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FRuiTROP magazine

English edition

Close-up
Avocado

The latest on
Banana
Sea freight
European apples & pears

fruitrop.com

cirad
AGRICULTURAL RESEARCH FOR DEVELOPMENT

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mehadrin
Growers at heart

Munchhausen syndrome is a psychiatric disorder characterised by the need to *fake a disease or trauma to draw attention or compassion. This disorder affects all social groups; no-one is immune. Yet it is without doubt the research community which has the highest prevalence, and its impact there is increasing rapidly. As proof, we need only take as an example the level of interest shown by certain European research groups in Tropical Race 4 Panama Disease, which affects banana plants. If we take them at their word, this disease, described in 1990 and present in Asia and more recently Africa (Mozambique), has an infectious potential capable of wiping the Cavendish banana plant off the map almost instantly: which would equate to 63 million tonnes of bananas (47 % of worldwide production), some 20 million tonnes of which is exported. The media, always on the lookout for a really trashy scoop, dramatic announcements and apocalyptic news, are fuelling the syndrome of these disturbed scientists. Would it not be better to give them the care they need, rather than leave them to dig themselves deeper into these pronouncements worthy of millenarians?*

That is, unless these outrageous pronouncements are being made on purpose. Indeed, some are starting to think that it is for base material reasons that scientists feel the urge to wave the red rag. They need to provoke tears among the general public, announce the end of the world and depict as bleak a future as possible to convince backers to fund juicy research programmes. Yet I refuse to believe in this theory, which would be in complete opposition to many of the principles listed in the scientist's oath, the researchers' version of the Hippocratic Oath. Rule number 8 could not be clearer: "I undertake to pursue the search for truth with a full focus on expressing a critical mind, and on complying with professional ethics in the use of information and communication media."

Denis Loeillet

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FRuiTROP

Contents

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Banana

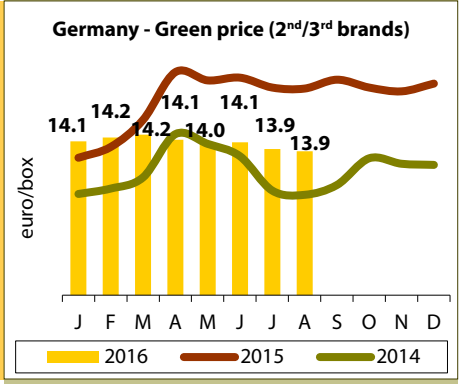
Summer 2016 (June-July-August)

The beginning of the summer was marked by a moderate supply and lively demand. Banana sales were able to maintain good levels thanks to the cool weather (rain & cool temperatures in Northern Europe until late June) and to a shortage of seasonal fruits, which were expensive at the beginning of the campaign. Until mid-July, volumes from Africa and the French West Indies were only average. Dollar banana imports, on their seasonal fall, were smaller than in 2015 because of the Colombian production shortage, which reached its lowest point in July. Hence green banana prices fell only moderately, remaining above average for the season. However, the market changed heading from mid-July because of the seasonal rise in African volumes, which arrived earlier than usual. Volumes, already at a very high level, reached a historic peak in August (45 % above average). Meanwhile, the dollar supply expanded distinctly with the end of the Colombian shortfall and trade-offs from Ecuador and Costa Rica continuing to favour the EU. Hence the markets started to swell toward mid-August, at the height of the stone fruits season, and while demand, traditionally less dynamic at this time of year, was slowed by the late-arriving high temperatures. Stocks started to form, and prices fell back to only average levels at the end of the month.

NORTHERN EUROPE — IMPORT PRICE

August 2016 euro/box	Comparison	
	previous month	average for last 2 years
13.89	0 %	- 1 %

EUROPE



■ **Banana: purée prices in Europe in June 2016.**

Type	Price (USD/t)	Source	Comments
ss aseptic, 22°Brix	650-700 cfr Rotterdam	Ecuador	Demand and supply in balance. Prices stable.

Note: cfr: cost and freight / Source: MNS-ITC Geneva

■ **The new French inter-branch banana organization.** The professional organizations of the banana sector in France have received recognition by the French authorities, of the Interprofessional Association of Banana (AIB) as an agricultural inter-branch organization. Founded in 2012, AIB aims to boost banana consumption in France. Indeed, with an estimated net consumption of 550 000 tonnes/year, around 8.6 kg/capita/year, France is a banana under-consuming country, compared to the European average of 11.5 kg/capita/year in 2015. The AIB's objectives are to increase awareness of bananas to consumers, to better preserve the quality of bananas in logistics from quayside to the end consumer and to better promote the product at points of sale.

It brings together the following professional families of the banana industry:

- ASSOBAN (Banana Producers Association of the French West Indies),
- CSIF's banana division (French Union Chamber of fruits and vegetables' importers),
- UFMB (French Union of banana ripeners),
- UNCGFL (National Union of Fruits and Vegetables' Wholesale Trade),
- UNFD (National Union of Fruits and Vegetables' retailers unions and specialized retailers),
- FCD (Commerce and Distribution Federation).

Source : AIB

■ **More space for the port of Guayaquil.** The world's number one banana port is too small! The terminal will be expanded by 11 hectares in order to be able to better manage an increasing number of banana containers. This increase is not only due to the continuing trend of conventional freight being replaced by container freight. It is also to cope with the big increase in Cavendish exports since 2014.

Source : Reefer Trends

Banana — Ecuador — Exports

000 tonnes	2012	2013	2014	2015
Cavendish	4 981.2	5 195.4	5 715.8	6 039.4
Bocadillo	16.1	41.6	28.9	24.7
Plantain	185.5	203.0	201.8	197.7
Others	15.2	4.7	1.5	5.7
Total	**5 198.0**	**5 444.7**	**5 947.9**	**6 267.6**

Source: Comtrade

EUROPE - RETAIL PRICE

Country	August 2016		Comparison	
	type	euro/kg	July 2016	average for last 3 years
France	normal	1.72	- 1 %	+ 5 %
	special offer	1.66	-	+ 17 %
Germany	normal	1.39	- 1 %	+ 4 %
	discount	1.25	- 1 %	+ 4 %
UK (£/kg)	packed	0.99	- 1 %	- 11 %
	loose	0.72	0 %	- 2 %
Spain	platano	2.05	+ 1 %	0 %
	banano	1.28	- 1 %	- 3 %

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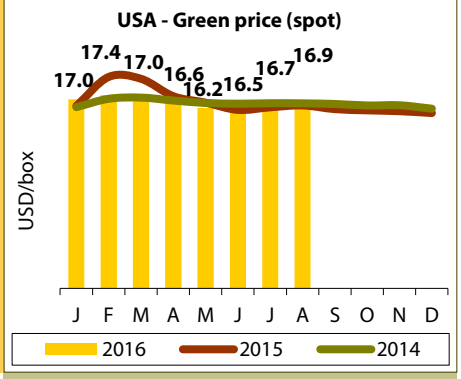
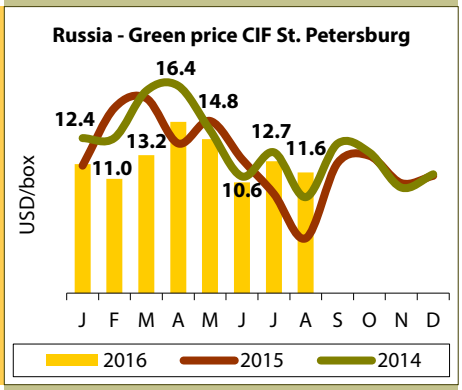
Banana

UNITED STATES



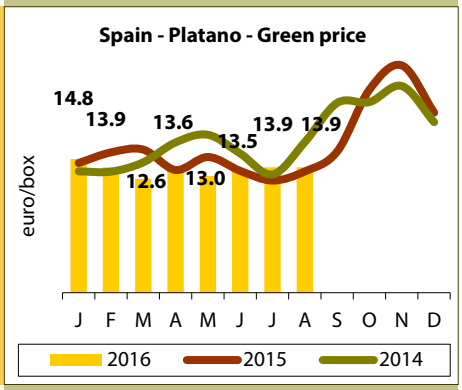
UNITED STATES - IMPORT PRICE		
August 2016 USD/box	Comparison	
	previous month	average for last 2 years
16.88	+ 1 %	+ 2 %

RUSSIA



RUSSIA - IMPORT PRICE		
August 2016 USD/box	Comparison	
	previous month	average for last 2 years
11.58	- 9 %	+ 60 %

CANARIES



CANARIES - IMPORT PRICE*		
August 2016 euro/box	Comparison	
	previous month	average for last 2 years
13.90	0 %	- 8 %

* 18.5-kg box equivalent

■ Half a million tonnes of banana consumed in the EU.

In June 2016, the EU-28 consumed just over half a million tonnes, beating the absolute record! Indeed, over twelve months, a new record of nearly 6 million tonnes was set. As a reminder, the figure was just 5.1 million tonnes in 2010, true without Croatia, the 28th Member State; but this country consumes only around 50 000 t year in year out. The monthly growth curve for consumption has followed a perfectly linear trend since early 2013. After an extremely heavy supply in May, we might have thought that the arrival of summer and seasonal fruits would change the hand. Nothing of the sort happened! In the 1st half of 2016, consumption increased by 4.4 %. Over this period, market shares were stable, with dollar sources controlling just over 71 % of the market, followed by the ACPs with just under 18 % and finally Community production with 11 %. The latter saw the biggest percentage rise for the 1st half (+ 8.4 %), though as always it was the dollar sources which benefitted from the consumption increase or which fuelled it with volumes up by 82 000 tonnes. Colombia and Costa Rica recorded the best dollar banana performances, while Côte d'Ivoire and the Dominican Republic did so for the ACP.

In the United States, the 1st half of 2016 saw a much smaller increase: + 1.2 % to 2.1 million tonnes. Highlights for this period: Costa Rica returning to its heights after a disastrous 2014, Guatemala remaining well ahead though slightly down, and finally Colombia confirming its preference for the EU rather than for the United States.

Source : CIRAD

Banana — January to June 2016 (provisional)				
000 tonnes	2014	2015	2016	Difference 2016/2015
EU-28 — Supply	**2 975**	**3 034**	**3 168**	**+ 4 %**
Total imports, of which	2 646	2 711	2 818	+ 4 %
MFN	2 096	2 172	2 254	+ 4 %
ACP Africa	300	280	313	+ 12 %
ACP others	250	259	250	- 3 %
Total EU, of which	329	323	350	+ 8 %
Martinique	98	95	101	+ 6 %
Guadeloupe	34	31	31	0 %
Canaries	188	187	208	+ 11 %
USA — Imports	**2 332**	**2 353**	**2 383**	**+ 1 %**
Re-exports	282	281	287	+ 2 %
Net supply	2 050	2 072	2 096	+ 1 %

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

EUROPE - IMPORTED VOLUMES - AUGUST 2016			
Source	Comparison		
	July 2016	August 2015	2016 cumulative total compared to 2015
French West Indies	↗	+ 10 %	+ 8 %
Cameroon/Ghana/Côte d'Ivoire	↗↗	+ 38 %	+ 12 %
Surinam	↗	+ 14 %	- 18 %
Canaries	↗	+ 22 %	+ 12 %
Dollar :			
Ecuador	↗	+ 2 %	- 1 %
Colombia*	↗↗	+ 9 %	- 4 %
Costa Rica	↗	+ 32 %	+ 15 %

Estimate made thanks to professional sources / * total for all destinations

RipeLock™ technology adds value to European banana market

System aids ripening, shelf life and consumer experience

By **André Vink,** European manager, RipeLock

The revolutionary **RipeLock Quality System** from **AgroFresh Solutions** brings enhanced fruit quality and superior handling flexibility to the European banana industry. This innovative fruit quality management system controls ripening to preserve banana quality during shipping, distribution and display. Ripelock benefits brand owners, wholesalers, ripeners, food service and retailers, as well as consumers who demand bananas with fresh taste and an appealing bright-yellow color.

AgroFresh developed RipeLock over several years to ensure it would bring both operational and commercial value to the banana market, based on its experience on the well-known and highly effective **SmartFresh™ technology,** increasing storage quality and customer experience with apples, kiwis and pears.

How RipeLock technology works

RipeLock has two components: a laser microperforated Modified Atmosphere Packaging (MAP) bag and a proprietary 1-methylcyclopropene (1-MCP) formulation from AgroFresh. The specially engineered MAP bag creates an ideal atmosphere to control fruit respiration during transport, ripening and distribution. The unique 1-MCP formulation, released in the ripening room, controls ethylene production during the final stages of ripening.

RipeLock technology requires no change in industry best practices for packing, shipping and ripening. Processors pack freshly harvested bananas into MAP bags, which remain closed until the moment the fruit is ready for retail display or consumption. The unique bag design delivers a more consistent color on the pallet and in the box, and controls weight loss better than other options on the market.

Extended green life during shipping

The RipeLock Quality System helps overcome the challenges of long-distance shipping. Shippers report the system extends green life by preserving bananas under optimum conditions during transport and storage. In customer trials, RipeLock prevented ripening and significantly reduced disorders like peel splitting, rots and molds during shipment.

Ripening and retailer benefits

For the ripening facility, RipeLock provides flexibility to manage supply and demand fluctuations by precisely controlling the ripening process. And, it requires no bag cutting.

Retailers and food service operators find that RipeLock helps maintain fruit quality for greater sales, operational efficiency and reduced waste. The system keeps bananas four to six days longer at color stages 5 and 6, which research shows consumers prefer for purchasing and eating. Plus, banana displays will maintain consistent appeal over the weekend without restocking and extra deliveries.

UNTREATED BANANAS*

*4 days after simulated delivery to retailer

BANANAS TREATED WITH THE RIPELOCK QUALITY SYSTEM**

**4 days after simulated delivery to retailer and removal from RipeLock Bags

Better bananas for consumers

Most important, RipeLock delivers a more appealing and flavorful product for the consumer. Testing by **MMR Research Worldwide** in the United Kingdom showed that 70 % of the consumers preferred fruit handled with RipeLock compared with conventionally handled bananas. With RipeLock, consumers can plan to purchase fruit to last for a full week.

The longer bananas are stored, the greater the RipeLock benefits. Even after five days in storage, bananas maintained their white pulp and fresh taste.

Service and support from AgroFresh

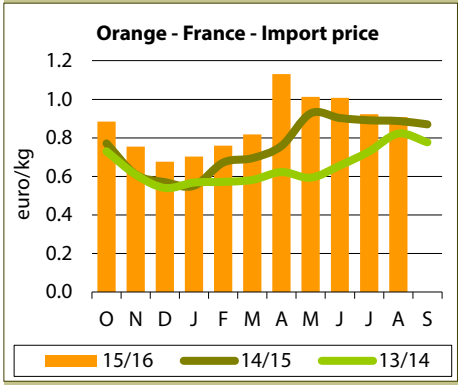
AgroFresh provides product training and customized service to help customers implement RipeLock technology. The system is now available with 18-kg bags and 1-kg cluster bags. Depending on customer needs, AgroFresh can create smaller formats and new product concepts, such as single finger, multicompartment or packages for quick-service restaurants.

The RipeLock Quality System is now registered in Belgium, the Netherlands, France, Italy, Spain, Austria,Switzerland, Greece and the United Kingdom. Registration in Germany is espected soon. The system also is available in the United States and Canada. For more information on the RipeLock Quality System, visit **www.agrofresh.com**

Orange

Summer 2016 (June-July-August)

In June, the lines remained focused on the Spanish Valencia Late, available in small quantities (lean campaign) and at high prices. Hence the South African Navel sold well, especially on the North European markets, despite its still pale coloration. Having started early at the beginning of June, with very high volumes (+ 142 %), the campaign maintained average prices. In July, despite slower sales, prices strengthened slightly because of the end of the Spanish campaign and the South African supply returning to average levels. Imports started to wane rapidly from late July, due to the early start to the campaign. Hence the South African Valencia arrived in August to find a lightly laden market. Given the lean harvest predicted and the shortage of small-size fruits, prices were high, except for the more abundant larger fruits. Prices remained strong and slightly above average.



PRICE

Type	Average monthly price euro/15-kg box	Comparison with average for last 2 years
Dessert orange	12.75	+ 6 %
Juice orange	13.50	+ 6 %

VOLUMES

Type	Comparison	
	previous month	average for last 2 years
Dessert orange	↘	- 25 %
Juice orange	↗	+ 2 %

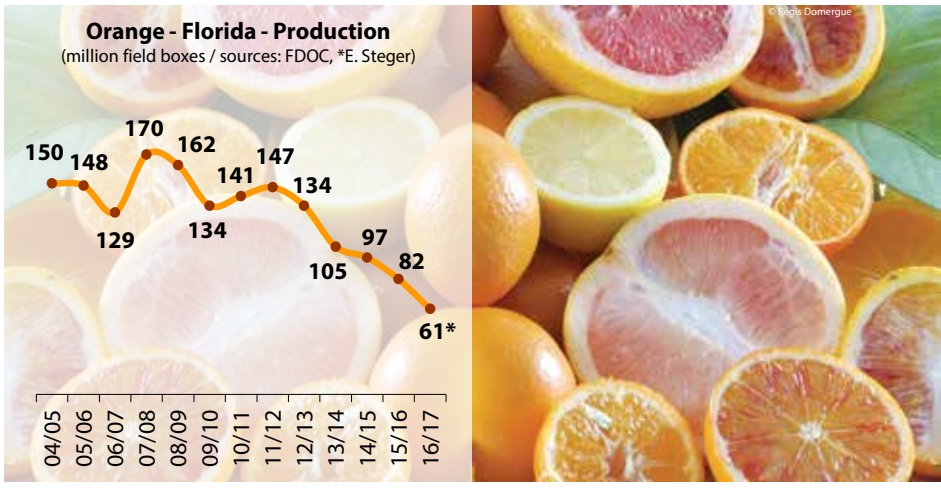
■ Orange: juice prices in Europe in June 2016.

Type	Price (USD/t)	Source	Comments
FCOJ, Pera, 66°Brix, bulk, ratio 14-16	2 000-2 300 fca Netherlands	Brazil	Prices up unexpectedly, though this increase was still not passed on to the consumer. Availability in Florida and Brazil apparently lower than last year. In Italy, the blood orange harvest practically sold out. Prices remained stable.
FCOJ, blood orange, 55°Brix	2 400-2 600 EUR/t exw Italy	Italy	

Note: fca: free carrier / exw: ex-works / Source: MNS-ITC Geneva

■ Floridian citruses: between a rock and a hard place. The years pass, yet they unfortunately bring no change for Floridian citrus growers. The decline in production, very largely due to the devastating effects of greening, seems even more marked every year. According to the firm Elisabeth Steger, the 2016-17 orange harvest should be down more than 25 % from the previous season, to barely more than 60 million field crates of approx. 38.5 kg (as opposed to 81.6 million boxes in 2015-16 and more than 100 million in 2013-14). The fall in cultivated surface areas is also gathering pace, both for oranges (approximately 170 000 ha remaining, after the loss of 10 000 ha in the past two years) and for grapefruits (approximately 37 000 ha remaining, after the loss of more than 1 000 ha per year in the past two years). The only good news is the explosive rise in orange concentrate rates, going from 1 800 USD per tonne into Rotterdam to more than 2 300 USD per tonne in early June.

Sources: Ultimate Citrus, NASS, Foodnews



VOLUMES

Varieties by source	Comparison		Observations	Cumulative total / cumulative average for last 2 years
	previous month	average for last 2 years		
South African Navel	↘	- 25 %	Navel volumes rapidly on the wane, with levels below average due to the early start to the campaign.	+ 15 %
South African Valencia Late	↗	+ 2	Supply continuing to rise, maintaining above-average levels, after the campaign started with high levels.	+ 14 %

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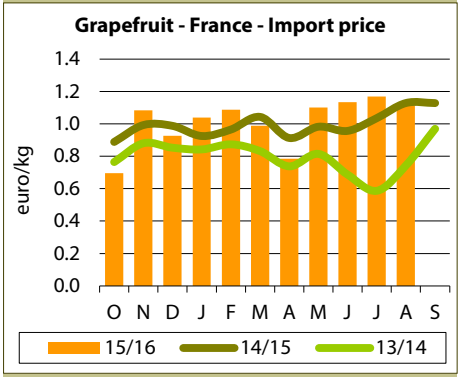
Grapefruit

Summer 2016 (June-July-August)

The summer campaign began in a context of under-supply, with the end of the last winter stocks and first limited imports from South Africa in June (12 % below average), which was set for a leaner campaign than the previous one. A lack of small-size fruits was observed, and the market, in a very tight state, registered historically high prices (+ 40 %). In July, the slump in demand, plus the rising South African supply (14 % above average) caused a drop in rates for large sizes, which were more abundant. However, prices remained very high for the season (+ 46 %). However, the distinct fall in demand in August, South African volumes subsiding though still very high (69 % above average) and Mexico's early start, all led to stocks of large-sized fruit forming, and to a more significant fall in prices. Average rates returned to last year's level.



PRICE

Source	Average monthly price euro/17-kg box equivalent	Comparison with average for last 2 years
South Africa	16.62	+ 22 %

VOLUMES

Source	Comparison	
	previous month	average for last 2 years
South Africa	↘	+ 69 %

VOLUMES

Source	Comparison		Observations	Cumulative total / cumulative average for last 2 years
	previous month	average for last 2 years		
South Africa	↘	+ 69 %	Campaign winding down, but with considerably bigger volumes than in previous Augusts.	0 %
Mexico	↗	-	Early start to the campaign, with moderate volumes, comprising mainly small sizes. Available in the distribution sector from week 34.	-

■ Grapefruit: juice prices in Europe in June 2016.

Type	Price (USD/t)	Source	Comments
Frozen concentrate, 58°Brix, red, ratio 6-8.5	1 100-1 300 cfr Netherlands	South Africa	Demand down, and possibly over-covered by volumes available. South African harvest delayed, and set to be below average. Demand for coloured grapefruit juice improving, helping prices strengthen.
Frozen concentrate, 58°Brix, white, ratio 7-9	1 800-2 000 cfr Rotterdam		
Frozen concentrate, 58°Brix, white, ratio 9<	2 000-2 150 cfr Rotterdam	Caribbean	

Note: cfr: cost and freight / Source: MNS-ITC Geneva

■ Lemon: juice prices in Europe in June 2016.

