an essential practice for warriors, to demonstrate their power. Since then the concept has been extended to all aspects of life, extending even as far as thought. We have to cut travel times, download times, work times, etc. We also have to cut short two-sided debates, avoid boring the people with overly long or overly complex exposés, and boil down the arguments to go directly to the conclusions. Ideas must move quickly, given the increasingly tight window for capturing the audience's attention. Constant channel-hopping prevents us from going into depth. Of course, our sector in its turn is no exception from this reductionism. René Char observed that "the essential was constantly under threat from the insignificant". Let's take the organic sector. True, it is suicidal, in media terms, to question this consumption trend. So I will do my best to avoid being hauled up before the courts for thought crime. Yet nonetheless, for the good of the organic market, would it not be honest and constructive to take an in-depth look? The study that has just been published on the link between health and organic food is the height of half-truths, not to say half-lies. Since while the authors, out of the need for recognition, and the press, out of intellectual laziness, imply a causal link between consumption of organic foods and a reduction in cancer rates, they have nothing to say about the actual composition of the group studied. In fact, as an enlightened tweeter declared: "Organic consumers (ed. the ones surveyed) smoke less, consume 40 calories less per day, 5 g more fibre, 17 g less red meat, have a lower BMI (- 1.5), drink less alcohol, are better off and better educated. So no real surprise that their cancer rates are lower". Curses! Correlation does not mean causality! And no evaluation is provided, with all other things being equal. Yet what's the problem, the people have got the message: organic, only organic, and nothing but organic. Even at the risk of seeing the same people turn away from fruits and vegetables when they cannot afford organic. Which would have a particularly devastating knock-on effect in terms of public health. But let's return to the Jivaroans: they shrank the heads of their enemies to trap the spirit of the dead man inside, and therefore guard against his vengeance, but also to appropriate his strength and qualities. A bit like us the post-modern generation, routinely shrinking our intellect.

Denis Loeillet



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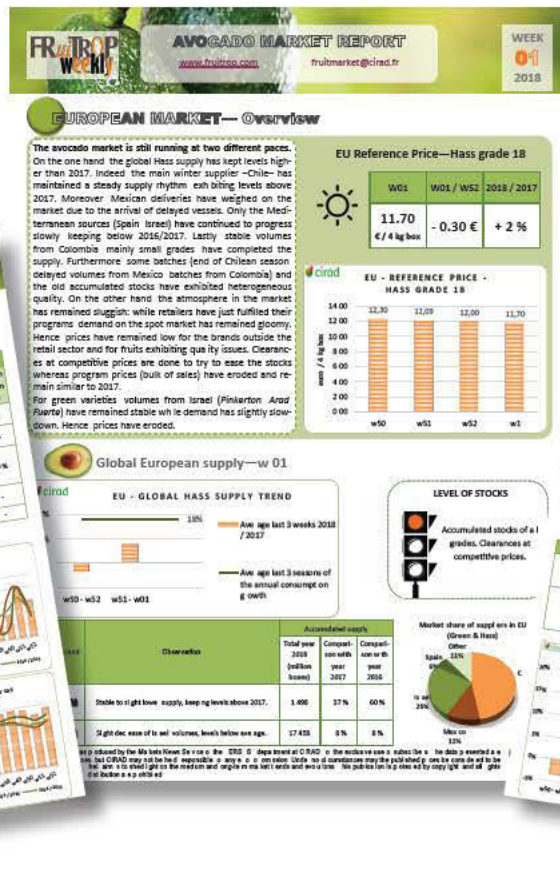
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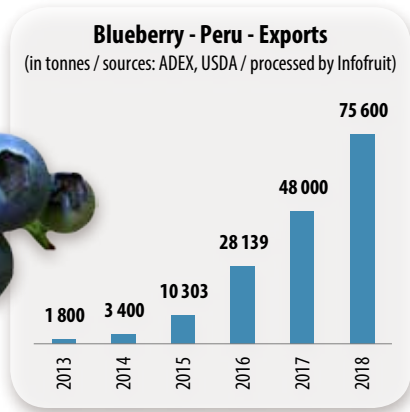
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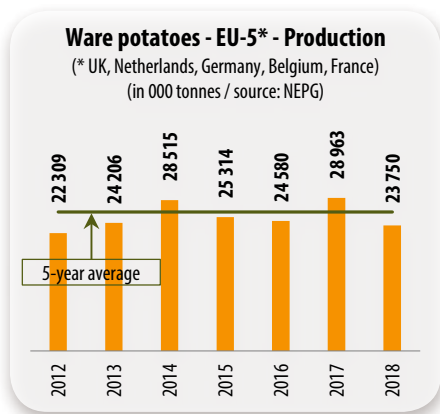
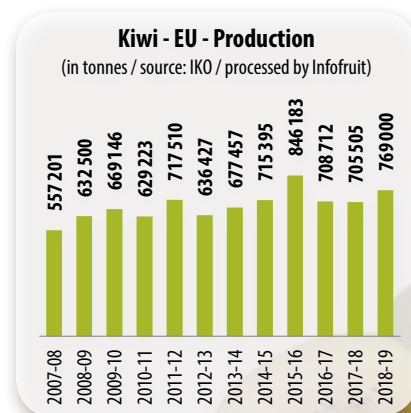


■ **Peruvian blueberry: fresh growth!** The blueberry campaign is underway in the Southern Hemisphere. The potential should continue to increase with the proliferation of surface areas and the opening up of new markets, especially in Asia. Hence this year Peru is planning to export a record tonnage of 75 600 t (+ 56 %), i.e. 580 million USD (+ 60 %). Besides the upward trend in planting in the south of the country, investments are going strong in the northernmost regions. This sector has become more important than asparagus, long an iconic crop of Peru. The bulk of volumes are aimed at the USA (48 % of export tonnages), ahead of the Netherlands, China and Hong Kong, the latter destinations being particularly in demand. China could soon become the number 3 blueberry importer.

Source: Infofruit

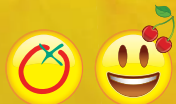
■ **European kiwi: a fresh surge?** After the somewhat truncated 2017-18 campaign, especially in Italy due to the April frosts, European production should see a good level, with a total of 769 000 t (+ 9 %), though barely above the three-year average (+ 2 %), according to the initial info presented by the International Kiwifruit Organization. Surface areas are on the march again with PSA-resistant varieties in particular, some yellow varieties, and uprooting is more limited thanks to better protection of the orchards. This crop, extending over 42 000 ha in Europe, is continuing to extend a little further in all directions, although its rise has slowed down, including in Greece and Portugal. The yellow kiwi, across all varieties, should make up 8 % of volumes, concentrated primarily in Italy. This origin should see its potential return to around 435 000 t for the green kiwi (+ 13 % on 2017), and reach 62 000 t for the yellow kiwi. There could be fierce competition with Greece, which is set for volumes as big as last year (220 000 t). French production should be a bit higher (+ 3 %), similar to the previous year in Spain (17 000 t), while Portugal is set for a good level (30 000 t), albeit slightly down.

Source: Infofruit



■ **European potato: low yields expected.** The latest estimates by NEPG (North-Western European Potato Growers) confirm the fears expressed since the late summer regarding the consequences of the exceptional drought ravaging Northern Europe. Production is set to fall to 8 % below the 3-year average (- 18 % on 2017), with yields of at most 40 to 41 t/ha, in spite of increasing surface areas (23.5 to 24 million tonnes). This is slightly more than in 2012 (22.5 million tonnes), a year of shortfall, though NEPG emphasises that demand is currently much greater, especially on the industrial market. Furthermore, all the countries are reporting field-side reject problems, and producers are concerned about how the crops will keep. In recent weeks, these second generation crops have caused a fall in dry matter content, which raises questions over the quality of harvests, and their preservability. In several countries, producers have asked their public authorities to acknowledge it as a case of force majeure, taking the view that they should not be held liable for the low yields, and not have to deliver the missing contractual quantities. Certain manufacturers have already loosened their quality standards. It has also been reported that some potatoes intended for the fresh market or starch are being directed to frying lines. In the event of low dry matter content, more raw material will be needed to manufacture the same quantity of finished product. Furthermore, in many NEPG regions, harvesting the crop for storage has been delayed because the field conditions are too dry.

Source: Infofruit



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■ **Back to a bumper citrus harvest in Spain and much of the Mediterranean.** In 2018-19, the combined production of Spain's three main citrus growing regions (Valencian Community, Andalusia and Murcia) should exceed the 7.2-million tonnes mark. This harvest is considerably above the average for recent years, albeit falling short of the record level of 7.5 million tonnes from 2011-12. There is a particularly significant increase for the lemon (28 % above average), and to a lesser degree for the orange (+ 8 %). There is a similar trend for two of the other big Mediterranean citrus growing players. The effects of the "Maroc Vert" plan are making themselves felt in Morocco, which is set for a record production of 2.6 million tonnes (+ 22 % above average). There is a

marked rise for both easy peelers and the orange (+ 25 % approximately). Similarly, Israel will be back to a high production level in 2018-19, after its lean harvest in 2017-18 (+ 15 %).

Sources: GVA, Ailimpo, Junta Andalusia

Citruses – Spain* – 2018-19 harvest forecast								
in 000 tonnes	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2018-19 compared to	
							2017-18	last 5-year average
Easy peelers	2 204	2 372	2 037	2 367	1 938	2 229	+ 15 %	+ 2 %
Orange	3 914	3 499	3 052	3 654	3 231	3 639	+ 13 %	+ 8 %
Lemon	1 024	1 100	802	1 160	1 004	1 300	+ 29 %	+ 28 %
Grapefruit	64	85	73	80	76	76	0 %	- 3 %
Total	7 207	7 056	5 964	7 261	6 250	7 244	+ 16 %	+ 9 %

* Valencian Community + Andalucía + Murcia / Sources: GVA, Ailimpo, Junta Andalusia

■ **EU-28 banana supply: dollar banana racing ahead.** August 2018 brought a stable net banana supply to the EU, with a minimal gain of 0.3 % on 2017 (+ 1 350 tonnes to 491 000 tonnes). Over twelve months (September 2017 to August 2018), the net supply registered a steady 6 484 000 tonnes. From the beginning of 2018 (eight months), the EU absorbed 4.4 million tonnes, i.e. 109 000 tonnes more than in 2017 (eight months), to register a growth rate of + 2.6 %. Unsurprisingly, it was the dollar origins group which contributed exclusively to this increase in the supply. The ACP origins (Africa with - 6.3 %, other ACPs with - 3.3 %) and EC production (- 7.8 %) have been on the wane on the European market. Looking in detail, Ecuador continued its offensive, with a 12 % rise over eight months. Costa Rica, Panama and Peru followed hot on its heels, with growth rates varying from 7.7 to 12.4 %. Only Colombia, the number two supplier, was down by nearly 2 %. As for the ACP, only Ghana played its cards right, registering a 6 % rise. Cameroon (- 16 %) suffered from the one of its operators halting production, while Côte d'Ivoire has been treading water (- 1 %). The Dominican Republic was back on the recovery trail, but its results are still not back to their 2017 level (- 3.8 %). Belize and Surinam have continued to cut sail (- 5.4 % each). Among the marginal, or even very marginal, origins we can note the rise of Saint Lucia (though stopped dead in its forward march by recent climate damage which the figures are not yet taking into account) and Angola. Finally, European production is still struggling. The French West Indies have been following their production recovery plan, while in the Canaries a marked shortfall has prevailed, which remained in place in September.

Source: CIRAD



■ **US banana supply: organic asserting itself on a flat market.**

There was a small rise in the US market supply over the first eight months of 2018: + 0.8 % to 2 789 000 tonnes. Guatemala was on hiatus after years of very strong headway (- 0.4 %). Ecuador and Mexico had a very good start to the year, with growth rates of 19 % and 14 % respectively. Colombia was back on the growth trail (+ 5.5 %), while Peru exceeded expectations thanks to the boom in the organic segment. The share of organic banana in total USA + Canada imports amounted to 13 %, as opposed to just 9 % one year previously.

Source: CIRAD

Banana – EU & USA – Supply from January to August 2018 (provisional)				
000 tonnes	2016	2017	2018	2018/2017 difference
EU-28 - Supply	4 071	4 281	4 391	+ 3 %
Total imports, of which	3 622	3 885	4 026	+ 4 %
MFN	2 876	3 162	3 340	+ 6 %
ACP Africa	407	427	400	- 6 %
ACP others	339	296	286	- 3 %
Total EU, of which	450	396	365	- 8 %
Martinique	136	94	90	- 4 %
Guadeloupe	43	35	18	- 48 %
Canaries	258	254	244	- 4 %
USA - Imports	3 144	3 248	3 265	+ 1 %
of which organic	248	292	432	+ 48 %
Re-exports	377	389	385	- 1 %
Net supply	2 767	2 858	2 880	+ 1 %

EU sources: CIRAD, EUROSTAT (excl. EU production) / USA Source: US Customs



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Counter-season tomato

Abandoning the standard round, and yet...

The winter tomato market remains subject to numerous vagaries that often make campaign forecasting a difficult matter. While the main protagonists are well known, there are a host of external factors that can disrupt the strategies implemented by the operators to match demand as closely as possible, and to stand out from the competition. And while a big climate impact, with its cortege of sanitary consequences, plays a leading role, we also need to take into account the backdrop of the political decisions at European level, but also internationally (Russia, Brexit), which are directly and indirectly affecting flows on the European market. These many reasons explain last campaign's poor results, and the uncertainty hovering over the coming campaign.