Type	Price (USD/t)	Source	Comments
Frozen concentrate, cloudy, 500 gpl	3 000-3 400 cfr Rotterdam	Argentina	Argentinean harvest undermined by rains, which also affected the quality of fruits aimed at the fresh market. Consequently, big volumes were transferred to for industry, exceeding processing capacities. Hence prices saw a considerable fall.
Frozen concentrate, clear, 500 gpl	3 600-3 800 cfr Rotterdam		

Note: cfr: cost and freight / Source: MNS-ITC Geneva

■ 2016-17 Spanish citrus campaign: bouncing back, ahead of schedule and with small fruits. These are the three key aspects of the very first trends of the 2016-17 season now underway, before official forecasts are released. The return of production to an above-average level will come as no surprise, after the lean harvest in 2015-16 due to the effects of the heatwave which hit the Western Mediterranean in spring 2015. Ailimpo is reckoning on a lemon production of 980 000 t, up by just over 20 % from the previous season, and 3 % above average. The growth margin seems to be around the same for easy peelers and the orange, according to Asaja (+ 15 to + 20 %, to be confirmed by the official figures). The early start and the small sizing (for early varieties at least) are both due to the severe lack of precipitation in the recent winter and spring periods.

Professional sources, Ailimpo, Asaja

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Pineapple

July and August 2016

July was marked by a reduction in the overall Sweet supply from Latin America. The volumes received were down by 30 % according to certain operators, because of the end of a natural flowering cycle. As in June, demand was flat, with more interest in seasonal fruits. However, as volumes continued to fall, the rates trend slowly but surely reversed. Still a bit unbalanced by its heavier proportion of small fruits, the Latin American supply sold better and better, despite its fairly heterogeneous quality (affected by rains in Costa Rica).

August brought practically no change to the situation. At the beginning of the month, there was a wide range of rates, with small sizes valued poorly. The flat demand raised fears of a difficult August. Yet this was not the case, since the overall supply, from both Africa and South America, kept on decreasing. From the beginning of the second half-month, the operators learned that the Latin American supply would remain low for several more weeks. Small-sized fruits earned better value, though this did not help offset the shortage of fruits, with certain operators receiving only 10 % of their usual volumes. At the end of the month, the market was desperately vacant. The increase in rates, which went back to the beginning of the second half-month, was steadier, with very high price levels. The end of the holidays and the subsequent re-opening of canteens pointed to rates remaining very high over the following weeks.

In July, the air-freight pineapple market was rather difficult. Despite a fairly limited overall supply, sales followed a false tempo since demand was more interested in the seasonal fruits supply, which was abundant and inexpensive. In addition, we should consider the fairly heterogeneous quality of the fruit from Cameroon, and the fairly poor coloration of the fruit from Benin. Sugarloaf sales (at between 1.80 and 2.00 euros/kg), still very limited, contributed to strengthening the impression of market fragility.

In August, a slight improvement was felt: the supply, just as heterogeneous in terms of quality but more limited, found it less of a struggle to sell. At the end of the month, the presence of some coloured Sugarloaf batches from Benin raised fears of the resumption of MRL checks by the DGCCRF. Making their appearance at the end of the first half of February, Dominican Sweet batches, highly coloured and highly rated, sold throughout the summer on a footing of between 2.30 and 2.50 euros/kg. Note that the week of their arrival, these fruits sold at between 2.70 and 3.20 euros/kg.

July was a complicated month on the Victoria market. Sales were slower since demand was more interested in seasonal fruits. So the operators considerably cut back their imports, to better match demand. In August, demand was no better, indeed quite the opposite. While the supply was even lower (Mauritian supply greatly reduced), sales remained very quiet. Conversely, prices remained stable throughout the summer.

■ **Pineapple: juice prices in Europe in June 2016.**

Type	Price (USD/t)	Source	Comments
Frozen concentrate, 60°Brix, smooth Cayenne variety	2 900-3 150 fca Netherlands	Thailand	Rates on the up due to the fresh fruit price increase in Thailand. Situation still sluggish in the Philippines and Indonesia because of a drought apparently due to El Niño.
Aseptic concentrate, 60°Brix, smooth Cayenne variety	2 900-3 150 cfr Rotterdam		
NFC, ss aseptic, 12°Brix, MD-2 variety	850-950 ddp London	Costa Rica	

Note: fca: free carrier / cfr: cost and freight / ddp: delivered duty paid / Source: MNS-ITC Geneva

FRANCE

PINEAPPLE - IMPORT PRICE IN FRANCE - MAIN SOURCES

Weeks 2016		27	28	29	30	31	32	33	34	35
Air-freight (euro/kg)										
Smooth Cayenne	Benin	1.80-1.90	1.80-2.00	1.80-1.90	1.80-1.90	1.80-1.90	1.80-2.00	1.80-2.00	1.80-2.00	1.80-1.90
	Cameroon	1.70-2.00	1.70-2.00	1.70-1.90	1.70-1950	1.70-1.90	1.80-2.00	1.80-2.00	1.80-2.00	1.80-1.90
	Côte d'Ivoire	1.80-1.90	1.80-190	1.80-1.90	1.80-190	1.80-1.90	1.80-190	1.80-1.90	1.80-190	1.85-1.95
Victoria	Reunion	2.80-3.50	2.80-3.50	2.80-3.50	2.80-3.50	2.80-3.50	2.80-3.50	2.80-3.50	2.80-3.50	2.80-3.50
	Mauritius	3.00-3.50	3.00-3.50	3.00-3.50	3.00-3.50	3.00-3.50	3.00-3.50	3.00-3.50	3.00-3.50	3.00-3.50
Sea-freight (euro/box)										
Sweet	Côte d'Ivoire	8.00-11.00	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50
	Ghana	8.00-11.00	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50	8.50-11.50
	Costa Rica	6.00-8.00	7.00-9.00	7.50-10.00	7.50-10.00	7.00-10.50	7.00-11.00	9.50-13.00	10.00-14.0	10.00-14.0

Mango

July and August 2016

In the first half of July, the European market was under-supplied in terms of sea-freight mangoes. Incoming shipments from Brazil, the main supplier at this time of year, stepped up though without satisfying demand. They partly offset the decrease in shipments from Puerto Rico and the Dominican Republic following the appearance of serious quality problems. Insignificant in previous years, these quality problems proved to be a major factor during this campaign for these two neighbouring sources. It would seem that the weather conditions arising from the El Niño phenomenon were particularly damaging during mango fruit-bearing, causing humidity levels which favoured the development of fungal diseases. Hence European importers cut back their procurement, only continuing their orders with exporters able to guarantee commercial quality. The situation proved favourable for the other sources present, such as Senegal and Brazil, which obtained fairly stable and high prices.

The air-freight mango market remained difficult through most of the month, because of massive imports from Mexico as demand was dwindling. Under these conditions, the last batches from West Africa sold on a downward footing at the beginning of the month, before disappearing from the market. The start of the Israeli campaign brought varietal diversification. The first Aya batches sold at around 3.00-3.50 euros/kg. In the second half of the month, this variety was rapidly replaced by Maya, which proved increasingly popular among purchasers as the Mexican supply dwindled. The Omer, Kasturi and Shelly varieties earned lower prices.

In the first half of August, the height of the summer holiday period, the European market saw a real collapse due to the steep downturn in demand. Whereas in July procurement had seemed insufficient, in August it appeared to be excessive, despite maintaining similar levels. Rates collapsed, especially for Brazilian mangoes, which reached their lowest level of the year, in particular Tommy Atkins (from 2.00 euros/box). Kent seems to have better withstood the turnaround in the trend, obtaining higher prices in line with the average. The heterogeneity of the imports in terms of source, variety and quality only aggravated poor sales. The supply, mainly comprising small-sized fruits, in addition proved ill-suited to the flagging demand. The fairly early withdrawal of shipments from Puerto Rico and the Dominican Republic helped stabilise the market conditions in the second half of the month, when Israel dominated the supply. At the end of period, the Spanish campaign was getting off to a slow start, with the first batches of Tommy Atkins, Osteen and Irwin.

The air-freight mango market was quieter than the sea-freight mango market, with steadier sale prices. The end of the Mexican campaign, after its volumes had saturated the market in July, helped stabilise rates for Senegal, in spite of quality problems, and for Israel which provided varietal diversification of the supply. Small batches of Egyptian Kent supplemented the limited supply in the second half of the month.

■ Mango: juice and purée prices in Europe in June 2016.

Type	Price (USD/t)	Source	Comments
Aseptic purée, 17°Brix, Alphonso variety	1 450-1 750 cfr Rotterdam	India	Alphonso prices down during the last quarter, due to waning demand and a fall in fresh fruit prices. Availability very high. Demand for Totapuri lower.
Aseptic concentrate, 28°Brix, Totapuri variety	1 300-1 450 cfr Rotterdam		
Aseptic concentrate, 28°Brix, Tommy Atkins variety	1 250-1 400 fca Netherlands	Mexico	

Note: cfr: cost and freight / fca: free carrier / Source: MNS-ITC Geneva

MANGO - INCOMING SHIPMENTS (estimates in tonnes)

EUROPE

Weeks 2016	27	28	29	30	31	32	33	34	35
Air-freight									
Mali	5								
Burkina F.	3								
Mexico	120	100	90	60	60	40			
Senegal	10	10	5	5	5	10	10	5	10
Israel			30	30	30	20	20	30	20
Sea-freight									
Brazil	1540	1650	1820	1820	1740	1580	1300	1010	1250

MANGO - IMPORT PRICE ON THE FRENCH MARKET

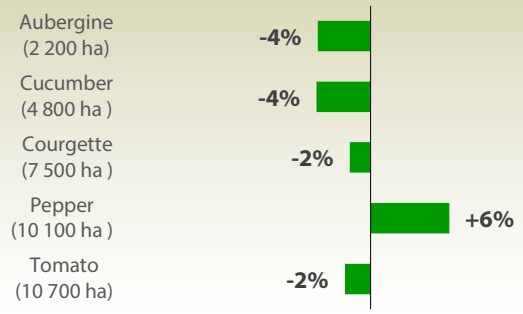
Weeks 2016		27	28	29	30	31	32	33	34	35
Air-freight (euro/kg)										
Mali	Keitt	3.0	3.0							
Burkina	Kent	3.0-3.5								
Mexico	Kent	3.5-4.0	3.0-4.0	3.5-4.0	3.0-4.0	4.2-4.5	3.8-4.5			
Senegal	Kent	3.0-3.5	3.0-3.5			3.0-4.0	3.5-4.0	3.5-4.0	3.5-4.0	3.5-4.5
Israel	Aya/Maya	3.0-3.5	3.0-3.8	4.0-4.2	4.0-4.2	2.5-3.5				
Israel	Autres			3.5	3.5-4.0	2.5-3.0	3.0-3.5	3.0-3.5	3.0-4.0	3.0-4.0
Israel	Kent						3.5-4.0	3.5-4.8	3.5-5.0	3.5-4.0
Egypt	Kent					4.5-4.8	4.5-4.8	4.5-4.8	4.5-4.8	4.5
Sea-freight (euro/box)										
Brazil	T. Atkins		6.0-7.0	5.0-6.0	5.0-6.0	2.0-3.0	2.0-3.0	2.0-4.2	4.0-5.0	5.0
Brazil	Palmer		8.0	8.0-9.0	8.0	3.0-5.0	3.0-4.0	3.0-4.0	4.0	5.0-6.0
Puerto Rico	Keitt	7.0-8.0	8.0-9.0	8.0-9.0	8.0	3.0-6.0	5.0-6.0	5.0-6.0		
Dom. Rep.	Keitt	6.5	6.5-7.5	6.5-8.0	6.5-8.0	5.0-6.0				
Senegal	Kent	7.0-8.0	8.0-9.0	7.0-9.0	7.0-8.0	5.0-7.0	3.5-5.5	3.0-5.5	4.0-7.0	4.0-7.0
Israel	Autres						3.0-3.5	3.0-3.5	2.5-3.5	
Israel	Kent						5.0-7.0	6.0-8.0	6.0-7.0	6.0-7.0
By truck (euro/box)										
Spain	Osteen						12-13	12-13	10-12	10-12
Spain	Irwin								6.0	4.5-5.5

Temperate fruits & vegetables

■ **Vegetable surface areas down slightly in Almeria, except for peppers.** The first estimates of the Ministry of Agriculture, Fisheries and Rural Development of the Andalusian Government (Spain) indicate a very slight fall in vegetable surface areas in the Almeria zone, apparent for most crops except the pepper. The reported fall amounts to a total of 127 ha (- 0.3 % on 2015) out of the zone's 36 600 ha. It should be more marked for the aubergine (2 200 ha, i.e. - 4.3 % on 2015) and the cucumber (4 800 ha, i.e. - 4.4 %). The reduction in surface areas should not exceed 2.1 % for the tomato (10 700 ha) and 1.7 % for the courgette (7 500 ha). Conversely, another increase in pepper surface areas is expected (10 100 ha, i.e. + 6.4 %).

Source: Infofruit

Vegetables - Almeria (Spain)
2016 production compared to 2015
(source: Junta Andalucia)



■ **European grapes: market well supplied in autumn, with a slight downturn expected at the end of the year.** European grape sales followed a steady tempo this summer, without doing anything spectacular. This year there is a good potential in Italy (Sicily and Puglia) and France. The harvest could even be slightly bigger than last year, with a very good sugar content due to the heat. Surface areas were slightly down again in Italy (44 460 ha, i.e. 1 million tonnes), especially because of a big fall outside of the traditional production zones of Sicily and Puglia. Italia remains by far the main variety, still representing 45 to 50 % of the stock. In recent years, the renewal has above all involved Vittoria (15 %) and to a lesser degree Red Globe (9 %). However, the supply is also expanding in seedless varieties, with planting of Crimson Seedless and Sugraone, which have now reached 6 000 ha, i.e. 10 to 15 % of Italian table grapes. French production is also holding up, driven by local varieties (4 700 ha, i.e. 41 500 t in 2015). There have been no overall changes in Spain either (13 000 ha and 280 000 t in 2015). The fall in surface areas seems for now to have been halted in Andalusia, with the stock currently fixed at around 2 000 ha. Meanwhile, the frenzy has slowed in Murcia, pending new seedless varieties to expand the range. Seedless varieties represent 30 % of Spanish table grapes (80 % in Murcia). Surface areas are holding up in Valencia in spite of a recurrent drought, yet this year a fall in yield of at least 10 to 15 % is expected in this region. So the campaign could be slightly lean at the end of the season, especially since it arrived around ten days ahead of schedule during the summer.

Source: Infofruit

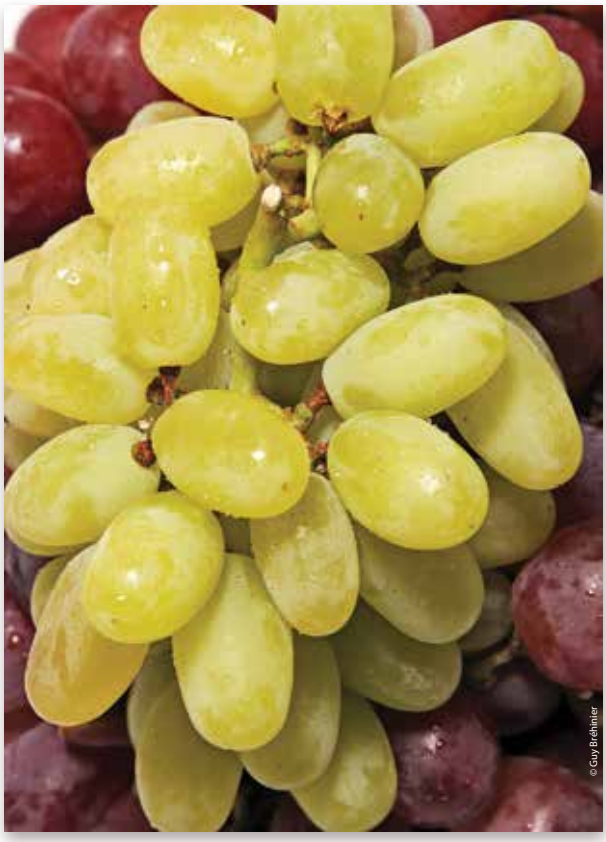


Table grape planted areas

in hectares	2013	2014	2015
Italy	45 934	45 686	44 460
Spain	13 402	13 103	13 074
France	5 160	4 810	4 760

Sources: Ismea, Marm, Scees

2016 FOOD EXHIBITION CALENDAR

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Roots & tubers

Q2 2016

After the turbulence of Q1 2016, the plantain banana rate saw a quieter period in Q2. The yam and cassava market conditions were more troubled given the more irregular imports. The other products followed a linear trend.

Sweet potato

A major white-fleshed sweet potato supplier, Egypt was present until early June, thus registering a campaign a half-month shorter than the previous year. The rate for this produce remained steady throughout the period. South Africa and Honduras also shipped white-fleshed sweet potatoes throughout Q2. Sales of South African produce were stable at around 1.40 euro/kg on average. Honduran produce was better valued (1.60 euro/kg) from April to mid-May, when its price dipped close to that of South African produce.

Israel, the United States and Honduras shared the orange-fleshed sweet potato supply, with some price differences in favour of Israel, which earned the highest value. The fall in Israeli shipments and the temporary suspension of US shipments in May helped rates for the Honduran produce recover somewhat. Usually a marginal presence on this market sector, South Africa too supplied orange-fleshed sweet potatoes, enabling it to vie with Israeli produce in April, May and at times in June.

Yam

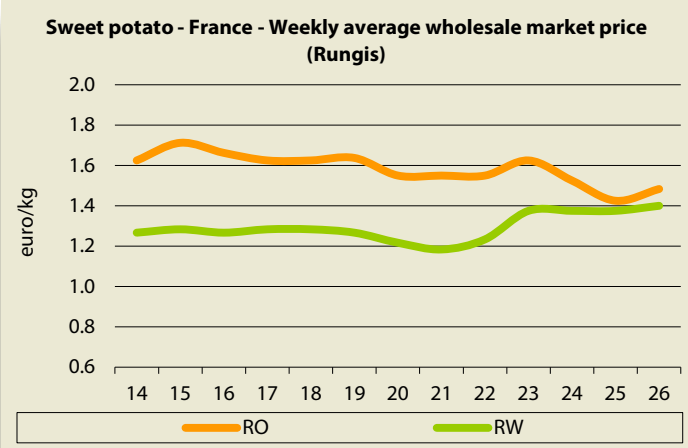
Puna or white yams from Ghana sold steadily until mid-May at the usual prices. Rates then took off, reaching particularly high levels in June, in excess of 2.00 euros/kg. This rapid rise seems to be due to the combination of a smaller supply from Ghana, which came at the end of the commercial campaign, and to a resurgence in demand during Ramadan. As Ghanaian produce became rare and of mediocre quality, the market made its procurements from other sources such as Brazil, with white yams and couscous selling at high prices. The new Ghanaian harvest should make its appearance in July.

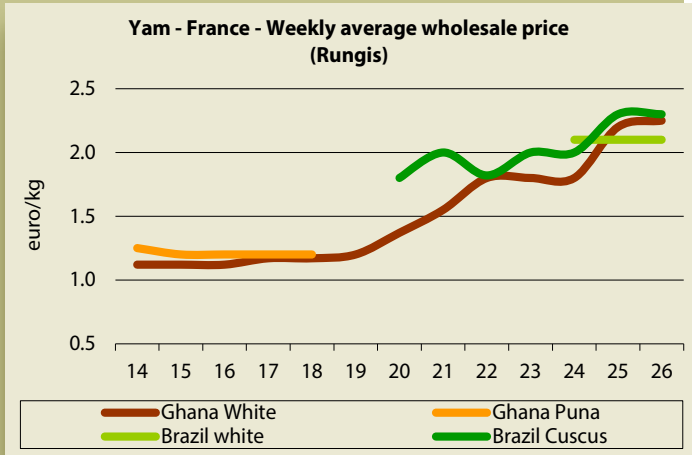
Cassava

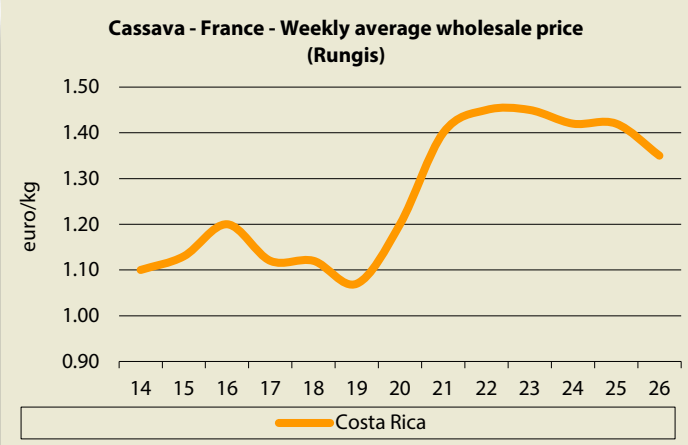
Ranging between 1.10 to 1.20 euro/kg until mid-May, the cassava rate from Costa Rica, the main supplier of this product, increased considerably to in excess of 1.40 euro/kg until the second half of June. It then subsided, but remained high. This increase in the cassava rate visibly followed the same trend as the yam, with a fall in supply as demand became more insistent.

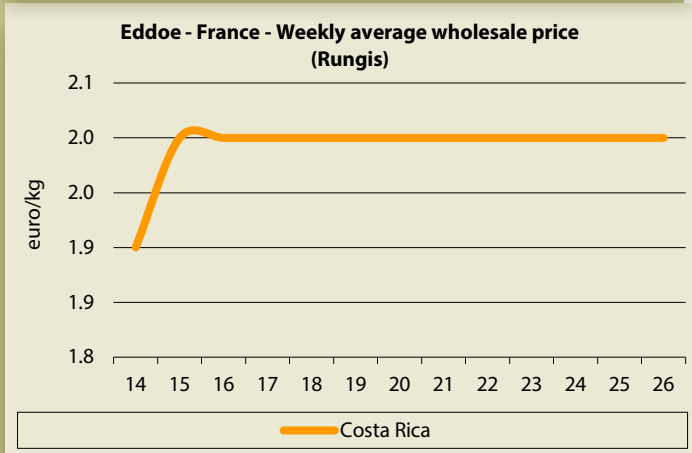
Eddoe

The Costa Rican eddoe rate was particularly stable during Q2, with an average price of 2.00 euros/kg. This average conceals a big price gap of between 1.80 and 2.50 euros/kg, depending on the size and freshness of the produce on the market. Some Ecuadorian and Chinese batches were also sold, though at distinctly lower prices.