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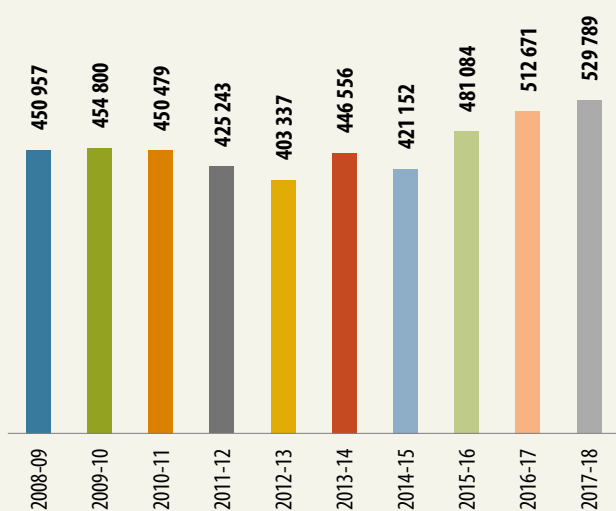
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European market still growing

Last campaign had no lack of difficulties, which can be summarised, as for 2016-17, by the collateral damage from politico-economic events shaking the European market and by sanitary problems due to the weather affecting Mediterranean production. Hence, against the backdrop of the Russo-Turkish crisis, there was no let-up last year in economic pressure, which dates back to 2016-17. Hence Turkish tomatoes maintained a strong presence, especially in Eastern and Central Europe, with nearly 100 000 t imported onto the European market (+ 2 % on 2016-17), out of a total of approximately 530 000 t from third countries (+ 3 %).

There was no downturn from the other extra-European origins, with some of them switching to Europe some of the volumes earmarked for the Russian market; Morocco even registered a slight rise (385 000 t, i.e. + 3 %) in spite of the production fall due to the ravages of *Tuta absoluta*. Senegal actually recorded a fine performance in 2017-18, returning to its previous level (9 500 t) thanks to the big measures taken in the greenhouse sector to manage the problems of viral infection and bacteria, though without reaching the record of 12 500 t from 2013-14. Similarly, Tunisian operators had decent results in terms of volume (9 700 t), boosted by good demand from their historic partners, especially Italy. Hence Israel alone continued to decline, with exports to Europe of less than 1 000 t, as opposed to 20 000 t ten years ago. Spanish production also registered a fall in its shipments to Europe (less than 700 000 t, i.e. 12 % below the 3-year average). This can be explained by sanitary problems (New Delhi virus, TYLC, *Tuta absoluta*), which restricted the origin to a late start to the season, and by the commercial pressure prevailing on the European market, due to the progress made in European production under artificial light, although Spanish producers have greatly modified their range in recent years.

Tomato - EU-28
Imports from extra-EU suppliers (October to May)
(in tonnes / source: Eurostat)



© Régis Domergue

Spanish tomato needing to stand out

Iberian production was again undermined by the weather last year, with an overall level 16 % below the 3-year average (1.3 million tonnes). This shortfall was due to falling yields in Murcia (159 000 t, i.e. 28 % on the 3-year average) at the beginning of the season, because of the high temperatures which somewhat shrank the contract volumes, and to average yields in Almeria (1.08 million tonnes, i.e. - 9 %) and the Canaries (53 000 t, i.e. - 14 %).

Hence exports to most destinations were down (- 6 % to Austria and Germany, - 8 % to the United Kingdom, - 5 % to Benelux), with the exception of Poland (+ 20 %), and to a lesser degree Portugal (+ 7 %) and France (+ 3 %).

However surface areas were stable overall in the big production centres aimed at the fresh market, according to figures from the Spanish Ministry for Agriculture, with a total for Alicante, Murcia, Almeria and the Canaries of approximately 15 000 ha. We can note a slight fall in surface areas in Almeria (12 000 ha, i.e. - 5 % on the 3-year average), with a switch to peppers, whereas the Murcia zone saw another rise (2 145 ha, i.e. + 13 %). Conversely, the Canaries seems to have stabilised at 578 ha, after registering big falls until 2012-13. However, the operators know that they must redouble their efforts to maintain their production, and to this end are contemplating applying for a PGI to protect it.

Hence there should be no big changes this year in terms of surface areas or planting calendar. We should see some new developments in terms of range, with still more segmentation to the detriment of standard references, especially the round tomato. Furthermore, organic surface areas should continue to expand. Last year, the Almeria zone sold 108 566 t of organic vegetables (73 600 t exported), with 44 % tomato, 22 % cucumber, 14 % watermelon and 9 % courgette. The association Coexphal expressed its concern about the deterioration of the market last campaign, and will focus its efforts once more this year on crop optimisation, especially recycling plastics and other waste, as well as on a real water policy for producers, in order to improve irrigation options.

Tomato – EU-28 – Imports from main suppliers (October to May)

in tonnes	2017-18	2017-18 compared to	
		2016-17	last 3-year average
Morocco	385 288	+ 3 %	+ 5 %
Turkey	94 704	+ 2 %	+ 57 %
Senegal	9 538	+ 11 %	- 3 %
Tunisia	9 748	+ 16 %	+ 9 %
Israel	659	- 45 %	- 72 %
Other extra-EU	29 853	+ 8 %	+ 31 %
Total extra-EU suppliers	529 789	+ 3 %	+ 12 %
Spain	697 563	- 2 %	- 12 %

Source: Eurostat

Moroccan round tomato seeing red

We can note a fall in surface areas in Morocco, more or less marked depending on the producers, with a switch to berries to the detriment of round tomatoes in a context of relentless segmentation. Hence certain professional sources are talking about a big fall for this campaign in surface areas for the round tomato, the predominant reference in the Moroccan range, of around 15 % from 2017-18.

Last season was certainly not a bumper year for Moroccan operators either. APEFEL actually reported an "unusually poor performance", between the ten-day delay at the start of the campaign and a long cold winter, which curbed maturation and reduced yields. In addition, quality problems intensified thereafter, with rising temperatures and numerous logistical problems (port of Tangiers clogged up and suspension of certain lines to North America and Russia). The European Union's decision to step up phytosanitary inspections from April 2018 (physical inspections on arrival into Europe) considerably extended the transport time, clogging up the port of Algeciras. Hence large quantities had to be destroyed on arrival to the export markets. Import prices dropped to 0.50 euro/kg for Moroccan round tomatoes in late January, and remained below 0.65 euro/kg until the end of the season.

Prospects remain uncertain

The start of the campaign is fairly promising, with seasonal production having finished early in Europe due to this summer's heat and drought. The end of the Russian embargo, which weighed down on Turkish tomatoes, should also help relieve the European market. While the market might see lighter volumes of round tomato, it could be competitive in terms of segmentation, whether for small fruits, surface areas of which are expanding in the Mediterranean, or vine tomato with European winter production on the up, and set to increase considerably with the construction of modern greenhouses in France and to surface areas switching over this period in Benelux.

Logistical problems could be less marked. Agreements have been renegotiated between France and Spain so that inspections can be carried out in Perpignan. So they might only take one hour, whereas it took four hours last year to clear this stage at Algeciras. Nonetheless, while these inspections only relate to 5 % of incoming tomato shipments, lorries carrying mixed loads with products such as chilli or sweet peppers, which are subject to 100 % inspection by the plant protection services, will still be systematically held up ■

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Madagascan litchi

A new start for 2018-19



The 2017-18 Madagascan litchi marketing campaign proved to be harder than the previous one, when the very early production helped the campaign go fairly smoothly. For 2018-19, the distinctly more marked Southern summer points to a campaign more in line with the norm.

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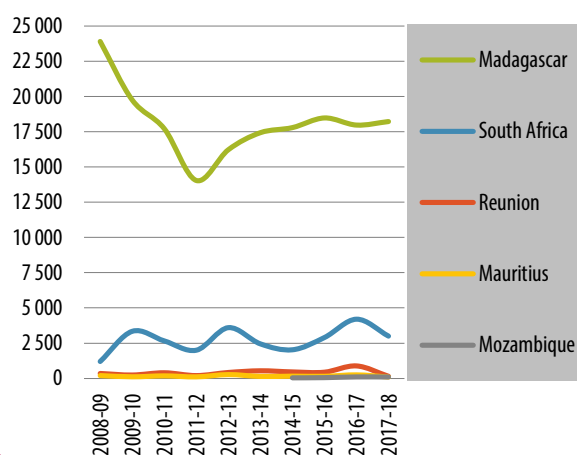
The litchi volumes shipped by Madagascar exhibit only marginal variation, remaining fixed at around 18 000 t, which corresponds to the overall absorption capacities of the European markets, whose consumption remains stable. Concentration of consumption around the end-of-year holidays is an increasingly consolidated phenomenon, with marketing of the litchi outside of this favoured period becoming practically anecdotal. Hence origins wishing to develop their exports at other times of year are often stymied by lack of interest in the product and competition from spring or summer seasonal fruits, available in quantity and cheap. So the litchi is a less common product, aimed at a higher-end clientele.

The very early timing of the 2016-17 campaign represented an opportunity, providing a longer marketing period, especially for sea-freight litchis distributed around the end-of-year festivities, and to a lesser degree for the Chinese New Year. In 2017-18, the campaign profile was very different, with a late start to the harvest because of less favourable weather conditions during flowering and fruit-bearing of the trees. On top of this delay, production was also smaller, which disrupted the supply to the packing stations and compromised the sea-freight export logistics. Unlike in previous years, when two conventional ships scheduled out of Tamatave were received in the Belgian port of Zeebrugge, industry professionals preferred to direct the first litchi ship to the French port of Sète, in order to minimise the transport times and reach the European markets quicker. The economic review for the 2017-18 campaign was less positive than in previous years. The greater rarity of the fruit forced collectors to considerably extend their harvest zone, which led to greater delivery costs and longer local transport times. This situation led to higher purchase prices for Madagascan exporters. With sale prices in Europe remaining stable, shippers' revenue came under greater pressure.

The late timing of the 2017-18 campaign did however favour air-freight shipments, which were up by fifty tonnes or so on the 2016-17 campaign. In this niche, we can also note a rise in shipments of fresh on-stem fruit during the first phase of the campaign. The paucity of production from Mauritius, and above all Reunion, specialists in this type of product, probably played in favour of Madagascan fruits. We might also highlight another secondary aspect in the 2017-18 campaign review, the Fairtrade litchi market. This segment, which has seen gradual progress over the past few years, was harder to place last campaign. The implementation processes for these products subject to specific certification are longer than for conventional fruits. The production delay, on the one hand, and the slowness of scheduling or misguided actions of European purchasers, on the other hand, greatly disrupted the sale of these litchis. A limited number of European consumers will accept a price in-

Litchi - EU-28 - Evolution of imports

(in tonnes / source: Eurostat)



crease, in the knowledge that this additional cost directly benefits the producers associated with this Fairtrade approach. Yet the price distortions observed in certain European chains proved to be counter-productive. With retail sale prices touching on 10.00 euros/kg, while conventional fruits were at the same time on offer at around 3.00-4.00 euros/kg, poor sales of certified fruits built up, neutralising the expected effects for this type of product. The set-up will need to be put right for the coming campaign, or consumers could be put off these products for good.

Finally, we can note a disappointing last phase of the campaign, corresponding to the marketing of sea-freight container litchis received at the beginning of the year. The rapid loss of interest from January was one of the main causes, and is a trend confirmed year after year. Yet this phenomenon intensified last campaign in view of the fragile quality of the fruits shipped this way. The rapid deterioration in quality put consumers off the product, especially in the face of the better-keeping South African produce.

A new start for 2018-19

This year's more distinctly marked Southern summer points to a campaign more in line with the norm. Flowering and fruit-bearing enjoyed better conditions, in spite of the damage by the cyclone which hit Madagascar in February. More abundant production and the return to a less tight calendar seem to be the signs prevailing over the coming campaign. We should remain cautious regarding campaign forecasts, as weather conditions can alter the state of production in both quantitative and qualitative terms. As at mid-October, the information provided by the Tamatave Technical Horticultural Centre (CTHT) stated that a significant harvest able to supply the packing stations was expected for week 47. However, the increasing temperatures in recent weeks and the water shortfall registered since August are likely to delay fruit bulking and maturation.

As regards trade organisation, the industry operators adopted the same logistical framework as in previous years. The two conventional ships scheduled for this campaign will be the same, insofar as their technical criteria have proven effective in the past. The European destination port(s) will be determined according to the official campaign opening date and the loading times. So the port of Sète, which made its litchi debut last year, remains an option, especially for the first ship because of the sailing time saving between Madagascar and Europe. The provisional quantities will be equivalent to previous years, namely between 7 000 and 8 000 pallets

per ship. The sea-freight container volumes will perhaps be revised downward, given the results obtained in the past in the latter phase of the campaign. Madagascan professionals are also contemplating stepping up their shipments to Russia, which would enable them to increase their export volumes, given the stability of quantities bound for the European markets. Every year, an external factor comes along to disrupt the campaign to some extent (climate conditions, epidemic, etc.). The 2018-19 campaign is no exception to the rule. The litchi campaign will be held between the two rounds of the presidential elections (7 November and 19 December). The complexity of the ballot and the large number of candidates could disrupt litchi shipments due to public disorder, as has been the case in the past. We hope that there will be no interference between these two events.

The other origins in the Indian Ocean zone also seem to have enjoyed better weather conditions this year for litchi production, which should be more abundant than last year. The probable start to the Mauritian campaign is predicted for week 45. Reunion, practically absent from the market last year, should return with a bigger presence, starting its campaign toward mid-November ■

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Côte d'Ivoire mango

2018 campaign review

2018 will remain etched in the memories of Ivorian exporters as a very painful campaign. The main factors for their discontent are direct competition with the Peruvian mango, and the fall in sale prices of nearly 40 % on the traditional markets. After several blissful years with volumes on the increase and prices more or less holding up, they had certainly forgotten the dark years of 2000, 2006 and 2012. This infernal cycle, in which a catastrophe occurs every six years, has punctuated Ivorian mango exports for nearly twenty years.