Sweet potato: RO: red-skinned, orange-fleshed / RB: red-skinned, white-fleshed / Source: Pierre Gerbaud

Other exotics

Q2 2016

Plantain banana

Rates were stable overall for the Colombian plantain banana, with this source dominating the European market supply. In June, prices were slightly higher with more restrained imports and more dynamic demand during Ramadan. Ecuador saw the rate of its fruit driven upward, thanks to the more moderate Colombian shipments.

Chayote and christophine

The limited chayote and christophine supply from Costa Rica promoted high, strong sale prices in Q2. Some air-freight batches from Martinique were sold in parallel, at around 2.80 euros/kg.

Dasheen

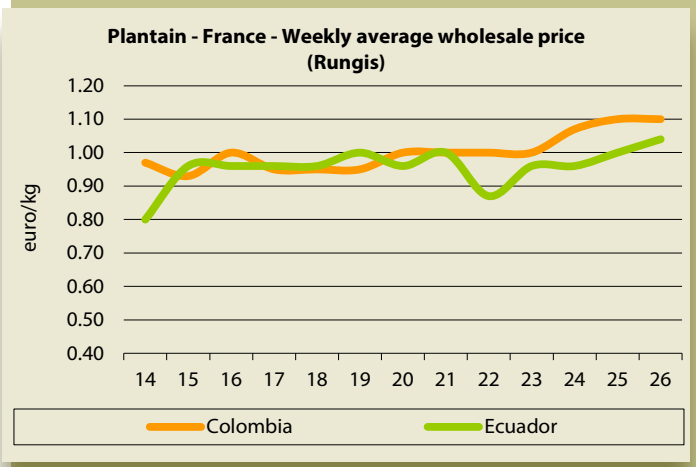
Starting the period at 2.70 euros/kg, Saint Vincent dasheens then traded steadily at around 2.50 euros/kg until late June. Some air-freight Martinique batches were sold in small quantities, at around 4.00 euros/kg.

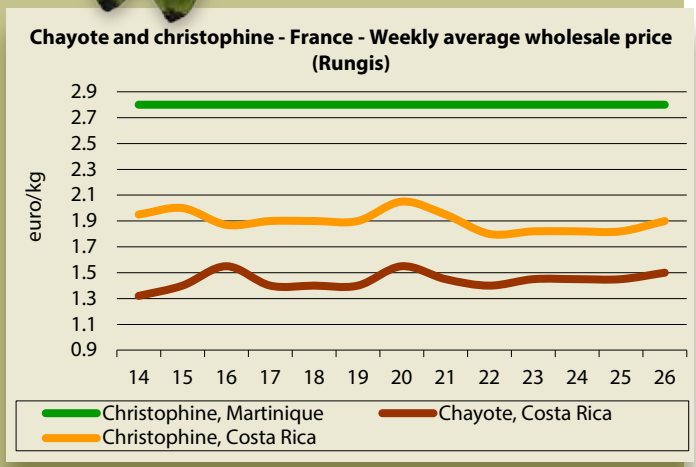
Chilli pepper

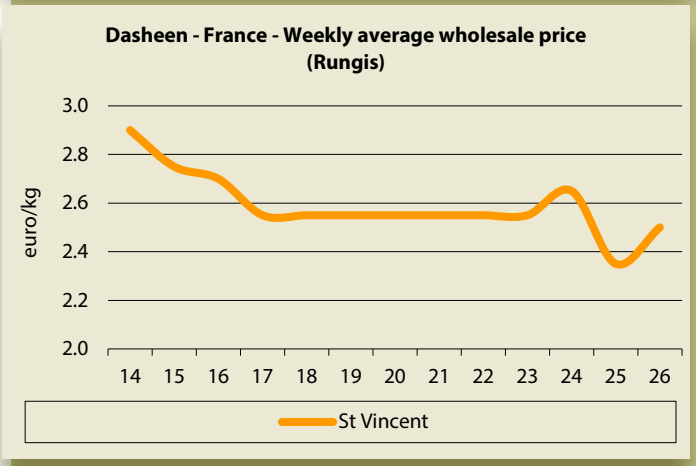
The rates for the two main West Indian chilli pepper suppliers, Guadeloupe and the Dominican Republic, dipped from May onward. Martinique supplied only limited spot quantities, its presence seemingly dwindling on the French market in favour of Guadeloupe, whose produce enjoys benchmark status. Small quantities of Cuban peppers made their appearance in April and May, selling on the same footing as the Dominican produce.

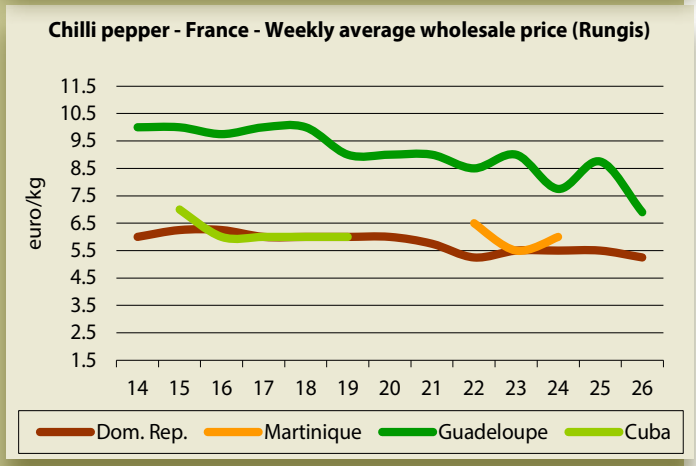
Chilli pepper

Plantains





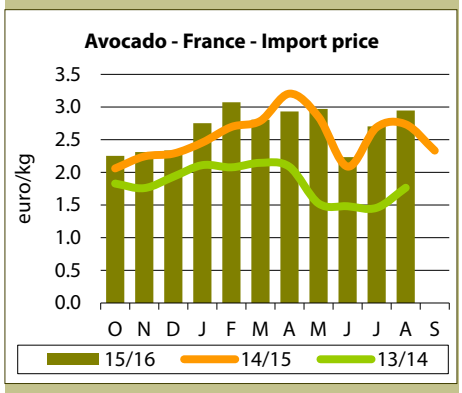




Avocado

Summer 2016 (June-July-August)

The summer started under pressure from substantial incoming Peruvian shipments and an excess of small-sized fruit from Kenya. Prices followed their seasonal fall in June, yet never fell below average; indeed they rapidly reversed the trend! Although the overall supply remained greater than in previous years (large volumes from Peru), July was marked by the return to a more moderate supply (South Africa rapidly winding down) and by lively demand, which caused tensions in particular for small-sized fruit (18-20). The volumes available were rapidly absorbed, and prices started to climb to record levels for the season. In August, the rates continued to strengthen, as the decline of the summer supply intensified and the early-arriving first batches from Mexico and Chile were moderate.



PRICE

Varieties	Average monthly price euro/box	Comparison with the last 2 years
Green	11.57	+ 72 %
Hass	12.17	+ 44 %

VOLUMES

Varieties	Comparison	
	previous month	average for last 2 years
Green	↗	+ 1 %
Hass	=	+ 23 %

VOLUMES

Source	Comparison		Observations	Cumulative total / cumulative average for last 2 years
	previous month	average for last 2 years		
Peru	↘	+ 9 %	Campaign winding down rapidly, with volumes back to a level nearer average for the season.	+ 32 %
South Africa	↘	- 2 %	Overall supply on the wane. Hass shipments down but near average (6 %), and a more pronounced shortfall for the green varieties (- 11 %).	+ 2 %
Kenya	↗	- 2 %	Rise in the Kenyan supply, reaching levels nearer average after a summer shortfall.	- 13 %
Mexico	↗	+ 160 %	Early start by the Mexican supply, with a rapid rise.	+ 160 %

■ Mission setting up in China. The Californian firm will set up the country's first avocado ripening unit. It will comprise four chambers and be able to reach 85 % of the country's consumers thanks to its strategic positioning in Shanghai. Mission is associated in China with Lantao, which currently distributes more than 70 % of avocados sold in the country.

Source: Mission

■ Indian market open to the Peruvian Hass. The agreement, signed in late August between the sanitary authorities of the two countries, of course entails complying with a strict inspection protocol. Despite its population of 1.3 billion, India is currently a virtual market for the avocado, with barely 50 tonnes imported in 2015, mainly from New Zealand.

Source: Senasa

■ Avocado-based processed products: a new natural stabilisation process. The Australian company Naturo has developed a process (Natavo Zero) able to stop enzymatic browning of the pulp or cut fruits, without any additives. The technique is based on the sensitivity of polyphenol oxidase, the enzyme responsible for browning, to pressure fluctuations. It is able to extend the life of the produce by around ten days, provided that it is refrigerated, even in opened packaging. The machine, dubbed "the avocado time machine", can process 500 kg of raw material per hour.

Source: natavozero@naturotechnologies.com

Sea freight

July and August 2016

Despite the flat market and customary lack of spot activity during July and August, the reefer fleet remained fully employed, inasmuch as all units continued to trade in liner services and/or COAs. The combination of just enough cargo and low bunker prices meant that there was no need for units to lay up. On the supply side, one vessel was reported demolished. On the downside, low rates and idle time left average TCE yields little better than marginally profitable in the best case.

By the end of August it was clear that there were banana volumes surplus to contract requirements east of the Panama Canal. With Colombia expecting to fix 1-2 vessels per week and additional cargo anticipated out of Costa Rica and Guatemala, the market for large units should have tightened significantly by mid September. If the Philippines also starts calling for tonnage, the charter market will register a stronger performance in H2 than in H1. What happens to banana market pricing in the eastern Med is another matter.

Over the summer the small segment finally started to benefit from the withdrawal of capacity in April and May: operators saw a rise in activity levels and voyage rates as demand from charterers matched the supply of tonnage. However with the Nigerian economy officially in recession, there is an underlying fragility to the market – until the economy shows signs of recovery and the naira strengthens, this is unlikely to change.

The inauguration of the newly expanded Panama Canal at the end of June was supposed to herald a new dawn in container shipping. Well the new era has certainly arrived - it's just the polar opposite of what had been envisaged! This was supposed to be the age of the ultra-large container carrier, piled high with thousands of steel boxes holding clothing, toys, bananas and Apple iPhone 7s. However it turns out that the world needs smaller, or fewer ships. With so many ULCCs still to be delivered into a global economy that is stuck on super slow steaming mode, the bankruptcy of Korean carrier Hanjin at the end of August may well be the first in a series of container line failures. If so, there will be significant consequences for reefer shipping.

■ **Other fruits: juice and purée prices in Europe in June 2016.**

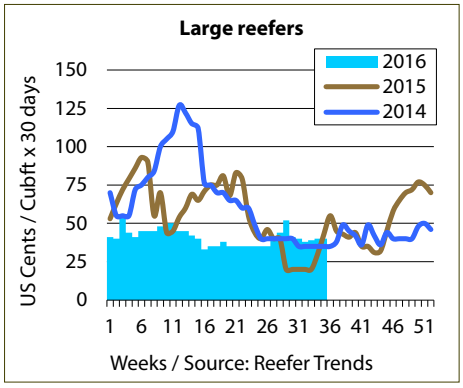
Type		Price (USD/t)	Source	Comments
Acerola	ss frozen, 6-8°Brix	1 150-1 200 cfr Rotterdam	Brazil	Market still well supplied and balanced.
	Frozen concentrate, 20-22°Brix, clear	3 000-3 100 fob Santos		
Passion fruit	Frozen concentrate, 52°Brix	9 100-10 300 cfr Netherlands	Ecuador	Prices up, since there were practically no more stocks available from Ecuador or Peru, and yields were low. Demand apparently in steep decline because of this continuous price increase.
Guava	Contentrated purée, 19°Brix, pink	1 200-1 350 cfr Netherlands	South Africa	Demand and supply in balance for white, with stable prices. South African production of pink guava purée particularly low because of the drought in the south of the country. Fruits 30 % more expensive than last year. Some limited Brazilian volumes available at slightly higher prices.
	Contentrated purée, 20°Brix, white	1 150-1 250 cfr Rotterdam	India	
Pomegranate	Clarified aseptic concentrate, 65°Brix	3 200-3 700 EUR/t fca Rotterdam	Turkey Iran	Demand on the increase, and prices strengthened during the 1st half of 2016. However, availability still falling. The next harvest will begin in October.

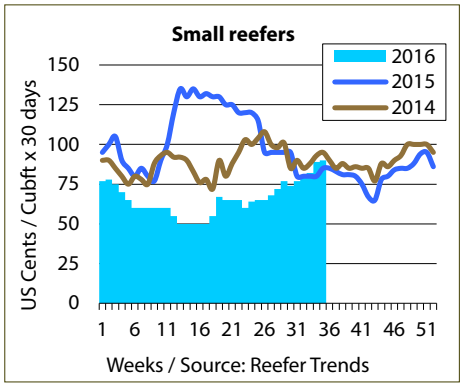
Note: cfr: cost and freight / fob: free on board / fca: free carrier / Source: MNS-ITC Geneva

EUROPE

MONTHLY SPOT AVERAGE

USD cents/cubic foot x 30 days	Large reefers	Small reefers
July-August 2016	36	74
July-August 2015	34	86
July-August 2014	28	93





European banana market

Perfect alignment

As volume and price remain on a simultaneous upward trend, we draw ever closer to perfection. Yet when the fall inevitably comes, it will be all the harder! Some are predicting it for the autumn. Since the worst is never certain, we have to savour this moment, draw the lessons from it and in future gather together the factors which have underpinned the success of the past few years.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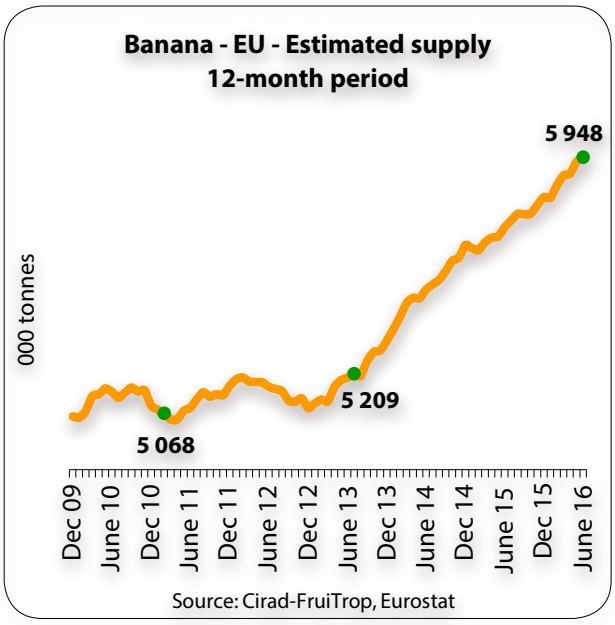
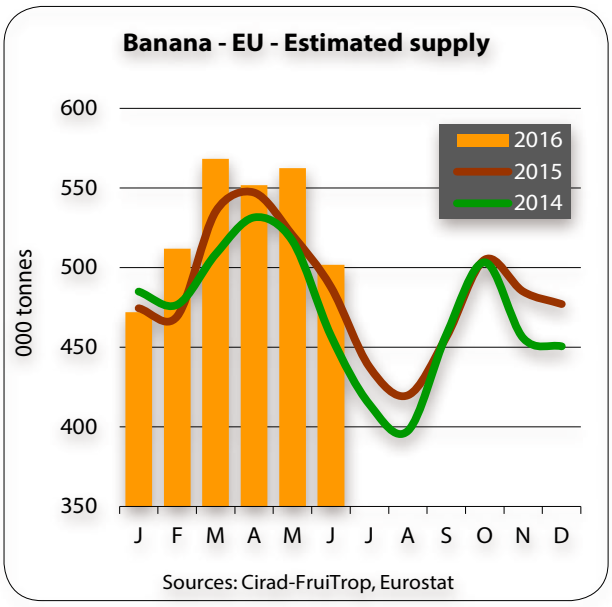
In 2016, European consumption should reach the symbolic 6-million tonnes mark! There is little risk of falling short, since it has practically reached this mark over the past twelve months (2nd half of 2015 and 1st half of 2016). Over the first six months of 2016, the market was up 4 % by volume. This fine dynamic has now been ongoing for some time. Over the past 42 months, annual consumption (12-month sliding scale) has slipped back only seven times. The EU has been steadily consuming more and more bananas, back to early 2013. If this trend is confirmed, at the end of the year the world's biggest market will have been through a continuous growth period of four years. Alongside France's post-War Golden Decades, these four years might seem like a tiny moment of fortune; yet on the banana time-scale, this is close to an eternity.

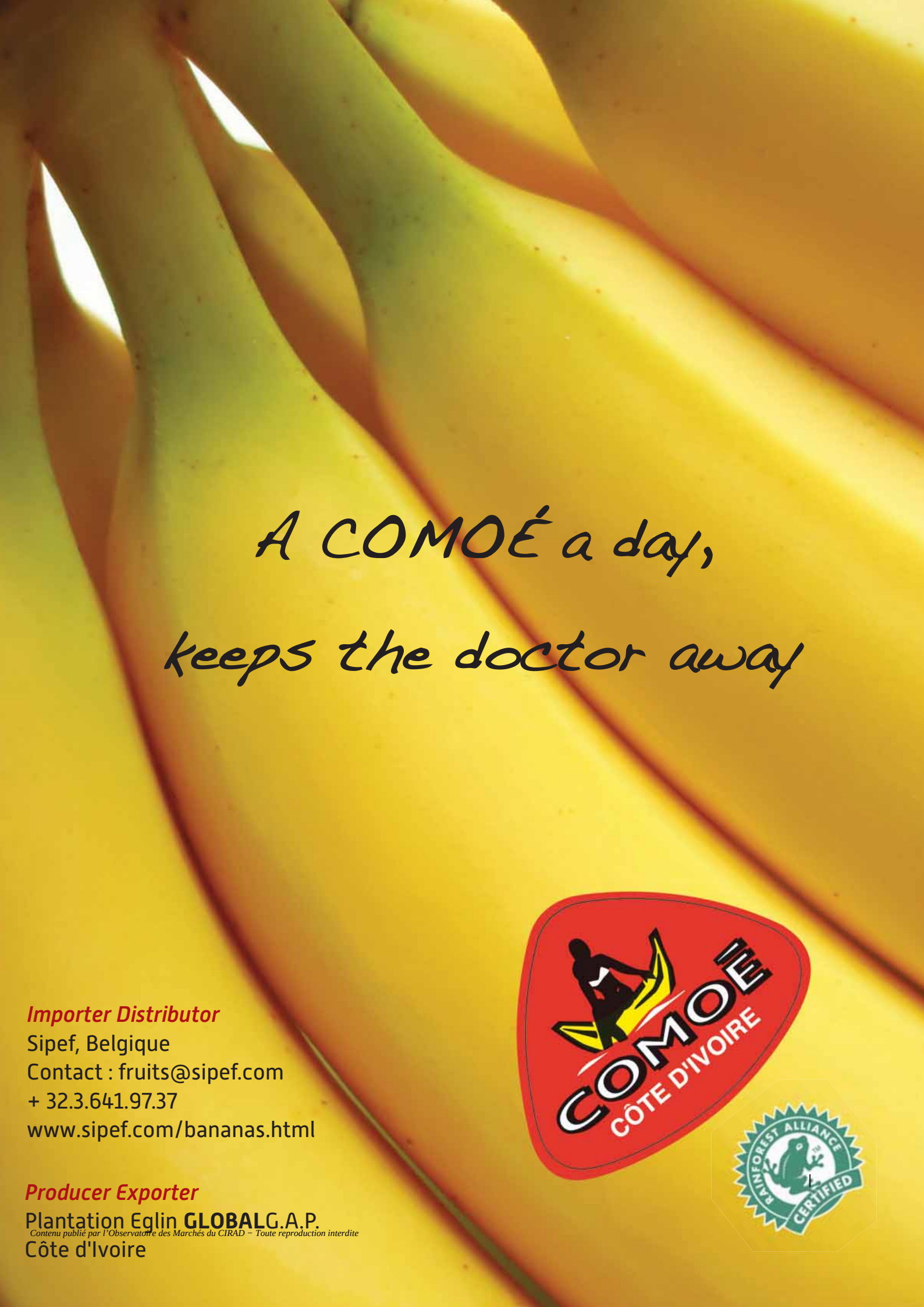
If things have been very good on the volumes side, wouldn't they have been very bad on the price side? Since, according to the most conventional economic theory, one always comes at the expense of the other. Very fortunately, as is often the case in the banana sector, reality does not match theory. The market works in an unorthodox fashion, to say the least. The more consumption volumes increase, the more prices, at certain stages, increase too, or at the least remain stable.

Retail prices on a mainly upward trend

First, let's look at retail prices. Many European countries are seeing inflation. In both Germany and France, prices in the conventional distribution sector and the discount stores (Germany) or even promo prices (France) gained between 3 and 4 % (1st half of 2016 as compared to 2015). The trend is the same for the Canaries platano, which exceeded the 2 euros per kilo mark in retail (+ 3.4 %), while volumes supplied by Spanish producers were at record levels. Indeed, we need to go back twelve years to find trade activity as high as in the 1st half (more than 200 000 tonnes). Conversely, the dollar banana retail price was down, by just 1 %. In Italy, retail prices also saw a modest decrease (-1.2 %). In the Czech Republic, there was a more considerable drop than elsewhere, doubtless due to the effect of very lively competition from the apple and orange, prices of which have been particularly competitive since autumn 2015.







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Producer Exporter

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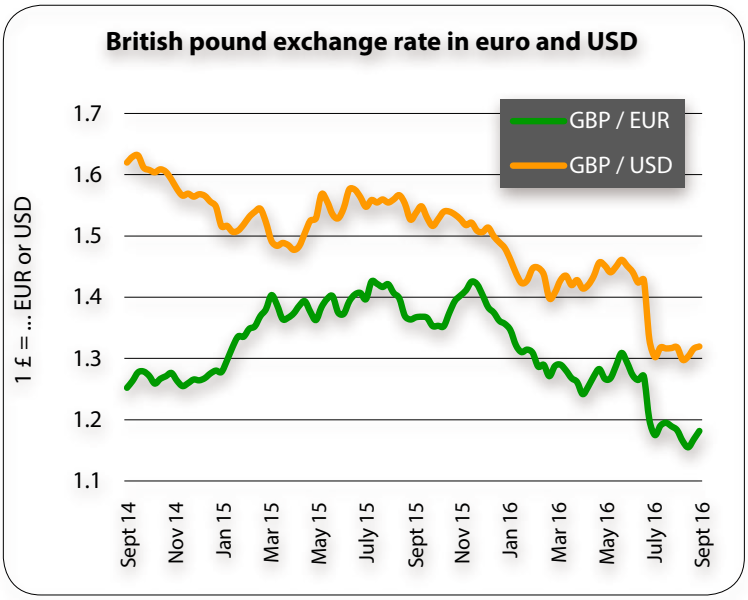
The situation in the United Kingdom is infinitely more complex to decode. Recent developments (1st half) could be the result of various forces: monetary considerations (pound down by nearly 20 % against the dollar and the euro under the effects of the Brexit referendum campaign and result), a high average import price in the Eurozone, close to the records of 2015 and also 2012 (see Cirad barometer), as well as the desire by the various distributors to continuously bring down prices for the consumer, as they have been doing for years. While the first two factors tended to push sterling banana prices in the UK, it was the latter factor, commonly known as the "price war", which apparently told on the trend. True, retail prices remained stable for the loose banana, but dropped dramatically by 11 % for the prepacked category.

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Germany: when contractualisation does not mean growth

The situation is clearer for import prices. The excellent situation in 2015 was confirmed in the 1st half of 2016. The indicator produced by Cirad (barometer) registered an import price of 14.3 euros/box in 2016, as opposed to 14.4 euros/box in 2015, again for the 1st half. The summer of 2016 after this half (July and August) was fine in terms of price, although the period came to a more difficult end. Nonetheless it appears that the summer, a time of high commercial risk for the banana, is no longer the spectre that it used to be. For years, operators have trimmed their procurement programmes, and the biggest crises were back in 2011 and 2012. So much for the general picture.

Looking at each market close-up, the situations reveal some interesting particularities. Let's examine various European markets, especially the United Kingdom and Germany. These two countries have a high degree of contractualisation between traders and the supermarket sector. This trend of aiming to set a delivery price to the distributor in advance (up to one year ahead) is taking hold throughout Europe. Hence looking into the behaviour of these contractualised systems is essential for the decision makers. As we will see, it is difficult to decide between the contractualised mode and spot mode. First let's take the German market, on which we can measure, going back several years, the relative evolution between "contract" green banana prices and so-called "free market" prices. Looking at the 1st half of 2016 alone, we might categorically conclude that the operators who opted out of contractualisation with the distribution sector made the better economic decision for their business. Indeed, they would have increased their takings by approximately 1 euro per carton. However we should be wary of seeing this as a fixed rule, since the bonus was just 11 eurocents in the 1st half of 2015, though 43 eurocents for the same period of 2014. 2013 saw the reverse trend, since the contract market earned 75 eurocents more per box than the spot market. Hence if we excluded 2013 from the analysis, we might easily conclude in the benefits of the free market.

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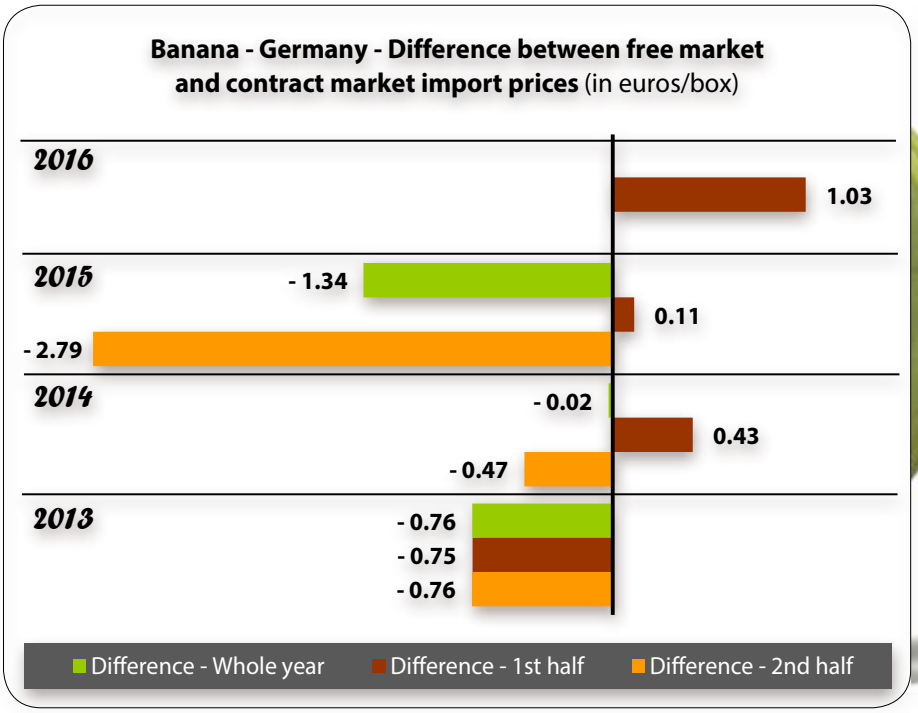

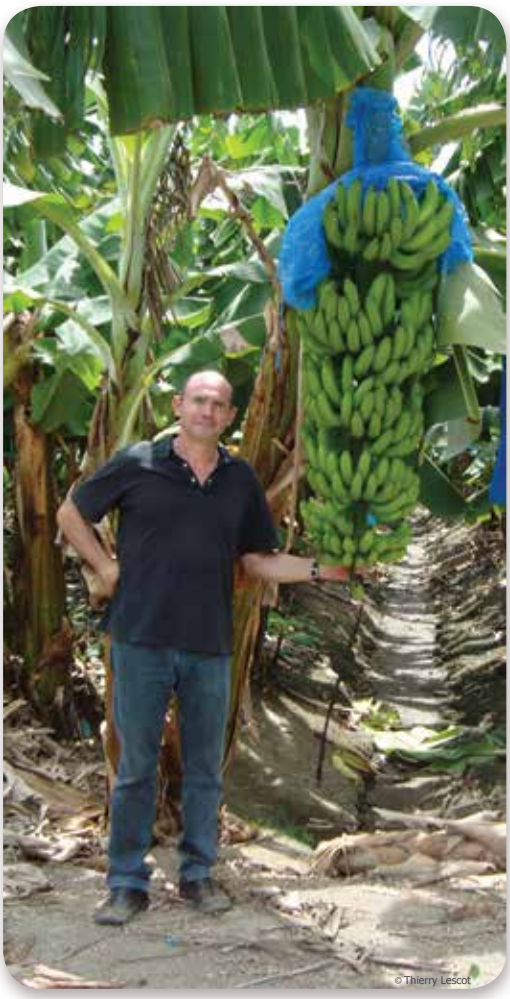

Yet that is only true for the 1st half, since the same analysis for the 2nd half completely reverses the conclusions. Over the last three years (2013 to 2015), there has been a major shortfall. The spot rate is 0.5 to 2.8 euros/box below the contract rate. The annual average confirms the effectiveness of the contract market, which brings in at least the same as the spot market (2014), and up to 9 % more, as in 2015. Hence drawing a conclusion based on the exceptional results of the 1st half of 2016 would be to ignore the annual dynamic of the European banana market. Especially as the market conditions in 2016 created a particularly favourable cycle, according to some even historically favourable, for the banana sector. In short, the dollar banana supply was restrained, demand very lively and competition from seasonal fruits moderate. We should recall that in France, for instance, fruit retail prices increased by 70 % between 2015 and 2016!

Let's finish our analysis of the German market by looking at the consumption level, in order to check whether there is a positive link between market contractualisation and growth of volumes. We cannot help but observe that, if there is a cause-effect relationship, it is adversely affecting consumption. While European imports in the 1st half of 2016 increased by 5 %, German consumption ebbed by 5 % from the same period in 2015. Of course, it is too simplistic to seek a categorical link between contracts and consumption, such is the number and variety of influences to which the markets are subjected. In addition, Germany already has a high banana consumption per capita. However, to explain this rather worrying phenomenon, we might propose the hypothesis that in wanting to structure its market excessively (difficult for ACP bananas, calls for tenders which benefit only large-scale operators, long-term contracts, etc.), Germany is snuffing out any potential dynamic. It has slipped into a routine discouraging risk taking, especially in terms of volume, to protect a price and market share for the benefit of the players already in place. Unfortunately, this model is being imitated, especially in the Czech Republic, whereas this country is exhibiting a great consumption dynamic (+ 30 % in three years).

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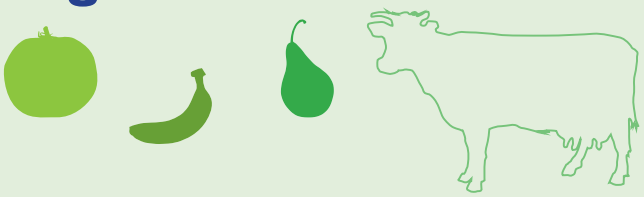
RETAIL STAGE
Fruits and vegetables
Flowers
Pork
Poultry
Ruminants
Dairy products
Fish products

TOTAL (excluding tax) €€
TOTAL (inclusive of tax) €€



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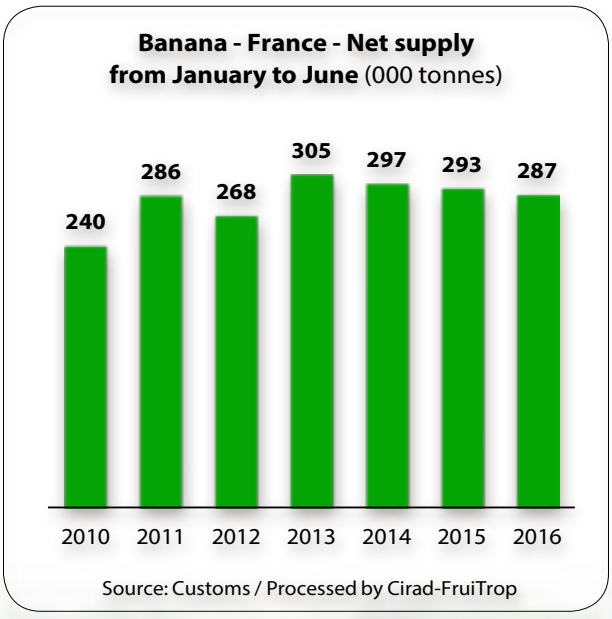
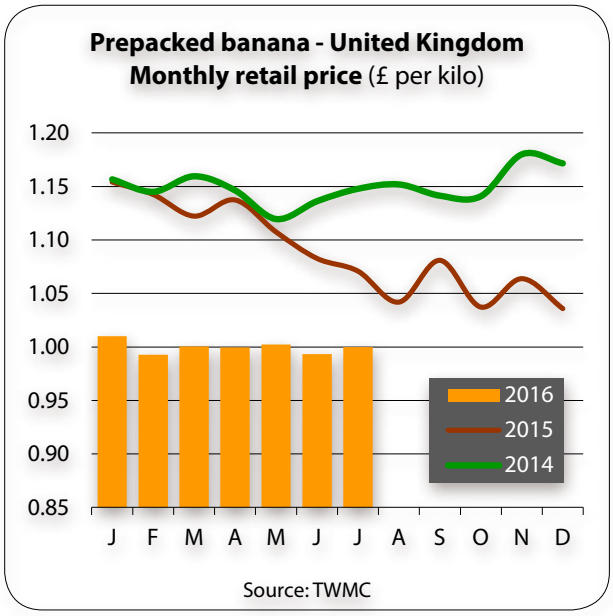
The French market, for other reasons, also seems to be losing momentum in terms of volumes consumed, which have been stagnating at around 290 000 tonnes in the 1st half, for three years. Yet on the other hand, it is no longer Europe's ugly duckling, which used to export its imbalances to other Member States. Its main operators have realised that they needed to stop eroding value, not to mention the in-depth marketing work carried out, especially by the producers themselves. Of course, particular market conditions (supply shortfall, competition from seasonal fruits, protective effect of the fall in the euro against the US dollar, etc.) have contributed to getting things back on an even keel. However, we might once more underline that this was done in large part by sacrificing the volume growth dynamic. It is perfectly clear that it is still difficult to reconcile protection of added value with increased volumes. Indeed, this is the challenge facing France's new Banana Interprofessional Association (AIB).

Italy is without doubt a perfect opposite of the German model. Increased competition between operators (due to the end of an association contract between two big players) has been brought about by increased volume availability, without green banana or retail prices being sacrificed. As proof, consumption in the 1st half saw a strong 9 % increase between 2013 and 2016.





Contractualisation in the UK: differing effects

It would be too easy to take the view that a high degree of market structuring prevents any rise in volumes consumed. It may also have differing effects. The United Kingdom, which has been a highly contractualised market for a very long time, has seen rising volumes. The analysis for the 1st half shows that between 2013 and 2016, volumes consumed climbed by 3 %, the same as between 2015 and 2016 (an atypical year). Yet we should beware hasty conclusions, since we are a long way from the economists' principle of "all other things being equal". What distinguishes the United Kingdom from Germany is the very different behaviour of its supermarket sector. Over the period of interest, the 1st half of 2016, pre-packed banana retail prices collapsed by 11 % in the United Kingdom, whereas they increased by 3 to 4 % in Germany. To put it in economic jargon, the land of Brexit seems to have high elasticity.

Besides the volume analysis, there is nonetheless the impression that the British market is in deadlock in terms of value. NGOs such as Oxfam or Bananalink did not wait for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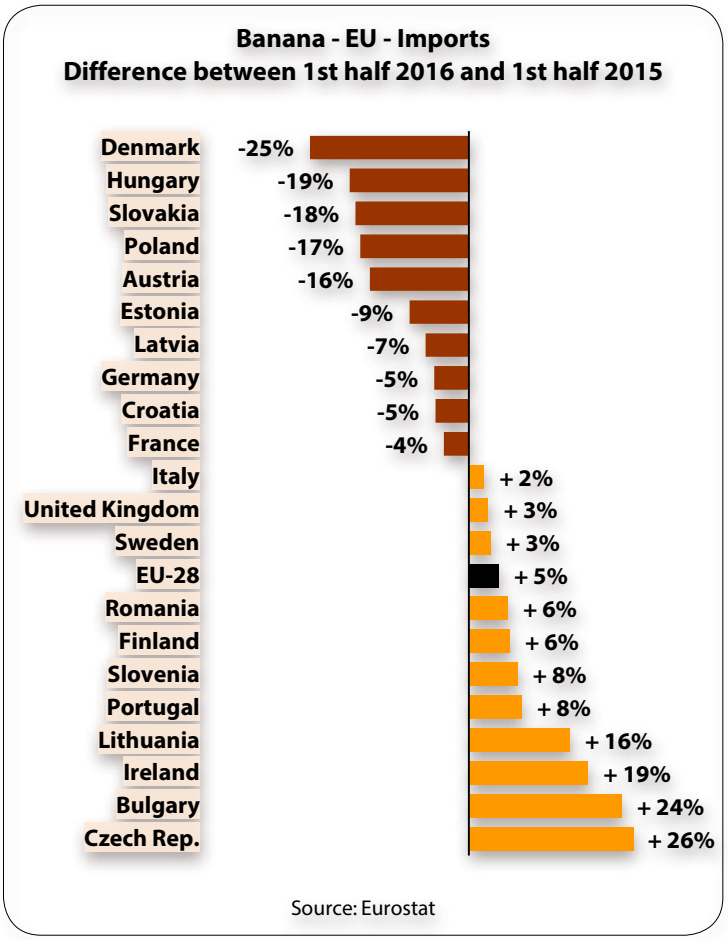


2016 to condemn the value slashing operations by the supermarket sector, and its repercussions on the upstream segment. Since the anticipation and confirmation of the Brexit vote sent the pound sterling plummeting against both the euro and the US dollar, with a depreciation of around 20 %. Furthermore, the European green banana price maintained very decent levels. So suppliers to British distributors suffered a double blow. Paid in pounds by the distributors (the currency in which the contracts are set), the importers & ripeners purchase their merchandise in euros or US dollars from the producers. So there are three ways for an intermediate operator to take this hit. It may either increase its sale price if the contract permits (revision clause), see its accounts deteriorate, or pass the cost upstream, to the producers. In April 2016, Fyffes, one of the big operators concerned, indicated that it wanted the distributors to accept a price increase, even if it meant passing on the increase to the retail price. In view of the figures, it seems clear that this was not the case, since prepacked prices collapsed. Since Fyffes did not announce a deterioration in its accounts, everything seems to indicate, as in practically all value chains, especially commoditised ones, that the bill will ultimately be paid by the most fragile members of the industry — the producers.

Africa: where the trees are hiding the wood

After an idyllic first half and a summer spared the often ravaging crises of the past, what are the prospects for the banana market in the short term? Late August indisputably marks a change in the campaign profile. Demand seems slower (heatwave, stronger competition from seasonal fruits, etc.) and the supply is expanding. Colombia is making a comeback. Ecuador, seemingly down slightly at the end of the summer, still retains a massive potential. Costa Rica is back with a vengeance. Guatemala is beating record after record. The autumn and winter are set to be difficult.

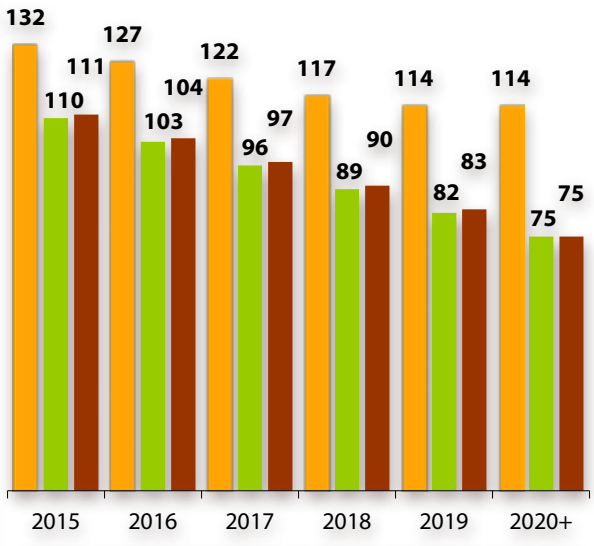
To that we need to add the conjecture over the African supply level. We know that the export banana cultivation area is expanding in Côte d'Ivoire, and that there are projects (extension or relaunches) in the planning or development stages in Cameroon and also Ghana. We also know that, over the months and years to come, the potential availability from Africa will be almost entirely aimed at the European market alone. Although the regional markets are setting out to expand, their rise to the fore will be painfully slow.

However, we should not lose sight of the relative importance of the forces in play: if there are thousands of hectares in Africa, there are hundreds of thousands in Ecuador. Every week, Guatemala exports 1.8 million boxes, i.e. more than Colombia, though the figure was barely 1 million in 2013. So yes, the market balance over the coming months and years will be down to Africa's ability to manage its growth as best it can. However, the potential is also growing elsewhere, often more rapidly and with more scope.

Yet the worst is never certain

While the supply is dynamic, demand is too, as could be observed in certain EU countries. Furthermore, this is one of the main factors helping the green banana price stabilise at decent levels. Since, without strong demand, we would have ended up consuming the entire supply produced, but in that case prices would have been revised downward. What is extraordinary here is that both indicators (price and volume) were both revised upward: a miracle which has not happened everywhere. In the United States, although prices have maintained a positive trend — as far as we know — volumes consumed have not risen (+ 1.2 % in the 1st half of 2016), in any case barely more than the population growth rate (+ 0.8 %). The same has been true over the past three years. Should we see in this yet another example of a market fossilised by contractualisation?

Banana - EU - Customs duty for third countries excl. ACP (euro/tonne)



* Costa Rica, Panama, Honduras, Guatemala, Nicaragua, El Salvador / ** Until the ratification procedure is completed, Ecuador stays at 127 euros/t in 2016
Processed by Cirad-FruiTrop

As for external factors, there will be very traditional fears over the European apples and pears campaign, which opens in September and is set for a record practically throughout Europe (see "European apples and pears in 2016" article in this edition of **FruiTrop**), and the end of the seasonal fruits campaign, which should be leaner than usual. Away from the market itself, there will be interest in whether the Russian embargo on European fruit will be lifted, but also in the evolution of exchange rates, with a possible rise in the US dollar if the FED implements its monetary stringency plan by increasing official US interest rates. Climate vagaries may once more change the hand, with cyclone activity set to be highly dense, but the La Niña phenomenon expected to have very little effect on the banana zones. In terms of regulations, we are still awaiting the entry into force of the reduction in customs duty for Ecuadorian fruits. From 1st January 2017, the customs duty for the main Latino-American suppliers (including perhaps Ecuador) will fall below 100 euros/tonne to 96 euros (or 97 euros for Ecuador).

In this highly changeable context, it is difficult to find the right path. According to the operators questioned on this subject, they are all aware that we have just been through an exceptional period when the planets were perfectly aligned and that they will need to very quickly kick the habit of the prices charged during the 1st half of 2016 and of constantly increasing consumption volumes in Europe. And that is never an easy exercise for anyone ■

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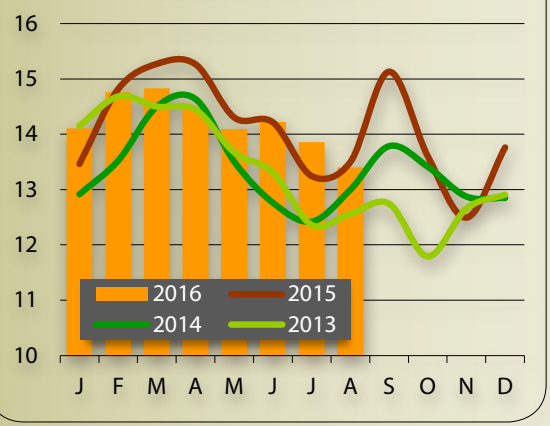
European banana market over the first eight months of 2016

While green banana prices did not scale the heights every month, they maintained a very positive trend thanks to the strong consumption dynamic. Hence the industry turnover and margins, at the import stage at least, were greatly boosted by these exceptional cyclical conditions.

January and February 2016 were marked by lively demand because of the weak competition from seasonal fruits (citrus campaign in shortfall and finished early) and the scarcity of strawberries, including in early spring. As in 2015, the year started with high banana volumes, across all sources, which could have easily been absorbed thanks to the very lively demand. Except in Italy and Poland, prices were higher than the previous year, but also than the three-year average.

We should note a minor turnaround in **March** due to a major incoming shipments peak. Volumes from Africa, the French West Indies, Costa Rica and in particular Ecuador more than offset the incipient shortfall from Colombia. Prices dropped to below 2015 levels until **April**. Demand was fortunately lively, thereby helping absorb the additional quantities. The Colombian supply, marked by quality problems (effects of the drought), disrupted in particular the East European markets with highly competitive prices. Generally speaking, green banana prices continued their traditional seasonal fall, even dropping slightly below average.