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PLEASURE

A year round supply of triggered mangoes

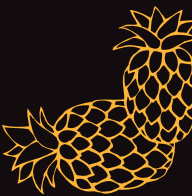


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Mango – European Union – March to June imports from Côte d'Ivoire, Brazil and Peru

in tonnes	March	April	May	June	Total
Côte d'Ivoire					
2017	0	3 205	23 983	2 874	30 062
2018	4	9 081	18 397	1 192	28 670
Brazil					
2017	9 956	9 635	7 336	5 145	32 072
2018	8 145	9 565	5 672	5 580	28 962
Peru					
2017	24 395	6 439	631	85	31 550
2018	25 800	17 959	2 802	122	46 683

Source: Eurostat

An earlier-running season

The Kent mango campaign started on 28 March 2018, i.e. two weeks earlier than last year, when it started on 10 April. The Amélie campaign opened on 20 March, though exports were practically non-existent. In 2018, production was much earlier and abundant than the previous year. The campaign finished on 15 May, at the order of the Ivorian Ministry of Agriculture.

The campaign opening and closing dates are now set by the government authorities, which are attempting to regulate the industry, and above all limit phytosanitary problems. The early timing of the Ivorian campaign, in this context, has helped limit the development of fruit fly infestations, which are most often observed at the end of the season.

A saturated European market

Unexpectedly, volumes imported into Europe in April were up by nearly 6 000 tonnes from Côte d'Ivoire (9 081 t in 2018, as opposed to 3 205 t in April 2017), and by more than 11 000 tonnes for Peru (17 959 t in 2018, as opposed to 6 439 t in April 2017). Conversely, Ivorian volumes decreased in May with 18 397 t, as opposed to 23 983 t in 2017, whereas Peruvian volumes were up on last year (2 802 t as opposed to 631 t in 2017). Tonnages from Côte d'Ivoire more than halved in June (1 192 t as opposed to 2 874 t in 2017) due to the hasty end to the campaign, which helped send sale prices soaring. Brazil did not see its quantities increase over April, May and June, hence it did not really impede Ivorian mango sales.

A fall in volumes

Peru's gain in market share is currently of great concern for Côte d'Ivoire, whose export volumes to Europe decreased for the first time (28 695 t in 2018, as opposed to 30 262 t in 2017) since the end of the politico-economic crisis that the country has been through.

So is this a structural or cyclical phenomenon? Nobody can give an accurate answer, but one thing is for sure, this origin faces great danger from a combative Peru, which seizes hold of the European market for months, whereas Côte d'Ivoire is only in place for a few weeks.

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The Ivorian industry is still rather disorganised, and product quality highly heterogeneous due to the mode of production itself: village plantations, proliferation of batches, homogeneity problems in terms of maturity, sanitary pressures, etc.

Ongoing phytosanitary problems

While seizures due to fruit fly were halved (17 interceptions in 2018 as opposed to 32 in 2017), the threshold set by the European Union is still a long way off. In response to the increase in interceptions in 2017, the Ivorian phytosanitary authorities stepped up inspections in the packing stations: extending the sampling plan, inspecting all batches from different origins, etc. They also prohibited mango exports to the European Union after 15 May, while other destinations remained open.

Yet the real issue has not been resolved, since producers have not yet implemented rational phytosanitary strategies on the plantations.



Mango – European Union Number of interceptions due to fruit fly

	2016	2017	2018
Burkina Faso	16	20	8
Côte d'Ivoire	10	32	17
Mali	66	26	14

Source: European Customs

Some more logistical problems

Despite an improvement in the port situation, there are some ongoing problems. While congestion at the port of Abidjan worked against the mango in 2017 (cancellation of ship rotations, malfunctioning facilities, etc.), things went smoother in 2018 thanks to the modernisation and better organisation of the Ivorian port complex (special storage yard for refrigerated containers, keeping to docking windows, etc.).

Transporting the containers up to the production zones and their delivery remains a major concern, sometimes leading to merchandise having to wait before being packed at the packing station. Secondly, the quality of the containers provided remains another point for improvement. Although product transportation to the ports has been improved, the 2018 campaign was marked by other concerns, no less serious.

Extremely low sale prices

2018 will go down as a catastrophic campaign for the Ivorian industry, due to incredibly low sale prices: 3.50 euros/box, down to even 3.00 or 2.00 euros/box, i.e. sales well below cost prices, whereas fruit purchase prices had been on the up for the past few years.

Côte d'Ivoire's number three export fruit after the banana and pineapple, representing 4 % of agricultural GDP and 10 million euros of revenue for the north of the country, the mango remains a major economic issue for the country.

An inter-professional association for the mango should be set up in 2019. Comprising representatives of producers, independent exporters, professional organisations, processors and harvesters, it will certainly have its work cut out in order to ensure the profitability of each of its players.

The West African Regional Mango Alliance (ARMAO) was created in September 2018. Based in Dakar, it brings together Côte d'Ivoire, Guinea, Senegal, Gambia, Mali and Burkina Faso. A host of actions will need to be undertaken in this framework too, to ensure that the West African industry can earn better value ■

Virginie Pugnet



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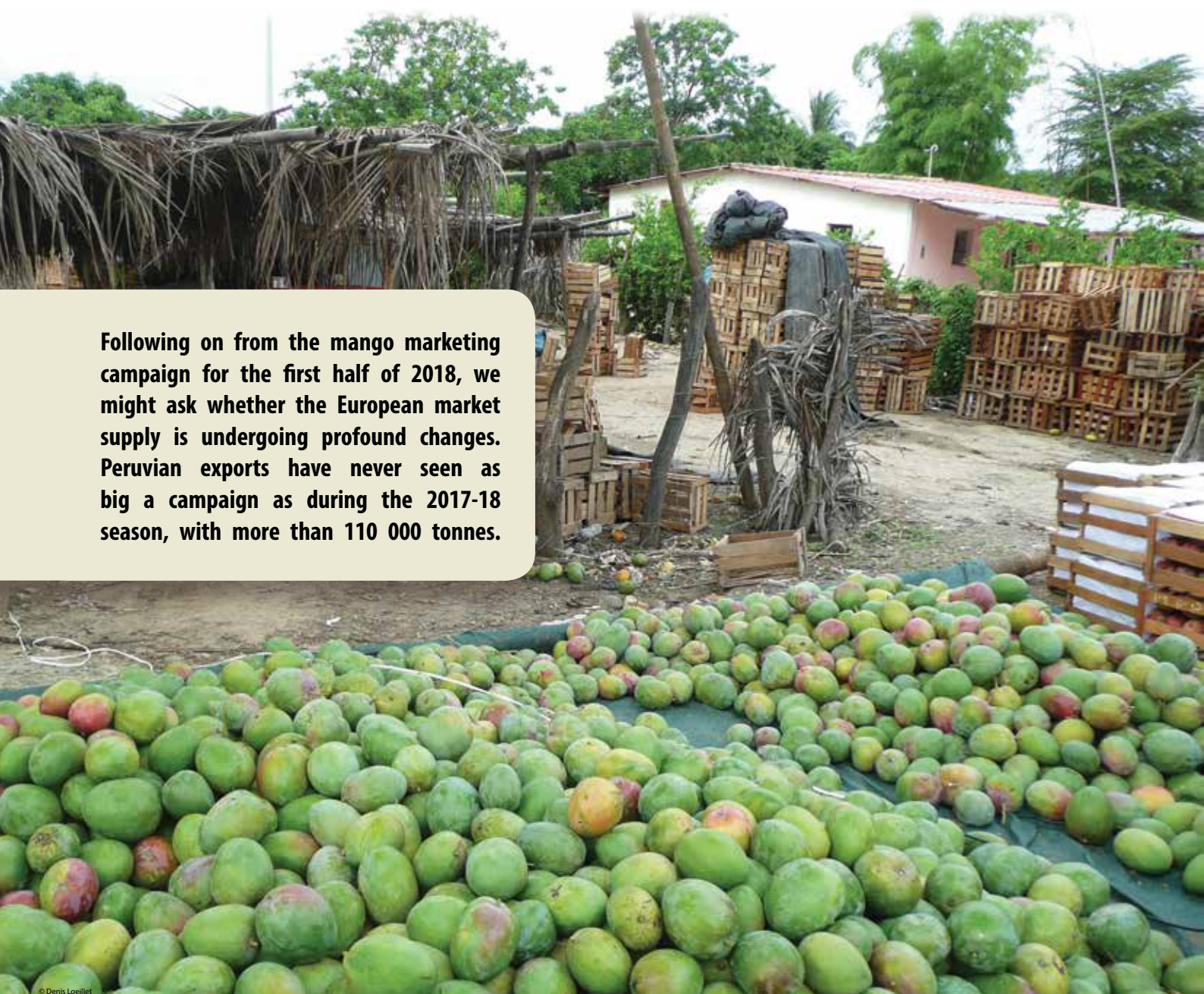
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European mango market

Supply heading for a reshuffle

Following on from the mango marketing campaign for the first half of 2018, we might ask whether the European market supply is undergoing profound changes. Peruvian exports have never seen as big a campaign as during the 2017-18 season, with more than 110 000 tonnes.





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Peruvian mango shipments have expanded for more than twenty years at an increasingly high tempo. Furthermore, it has drawn slightly ahead of Brazil in quantitative terms internationally, and has now slipped into third position behind Mexico and Thailand. On the European market, Brazil remains the biggest supplier with 117 500 tonnes, yet Peru is just behind, with 95 500 tonnes for 2017.

By virtue of the sheer size of its territory, its pedoclimatic conditions and the varietal range selected, Brazil can produce and export mangos year-round. Peru runs its export campaign from November to May, and the country's natural conditions probably do not favour extension of the production calendar. Conversely, new plantations are expanding the volumes available in the country's traditional slot.

During the last campaign, Peruvian exports increased, yet the difference with previous years can be illustrated rather by the breakdown in tonnages. The calendar has remained identical, while monthly volumes at the end of the campaign have increased significantly. In 2017, European imports of Peruvian mangos were 6 400 tonnes in April and 655 tonnes in May. In 2018, they reached nearly 18 000 and 2 800 tonnes for the same period. This quantitative rise literally sheared off the start of the campaign for the West African origins, which had come slightly earlier this year.

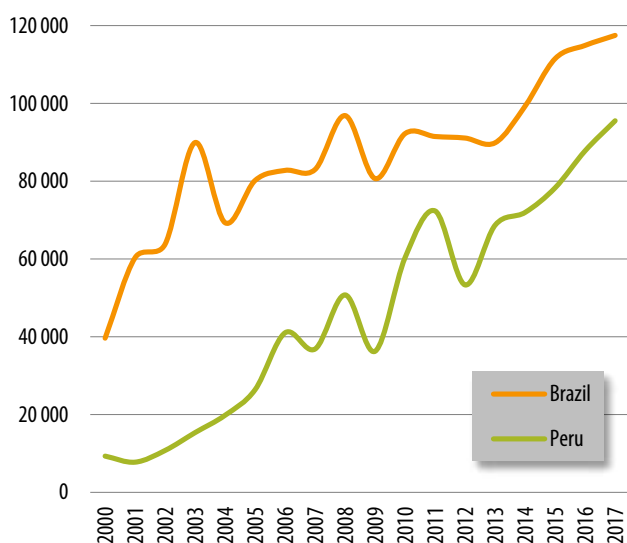
The European distribution sector, reluctant to modify its referencing, especially since the quality of the Peruvian produce remained decent, continued with its procurement policy, shunning West African fruit and thereby contributing to the highly mediocre progress of the campaigns of these origins, chief among which was Côte d'Ivoire.

There is a great temptation to invoke the exceptional nature of the Peruvian campaign to explain poor sales of West African produce. Yet the downturn in recent months turns the mind to other factors which could represent additional obstacles for the African origins.

The overall context, first of all, must be taken into account, with the Central American origins present to varying extents, such as Puerto Rico, the Dominican Republic, and to a lesser degree Guatemala and Nicaragua. All of these origins represent considerable volumes from the sec-

Mango - European Union - Imports from Brazil and Peru

(in tonnes / source: Eurostat)



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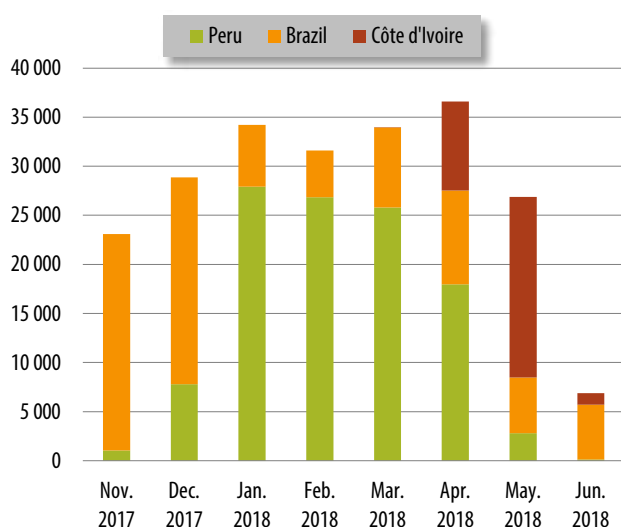


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**Mango - European Union - 2017-18 imports
from Brazil, Peru and Côte d'Ivoire**
(in tonnes / source: Eurostat)



ond half of May, which generally corresponds to when West African shipments are winding down. The increase in Peruvian volumes at the end of the campaign (April-May) encroaches heavily on the start of the West African campaign, already increasingly concentrated year on year. So the West African campaigns are being caught in a pincer movement by the growing quantities from the Latin American origins, and the pincers are tending to tighten their grip. In spite of possible seasonal fluctuations for each origin, it is rare for one or more of them not to offset any shortfall.