Banana - EU - Green price barometer
(euro/box / source: CIRAD)



In May, after the Easter holidays, sales saw their usual slowdown, but maintained satisfactory levels thanks to the ongoing cool temperatures and promotions. The dollar banana imports started to fall considerably, with the intensification of the Colombian shortfall, no longer offset by Ecuador. Hence green banana prices held up instead of continuing their traditional seasonal fall. This trend helped prices end up being higher than in 2015 in Poland and Italy.

In June and July, the situation was perfectly managed in terms of procurement, in a favourable context of not excessively high temperatures and a modest stone fruit supply at the beginning of the campaign. Dollar banana volumes were distinctly down from 2015, with the Ecuadorian excess not making up for the wide Colombian shortfall which was at its pinnacle in July. Shipments from Africa and the FWI were moderate until mid-July.

The turning point of the campaign came in **August**. Sales were slow at the beginning of the month due to the more marked competition from seasonal fruits and the increasing temperatures. Furthermore, volumes saw a very significant increase across all sources, with in particular the end of the Colombian shortfall and an unprecedented African shipments peak. The adverse impact of the increasing supply and slower demand only started to make itself felt on green prices at the end of month, as stocks were reforming.

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Sea freight

Charter market 1st half 2016

In the end, the first half of 2016 was no more difficult than the forecasts predicted that it might be. However this is scant comfort for the reefer owners and the container lines, which struggled with each other and between themselves to secure cargo volumes that were lower year-on-year, at a time when bunker costs were on a rising curve. Lower rates and higher operating expenses led, inevitably, to a significantly lower average TCE yield for both large and small segments than for the corresponding period in 2015.

In such a perfect storm of a year, it is difficult to identify many positives for reefer operators other than to state that it could have been worse! The industry can count its blessings that the most recent El Niño did not wreak the damage its previous incarnation did to the Ecuadorian banana industry in 1997. In fact, according to exporter association AEBE data, in the first six months of the year the world's largest banana exporter shipped a total of 162m boxes, 1m boxes more than the January to June figure in 2015. There had been fears of an El Niño-related 30 % reduction in volume this year!

Given the structural change in the business model, the trend towards charterers fixing on COA and liner terms means that the spot trade is exposed. The very few spot positions fixed between January and end June, whether bananas or deciduous fruit from west and east coast South America, meant that any operator without contract cargo struggled. The market also missed Med banana charterer Rastoder, which has scaled back its involvement in reefers since the end of last year. Although Rastoder now moves the bulk of its bananas on third-party container services, it could always previously be relied upon for a reefer charter if the price was right.

After three good years for the small segment, the first six months of 2016 was extraordinarily difficult. Demand for capacity was first hit by a premature end to the N Cont to Algeria potato trade and then the lack of a squid season between February and April. However the greatest impact on demand was indirect — it came from the low oil price on energy-based economies and their national currencies, which led to import quotas, foreign exchange restrictions on trade and talk of self-sufficiency in seed potato production. Both owners Lavinia and GreenSea withdrew tonnage from the market in May, which tightened supply and led to a new equilibrium. On the positive side, this should provide a more profitable platform for the second half of the year.

What used to be the bellweather fixture of the health of the reefer industry, the 5-month Canary Island tomato charter, was eventually fixed on Time Charter to two vessels in the Lavinia operation, the Frios Nagato and Mogami. Last year three larger vessels were fixed: two from Seatrade and one from Star Reefers. The rate was reported to be similar, in the low 70s c/cbft. The delay in fixing the contract led to speculation that FEDEX had 'defected' to the container carriers. That the business has remained in reefers is good news for both Lavinia and the wider specialized reefer community, which continues to face aggressive price competition from the carriers.

From seasonal volumes in excess of 350K MT, the Canary Island tomato business has been in steady decline since the mid 1990s. The 6 % reduction in volume of tomatoes shipped from the Canary Islands to the UK and N Continent last season was partly offset by a rise in shipments of cucumbers. The total tomato export crop for 2015-16 fell 4 171 tonnes to only 61 751 tonnes according to producer associations FEDEX and ACETO. In contrast, cucumber volumes rose from 22.8K MT to 23.2K MT. With another season of a similar export total likely, this explains why only two of the smaller vessels in the reefer fleet have been chartered.

Corporate

In the text accompanying its results for the first six months of 2016, Star Reefers (Siem Shipping) said it was in the process of preparing an application to de-list from the Oslo Stock Exchange, following approval for the action at the company's AGM in May.

In the period under consideration, Star posted net earnings of USD 6.4m compared to USD 5.3m in the corresponding period in 2015 and achieved this figure despite a reduction in top line revenue. Gross revenues were USD 94.9m (USD 101m), and net revenues after voyage expenses were USD 78.1m (USD 80.7m).

Under current circumstances, this was an impressive financial return for the reefer owner/operator. With the writing now firmly inscribed on the wall for spot trading large tonnage, Star's strategic decision to focus almost exclusively on contract business has continued to pay dividends, despite the ever increasingly hostile market environment. However it is not just the strategy that has delivered the results — Star's success proves that high specification, fuel-efficient specialized reefers can add value and be cost competitive with the carriers.

In contrast, container shipping finds itself in increasingly difficult financial straits. It appears that more aggressive cost-cutting, including new pressure on terminal costs, consolidation and the development of larger alliances, are the only tools left in the box for an industry on its knees — and it only has itself to blame.

Container lines are enduring a "severe revenue contraction", after the first series of six-month turnover figures reported by carriers were down an average of 18 % on the same period of 2015. Sales are contracting faster than carriers can cut costs, and unless there is a significant uptick in freight rates, there will be industry losses of "at least USD 5bn" this year and this will spark a further flurry of M&A activity, claims consultancy Drewry. If the carrier depression continues apace, full-year revenue is on course to plunge below that of its lowest point in 2009, a year when the industry suffered collective operating losses of USD 19bn.


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OOCL, Hapag-Lloyd and market leader Maersk Line reported interim losses of USD 57m, USD 158m and USD 114m respectively; however more worryingly, all three suggested that a return to profitability was a very long way away. "Freight rates dropped in the second quarter of 2016 to record low levels; we made a loss as we were unable to reduce costs at the same speed. We are not satisfied with our second-quarter result," said Maersk Group and Maersk Line CEO Soren Skou. Mr Skou said he thought container rates had "bottomed out", given recent jumps, albeit tenuous, in the spot market indexes. However, he admitted that rates would "remain under pressure" for some time due to low demand and chronic overcapacity.

The group maintained its guidance that "of an underlying result significantly below last year", and added that it would be reducing its capital expenditure for 2016, from around USD 7bn to approximately USD 6bn. It will be interesting to see whether reefer equipment is sacrificed in the drive to cut costs. Maersk Line needs to spend upwards of USD 300m annually just to maintain the size of its reefer container fleet, which is by far the world's largest. With rates struggling just as much in reefers as in the dry segment, it is becoming ever harder for the Danish carrier (all the carriers!) to justify such investment.

There is potentially worse to come, as the increased use of containers is being blamed for environmental damage. The International Plant Protection Convention (IPPC) of the UN Food and Agriculture Organisation was the first to issue a warning. It said that the "biological spill" from sea containers can spread exotic species capable of wreaking 'ecological and agricultural havoc' across borders. It said that while oil spills garner much public attention and anguish, these spills represent a greater long-term threat and do not have the same high public profile.

In a paragraph entitled, 'Trade as a vector, containers as a vehicle', the report says while invasive species arrive in new habitats through various channels, shipping is the main one. "And shipping today means sea containers: globally, around 527m sea container trips are made each year the IPPC estimates — China alone deals with over 133m sea containers annually. It's not only the cargo — it's also the steel units themselves that can serve as vectors for the spread of exotic species capable of wreaking destruction.

An analysis of 116 701 empty sea containers arriving in New Zealand over the past five years showed that one in 10 was contaminated on the outside, twice the rate of interior contamination. Unwelcome pests included the gypsy moth, the Giant African snail, Argentine ants and

the brown marmorated stink bug, each of which threaten crops, forests and urban environments. Soil residues, meanwhile, can contain the seeds of invasive plants, nematodes and plant pathogens.

"Inspection records from the United States, Australia, China and New Zealand indicate that thousands of organisms from a wide range of taxa are being moved unintentionally with sea containers," the study's lead scientist, Eckehard Brockerhoff of the New Zealand Forest Research Institute, told a recent meeting at FAO of the Commission on Phytosanitary Measures (CPM), IPPC's governing body.

Damage goes well beyond agriculture and human health issues. Invasive species can cause clogged waterways and power plant shutdowns. Biological invasions inflict damages amounting to around five percent of annual global economic activity, equivalent to about a decade's worth of natural disasters, according to one study. Factoring in harder-to-measure impacts may double that, Mr Brockerhoff said. Around 90 % of world trade is carried by sea today, with a vast panoply of differing logistics, making agreement on an inspection method elusive, Mr Brockerhoff concluded.

Although he did not mention the banana industry, it is surely no coincidence that leaf disease Black Sigatoka has proliferated over the past decade since containerization crashed the banana party. How long will it be before the movement of containers is blamed for the dissemination of Panama Disease TR4? It would also not be a surprise to discover that kiwifruit disease Psa-V spread so rapidly over different continents for the same reason.


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The second report reveals the environmental cost of the inefficiencies of container shipping. In an article published by Hellenic Shipping News, the CEO of Cadiz, Spain-based Connectainer Intermodal Solutions Jesús García López claims that finding more efficient ways to utilize empty shipping containers to limit their movement around the globe will significantly lower CO2 and other greenhouse gas emissions. Sr García López estimates that about 21 % of all containers moved per year are empty, and that the percentage stays fairly constant — in other words, as the total number of containers shipped each year increases, so does the number of empties.

The problem, López said, is that "If we calculate the CO2 emissions of a 40-foot empty unit repositioned from Algeciras, Spain to Shanghai, China, the result is around 328 kg per container in only one leg." In addition, normal movement within a port generates about 6 kg of CO2 per TEU.

Sr López suggested that simply working to reduce movements rather than optimizing costs would lead to more flexible repositioning management, as well as making a serious impact on reducing greenhouse gases. "If main shipping actors could reduce empty movements by 30 %, there would be a saving of 145.8m kg of CO2 per year," López said, citing his own company's research.

When the carriers next attempt to take the moral high ground on greenhouse gas emissions, it would be worth considering the impact that poor load factors, surplus equipment and idle tonnage has on the environment, as well as the dangers of 'biological spill' noted by the FAO.

Economic progress in all its forms always comes at a cost — however this cost should surely not be at the expense of the environment, particularly when the damage in this case can be managed, mitigated or avoided. At the very least, the cost of minimizing the harm to the environment should be borne by the consumer ■

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European apples and pears in 2016

Little respite, especially for the apple

As is the annual custom, 300 representatives from the apple and pear sector came together for the 40th Prognosfruit Conference, which was held in early August in Hamburg, Germany. The harvest forecasts unveiled on this occasion reflect the good apple potential expected this year, with a total of more than 12 million tonnes, for the third consecutive year. Conversely, pear production is a bit down on the average (2.2 million tonnes, i.e. 7 % below the 5-year average) due to a shortfall from most European countries, especially marked for the early or mid-season varieties.

Although the start of the campaign is enjoying a fairly clear context, with production levels slightly lower than the two previous bumper harvests, feelings are mixed with the Russian embargo continuing to weigh down on European apple exports. Producers have stepped up their sea-freight exports, but the competition is hotting up in Asia and North Africa, destinations to which European exporters have turned. Furthermore, certain outlets could see cutbacks, such as the United Kingdom because of repercussions from the Brexit vote, while others, such as the industrial sector, are for the moment still saturated from the last harvest.

Some potential for the apple in both Western and Eastern Europe

For the 3rd consecutive year, European production should exceed 12 million tonnes, although 2016 is set to be down very slightly from 2015 (12.3 million tonnes) and from 2014 (12.5 million tonnes). The harvest level should nonetheless be very high throughout Western Europe, and is set for a total of 6.8 million tonnes. This is the case in Italy (2.28 million tonnes), and Germany (1 million tonnes), whereas France is registering a slight shortfall (1.5 million tonnes, i.e. - 7 % from 2015) due to a fall in production in the South-West. Similarly, Spain (509 000 t), the Netherlands (332 000 t) and the United Kingdom (250 000 t) will have no shortage of produce. Conversely, the harvest is set for a shortfall in Belgium, Austria and Portugal, which have been more affected by the climate conditions.

Apple — EU-28 — Harvest forecasts

in 000 tonnes	Forecasts 2016	2016 compared to	
		2015	5-year average
Total EU-28	**12 005**	**- 3 %**	**+ 6 %**
of which EU-15	**6 813**	**- 4 %**	**+ 1 %**
Italy	2 282	0 %	+ 3 %
France	1 564	- 7 %	+ 3 %
Germany	1 052	+ 8 %	+ 9 %
Spain	509	+ 6 %	+ 8 %
Netherlands	332	- 1 %	- 2 %
Greece	263	+ 9 %	+ 4 %
Portugal	263	- 20 %	- 4 %
United Kingdom	250	+ 3 %	+ 18 %
Belgium	234	- 18 %	- 13 %
Austria	22	- 88 %	- 87 %
Denmark	22	- 8 %	- 1 %
Sweden	20	- 5 %	+ 18 %
of which NMCs	**5 193**	**- 1 %**	**+ 13 %**
Poland	4 150	+ 4 %	+ 27 %
Hungary	449	- 14 %	- 27 %
Romania	371	+ 10 %	- 1 %
Czech Rep.	113	- 28 %	- 7 %
Lithuania	38	- 17 %	- 5 %
Croatia	35	- 65 %	- 56 %
Slovakia	17	- 58 %	- 57 %
Slovenia	12	- 83 %	- 81 %
Latvia	8	0 %	- 20 %

Source: WAPA

Apple — EU-28 — Harvest forecasts by variety

in 000 tonnes	Forecasts 2016	2016 compared to	
		2015	5-year average
Golden Delicious	2 364	- 7 %	- 7 %
Gala	1 329	- 4 %	+ 8 %
Idared	1 064	- 6 %	+ 5 %
Red Delicious	633	- 2 %	+ 1 %
Jonagold	565	- 11 %	- 3 %
Jonagored	535	+ 3 %	+ 40 %
Club varieties	530	+ 14 %	+ 44 %
Shampion	520	+1 %	+ 17 %
Elstar	394	- 1 %	- 1 %
Granny Smith	390	- 4 %	+ 5 %
Braeburn	322	+ 3 %	+ 6 %
Fuji	309	- 9 %	+ 7 %
Cripps Pink	260	+ 7 %	+ 29 %
Gloster	193	+ 5 %	+ 5 %
Jonathan	123	- 14 %	- 36 %
Reinette Grise	120	- 10 %	+ 7 %
Pinova	90	- 10 %	+ 40 %
Boskoop	71	- 23 %	- 3 %
Morgendurf/Imperatore	66	+ 43 %	+ 13 %
Cox Orange	29	- 15 %	- 38 %

Source: WAPA

The 2016 harvest should also go down in history for Eastern Europe, as it is set to at least equal the high levels registered in recent years (5.2 million tonnes). This is due primarily to the record production expected in Poland (more than 4 million tonnes), since most other countries in this zone are set for a lean harvest. Furthermore, production in the other big Northern Hemisphere producer countries should also be massive. For the second consecutive year, more than 43 million tonnes is expected in China, more than 5 million tonnes in the USA (the 2nd biggest harvest recorded in this country), more than 1.7 million tonnes in Russia and 1.2 million tonnes in Ukraine, i.e. very high levels for the latter two countries. Hence there should not be any great demand from them, especially since the Russian embargo is for the moment still in force. Shipments to Russia are now practically zero: 1 500 t last campaign, as opposed to 793 000 t in 2011-12 and even 60 200 t in 2014-15. Therefore the overall extra-Community export results have dropped to 1.3 million tonnes, i.e. - 16 % from the previous campaign. Conversely, intra-Community flows have remained stable.

Varietal conversion continuing unabated

The varietal range should be fairly balanced without a marked shortfall, with the exception of certain local varieties such as Boskoop (- 23 % on 2015) or Cox Orange (- 17 %). The production should be good for bicolored apples, especially for Gala with production exceeding 1.3 million tonnes for the 3rd consecutive year, for Elstar (nearly 400 000 t) as well as for late varieties (1.1 million tonnes for the combined Jonagold/Jonagored and 322 000 t for Braeburn). Only Fuji (- 9 %) and Jonathan (- 14 %) will be down. The Golden production level should still be fairly good (2.34 million tonnes), although it is decreasing a little more every year. Granny production is holding up, and should barely be less than 400 000 t (+ 2 % on the 3-year average). For their part, the new varieties are still riding high. Cripps Pink could register a new record at 260 000 t (+ 29 % on the 5-year average) and the new varieties (Ariane, Belgica, Cameo, Diwa, Greenstar, Honey Crunch, Jazz, Junami, Kanzi, Mairac, Rubens, Tentation, Wellant, etc.) could exceed 500 000 t overall (+ 44 % on the 5-year average). Overall, the season is on a normal schedule and the sizing average. The quality in August was deemed satisfactory.

Pear production in shortfall in both Western and Eastern Europe

European pear production is overall set to be in slightly in shortfall (less than 2.2 million tonnes, i.e. - 9 %), in both the west and east of the continent. This shortfall is above all attributable to the fall in production of early varieties (Guyot, Coscia, Rocha), as a consequence of the cold and wet spring, and to a lesser degree for autumn varieties (Williams, Abate, Comice, Kaiser). The potential of winter varieties is practically normal. Hence the shortfall should be around - 11 % to - 14 % in France, Italy and Spain, whereas Portugal is this year set for a small harvest (135 000 t), similar to the previous one but 18 % below the 5-year average. The harvest should also be lean in Greece (- 28 % on 2015). The Netherlands are set for a very good potential, whereas there should be a 10 % fall from 2015 in Belgium. East European production should also be a bit less than last year (- 10 %).

Pear — EU-28 — Harvest forecasts

in 000 tonnes	Forecasts 2016	2016 compared to	
		2015	5-year average
Total EU-28	**2 170**	**- 9 %**	**- 7 %**
of which EU-15	**2 047**	**- 9 %**	**- 8 %**
Italy	678	- 11 %	- 11 %
Netherlands	352	+ 1 %	+ 13 %
Belgium	332	- 10 %	+ 4 %
Spain	303	- 12 %	- 23 %
Portugal	135	+ 1 %	- 18 %
France	134	- 14 %	- 10 %
Greece	43	- 28 %	+ 4 %
Germany	36	- 16 %	- 11 %
United Kingdom	28	+ 12 %	+ 6 %
of which NMCs	**130**	**- 10 %**	**+ 5 %**
Poland	65	- 19 %	+ 10 %
Hungary	35	+ 6 %	+ 12 %
Romania	16	+ 23 %	- 21 %

Source: WAPA

Production fall for early and also mid-season varieties

The harvest was smaller for Guyot-Limonera (58 000 t, i.e. - 22 % on 2015) and Coscia-Ercolini (- 16 %). The potential is at most the same as last year for Rocha (- 19 % on the 5-year average). The shortfall is already less marked for Williams Bon Chrétien (- 11 %), Abate Fetel (- 13 %), Kaiser (- 13 %), Comice (- 13 %) and Passe-Crassane (- 14 %), and should be near-normal for Conference (918 000 t). So the market could be swollen at the end of the season, especially since exports should still be stymied by the Russian embargo. Shipments to this destination did not exceed 1 000 t last year, as opposed to 18 000 t the previous campaign and 250 000 t in 2013-14. Extra-Community exports fell by 28 % last year (278 000 t as opposed to 450 000 t in 2013-14) ■

Pear — EU-28 — Harvest forecasts by variety

in 000 tonnes	Forecasts 2016	2016 compared to	
		2015	5-year average
Conference	918	- 5 %	+ 4 %
Abate Fetel	290	- 13 %	- 12 %
Others	284	- 14 %	- 7 %
William BC	252	- 11 %	- 12 %
Rocha	135	+ 1 %	- 18 %
Comice	76	- 13 %	- 11 %
Coscia-Ercolini	66	- 16 %	- 14 %
Guyot-Limonera	58	- 22 %	- 25 %
Kaiser	39	- 13 %	- 16 %
Blanquilla	37	- 16 %	- 35 %
Passe-Crassane	12	- 14 %	- 18 %
Durondeau	4	- 20 %	- 31 %

Source: WAPA

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Avocado

A report by
Eric Imbert

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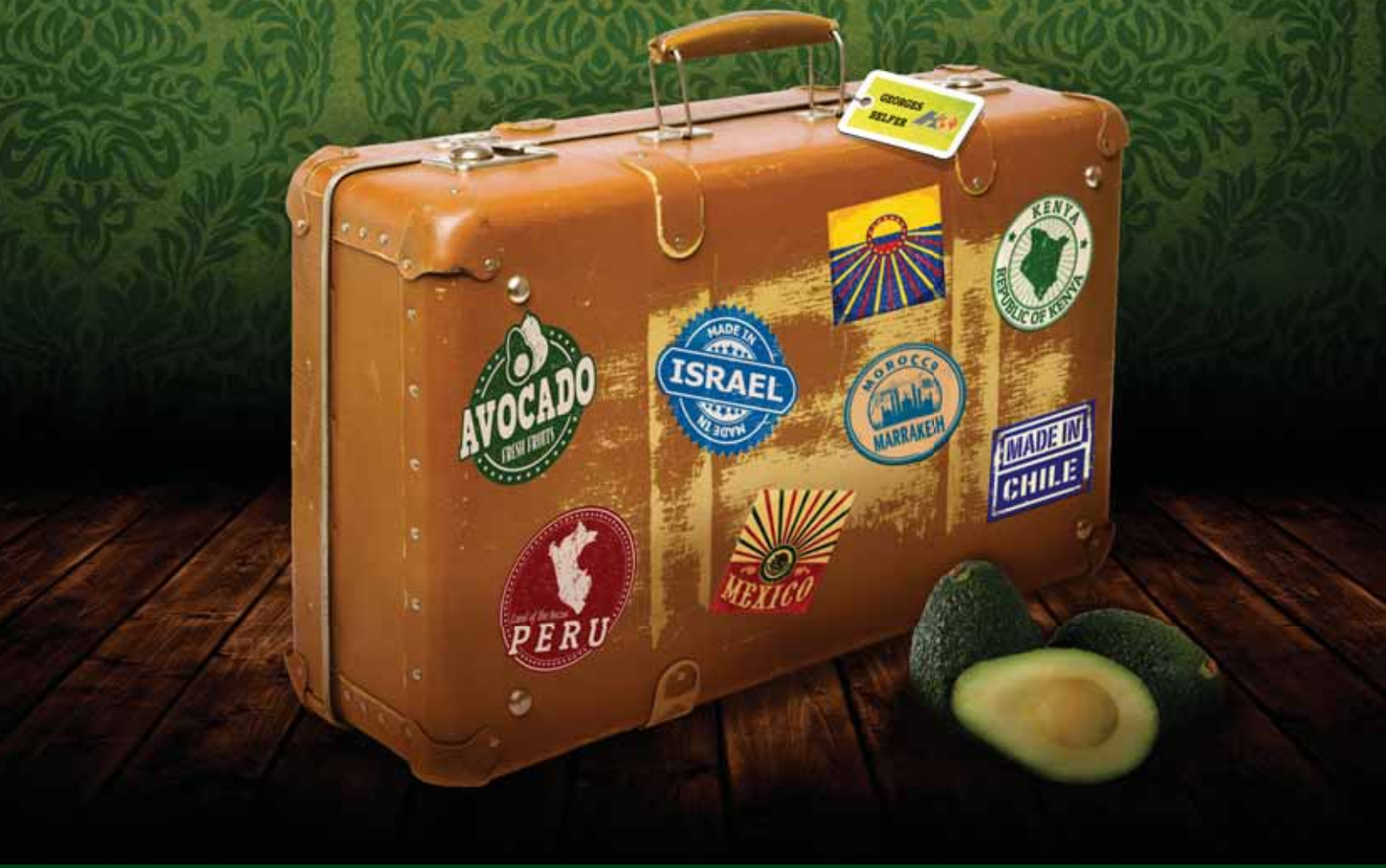
World avocado market

Mexican production: a tidal wave, albeit well channelled

The soothing succession of commercial success on the world avocado market, year on year, almost leads us to forget that the world cultivation area is not static. Planting is continuing, and on a massive scale in Mexico, to the point that annual growth has now been measured in tens of thousands of hectares for at least the past four years. Is this massive trend in the Mexican cultivation area something to be feared, given that its proportions are already so impressive that it can call the shots on the international trade?

Georges Helfer
Avocado Hunter
since 1972



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An undisputed world leader, built on solid foundations

Mexico was dealt a good hand to play a leading role on the world avocado market. This is rooted first of all in the country being the birthplace of one of the three races from which all currently cultivated varieties originated. Indeed, it is from a Mexican vernacular language, Nahuatl, that the avocado draws its name. It also enjoys cultivation characteristics, with particularly suitable pedoclimatic conditions in the central part of the country: rich and well-drained volcanic soils, temperatures ensuring excellent photosynthesis and preventing frost risks, and good availability of high quality water. With such a potential and such a long pedigree, it is no surprise that this country plays such as predominant role in the world avocado industry, controlling nearly one third of production (with approximately 1.6 million tonnes) and two thirds of exports (coming very close to the one-million tonne mark in 2015-16). If Mexico is important for the avocado, the avocado is also important for Mexico, with the sector currently a heavyweight of its economy. The country's 18 000 producers and forty or so packing stations generate nearly 100 000 direct jobs and an export turnover expected to be around 2 billion USD in 2015-16.

© Guy Bréhinier

Hass avocado — Estimated planted areas and production in main world production zones

	Planted areas in 2015-16 (hectares)	Average production for recent campaigns (tonnes)
Michoacán	147 700	1 500 000 to 1 600 000
Chile	26 400	150 000 to 250 000 t
Peru	24 000	200 000 t
California	21 000	130 000 to 230 000 t
Jalisco	17 800	120 000 t

Professional sources

Rapid, localised development, built on a broad production base

This massive industry has been put together in a matter of only around fifty years. Its foundations were laid in the late 1950s, with the introduction in Michoacán of improved varieties such as Fuerte and Hass from California. The growing demand from the local market, rapidly converted to Hass, and the support measures proposed under the national fruit cultivation promotion plan (CONAFRUT), led to a boom in surface areas from the early 1970s. A broad production base comprising investors or farmers often new to the crop emerged, with each individual setting up mainly small to medium-sized orchards, with generally very basic cultivation systems. The activity, unprofitable in the mid-1980s, became extremely lucrative the following decade, with the start of exports and above all the gradual lifting, from 1997, of the ban on exporting to the big US market, which had been in place since 1917. The Mexican cultivation area, which amounted to less than 10 000 ha in the early 1960s, now extends over nearly 190 000 ha. More than 80 % is packed into the State of Michoacán, on the western foothills of the Sierra Madre Occidental, especially in Uruapan and the neighbouring districts.

Michoacán, a giant still growing

The boom in Mexican production is far from over. As huge as it is, Michoacán has not stopped growing. On the one hand, the existing cultivation area is a long way from expressing its full potential. More than 25 000 ha planted in the past three years has not yet entered production, while nearly 20 000 ha of young trees less than eight years old are coming into their prime. On the other hand, while the surface area expansion trend could well ease back, it should not stop altogether. True, the historic cultivation zone of Uruapan is at saturation point, while public opinion no longer sees only the economic lifeblood derived from this crop, but also its negative externalities: the outrageous clearance of the primary forest, tension over water and contamination of water tables, and insecurity due to cartel wars to gain control over the juicy business of extorting funds from producers. However, planting of new orchards should continue at a more moderate rate, especially in zones situated on the eastern and western margins of the avocado zone.

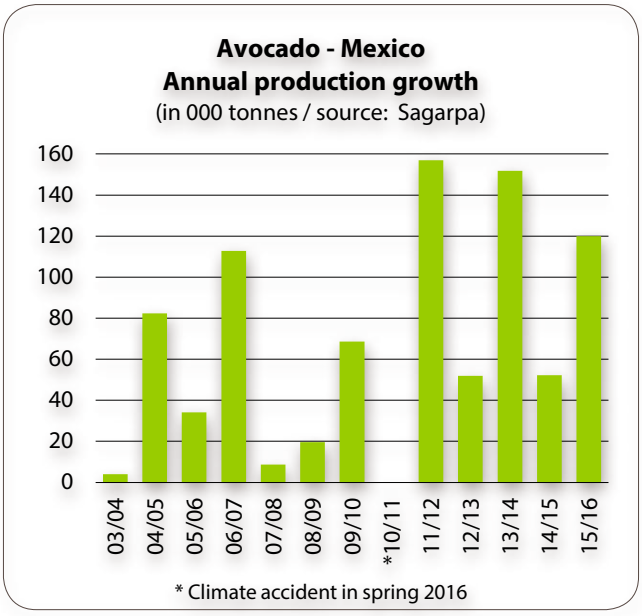
Avocado — Mexico — Evolution of planted surface areas nationwide and in the main states

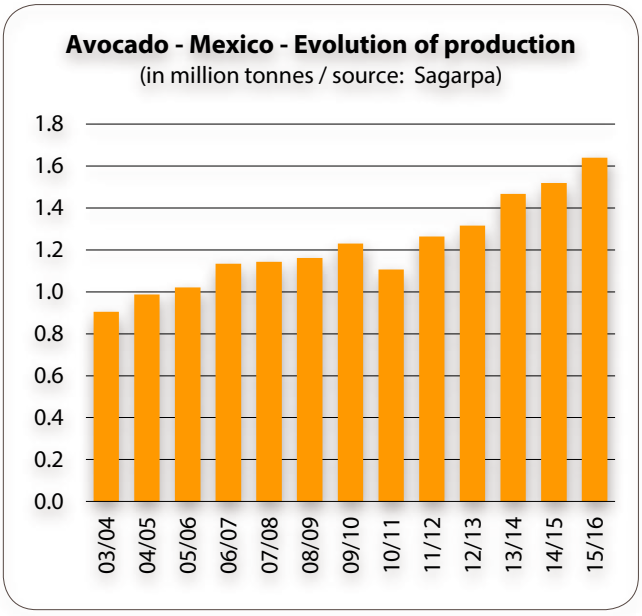
	At full potential > or = 8 years	Coming into prime > or = 4 years and < 8 years	Not yet productive < or = 3 years	Total
Michoacán	103 600 ha	18 600 ha	25 500 ha	147 700 ha
Jalisco	2 200 ha	11 200 ha	4 400 ha	17 800 ha
Mexico	2 000 ha	4 700 ha	2 800 ha	9 500 ha
Nayarit	2 700 ha	2 600 ha	150 ha	5 450 ha
Mexico, total	**122 300 ha**	**45 800 ha**	**35 600 ha**	**203 700 ha**

Source: Sagarpa (estimate for 2016 total)

Green tide rising in Jalisco

Furthermore, the dynamic of the other States in the Mexican Confederation should not be under-estimated, especially since the promulgation in late June 2016 of an APHIS decree authorising exports from all the country's production zones to the United States, subject to compliance with strict phytosanitary constraints. Surface areas have expanded by 1 500 ha per year on average in Jalisco, where producers had banked on this measure and started early. With more than 17 000 ha, this State neighbouring Michoacán is now home to the fourth largest Hass cultivation area in the world. Surfaces areas should increase even more substantially over the coming years, given the comparative advantages enjoyed by this region: a production calendar supplementing that of Michoacán, thanks to the possibilities of cultivating the early clone Mendez, land reserves with favourable characteristics, and more advanced cropping techniques than in Michoacán, making it possible to obtain average yields of approximately 18 t/ha. Other producer States should also expand their surface areas, although their potentials probably cannot rival that of Jalisco. So overall, a scenario of Mexican production maintaining for the next five years an annual growth rate similar to that seen since 2012, around 100 000 t per year, is not far-fetched.

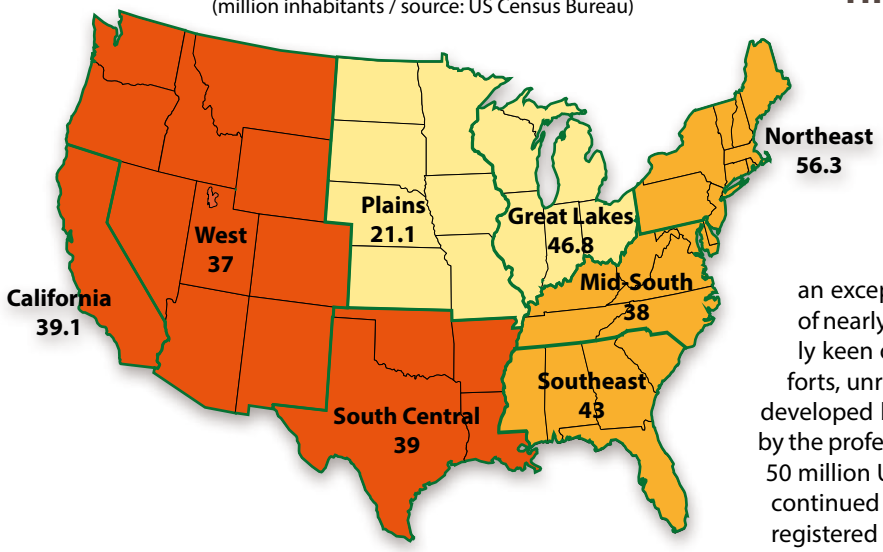




USA - Population by main regions

USA total: 321 million

(million inhabitants / source: US Census Bureau)

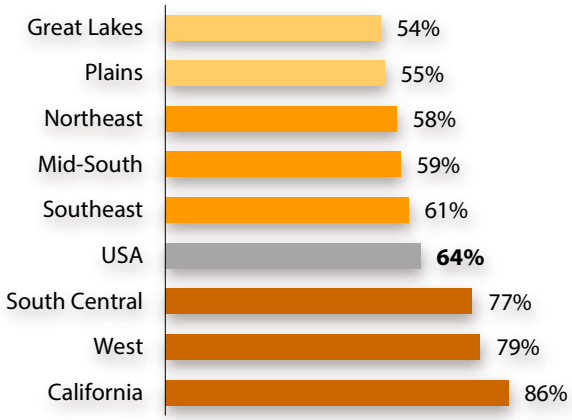


The USA's appetite for the avocado cannot be denied

True, these are colossal volumes, but the appetite of the US market, the natural destination for Mexican exports, is no less huge. Consumption doubled in ten years, to approach the one-million tonne mark in 2014-15. This was an exceptional performance based on a foundation of nearly 320 million potential purchasers increasingly keen on the avocado, and on the promotional efforts, unrivalled in the world of fruits and vegetables, developed by the HAB, an ad hoc organisation created by the professionals and backed by a budget in excess of 50 million USD in 2015. Nonetheless, can we imagine a continued growth dynamic of 10 % per year, the figure registered over the past decade, when consumption per capita is already in excess of 3 kg/year? The answer to this question is yes, which could lead us to think that the sky really is the limit for the avocado… True, the sudden slump in growth to 5 % in 2014 sowed some seeds of doubt, with the over-consuming zones of the Western USA seeing stability for the first time, or in some parts a decline. Yet it is the supply rather than demand which was to blame, and things got back to normal in 2015 with growth returning to 19 %! As long as the volumes are there, consumption can still take giant steps forward, even in the parts of the country which were thought to be close to saturation. So the prospects are extremely reassuring, though a lot of fuel will be required: an additional 100 000 t per year will be required to satisfy the needs of the market, if we reckon on a growth rate of 10 % per year. This is an apparently conservative hypothesis, if we consider the sales from previous seasons and the growing share of imports in the supply, given the structural problems facing the Californian industry, which is somewhat on the wane.

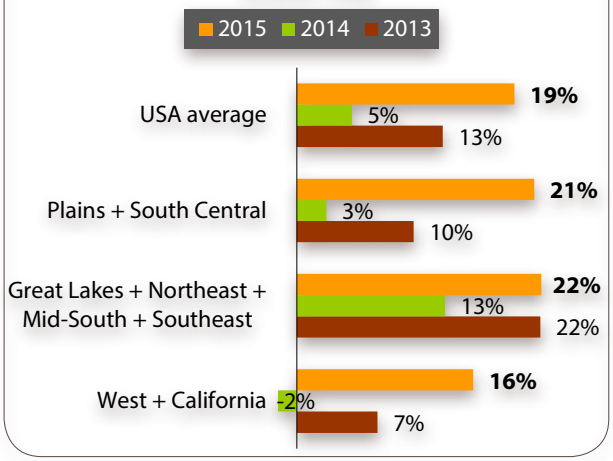
Avocado - USA - Penetration rate

(sources: HAB, IRI)



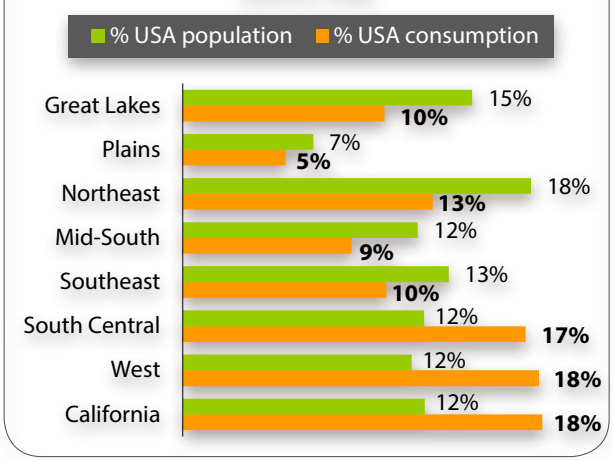
Avocado - USA - Market annual growth compared to previous year

(source: HAB)



Avocado - USA Consumption and population by region

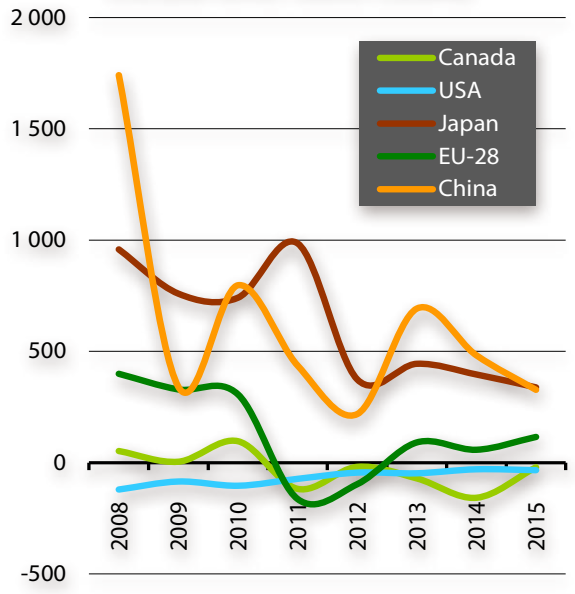
(source: HAB)



USA: the still essential core market

While the US market retains a phenomenal capacity for growth, it lacks the magic powers to prevent prices from being eroded by the increase in volumes. Might this trend, combined with the opposite trend of strengthening rates seen in Europe, profoundly alter the trade-offs by Mexican exporters and lead to a green tide rolling onto the Old Continent? The answer is clearly no, since the United States has a number of assets for Mexico. The most obvious is that of proximity. Being less than one day by lorry from the Texan border of course limits logistical costs, but most of all operators can feel unconcerned about trading in avocados produced in a subtropical climate, with cropping techniques that are often still basic, and with a possibly heterogeneous maturity level, since the fruits come from small or medium-sized orchards (less than 5 ha for 75 % of them). Furthermore, contrary to certain preconceived ideas, the USA is less demanding in terms of external quality or size than Europe, and far less so than Japan. According to certain professionals, the packing yield for the USA is around 95 %, i.e. 10 to 15 points higher than for the other markets mentioned. We also need to take into account the fact that Mexican exporters are, to a significant degree, American. All the big names in the US avocado trade have a long-standing presence in Michoacán, sourcing fruits aimed at the United States (West Pack since 1996, Calavo since 1998, Mission since 1991). These transnational structures controlled 40 % of exports in 2015-16.

Mexican avocado - Difference in average customs value: who is overpaying and who is underpaying?
(USD pear tonne / source: Customs)

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Some fine crumbs for the Community market, but under conditions

While the increase in Mexican production should above all be aimed at feeding the growth in US consumption, the diversification markets will probably receive some additional volumes. The EU has enjoyed a highly visible rise since 2012: Mexican shipments, which had plummeted to 3 000 t in the early 2010s, exceeded 12 000 t in 2014-15 and practically quadrupled in 2015-16 to reach a historic level of 45 000 t: which is mere crumbs for Mexico, representing less than 0.5 % of its overall exports, but is far from insignificant for the Community market, making up approximately 20 % of the winter market supply last campaign. Might these volumes endanger the balance of the Community market? Again, the answer is clearly no, since the European importers can only trade in Mexican fruit if the prices are good. Wooed on all sides, Mexican producers have the power and are laying down the law for the rest of the industry. Mexican exporters, who purchase their fruits at strong prices (often "on the tree"), assume all the commercial risks, and in turn demand cash payment by the importers before releasing their precious merchandise. The growth in production has not altered these relationships of power, very much in favour of the upstream segment, and that should not change, at least in the medium term. Certain European importers are simply seeing a little more flexibility from the Mexican exporters in case of damage. Furthermore, it should also be considered that the European market is not the only one doing well, whereas volumes allocated outside of the USA remain limited. Volumes to Japan are not really on the rise, but it remains a high lucrative market, while China, a market guaranteeing even higher returns, is taking off.

Toward a strategic switch to the EU-28 by the US market's other suppliers?

This wave of Mexican production, of which the European Union will probably only receive the froth, will on the other hand have indirect effects that will affect the Community market. While the borders of the United States are opening up and will open up increasingly widely to Mexican avocados, the door could well close, at least partially, to fruits from other sources. They will need to find new targets on a world market, though increasingly globalised, where the EU will for a long time to come remain the sole large-scale alternative. The example of Chile, the historic and key market supplier to the United States during the winter season, when faced with a more competitive Mexico, is extremely revealing. The upstream segment of the industry had to switch to the EU-28 and the local market. The figures show the scale of the turnaround: the USA, which absorbed approximately three quarters of export volumes at the end of the last decade, received just 10 % in 2015-16, while Europe became the central market, capturing more than 70 % of shipments. Might this precedent be repeated in countries which have planted on a massive scale with view to feeding the US market? The case of Peru, whose export potential should rapidly double to reach 400 000 t, is raising questions. The same is true for Colombia, which at present still has a low profile on the international market, but which has a young cultivation area of 10 000 ha, expanding rapidly.