A crucial point: quality

As for Peru, the risk of expansion does not come solely from the expanding cultivation area, especially in later production zones than the Piura region, such as Mopute or Casma. It is in fact sustained by a general favourable context. Although remote from the European markets, Peru enjoys efficient and large-scale logistics, where the mango is only a part of the country's exports. The avocado, grape and other fruits represent a considerable and healthy export portfolio.

Peru's industrial type mango orchards, in some cases over large surface areas, contrast with the most often fragmented and small-scale orchards of West Africa. The form of these orchards favours better control of fruit quality, all the more essential for Peru being subject to long transport times. Of course, Peruvian fruit is not all perfect, yet overall exports remain fairly homogeneous. And it is probably on this point that the commercial rivalry between Latin America and West Africa on the European markets is fundamental. The pressure exerted by Peruvian fruits at the transition between the Peruvian/Ivorian campaigns is largely due to the lack of reliability of the Ivorian supply. The qualitative disparity of Ivorian fruit, in terms of coloration but also maturity, rapidly put the distribution sector off the origin. It is probably on this aspect that Ivorian and African exporters in general should focus their efforts. The task is complex given the above-mentioned handicaps, yet without improving this crucial factor, the West African origins, and primarily Côte d'Ivoire, could lose market share ■

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A report by
Denis Loeillet
and
Thierry Paqui

Pineapple

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Pineapple

European market

Full steam ahead!



In 2018, the European pineapple market set an absolute volumes record! Yet this is most definitely a market of few surprises, with this record accompanied by a sharp fall in prices. The destruction of value cycle is on the move, to be followed by uprooting. Costa Rica is playing its role to perfection, but suffering for its art, as the all-powerful origin which has the market to itself.



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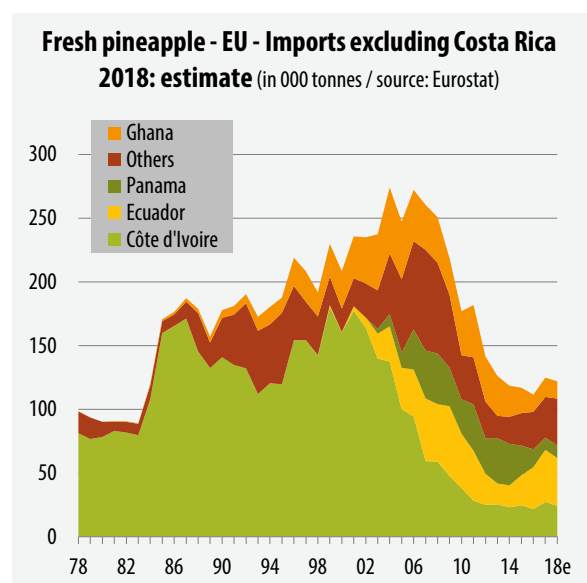
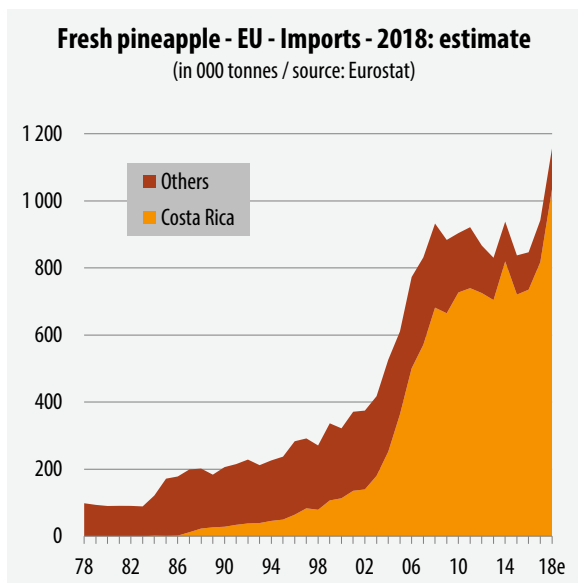
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The years 2015 and 2016 seem an awful long time ago. After volumes imported into the EU-28 hitting a low point two years in a row (approximately 840 000 tonnes), 2017 and 2018 marked the (provisional) end of the decline. European pineapple imports are exhibiting staggering vitality. Over the first eight months of 2018, they saw a 17 % rise, reaching 620 000 tonnes. On a twelve-month sliding scale (September 2017 to August 2018), the rise was not as dramatic (+ 12 %), yet spectacular nonetheless, with a quantity exceeding the one-million tonnes mark (1 023 000 tonnes). If the dynamic remains the same, we can assume that the European fresh pineapple market in 2018 will exceed the 1.1-million tonnes mark, i.e. quite simply an absolute record!

While this is an avalanche on an unprecedented scale, the origins involved in this inflation of volumes are well known. Or we should say, is well-known, since Costa Rica is alone in contributing to this strong upward trend. If nothing changes by the end of 2018, its market share in Europe will be 89 %, once again an absolute record. In the not so distant past, one decade ago, Costa Rica held “only” 73 % of the market. Since then, it has gone up by 50 %, while the market has only grown by 24 %. The other origins, even pioneers such as Côte d’Ivoire, have been swept aside by the Central American giant. This was especially true in 2018, when all the big origins were down: Ecuador (- 8 %, estimated for the whole of 2018), Côte d’Ivoire (- 12 %), Ghana (- 10 %). The two that got away, Colombia (stable) and Panama (+ 3 %), are still a long way off being able to reverse the overall trend. Ultimately, the secondary origins can find space to express themselves commercially speaking, if and only if Costa Rica is in poor form. The Costa Rican steamroller is on the move, leaving no room for pretenders.

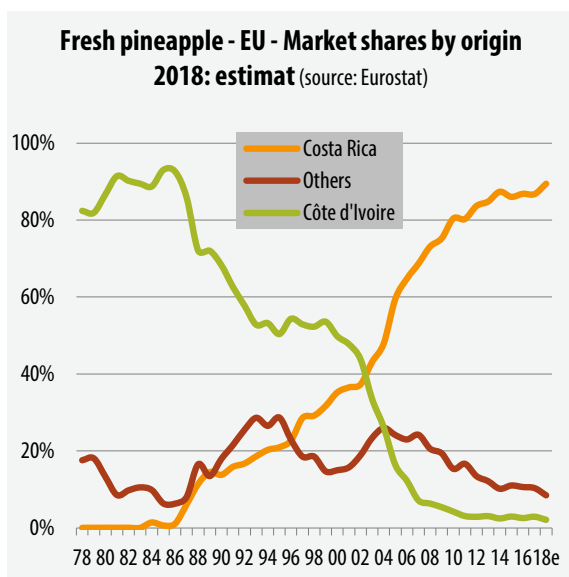


Costa Rica: constantly coming to the end of an era

And it is not through quality that this all-powerful supplier stands out from its competitors. Although it is difficult to generalise when we are talking about one origin that weighs in with 1 million tonnes to the EU, and more than 2 million to the international market, we can say that its only power is that of a dominant supply policy. It is the same pattern as for the banana. Demand does not increase spontaneously by 10, 15 or 20 % per year. An increase in consumption is driven by the supply, with in this context a single engine, i.e. price.

And the engine is running out of steam. Check out the price data on the European market collated by the specialist consultant Thierry Paqui (see following articles); the descent into the abyss has begun, and will only gather pace. From the heights reached in 2016, the import price per box has lost between 50 eurocents and 1 euro per year. The average annual price level of 7 euros per box should be reached this year. And because this is an average annual price, levels of 4 to 5 euros have already been reached in the course of the year.

We have definitely settled into another hyper-crisis, as in 2014, which marked the end of the expansion phase. The record figure reached at that time was 938 000 tonnes entering the EU-28 market. 2015 and 2016 were years of decline, with volumes to the market not exceeding 850 000 tonnes. This fall in the supply had an inflationary effect on import prices, which reached 9 euros/box as an annual average, frequently exceeding 10, 11, or even 12 euros in the course of the year.

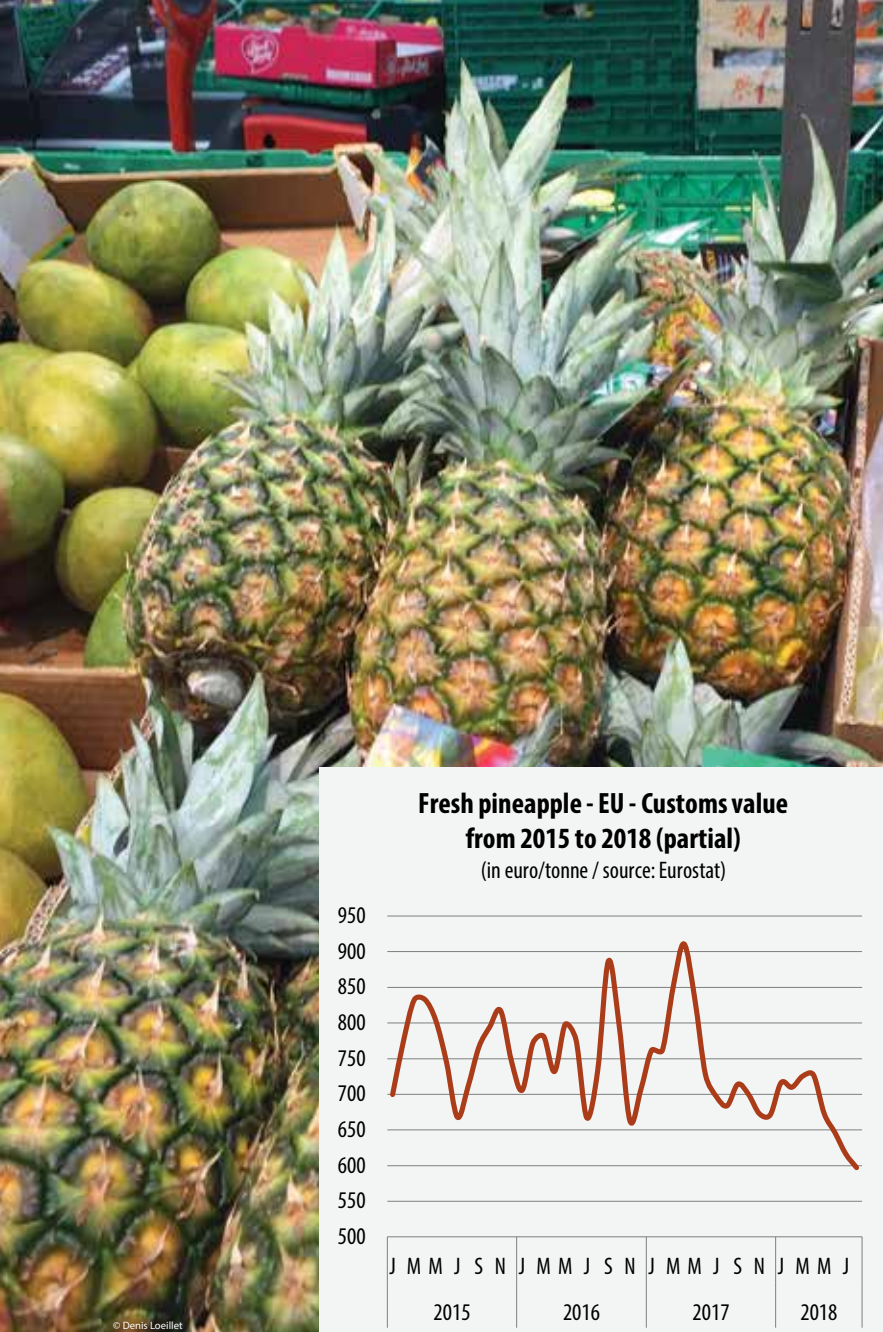


On the strength of a very considerable improvement in the financial return, at all stages, the sector embarked on an upward cycle in volumes to market (942 000 tonnes in 2017), which reached its peak in 2018; prices immediately swung the other way, i.e. downward.

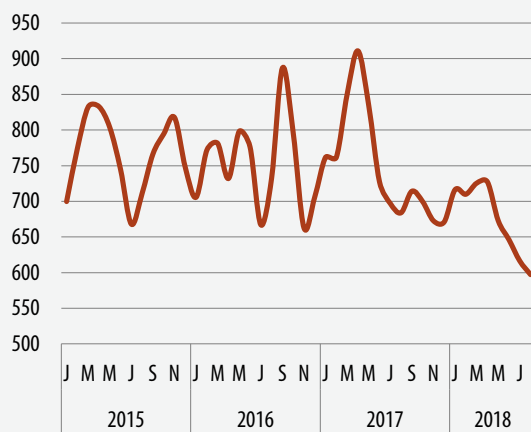
This market, seemingly stalling at the 900 000 to 950 000-tonnes mark, could barely be any more mechanical. Clearly, with a forecast of 1.1 million tonnes in 2018, anxiety is rising in the trading rooms. Since while the avocado sector has seen steady progress combining prices and volumes, exactly the opposite is true for the pineapple. While the avocado sector is innovative, working on stages of maturity, the pineapple sector is, by comparison, stuck in the past. Maturity is an approximation; colour is either very green, or often faded. The fruits are old and tend to develop brownish hues, with tired plumage. With Sweet already not renowned for offering a sugar-acidity equilibrium ensuring a nice flavour, the fruits on the market are often extremely banal.