© Eric Imbert


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Welcome to Europe, at least during the winter

Should we be concerned at these potential turnarounds? Like the US market, the Community market also needs large additional volumes to ensure its continued progress. The average price has kept on climbing, despite the growth in supply of between 14 and 17 % for the past four campaigns. A rise of only 10 %, a highly conservative scenario, would require an additional 40 000 t per year, i.e. the production of approximately 4 000 ha of orchards of average yield. True, the rate at which the Peruvian production is coming into its prime might raise questions over the coming campaigns (see **FruiTrop** 240). Conversely, neither the Mediterranean suppliers nor Chile are able to provide these volumes, at least in the medium term, during the winter season when the under-supply is most acute. So the big "crumbs" from Mexico and the additional volumes from Colombia will be welcome ■

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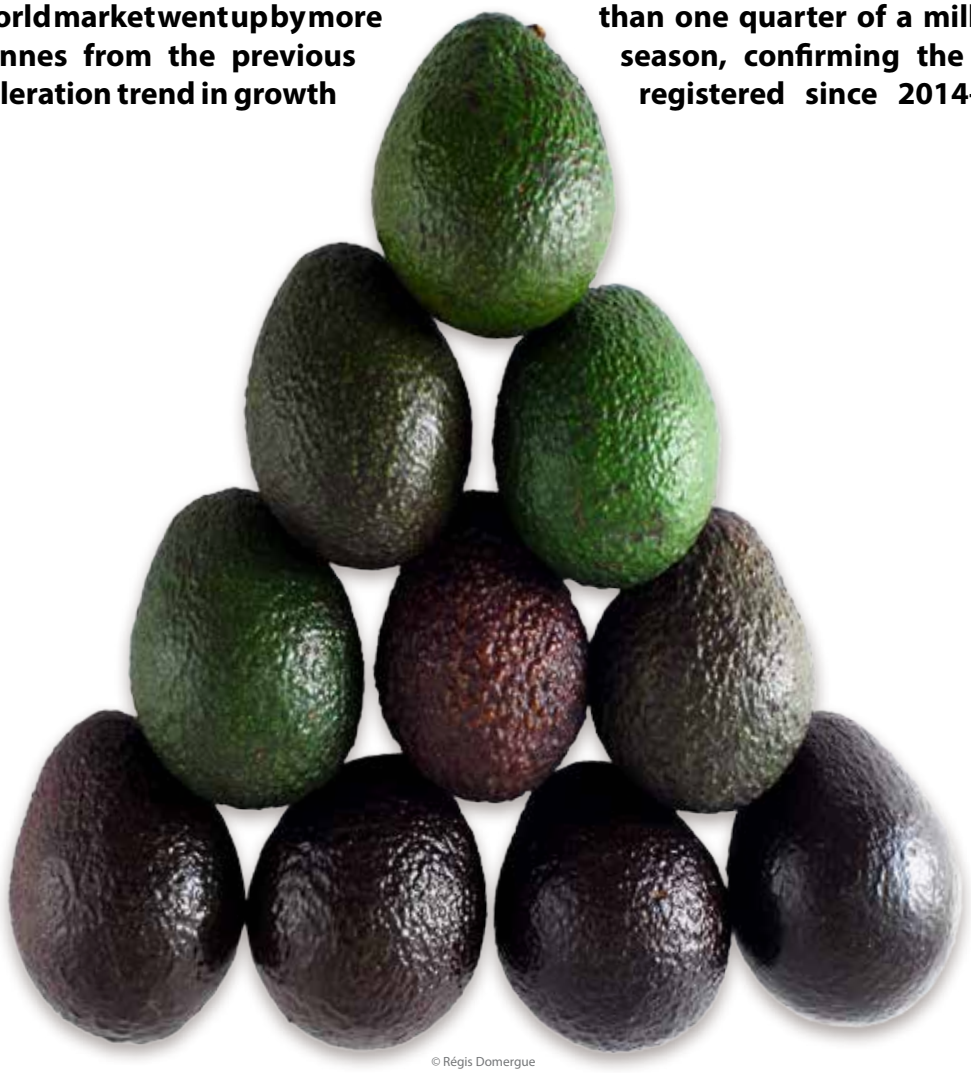
World avocado market 2015-2016 review

Citius, Altius, Fortius

"Faster, higher, stronger". The avocado professionals seem to be following to the letter this ancient call to surpass oneself, which was adopted as the motto of the modern Olympic movement by Baron De Coubertin. By the by, we might even add that they are outdoing the athletes in Rio since they are setting new records every year. 2015-16 undeniably saw a gold medal performance: by exceeding a trade volume of 1.6 million tonnes, the world market went up by more than one quarter of a million tonnes from the previous season, confirming the acceleration trend in growth registered since 2014-15.



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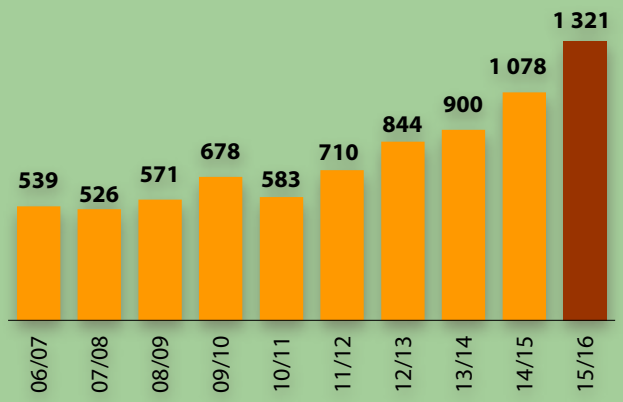
Volumes available to fuel growth

The procurement profile proved to be very different during the two main trade seasons covered by the period analysed (from spring 2015 to late winter 2016). Unlike in previous seasons, the production available in the countries supplying the world market during the summer campaign proved no more than stable in 2015 (see **FruiTrop** 240). On the one hand, while the South African harvest achieved a good level, it was less plentiful than during the record season 2014. On the other hand, and above all, Peru did not play its usual driving role. Climate vagaries counterbalanced the entry into their production prime of the vast surface areas planted since the end of the last decade. This stability contrasts with the distinctly rising volumes available during the winter season. However, Mediterranean production proved limited. The heatwave of spring 2015 hit all the Mediterranean exporter countries hard, with the zone's meagre planting dynamic only able to slightly mitigate the adverse effects of this climate vagary. However, the supply from the Latin American supplier countries was at very high, or even record levels. Chilean producers regained a normal production level, and in so doing, their good cheer after a long period of difficulties, especially because of a recurrent drought. In addition, the rather clement weather helped boost the very strong growth of the Mexican cultivation stock, with production exceeding 1.6 million tonnes (i.e. one third of the worldwide harvest). Meanwhile Colombia emerged from the shadows, with exports exceeding the symbolic 10 000 t mark for the first time.

Winter season

Export calendar mainly centred on autumn and winter

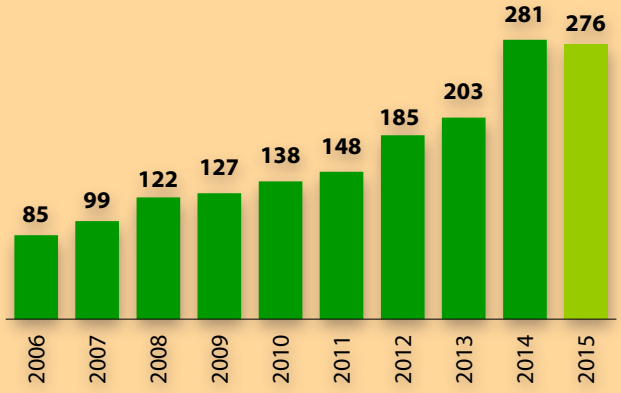
Avocado
World exports during winter season
(000 tonnes / professional sources)



Summer season

Export calendar mainly centred on spring and summer

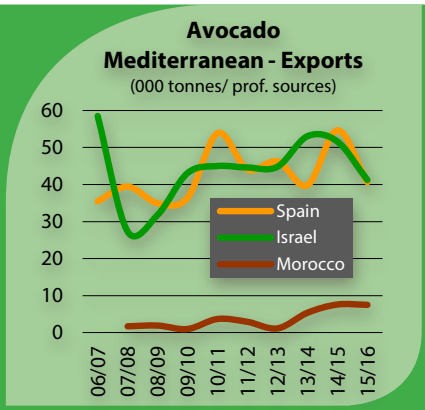
Avocado
World exports during summer season
(000 tonnes / professional sources)



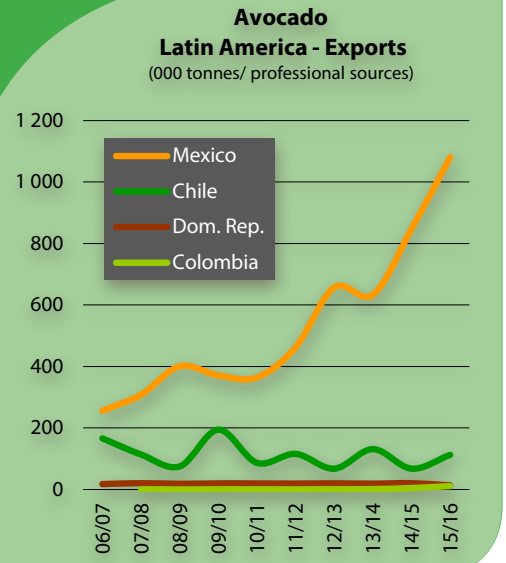
World avocado trade

Export dynamics of the world's main suppliers

Mediterranean:
89 000 t in 2015-16,
7 % of winter market



Latin America:
1 220 000 t in 2015-16,
92 % of winter market

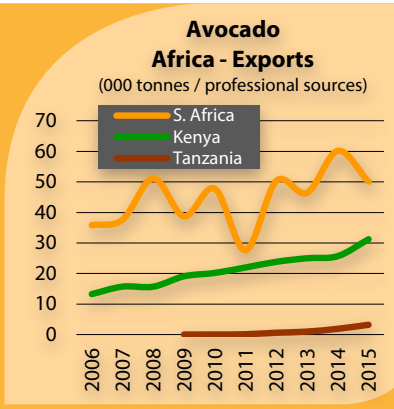


Avocado — Main supplier countries — Exports during winter season

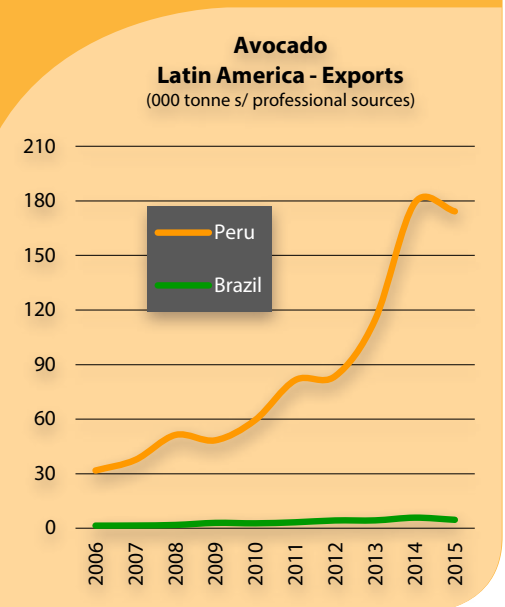
in tonnes	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Winter season	**583**	**710**	**844**	**900**	**1 078**	**1 321**
Latin America	**470.5**	**597.7**	**745.2**	**784.8**	**939.6**	**1 217.6**
Mexico	364.5	462.7	657.4	633.4	847.1	1 081.0
Chile	86.4	115.7	67.5	131.3	67.6	112.5
Dominican Rep.	19.5	19.2	19.8	18.9	20.4	13.2
Colombia	0.1	0.0	0.5	1.2	4.5	10.9
Mediterranean	**102.6**	**91.6**	**92.2**	**98.2**	**113.8**	**89.3**
Spain	53.9	44.1	46.2	39.8	54.6	40.6
Israel	45.0	44.6	44.8	53.1	51.6	41.2
Morocco	3.7	2.9	1.1	5.4	7.6	7.5
New Zealand	**9.6**	**20.4**	**6.7**	**17.3**	**24.7**	**13.8**

Professional sources

Africa:
85 000 t in 2015-16,
31 % of summer market



Latin America:
1 323 000 t in 2015-16,
92 % of summer market



Avocado — Main supplier countries — Exports during summer season

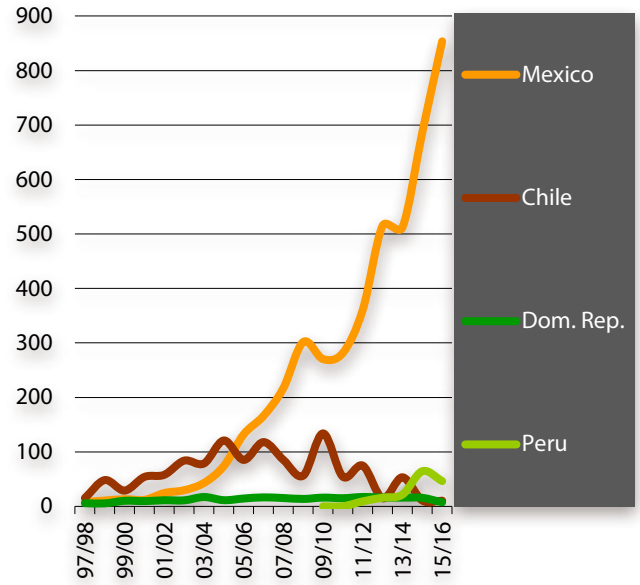
in tonnes	2010	2011	2012	2013	2014	2015
Summer season	**138**	**148**	**185**	**203**	**281**	**276**
Latin America	**62.2**	**84.7**	**87.8**	**118.9**	**184.9**	**178.9**
Peru	59.5	81.4	83.6	114.5	179.0	174.3
Brazil	2.7	3.3	4.3	4.3	5.8	4.6
Africa	**68.0**	**49.7**	**74.7**	**72.4**	**87.8**	**84.5**
South Africa	47.8	27.6	50.3	46.4	60.2	50.1
Kenya	20.2	22.0	23.8	25.0	25.7	31.2
Tanzania	0.0	0.1	0.6	1.0	1.9	3.2
California	**8.1**	**13.9**	**22.5**	**11.5**	**8.4**	**13.0**

Professional sources

Nearly 20 % annual growth in the United States!

The more you eat, the hungrier you become? This paradoxical saying actually seems to be right on the mark if we analyse the evolution of the US market, growing ever bigger and more dominant (with a consumption of nearly 1.1 million tonnes in 2015-16). US consumers have not been sated, despite a decade of a steeply rising supply, and are continuing to demand more and more avocado, as is demonstrated by the annual growth, which went from 10 % on average for recent seasons to an exceptional 20 % in 2015-16. The promotion system set up by the Hass Avocado Board, with its budget now set to approach 50 million USD, is definitely a formidable selling machine, from which many industries should take inspiration. Weekly consumption saw several completely new peaks at more than 20 000 t in the 2nd half of 2015, and even at more than 25 000 t during the 1st half of 2016, a figure which represents half of the total seasonal exports of a country like Israel or South Africa.

Avocado - United States - Imports
Mexico... and the rest?
(000 tonnes / source: US Customs)

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Mexico increasingly out on its own on the US market

While procurement by the big US market of Californian avocados was mixed (rather high during the first half of 2016, but limited during the latter half of 2015), procurement from Mexico was extremely high. With more than 850 000 t exported to the United States in 2015-16, this source alone accounted for more than 80 % of the total market procurement, and for 93 % of imports! The constant rise of this market share shows how difficult it is for competing exporter countries just to hold steady against the Michoacán steamroller, despite the strong growth in consumption. Chile has plateaued out for the past two seasons at 10 000 t, i.e. one tenth of what it was a decade ago. The Peruvian Hass has still not managed to take root, with shipments on a constant decline after the fine performance achieved in 2014, the first full season that the US market was opened. This provides food for thought, while the Mexican giant is seeing its production rise at an increasingly rapid tempo, and the US market is opening its doors ever wider (see following article).

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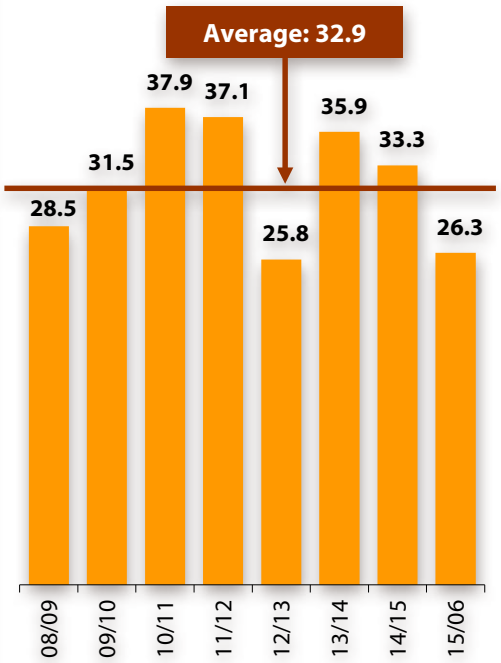
Fewer dollars, especially at the beginning of the season

This relentless rise in volumes placed on the US market has of course not been without consequence for prices. The scale of Mexican shipments put the market under pressure from early August 2015 to early June 2016, especially since the proliferation of small operators in recent years is an additional factor for instability. Rates slipped below the 7 euros per 4-kg box mark (less than 20 USD/25-pound box or "lug") in October, December, February and late April. So the end of the 2015 season and the first part of the 2016 season were particularly difficult for Californian producers, especially since the lucrative large fruits segment was not spared, with the Mexican Hass achieving above-average sizing. The market average price of 1.45 USD/kg (calculated by the California Avocado Commission), during the period running from November to April, is certainly close to the red zone, if not in the red, for certain producers especially in the south of the State, where the irrigation costs are highest (average production costs of around 15 000 to 17 000 USD/ha for an average yield of around 11 tonnes/ha). Fortunately, the excellent prices charged during the second half of the season, when the majority of Californian fruits are sold, helped restore the balance. Mexican operators also suffered from this long period of low prices, though without endangering their financial balance, since its production cost structure is very different from that of California (production cost estimated at between 4 500 and 5 500 USD/ha for an average yield of around 10 t).

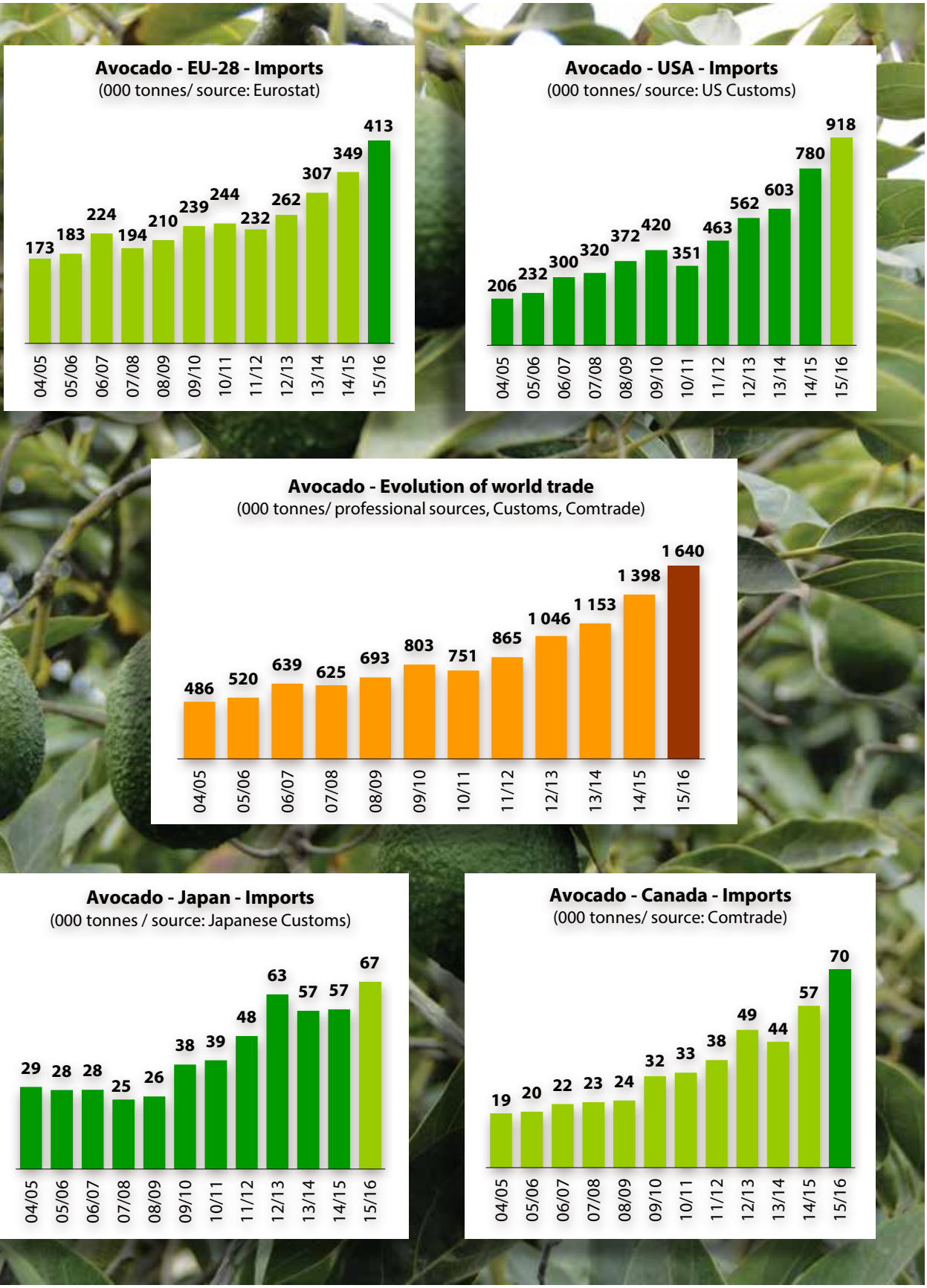
Avocado - United States - Average price index for July to June period
(in USD/11.14-kg lug / source: USDA)



World avocado trade

during the 2015 summer campaign and 2015-16 winter campaign

(international trade – excl. local sales)



An exceptional performance in Europe, from all perspectives

Unlike the United States, the Community market enjoyed an unblemished record for the 2015-16 season. First of all, the volumes on the market were exceptional (nearly 420 000 t). This new year of strong growth confirms a change of gear for the European market, with a consumption gain of more than 200 000 t since the beginning of the decade, i.e. an annual growth rate of 14 to 18 %. The spread of pre-ripening has definitely radically changed the face of the market! Just for once, it was the winter campaign which provided the bulk of the growth in 2015-16, and more specifically the South American Hass specialists, in the context of the Mediterranean production shortfall mentioned above. Chile remained the number one supplier to the Community market, with record volumes of close to 80 000 t. Furthermore, Colombia joined the big league, by exporting more than 10 000 t to Europe for the first time. Yet most of all, Mexico did much more than confirm a trend of returning to the Old Continent, apparent since 2012-13. Without abusing the expression, we might say that the Hass shipments from Michoacán and Jalisco have exploded, going from less than 13 000 t in 2014-15 to more than 45 000 t in 2015-16.