Certain origins or operators are trying to get off the beaten track, as with Ecuador, thanks to different production systems or locations, but also in Costa Rica, West Africa (thanks to varietal segmentation – Smooth Cayenne, Sugarloaf – or air-freight), and also the Indian Ocean (air-freight Victoria). The big operators (big brands) are also trying to stand out from the herd. Similarly, it is through the variety (or a variety-air freight logistics pairing) that they are applying differentiation. Yet the volumes involved are relatively small. In the vast majority of cases, the sea-freight Sweet market is comparable to the old “spud” markets, prior to the segmentation policies (varieties, usages, marketing) and quality policies.





Fresh pineapple - EU - Customs value from 2015 to 2018 (partial)
(in euro/tonne / source: Eurostat)



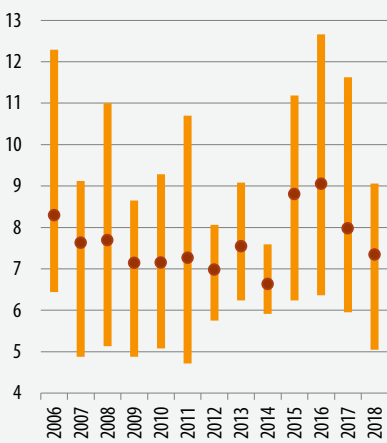
Immobility as a code of conduct

Is there nothing salvageable from this market? We need to look hard, and to the East, toward the new Europe i.e. the New Member States (NMS). A tiny part of this inflation in volumes is earmarked for them. They are modest markets, without doubt ones for the future. Hence each kilo gained on these new markets is a success. We can note the fine surge by Poland, the most populous NMS, whose market is up by 39 % (+ 4 800 tonnes over the first eight months of 2018). However, we should not make too much of the NMS, since of the extra 90 000 tonnes net (eight months) taken in by the EU-28 in 2018, only 8 300 tonnes were bound for the NMS.

The big question, which has remained resolutely the same throughout our articles, since it remains unresolved, is innovation. Whether in the technical or varietal field, there is no movement. It is very curious to see that the pineapple now has the same handicaps as the pineapple of yesteryear, when Côte d'Ivoire was all-powerful. Its sector perished, as Costa Rica's could. The only difference, and a huge one at that, is that the latter rose from the ashes when the cash flow returned. We should be wary of the market conditions, which are changing somewhat: the euro is sinking and energy prices are soaring.

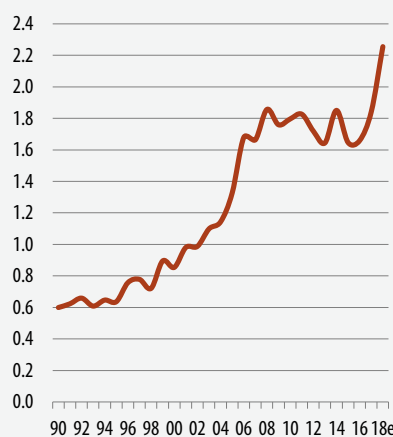
Sea-freight Sweet pineapple - Germany Import price

(in euro/box - 2018: Jan. to Sept. / source: Thierry Paqui)



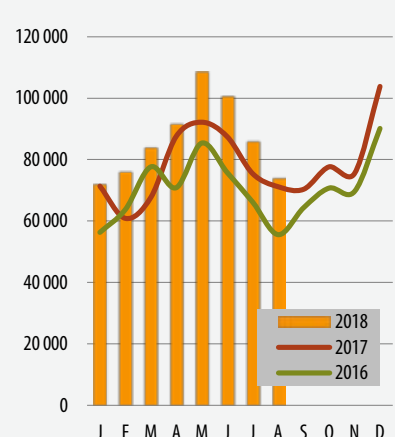
Fresh pineapple - EU - Consumption

Including EU enlargements - 2018: estimate
(in kg per capita / source: Eurostat)



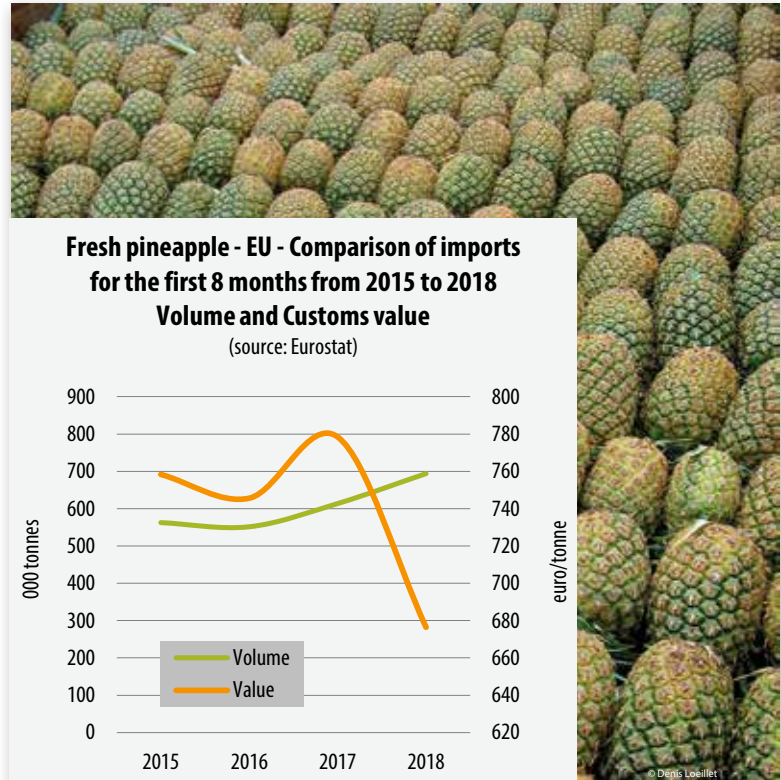
Fresh pineapple - EU - Monthly imports across origins

(in tonnes / source: Eurostat)



Yet Costa Rica has the advantage of the absence of serious competitors. This was not the case for Côte d'Ivoire, which was unable to learn from its mistakes and relaunch its sector. In the case of Costa Rica, in a trough period, there will be no-one to dispute its leadership. Like the phoenix rising from the ashes, the sector will quite readily be able to put its supply back together (apart from the social breakdown), and restart its cycle. How this apparently never-ending story concludes is unclear. There are of course recurrent alerts as to the highly adverse impacts of cropping practices on the environment and the populations. Yet the production zones are a long, long way from the consumption zones. We are also awaiting for the pineapple to adopt "zero pesticide residue". The ultimate certification, which makes a mockery of producers, labourers and local residents, but which reassures European or US consumers. Finally, and for the time being, creative destruction is doing nothing but destroy. We are still waiting for innovation, which would finally shift this sector into the 21st Century ■

Denis Lœillet, CIRAD
denis.loeillet@cirad.fr



Fresh pineapple – European Union – Imports (September to August)

in tonnes	2013-14	2014-15	2015-16	2016-17	2017-18	2017-18 compared to 2016-17
Total, including	924 303	873 144	826 019	909 233	1 022 648	+ 12 %
Costa Rica	778 250	760 028	710 531	789 180	905 453	+ 15 %
Ecuador	16 389	19 374	32 231	38 149	36 119	- 5 %
Côte d'Ivoire	24 752	22 524	22 367	25 927	24 568	- 5 %
Ghana	25 309	21 157	16 453	14 101	14 401	+ 2 %
Colombia	2 161	3 036	6 448	13 498	13 458	0 %
Panama	36 921	26 212	17 648	10 251	9 130	- 11 %
Honduras	3 336	4 329	3 526	2 058	3 329	+ 62 %
Cameroon	2 843	3 080	3 953	3 946	3 060	- 22 %

Source Eurostat

Fresh pineapple – European Union – Imports (January to August)

in tonnes	2014	2015	2016	2017	2018	2018 compared to 2017
Total, including	627 734	562 968	551 601	614 197	694 958	+ 13 %
Costa Rica	548 698	489 284	479 122	532 337	620 774	+ 17 %
Ecuador	11 406	13 555	22 101	27 284	22 576	- 17 %
Côte d'Ivoire	16 135	15 600	13 301	17 642	14 877	- 16 %
Colombia	1 861	2 107	4 111	9 129	8 643	- 5 %
Ghana	15 220	11 970	8 435	9 078	8 344	- 8 %
Panama	22 110	15 814	10 162	6 402	5 932	- 7 %
Honduras	2 610	3 365	2 985	1 961	2 931	+ 49 %
Cameroon	1 907	2 376	2 848	2 906	2 036	- 30 %

Source: Eurostat

Processed pineapple: Thailand, a giant with fundamental flaws

by Denis Loeillet, from Cyclope 2018

The global pineapple trade is structured around two types of product that have almost nothing in common as far as origins or market dynamics are concerned. The two markets in question are the fresh pineapple and processed pineapple (juice and canned). Out of 100 pineapples exported worldwide, 64 are processed and 36 are traded as fresh fruit. Since 2006, the fresh-fruit market has grown by 50 %, yet the processed fruit market has grown by only 28 %.

Thailand, Philippines and Indonesia, the major processing countries (of juice and canned products) account for almost 6 million tonnes of production. Thailand gradually slipped on the ladder between 2011 and 2016, and fell from first to sixth place in the global ranking. The Philippines are forging ahead and Indonesia is recovering from a disastrous 2016.

Global canned-pineapple exports have stagnated at around 1.1 million tonnes, or 1.9 million tonnes of fresh-fruit equivalent. In whole slices, segments, pieces of various sizes, diced, and so on, there is a vast range of processed pineapple products. The aim is to recycle as much fruit pulp as possible. This also relates to the different uses that the manufacturers make of this raw product: from fruit in syrup all the way to milk-based products. The canning industry mostly uses the Smooth Cayenne variety. Only eight suppliers (Thailand, Philippines, Indonesia, Kenya, Vietnam, China, Malaysia and Swaziland) make up 100 % of the global supply of canned pineapples. But the first three have been responsible for 89 % of exports. In 2016 (last available figures), as in 2015, Thai exports remained below half a million tonnes of canned fruit (850 000 tonnes of fresh-fruit equivalent). Exports from the Philippines increased significantly (+ 16 %), whereas those from Indonesia dropped by a third. The USA and the EU each took up one third of the export supply. It should be noted that Russian imports have fallen since 2014 and now represent only 4 % of the global import potential. The international price of the canned pineapple fell back by 20 % at the beginning of 2017, dropping from USD 20 to USD 15.5 per 6 x A10 box (slices in light syrup) FOB Bangkok. The drop was less steep for the 24 x 20oz box, yet levels are low at around USD 13.5.

Pineapple-juice markets cover two types of product: plain juice and concentrated juice. In most producer countries, juice is a by-product of the industry, apart, for example, from Costa Rica and Swaziland. The list of suppliers differs from that of canned-pineapple

producers. For some years now, Swaziland has been developing a concentrated juice market alongside the mainstays, Philippines and Thailand. Since 2010, Costa Rica has also been at the forefront, becoming the leading world exporter of plain juice and the fourth supplier of concentrated juice. Its immense production base is completely orientated to fresh fruit exports, which allows manufacturers to have large quantities of MD-2 pineapple grade-outs at their disposal. Perhaps world juice prices will finally recover in 2018, after concentrate prices being reduced four-fold between their peak at the end of 2015 at USD 4 000 per tonne CFR Europe and USD 1 100 at the end of 2017.

Most producers anticipate a rise in 2018 that could carry on into 2019. Price rises in the region of USD 1 300 per tonne were already announced at the beginning of 2018. Nevertheless, the price of Costa Rican plain juice fell to USD 600 per tonne FOB at the beginning of 2018 compared with USD 750 only a year before. Stocks of mediocre quality juice (presence of nitrates) in Thailand are now being taken up thanks to exports to China. This price rise gives renewed hope to the Thai sector. This is timely when producers' selling prices are at their lowest. There is talk of a 4 THB/kg farm-gate price. This seems outlandish since it was over 12 THB/kg in 2016. Nevertheless, any emergence from the crisis still seems a long way off, since the Thai immigration policy could empty the country of seasonal foreign workers in the future. Other sources will certainly benefit from the major weakness of a global leader that, among other things, should no longer be able to exhibit its former ability to disrupt the market with large quantities of poor-quality products ■

Pineapple - Thailand - Concentrate world price
(60°Brix, cfr Rotterdam / in USD per tonne / source: Agra-net)



Sea-freight pineapple European market

Not an infinitely expandable market

The European market, with 500 million consumers, represents quite an outlet. And the one million tonnes of fresh pineapple imports into Europe every year gives the impression that this market is infinitely expandable. Unfortunately, nothing could be further from the truth! It has to be recognised that the increasingly large import volumes are detrimental to remuneration to the various operators in this industry.

While 2015 and 2016 were excellent years for European pineapple market operators in terms of remuneration, this was due above all to the paucity of Costa Rican production, and consequently to a more limited supply to the European market at certain points in the campaign. This downturn was brought about by a series of concurrent chance events in Costa Rica: flooding, paucity of fresh pineapple production and excellent demand from the processing industry. Yet while Costa Rican producers were satisfied with the remuneration level that they managed to achieve, they failed to take the measures that would have made it possible to stabilise and maintain them. In particular, they could have scaled back their production to enhance the value of their fruits. Conversely, they embarked on a production frenzy to offset their losses in volumes.

The supermarket sector, which use the pineapple as a loss leader, apparently absorbs in part the large volumes of MD-2 (Extra Sweet) available year round. Yet it is important to specify that only a few key operators have regular access to the supermarket sector. The others, which represent a consider-



able proportion of the fresh pineapple supply to the European market, must sell their fruits outside of these circuits. As soon as demand from the supermarket sector dips or simply flags, we see clogging of the so-called "parallel" circuits, with a consequent fall in prices.

The European fresh pineapple market depends very much on Costa Rica, which on its own accounts for 90 % of the supply. The natural flowering phenomena, which significantly increase the Costa Rican supply at certain times of year, are becoming increasingly difficult to manage. Indeed this annual flowering is tending to involve more volumes (since the planted areas are expanding), last longer and recur within increasingly short time frames.

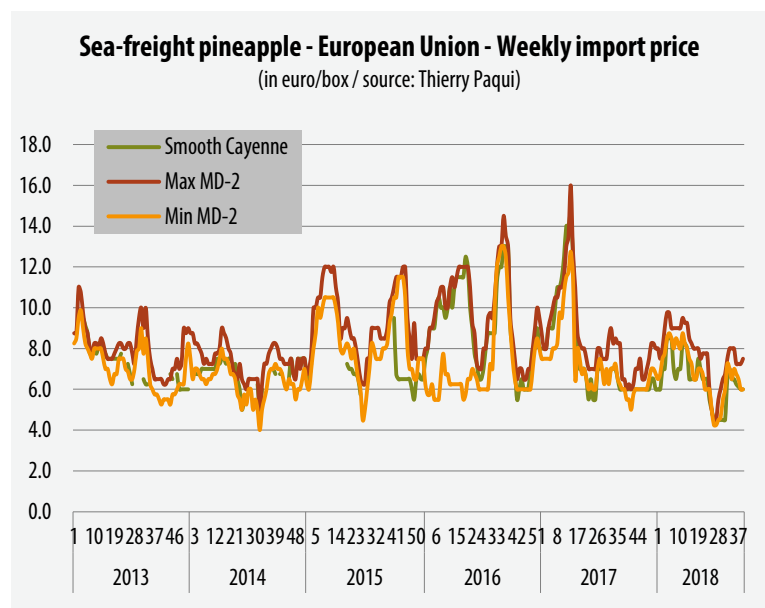
The increase in the Costa Rican supply at the beginning of the summer, precisely because of a natural flowering episode, created strong tensions on the European market, since it coincided with a time of an abundant seasonal fruits supply available at low prices. In addition, the exceptional heat and fine weather in Europe, which this year continued into September, made a considerable contribution to switching demand to seasonal fruits. Under these conditions, the sluggishness of pineapple demand forced all the operators to glean market share from outside of the supermarket sector circuits, which can generally only be achieved by relaxing prices and selling the available fruits on the cheap. At this game, the big brands, which already sell their fruit via the supermarket circuits, have a certain advantage, since at equivalent low prices, the purchaser will most often opt for fruit provided by a big brand rather than a less well-known brand.

The appeal of the European market thanks to the strong euro should of course not be neglected, since the Costa Rican supply has continued to flood the European market despite a pending disaster in terms of price and flat-lining demand. So under these conditions, how can Costa Rican exporters be made to understand that the European market is in a saturation phase?

The market from May to September

Among the key elements marking the period from May to September (weeks 18 to 39 2018), we might mention shipping delays, the big increase in the Costa Rican Sweet supply because of the natural flowering phenomenon, and of course the considerable role played by the supermarket sector. Average rates fluctuated between 4.30 and 8.00 euros/box. However, sales were made at lower rates for several weeks. The market was so saturated with fruit that several times operators resorted to PSPs (post-sale prices), an alternative form of clearance sales. Once again, what was of most concern to the operators was demand flat-lining several times in the period.

In May (weeks 18 to 22), the supply was heavily disrupted by the numerous shipping delays and by the beginning of natural flowering. Because of the shipping delays and overlapping incoming shipments in certain weeks, the supply was either large or lighter. Thanks to the supermarket sector, the bulk of volumes entering the market was absorbed. From



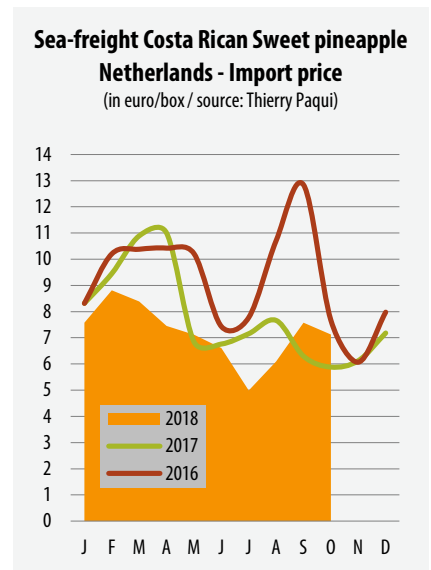
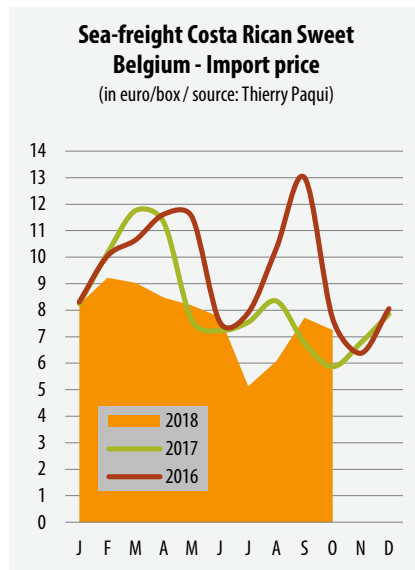
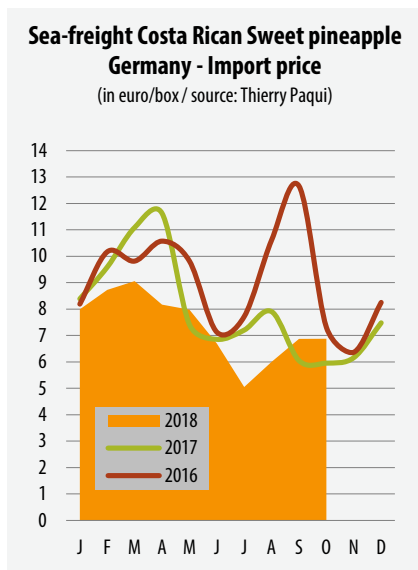
week 21, the Costa Rican supply, boosted by the natural flowering phenomenon, entered a growth phase. Though well in excess of demand, it did not immediately weigh down on the market, because of numerous shipping delays. Average rates fluctuated between 6.00 and 8.00 euros/box.

In June and July (weeks 23 to 30), the Costa Rican supply saw a distinct increase because of the natural flowering phenomenon, which continued until late July. The market conditions rapidly deteriorated since demand, more interested in seasonal fruits, was struggling to absorb the available pineapple volumes. So we saw a downward spiral in rates between big brands, which forced small brands to resort to PSPs. Not to mention the numerous clearance sales made at lower prices, with average rates fluctuating between 4.30 and 6.00 euros/box.

August and September (weeks 31 and 39) were marked by a considerable fall in the Costa Rican supply, because of the end of natural flowering. So operators were gradually able to clear their stocks. Despite very limited volumes, sales in August were very low, with demand completely won over by seasonal fruits. Pineapple sales were especially complicated since the supply mainly comprised small sizes. In September, activity remained quiet because of the fine weather and a still substantial supply of seasonal fruits. Average prices fluctuated between 6.00 and 8.00 euros/box. Although it disrupted the supply, the general strike in Costa Rica in the middle of the month did not generate high demand for the fruit. It was only once again thanks to sales to the supermarket sector that some degree of fluidity was maintained, even though demand was erratic ■



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Air-freight pineapple European market

A fresh hand?

Besides the Victoria pineapple, the varietal range on the air-freight pineapple market is divided, in order of importance, between Cayenne, Sugarloaf and now Extra Sweet. This breakdown, which had seemed firmly established, is gradually evolving, and although Cayenne has not yet been excluded from the market, we cannot help but observe that in terms of purchaser preferences, outside of the supermarket sector circuit, it is increasingly losing out to Sugarloaf and Extra Sweet.

We are not about to rehash the debate on heterogeneous quality of most Cayenne batches present on the air-freight pineapple market, and its impact on demand in general. The near-absence or disappearance of Cayenne exports from Benin in recent months shows to what extent varietal hierarchy has been transformed.

Cayenne sales are increasingly irregular. Côte d'Ivoire and Cameroon continue to account for the bulk of the supply, followed by Ghana with fairly limited volumes. Benin is still struggling to recover market share since the calamitous self-censorship decision taken by the Beninese authorities. As a reminder, in view of the difficulty for certain



© Léa Benoit

Sugarloaf producers to produce coloured pineapples without exceeding the MRL (maximum residue limit) for ethephon, the Beninese authorities made the decision to prohibit for a certain period exports of all coloured pineapples (Sugarloaf and Cayenne). The absence for nearly nine months of coloured pineapples from Benin helped competing origins gain a better foothold. Benin, having resumed its coloured pineapple exports, is still struggling as much to bring a high-quality supply onto the market. While Sugarloaf batches sell without any problems, the same cannot be said for Cayenne, continuing to face concerns of keeping and exceeding the MRL, which has gradually marginalised the origin, if not swept it aside, on the Cayenne market since mid-July.

Demand seems more interested in Sugarloaf pineapples available, whether green (without ethephon treatment) or coloured. Benin and Ghana are offering green and coloured fruits, while Togo is exclusively positioned with a coloured supply. According to air-freight market operators, supply and demand for Sugarloaf are on a steep rise. However, we can note that operators with coloured fruits are finding it easier to sell them off on specialist distribution networks, whereas the green Sugarloaf supply is better represented in the supermarket sector. The "Grand Frais" chain is the number one on this market.

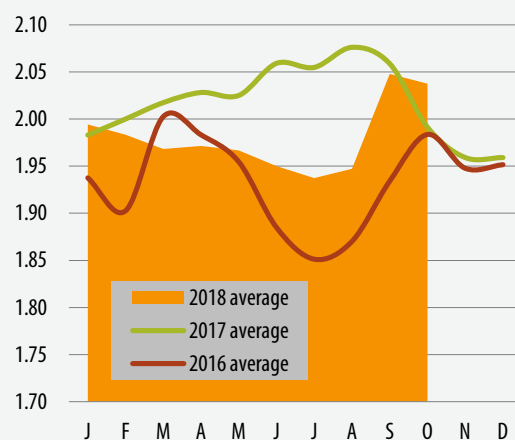
The Sweet supply comes primarily from Latin America, although some batches from Africa can be found on the markets. Still very limited, it is continuing to sell well at highly lucrative price levels. With the exception of France, where the Costa Rican supply seems to be available year-round, several European markets have opted to adhere to a degree of seasonality, and only market fruits from origins such as Cuba and the Dominican Republic outside of the summer period.

The market from May to September

From May to September (weeks 18 to 39 2018), we observed a gradual fall in the Cayenne supply, and greater fluidity of Sugarloaf sales.

From May to June (weeks 18 to 26), the overall Cayenne supply shrank constantly. True, the gradual switch of demand toward seasonal fruits drove importers to reduce volumes on the market, to better adapt the supply to demand. Fruits from Cameroon and Benin experienced keeping concerns, above all because of rains in the production zones. Sugarloaf sales were fluid and more regular. Again, it was the coloured fruits from the three main origins which sold best outside of the supermarket circuits. The reduction in the Sugarloaf

Air-freight pineapple - France - Import price
(in euro/kg / source: Thierry Paqui)



supply had the effect of strengthening and stabilizing fruit rates. Until the end of June, the additional supply of Sweet, although limited, remained highly diversified (Costa Rica, Cuba, Ecuador, Ghana and the Dominican Republic), with rates remaining high at between 2.20 and 2.40 euros/kg.

July and August (weeks 27 to 35) saw activity very much scaled back. The proliferation of quality problems on Beninese batches caused the near-disappearance of the Cayenne supply from the origin from week 29. So the market, with its lean supply, maintained a positive trend throughout the summer, with Côte d'Ivoire and Cameroon as the main origins for Cayenne. The Sugarloaf supply, still limited, continued to sell well, with a preference among specialist dealers for coloured fruits. The Sweet supply, reduced to just fruits from Costa Rica and therefore more restrained, sold on a footing of between 2.40 and 2.60 euros/kg.

In September (weeks 36 to 39), the overall Cayenne supply remained limited, with an ongoing near-absence of fruits from Benin. True, the implementation of new outbound self-inspection measures by the Beninese authorities, in light of further cases of exceeding the MRL, greatly reduced availability of Cayenne batches. Yet overall, neither Cameroon nor Côte d'Ivoire could really take advantage of this weakness, since both these origins also had to face coloration concerns with very green fruits, fairly difficult to market. Sugarloaf sales (green and coloured) were fairly stable overall. The top-up supply of Costa Rican Sweet, hit by rains at the production stage, sold more or less well depending on the fruit coloration, within wider price ranges of between 2.20 and 2.60 euros/kg ■

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Victoria pineapple European market

A new origin entering a relatively stable market

The Victoria supply usually available comes primarily from the Indian Ocean (Reunion and Mauritius). South Africa is indeed an occasional market supplier, yet its production is increasingly earmarked for self-consumption. The relative paucity of the supply from the Indian Ocean enabled another African origin, Ghana, to make a limited, yet popular, incursion onto the Victoria market.



© Patrick Fournier

Still very popular among consumers despite being scaled down, the Reunion supply continued to sell at fairly high rates. The price range was fairly wide precisely because of the often unbalanced supply. From May to September, rates for the origin fluctuated between 2.50 and 4.00 euros/kg, depending on the sizes available.

The Mauritian supply, with bigger volumes and a distinctly more regular sizing than the Reunion supply, enjoyed bigger supermarket sector sales, as usual. Outside of the promotions, rates for Mauritian fruit fluctuated between 2.80 and 3.60 euros/kg.

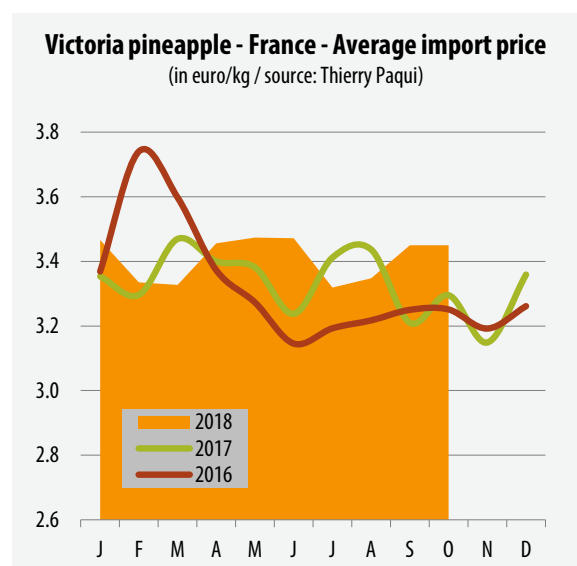
The Ghanaian supply was able to take advantage of the occasional supply shortfall to carve out a niche for itself. Very limited in terms of volume, but with a more regular fruit sizing, it managed to find takers, selling at relatively stable prices of between 3.00 and 3.60 euros/kg.

From May to mid-June (weeks 18 to 24), Victoria volumes from the Indian Ocean were very limited because of the big tropical storm which hit the zone. The paucity of the supply did not result in increased demand, since seasonal fruits were becoming available. However it did manage to strengthen sale prices of the batches available and also facilitated the arrival, albeit in very small volumes, of the Ghanaian supply, which therefore struggled to sell. Over this period, the Reunion supply, although restrained, was often unbalanced with a large proportion of size 8, which forced certain operators to relax their prices to remain fluid.

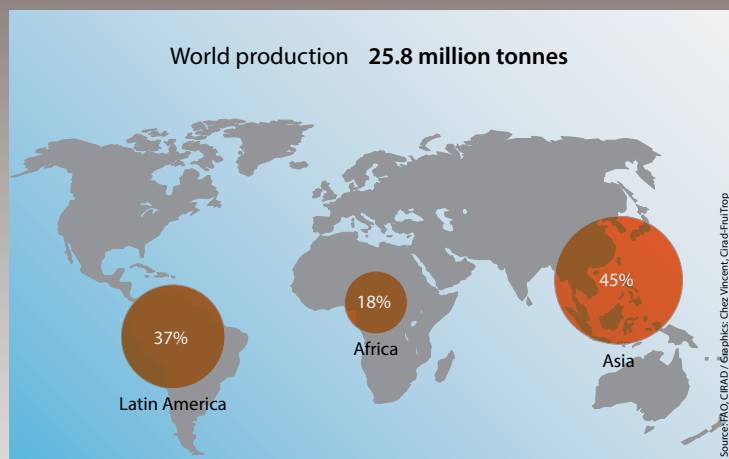
From week 24, in anticipation of the fall in demand for Victoria in the summer, operators started scaling back their imports heavily. The market supply was reduced throughout the summer, to better adapt the supply to demand, mainly interested in seasonal fruits. In spite of this, the Victoria market was fairly tight, since fruit quality (from Reunion and Mauritius) was highly irregular. However the extreme paucity of the supply helped operators avoid having to manage stocks. Sales were slower, with only Victoria die-hards continuing to purchasing it.

Weeks 32 to 39 marked a return to a more substantial supply, though still fairly limited overall, while demand still exhibited little interest in the fruit. Unbalanced with a high proportion of size 8 fruits, the Reunion supply had a bit more difficulty selling. The Ghanaian supply, with its more regular sizing, was able to take advantage of this situation to achieve good sales ■

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PINEAPPLE - Production (2017)



Pineapple — Top 10 producer countries	
tonnes	2017
Costa Rica	2 930 661
Brazil	2 694 555
Philippines	2 612 474
China	2 078 126
India	1 964 000
Thailand	1 811 591
Nigeria	1 591 276
Indonesia	1 396 153
Mexico	875 839
Colombia	755 971

Source: FAO

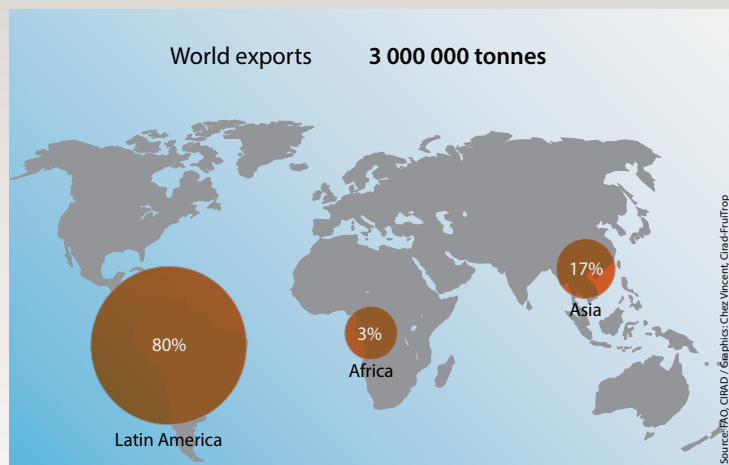
PINEAPPLE - Imports (2016)



Pineapple — Top 7 importer countries	
tonnes	2017
United States	1 152 953
Netherlands	262 574
China	162 870
Japan	156 992
United Kingdom	156 051
Italy	149 265
Spain	129 528

Source: national Customs

PINEAPPLE - Exports (2016)



Pineapple — Top 6 exporter countries	
tonnes	2017
Costa Rica	2 160 320
Philippines	495 440
Mexico	87 476
Ecuador	84 691
Honduras	59 013
Guatemala	40 347

Sources: national Customs, professionals

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USA - Imports - Main supplier countries						
tonnes	2012	2013	2014	2015	2016	2017
Total	924 526	975 591	1 047 066	1 028 693	1 076 517	1 152 953
Costa Rica	788 463	853 894	938 281	868 779	910 092	976 603
Mexico	55 222	54 182	40 634	75 165	82 358	85 250
Honduras	37 288	38 894	38 154	47 734	48 008	53 790
Guatemala	14 105	13 804	14 858	15 956	19 772	23 397
Panama	14 676	5 093	4 522	5 276	5 116	6 054
Thailand	4 516	3 264	3 466	2 336	2 759	2 550
Ecuador	7 875	3 188	3 883	5 972	3 140	542
Others	2 381	3 271	3 268	7 474	5 272	4 767

Source: US Customs

Canada - Imports - Main supplier countries						
tonnes	2012	2013	2014	2015	2016	2017
Total	121 314	122 630	126 289	109 493	118 539	127 600
Costa Rica	112 751	114 929	118 079	100 461	108 122	112 695
Honduras	2 879	1 508	2 008	1 835	3 007	6 547
United States	2 480	3 289	2 649	2 687	2 365	2 321
Ecuador	610	691	1 342	1 033	728	695
Others	2 594	2 213	2 211	3 477	4 317	5 342

Source: COMTRADE

Central and South America - Main markets						
tonnes	2012	2013	2014	2015	2016	2017
Total	50 581	65 315	71 432	86 519	78 530	80 073
El Salvador	10 151	11 866	16 624	20 154	22 184	22 234
Chile	20 146	28 718	30 292	30 749	16 331	18 254
Argentina	10 394	10 970	11 890	11 564	13 621	16 689
Costa Rica	683	6	7	16 118	18 128	14 859
Uruguay	779	910	1 155	1 507	1 747	2 211
Paraguay	537	746	881	812	849	805
Mexico	1 018	1 035	760	511	1 258	263
Colombia	56	182	340	-	52	61
Peru	3 133	1 397	153	1	-	1

Source: COMTRADE

European Union - Imports - Main supplier countries						
tonnes	2012	2013	2014	2015	2016	2017
Total extra-EU, of which	864 016	830 573	937 491	836 875	847 087	941 887
Costa Rica	723 119	704 203	819 207	720 418	736 274	817 016
Ecuador	24 516	16 364	17 225	23 540	33 031	40 827
Côte d'Ivoire	24 946	25 366	23 060	24 666	21 624	27 333
Ghana	35 339	31 275	24 407	19 954	13 530	15 134
Colombia	1 245	418	2 790	4 444	8 480	13 945
Panama	27 506	35 616	32 508	23 300	13 991	9 600
Cameroon	9 771	4 373	2 594	3 481	3 888	3 931
Togo	857	948	1 342	1 829	1 736	2 825
Honduras	6 842	2 543	3 574	3 905	3 072	2 359
Dom. Rep.	2 827	1 302	1 603	2 267	3 000	1 579
Benin	2 413	3 053	3 675	3 647	2 949	945
Brazil	63	7	115	66	204	146
Others	4 572	5 105	5 392	5 359	5 310	6 249

Source: Eurostat

Other West European countries - Main markets						
tonnes	2012	2013	2014	2015	2016	2017
Total	27 671	26 886	27 735	26 334	25 898	26 247
Switzerland	20 617	19 960	20 797	20 079	20 068	20 832
Norway	6 585	6 453	6 444	5 744	5 231	5 351
Iceland	469	473	494	511	599	64

Source: COMTRADE

Russia - Imports - Main supplier countries						
tonnes	2012	2013	2014	2015	2016	2017
Total	49 259	50 014	44 797	32 229	33 381	45 867
Costa Rica	35 068	39 926	37 001	28 592	28 418	40 101
China	1 728	1 975	1 547	1 252	2 118	3 519
Ecuador	4 720	2 671	2 746	736	1 477	1 022
Philippines	1 184	1 144	1 040	537	406	267
Ghana	1 348	635	123	215	111	54
Cameroon	62	119	22	31	39	49
Brazil	30	17	3	-	26	12
Panama	2 703	1 937	1 497	312	40	8
Côte d'Ivoire	1 790	1 211	533	398	82	-
Others	626	379	285	156	664	835

Source: COMTRADE

Other East European countries - Main markets						
tonnes	2012	2013	2014	2015	2016	2017
Total	11 509	11 727	10 350	6 603	5 465	7 845
Ukraine	8 862	8 525	5 686	2 554	3 022	4 087
Serbia	748	765	1 111	1 092	1 443	2 169
Belarus	1 899	2 437	3 553	2 957	1 000	1 589
Bosnia	528	499	663	535	742	974
Moldova	677	604	732	560	579	675

Source: COMTRADE

Japan - Imports - Main supplier countries						
tonnes	2012	2013	2014	2015	2016	2017
Total	174 025	181 197	166 295	150 598	143 173	156 992
Philippines	172 627	180 062	164 389	147 525	135 911	145 724
Costa Rica	-	-	-	770	4 895	7 246
China	-	86	819	-	-	900
Taiwan	713	871	885	1 254	1 126	657
United States	629	48	-	33	82	1
Others	56	130	202	1 017	1 159	2 464

Source: Japanese Customs

Other Asian countries - Main markets						
tonnes	2012	2013	2014	2015	2016	2017
Total	147 978	161 495	193 830	199 467	222 849	270 235
China	50 164	58 412	89 047	103 582	118 203	162 870
South Korea	73 131	75 917	75 420	68 373	77 375	78 998
Singapore	17 995	20 219	22 835	22 062	21 930	22 527
Kazakhstan	2 786	4 093	2 950	2 221	1 848	3 556
Malaysia	2 455	1 698	2 537	2 646	2 324	2 169
Azerbaijan	1 447	1 156	1 041	583	1 169	115
Others	6 952	7 092	7 815	10 614	10 877	8 796

Source: COMTRADE

Oceania - Main markets						
tonnes	2012	2013	2014	2015	2016	2017
Total	7 562	8 523	8 094	8 831	9 181	8 260
New Zealand	7 195	8 096	7 905	8 377	8 829	8 113
Australia	367	427	189	454	352	147

Source: COMTRADE

Near East - Main markets						
tonnes	2012	2013	2014	2015	2016	2017
Total	18 694	20 917	22 893	24 285	26 734	35 231
Turkey	13 103	14 068	14 771	14 894	15 948	16 851
Israel	302	602	754	940	1 168	6 908
Morocco	2 349	2 570	3 066	3 493	4 477	6 473
Lebanon	1 976	2 696	3 036	3 694	4 021	3 724
Jordan	964	981	1 266	1 264	1 120	1 275

Source: COMTRADE

Persian Gulf - Main markets						
tonnes	2012	2013	2014	2015	2016	2017
Total	72 740	82 477	93 929	101 589	87 966	102 481
Unit. Arab Em.	40 914	46 021	48 138	49 011	42 095	46 630
Iran	1 418	2 694	9 069	11 000	13 450	23 000
Saudi Arabia	15 822	19 042	19 546	21 704	18 837	21 922
Kuwait	4 859	4 800	5 648	4 757	4 097	5 268
Oman	2 354	2 100	3 617	2 702	3 590	2 545
Qatar	2 524	3 539	4 127	5 097	5 289	2 191
Yemen	4 849	4 281	3 784	7 318	608	925

Source: COMTRADE



Pineapple

Quality defects

Photos © Pierre Gerbaud



Internal browning



Internal browning



***Thielaviopsis paradoxa*
on a lateral blemish**



**Incipient *Thielaviopsis
paradoxa* on peduncle**



***Thielaviopsis paradoxa*
external appearance**



Sun scald on 'Victoria'



Sun scald on 'Victoria'



Over-ripeness



Scales



Attack by insects



Crack malformation or deformity



**Colour variation
in the same batch**



Damaged, scorched crown



**Crown too long
and crushed by box lid**



Incipient internal browning



Incipient internal browning in 'Victoria'



Thielaviopsis paradoxa



Incipient *Thielaviopsis paradoxa* on a blemish



External symptom of *Penicillium funiculosum* on Sugarloaf



Internal symptom of *Penicillium funiculosum* on Sugarloaf



Translucent



Mould (*Penicillium*) on peduncle after transport



Mould after transport (*Penicillium*)



Micro-bruising



Dry bracts on 'Victoria'



Peduncle cut irregularity



Irregular crown size



Poorly reduced crown



Double crown

Pineapple

Pineapple growing

This article is drawn from three main sources:

- 'Crop management sequence - Pineapple', PIP, 52 pages. www.coleacp.org
- 'L'ananas', Alain Guyot, ISTOM lectures
- 'L'ananas, sa culture, ses produits', Claude Py & Claude Teisson, 568 pages, Maisonneuve et Larose

The pineapple, *Ananas comosus*, a member of the Bromeliaceae family, originated in South America. The cultivated pineapple still has several traits of this parentage:

- its root system is extremely fragile and the plant prefers light, well-tilled soil;
- it tolerates very dry spells by strongly reducing growth but still surviving;
- the base of the leaves is the most efficient zone for uptake of nutrients and it responds well to foliar fertilisation;
- flowering is induced by low temperatures and short days and is erratic under natural conditions. This gives rise to the most remarkable feature of cultivation—flowering induced artificially by a cropping operation.

Growers can thus—almost at will—control harvest date and yield, as fruit weight depends on the size of the plant at the moment at which flowering is induced artificially. Fruit quality is determined primarily by sugar content and acidity, and varies considerably according to weather conditions and the fertilisation applied. In simple terms, nitrogen intake determines weight and potassium intake determines quality. It is an extremely heterogeneous compound fruit whose base is always at a later stage of development than the upper part. The pineapple is not climacteric and after harvesting the main change in the fruit is a gradual loss of its qualities. This deterioration must therefore be limited in the fresh fruit packing and transport chain—fast transport and sales with no breaks in the cold chain. When the fruit is processed, this must be performed as quickly as possible.

Plant cycle

The pineapple exhibits three main phases:

- **the vegetative phase** from planting to the differentiation of the inflorescence (flowering);
- **the fruiting phase** running from differentiation to fruit harvesting;
- **the sucker growth phase:** from fruit harvesting to the destruction of the plant.

The parts of an adult pineapple plant are as follows:

- **stalk:** a short club-shaped stem that contains starch reserves and has a fibrous structure that makes mechanical destruction difficult;
- **leaves:** with a maximum of 70 to 80, these can be more than 1 m long and 7 cm broad. Their appearance indicates the state of health of the plant and growth vigour;
- **fruit:** a compound fruit that is the equivalent of a fused, compressed bunch. Its weight depends on plant size at floral induction and the nutritional state of the plant at that stage. It is determined first of all by the number of eyes;
- **crown:** a leafy part topping the fruit;
- **roots:** underground and above-ground. The underground roots are fragile and the slightest discontinuity of the soil profile strongly disturbs growth. The roots are put out in the first month after planting. They then just lengthen and no new root emission takes place before the fourth or fifth month;
- **shoots:** these are of two types—slips that grow on the stalk beneath the fruit, and true shoots that grow at the leaf insertion point on the stalk.

Ethephon

Ethephon is widely used around the world on flower, grain and fruit crops. France alone has no less than 24 registered uses in fruit growth, flowering and maturation processes.

Ethephon is registered for two specific uses in pineapple growing: for triggering the flowering process (floral induction treatment) and the regulation of fruit ripening (degreening). In both cases, the ethylene released by the product acts on physiological mechanisms.

Pineapple possesses the feature of being able to flower on demand, and floral induction is generally performed using gaseous ethylene dissolved in water. As application is a big operation, the process is generally used only on mechanised plantations. Another method used on non-mechanised small-holdings is calcium carbide. However, this is somewhat dangerous as the acetylene gas released is inflammable and even explosive if it comes into contact with copper.

The product that is easiest to use is Ethephon, even though it is less effective on varieties such as 'Smooth Cayenne' and MD-2, more popularly known as 'Sweet'.



Cultivation

- **Soil:** alluvial or volcanic at an elevation of less than 600 metres. Deep soil. Good drainage. Gentle slopes (less than 4%). As 'Sweet' is susceptible to *Phytophthora* (a fungal disease), the ideal soil pH range is 5.0 to 6.5.
- **Plants:** 50 000 to 70 000 plants per hectare. The quality of planting stock is of fundamental importance: genetically pure 'Sweet' stock with no defects (spines, diseases, etc.), of uniform size (calibrated in 100 g categories), propagules must be as heavy as possible to shorten the cultivation period (but not too heavy as natural flowering should be avoided) and treated with registered pesticides to prevent the spread of pests and diseases.
- **Post-harvest:** 'Sweet' is susceptible to bruising.
- **Nutrition:** fertiliser is applied by spraying every two weeks. The fertilisation programme starts after the harvest.
- **Weeds:** these can reduce yields and harbour pests and diseases that attack planted fields if they are not eradicated in time.



Controlling flowering

When the plant reaches the appropriate stage of development it becomes sensitive to climatic factors and meteorological factors (day length, decrease of minimum temperature and cloud cover) that determine the differentiation of the inflorescence. Natural flowering then occurs, which is not compatible with the commercial management of a plantation. Floral induction treatment (FIT) consists of changing the natural cycle of the plant for the following purposes:

- homogenisation of flowering;
- control of production;
- control of average fruit weight;
- harvest planning.

The date of FIT is determined according to:

- the harvest date desired;
- the FIT/harvest date interval for the period (historical or calculated from the sums of temperatures);
- plant weight (a good indicator being the weight of leaf 'D') that determines fruit weight.

Three floral induction substances are used:

- acetylene in calcium carbide form: grains are placed in the centre of the floral rosette or mixed with water to make an acetylene solution;
- ethylene gas: less dangerous than acetylene, treatment with an ethylene solution can be mechanised;
- ethephon (Ethrel®): this is an ethylene generator. It is much easier to use than the first two alternatives but the results are often mediocre, especially in very hot conditions.

Degreening treatment

This is performed by application of Ethrel and is to achieve homogeneous fruit colour and reduce the number of picking operations. Ethrel releases ethylene as it breaks down. It does not have an effect on all maturation phenomena but mainly targets colour. It must be applied fairly close to natural fruit maturity in order to be effective with no major disadvantages. Fruits treated in this way are easy to recognise as their colour is not scaled from bottom to top but uniform throughout the shell.



Photos © Claude Janssen



Sun scalding

Protection from sun scald

This seasonal phenomenon occurs above all during very sunny periods. Fruits that have lodged, whose stalks are too long or that have a deficient leaf system are those most exposed to sun scald. Several protective methods can be used: tying the leaves in a bunch over the fruit or the whole crop ridge, mulching with grass, or lifting up lodged fruits.

Pineapple

The main varieties

'Smooth Cayenne' was for a long time practically the only variety exported fresh and canned. The Hawaiian hybrid 'MD-2' took over its position on the fresh pineapple market, mainly as a result of its extraordinary capacity for withstanding cold and transport. The robustness of this fruit after harvesting was hitherto unknown and is opening up new prospects in the breeding of new varieties by hybridisation. Other varieties with good taste qualities are preferred on domestic markets but do not keep at all well: 'Perola' in Brazil and 'Queen' in Asia and the Indian Ocean.

Smooth Cayenne



Leaf edges: spines behind tip only
Fruit shape: cylindrical
Fruit colour: green & yellow
Fruit eye diameter: medium
Fruit eye profile: slightly prominent
Flesh colour: pale yellow
Flesh firmness: medium
Flesh texture: smooth
Weight without crown: 1 500 g
Height without crown: 148 mm
Diameter: 121 mm
°Brix : between 14.5 and 16.5
Acidity (meq%ml): between 13.5 and 15.0
Sugar/acid ratio: between 1.0 and 1.2
Flesh maturity homogeneity from bottom to top: with a gradient
Agronomic potential: high yield
Susceptibility: susceptible to core rot, susceptible to *Phytophthora*, susceptible to soil pests
Post-harvest potential: good, susceptible to internal browning

Sweet



Leaf edges: spines occur irregularly along both margins
Fruit shape: cylindrical
Fruit colour: green & yellow
Fruit eye diameter: medium
Fruit eye profile: flat
Flesh colour: yellow
Flesh firmness: medium
Flesh texture: smooth
Weight without crown: 1 400 g
Height without crown: 143 mm
Diameter: 116 mm
°Brix : between 12.8 and 13.7
Acidity (meq%ml): between 6.15 and 10.10
Sugar/acid ratio: between 1.31 and 2.11
Flesh maturity homogeneity from bottom to top: homogeneous
Agronomic potential: high yield. Maturation more rapid than Smooth Cayenne (- 4 to - 5 days)
Susceptibility: low susceptibility to core rot, highly susceptible to *Phytophthora*, average susceptibility to soil pests
Post-harvest potential: good, not susceptible to internal browning

Victoria



Leaf edges: spines along all margins
Fruit shape: trapezoid
Fruit colour: golden yellow
Fruit eye diameter: small
Fruit eye profile: prominent
Flesh colour: yellow
Flesh firmness: medium
Flesh texture: crisp
Weight without crown: 1 300 g
Height without crown: 172 mm
Diameter: 108 mm
°Brix : 14.8
Acidity (meq%ml): 10.9
Sugar/acid ratio: 1.36
Flesh maturity homogeneity from the bottom to the top: with a medium gradient
Agronomic potential: good yield. Maturation more rapid than Smooth Cayenne (- 10 to - 15 days)
Susceptibility: highly susceptible to core rot, susceptible to *Phytophthora*, susceptible to soil pests

Observations made on commercial plantations in Central and West Africa:

- average weight of exported fruits (size B10, B9, A8, A7, A6, A5): 1 430 g, varying from 1 150 to 1 890 g
- °Brix: min 13.4° (October), max 14.5° (January)
- Free acidity (meq%ml): min 6.0 (April), max 7.7 (February)
- Sugar/acid ratio: min 1.8 (February), max 2.4 (April)

Post-harvest potential: highly susceptible to internal browning

Observations made on commercial plantations in Reunion:

- average weight of exported fruits: 700 to 800 g
- °Brix: average 13° in July-August and 18° from November to April
- Free acidity (meq%ml): average 16 in July-August and 13 from November to April
- Sugar/acid ratio: average 0.8 in July-August and 1.4 from November to April
- Crown weight: 15% of total fruit weight from August to December and 30% from March to May

Note: data collected under production conditions on Martinique, except for the «Observations» part / Source: Cirad

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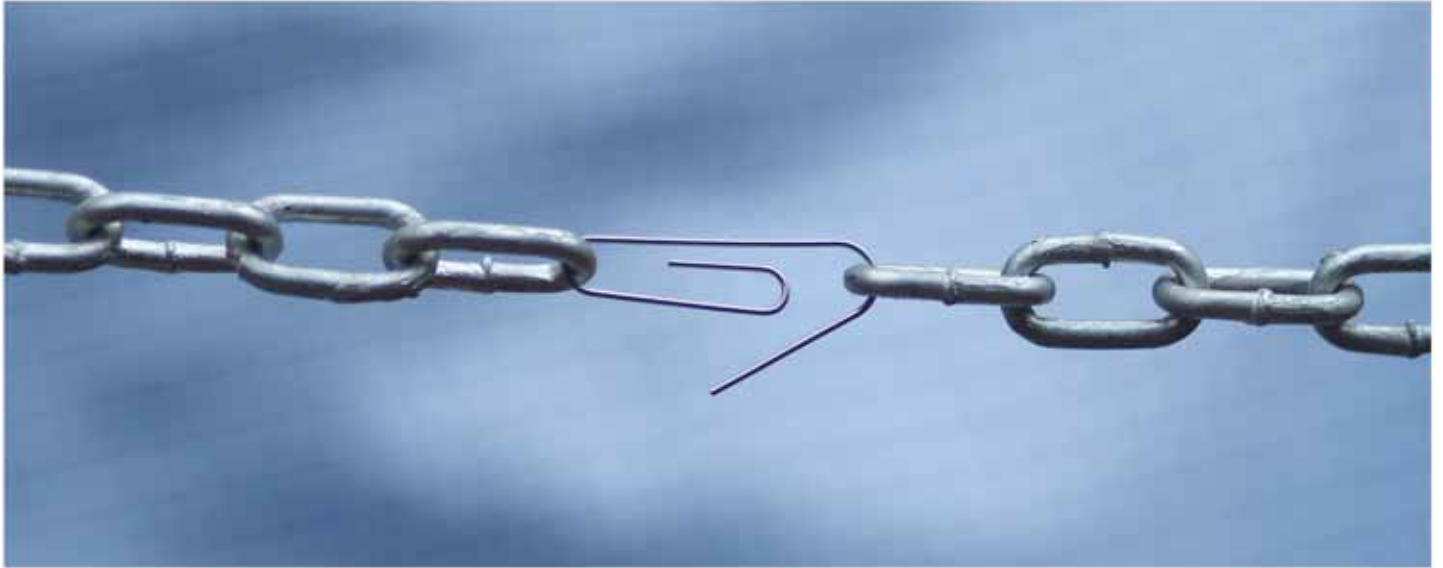
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