© Carolina Dawson

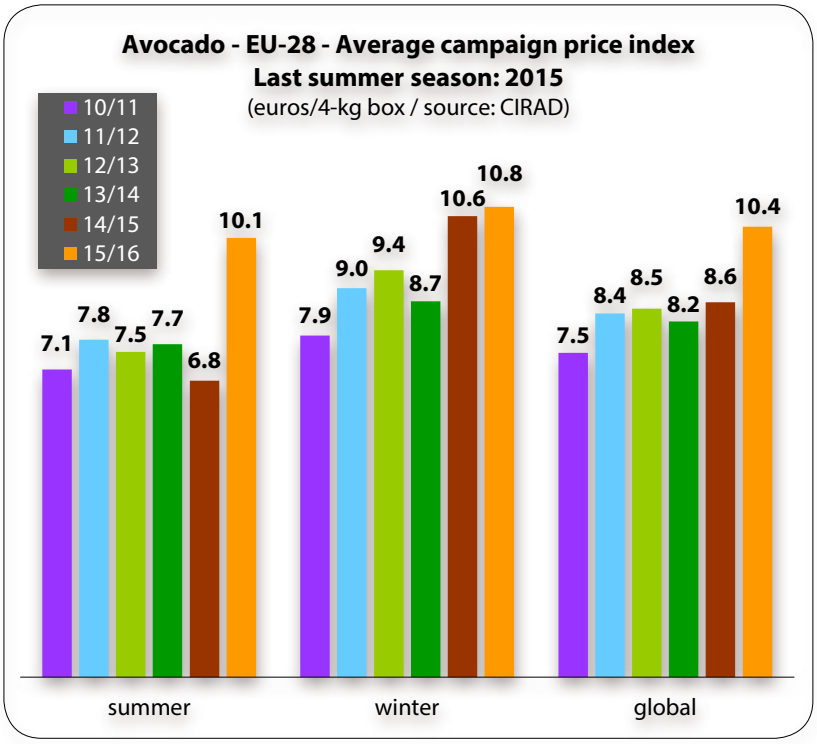
Avocado — EU-28 — Main supplier countries

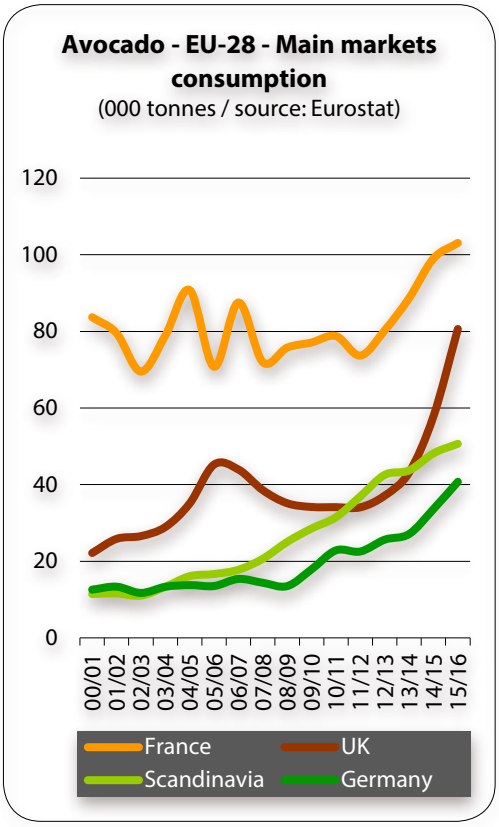
tonnes	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total	**240 068**	**244 220**	**232 201**	**261 757**	**306 997**	**348 856**	**412 817**
N. Hemisphere total	**135 761**	**123 266**	**120 259**	**128 772**	**157 205**	**167 617**	**219 900**
Chile	51 383	25 244	32 637	41 074	62 968	42 797	78 244
Mexico	9 326	3 371	2 909	9 085	6 293	12 918	45 593
Spain	31 420	48 600	38 900	38 500	36 700	50 600	37 700
Israel	38 522	38 512	40 448	35 175	42 844	46 086	34 995
Colombia	51	121	121	486	1 142	3 740	11 189
Morocco	977	3 346	2 803	840	4 766	7 798	7 115
Dom. Rep.	3 016	3 621	1 312	2 451	1 749	2 910	4 027
Greece	966	446	1 029	474	740	765	987
United States	101	5	100	687	3	3	50
S. Hemisphere total	**104 307**	**120 954**	**111 942**	**132 985**	**149 792**	**181 239**	**192 917**
Peru	45 661	56 345	66 155	62 618	86 260	101 971	114 337
Southern Africa*	38 821	47 800	27 375	49 083	45 165	56 713	50 887
Kenya	15 038	14 123	15 028	17 078	13 313	15 604	20 802
Brazil	2 797	2 665	3 006	3 959	3 928	5 265	3 535
Tanzania	6	21	6	133	968	1 643	3 278
Others	353	113	79	306	300	447	497
Argentina	1 984	-	372	114	158	43	78

* Southern Africa: South Africa, Swaziland, Zimbabwe / Source: Eurostat

Better than US prices!

Unlike the US market, the big increase in volumes in the European Community did not come at the expense of prices. Conversely, our performance indicator (based on the import rates for the size 18) exceeded the 10-euros mark for the first time. Again, the winter season provided a surprise with the price index climbing by 2 % in a context of a 30 % increase in volumes (more than 240 000 t on the market)! According to our indicator, Hass rates maintained an exceptional level, of between 9 and 10 euros from October to December, and then 11 to more than 12 euros from January to May (with peaks at 13 euros in April, just as in 2015). So this season the Community market achieved an even better performance than the US market, in terms of both volumes and price.





Four countries still the main driving forces in terms of consumption

While it is still the same quartet leading the dance in Europe, it is increasingly clear that not all the musicians are playing at the same tempo. France remains undeniably the lead soloist, with consumption for the first time in excess of the symbolic 100 000-t mark. Nonetheless, the UK is now hot on its heels, with volumes on the market rising by more than 20 000 t between 2014-15 and 2015-16. This is a phenomenal boom, largely due to the much greater attractiveness of the pound compared to the euro throughout most of the season, until the Brexit referendum. Scandinavia retained its third place, but is tending to level out. Norway and Denmark confirmed their position as European leaders in terms of consumption per capita (more than 2.4 kg/year) and are continuing to rise. Conversely, Sweden, with its population of 10 million, saw a decrease for the second consecutive year. Germany remained in fourth place, but is rapidly making up ground with another great performance this season (rising by approximately 7 000 t for the second year). The awakening of Italy to the avocado has also been confirmed, with consumption exceeding 10 000 t for the first time. Conversely, the high price of the fruits has destroyed the fine growth dynamic in place since the beginning of the decade in Eastern Europe. This new year of a fine Community market dynamic will doubtless pave the way for others: the average consumption is still barely more than 900 g/capita in Western Europe, a level far removed from the 1.5 to 2.5 kg seen in the established consumer countries. To mention only the country with the biggest growth margin, the 80-million population of Germany currently consumes barely more than 500 g/capita, with the pre-ripened revolution just underway. The European market still has some fine times ahead!

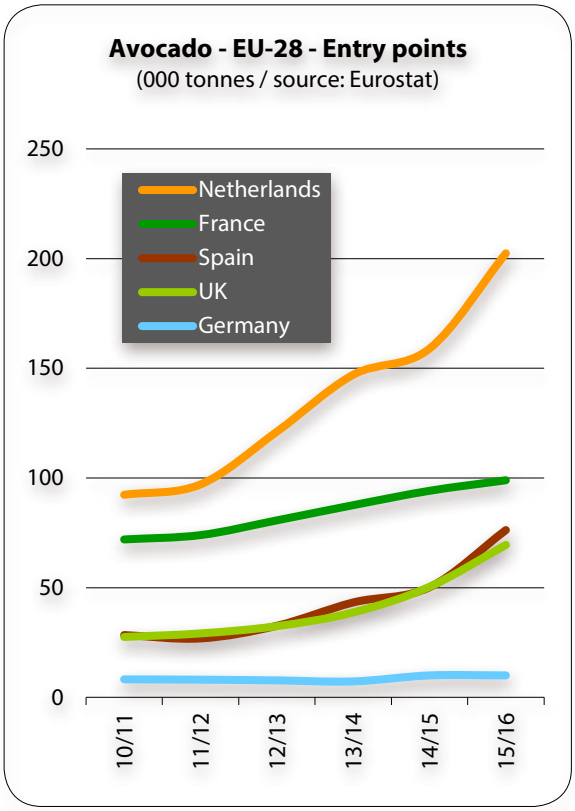
Avocado — Consumption in Europe

	Estimated marketed volume in 2015-16 (t)	Population in millions	Consumption per capita (grams)	2015-16 compared to 2014-15	2015-16 compared to average 2011-12 to 2014-15	GNP-pps (index)
EU-28 + Norway	**421 140**	**495.0**	**851**	**+ 16 %**	**+ 48 %**	**100**
EU-15 + Norway	**399 401**	**401.2**	**996**	**+ 17 %**	**+ 48 %**	**111**
France	103 072	65.9	1 564	+ 4 %	+ 21 %	107
Scandinavia	50 658	25.8	1 963	+ 5 %	+ 18 %	132
Sweden	16 926	9.6	1 763	- 9 %	- 10 %	124
Denmark	13 712	5.6	2 449	+ 16 %	+ 26 %	124
Norway	12 387	5.1	2 429	+ 14 %	+ 41 %	179
Finland	7 633	5.5	1 388	+ 11 %	+ 75 %	110
United Kingdom	80 609	64.3	1 254	+ 39 %	+ 87 %	108
Germany	40 746	80.8	504	+ 21 %	+ 50 %	124
Netherlands	50 821	16.8	3 025	+ 20 %	+ 83 %	130
Spain	37 463	46.5	806	+ 23 %	+ 92 %	93
Italy	11 456	60.8	188	+ 26 %	+ 83 %	97
Belgium	5 948	11.2	531	+ 7 %	+ 11 %	119
Austria	5 488	8.5	646	+ 29 %	+ 72 %	128
Portugal	2 431	10.4	234	- 8 %	- 12 %	78
Ireland	5 263	4.6	1 144	+ 55 %	+ 120 %	132
Greece	5 115	11.0	465	- 7 %	+ 14 %	72
Luxembourg	331	0.6	602	+ 2 %	+ 30 %	263
Eastern European NMCs	**21 738**	**99.7**	**218**	**+ 5 %**	**+ 57 %**	**66**
Poland	7 803	38.5	203	+ 4 %	+ 84 %	68
Baltic states	4 499	6.2	726	- 6 %	+ 9 %	70
Czech Republic	2 044	10.5	195	+ 9 %	+ 70 %	84
Slovakia	1 064	5.4	197	+ 12 %	+ 65 %	76
Hungary	1 229	9.9	124	- 30 %	+ 18 %	68
Slovania	470	2.1	224	- 17 %	- 7 %	83
Romania	3 289	19.9	165	+ 30 %	+ 127 %	54
Bulgaria	900	7.2	125	+ 16 %	+ 83 %	45
Croatia	441	4.2	105	+ 10 %	+ 34 %	59

From June 2015 to May 2016 / Import-export+production / Professional sources, Eurostat, FAO

Spain, a new hub

Among the four main gateways to the Community market, through which 90 % of volumes from the production zones pass, some are tending to open ever wider. The Netherlands, which handles approximately 40 % of volumes, remains by far the main route. France is still a major access point via which nearly 100 000 t of avocado (i.e. approximately its consumption level) enter, though its share of overall imports is on the wane. Conversely, two countries are exhibiting a fine dynamic and have seen their share go from approximately 10 % to 15 % in recent years. The growth of imports into the UK will come as a surprise to no-one, given the country's exceptional consumption dynamic. It now directly imports slightly less than its annual consumption level. The growth in Spanish imports is only due in part to its local market. Indeed, certain supermarket chains now prefer to work with the South American Hass, more attractive in terms of price than the produce from Axarquia. Yet most of all, the big private Spanish operators are increasingly tending to position themselves as global players on the European market, no longer solely during the summer season but also during the winter. By way of example, Spain imported nearly 18 000 t of avocado from Mexico in 2015-16, i.e. one third of the total volumes into Europe.



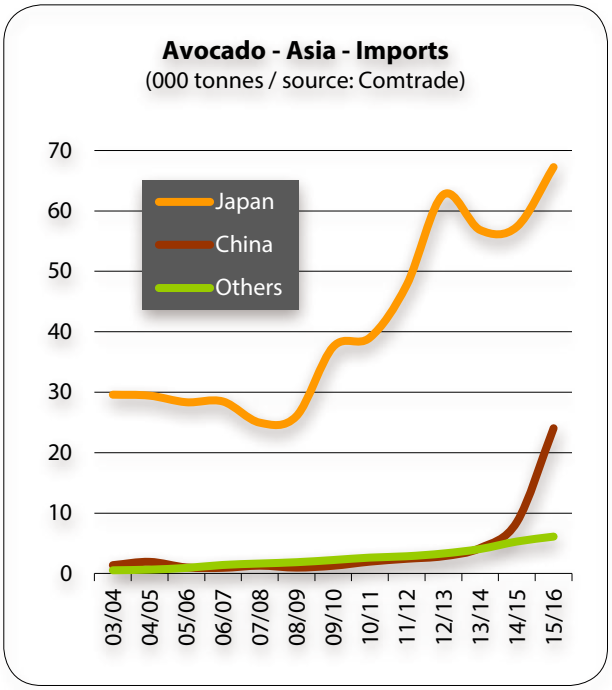
A major consumption centre in Asia? Probably, but in the medium term

Outside of North America and Western Europe, are there any alternatives for an avocado exporter? True, these two enormous markets continue to absorb more than 85 % of world flows, with North America carving out the lion's share with approximately 60 %. Nonetheless, the Asian markets are now a long way from being marginal. Total imports exceeded 100 000 t for the first time in 2015-16, mainly thanks to the dynamic of two big countries. On the one hand, the Japanese market is back on the growth trail after three completely flat seasons. On the other hand, China is now visible on the international trade radar. This is a noteworthy development, especially since it is starting to be backed up by investment from big players in the worldwide avocado trade (construction of a ripening plant in Shanghai by the Mission group). Yet nor should we start dreaming, since while imports tripled between 2014 and 2015, volumes remain less than 25 000 t (combined for China + Hong Kong + Macao).

Avocado — China and Hong Kong — Imports

tonnes	2011-12	2012-13	2013-14	2014-15	2015-16*
Total	**2 476**	**2 693**	**6 114**	**11 399**	**23 264**
Mexico	799	810	2 801	9 058	13 806
Chile	809	619	1 414	1 273	7 680
United States	239	476	543	262	1 031
Peru	272	628	1 196	524	644
South Africa	358	159	160	282	104

* One month is missing in 2015-16 / Source: Comtrade



Fine growth, but needs to be sustained

There is plenty of good news: 20 % annual growth in the United States, 30 % during the winter season in the EU-28, resumed consumption dynamic in Japan, the emergence of a market in China, etc. Yet we should not forget that the world cultivation area is not static (see next article). Promotion efforts must not be relaxed, and the World Avocado Group, dedicated to worldwide promotion of the avocado, must not be left at the stage of a great idea ■

Eric Imbert, CIRAD
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Avocado — 2016 summer season review in the EU: better and better!

The 2015 summer season had broken the trend of rate stability, after a long plateau at between 7 and 8 euros/box. 2016 well and truly confirmed this break! Our price indicator reached a record level of more than 11 euros/box, up by more than 10 % from the previous year. However, the procurement activity was not particularly light. Peruvian and South African professional data, still to be confirmed by the Customs figures, indicate that the supply reached a record level, approximately 15 % greater than in 2015. This increase should be credited primarily to Peru yet again this season. The volumes shipped to the Old Continent were probably around 135 000 to 140 000 t, up by 20 % from 2015. This should delight this country's exporters, and help mitigate another disappointing year on the US market, where the Peruvian Hass is finding it just as much of a struggle to break through (barely more than 30 000 t exported, as opposed to more than 46 000 t in 2015 and 64 000 t in 2014). South African exporters did better than expected. Their shipments to Europe, forecast to be only average due to the drought and hail damage in certain zones, ultimately reached a very good level, of around 55 000 t (+ 7 to + 8 % from 2015).

The season got off to an explosive start, with the overall supply approaching 2 million boxes per week from mid-April, and then exceeding 2.5 million boxes from early May. This trend is due mainly to the young Peruvian orchards located in the early zones (Lambayeque-Olmos, foothill zones) reaching their prime, and should increase in the coming years. It was unfortunately magnified this season again by shipments of fruits that had not always reached the minimum maturity level, because of the attractiveness of prices charged in Europe. Conversely, the small and atypical size of the fruits available at the beginning of the season seems to be a cyclical phenomenon, due to the abnormally high temperatures in these zones in this El Niño year. The rapid plunge of prices due to this early combination of heavy volumes and small-sized fruits seemed to drive the market toward another episode of the series "week 21 crisis" (see FruiTrop 240). It was most fortunate that the return of volumes in step with the now pan-European demand helped restore the balance and pave the way for a fine summer in terms of price.

Avocado — EU-28 — Imports

tonnes	2012	2013	2014	2015	2016	2016 / 2015	2016 / 2012-2015 average
Peru	62 618	86 260	101 971	114 337	137 000	+ 20 %	+ 50 %
Southern Africa*	49 083	45 165	56 713	50 887	55 000	+ 8 %	+ 9 %
Total	**111 701**	**131 425**	**158 684**	**165 224**	**192 000**	**+ 16 %**	**+ 35 %**

* South Africa + Zimbabwe + Swaziland / Source: Eurostat


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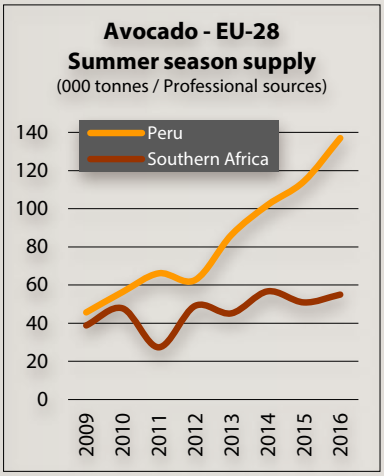

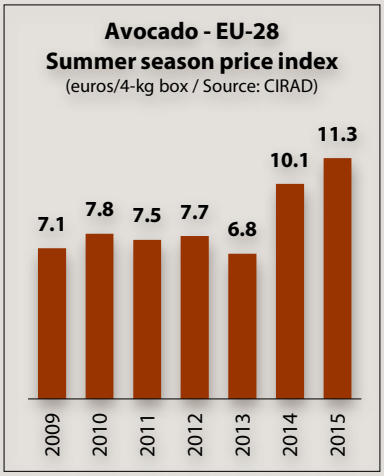

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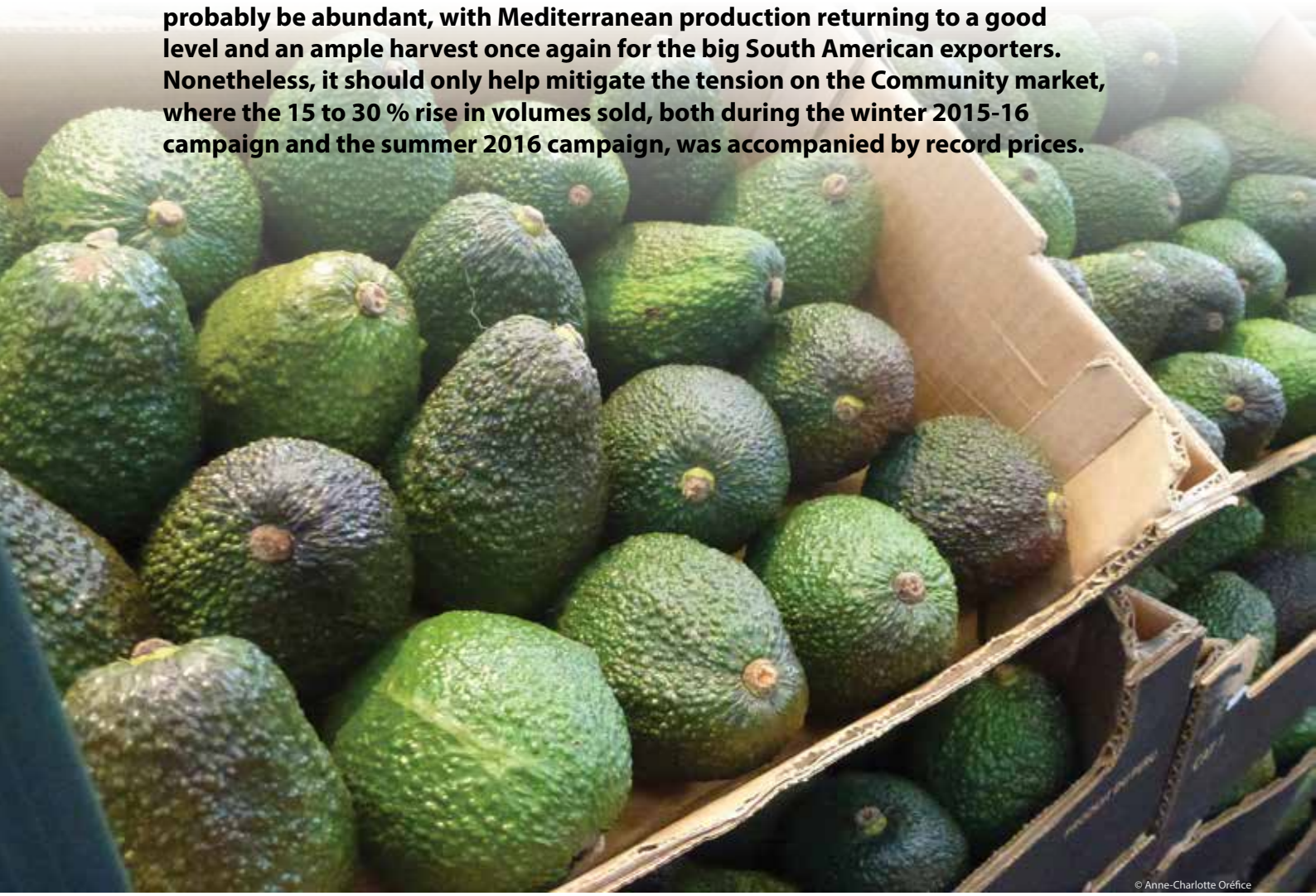
European avocado market Forecasts for the 2016-17 campaign

Volumes to fuel the growth

While forecasting remains a fraught exercise, some industries seem easier to deal with than others. For the past few seasons, the avocado market specialists have not been the worst off. The power of the demand has enabled them to forecast the near future without much risk, and in addition, to announce good news for most of the industry, banking on the high prices holding up. It is in this positive state of mind that we should approach this 2016-17 campaign. The supply will probably be abundant, with Mediterranean production returning to a good level and an ample harvest once again for the big South American exporters. Nonetheless, it should only help mitigate the tension on the Community market, where the 15 to 30 % rise in volumes sold, both during the winter 2015-16 campaign and the summer 2016 campaign, was accompanied by record prices.



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Israel doing more than bouncing back!

Mediterranean production is set for a better level than in 2015-16, when several heatwaves melted away the harvests of the main exporter countries like snow in the sun. It could even reach a record level in Israel. True, certain orchards in Galilee were hit hard by the frost in December 2015 (some also registering major structural damage). However, the other regions, which make up the bulk of production, were not affected. Furthermore, the moderate yet steady growth in surface areas in cultivation will expand volumes slightly. Hence the export potential should be between 55 000 and 60 000 t, a level up by more than 30 % from the previous season and close to the record set in 2006-07. The share of Hass should continue to rise, and exceed 40 %. Volumes should progress later than in 2015-16, with the Jewish holidays which mark the beginning of the New Year only starting in early October and not finishing until the middle of the month.

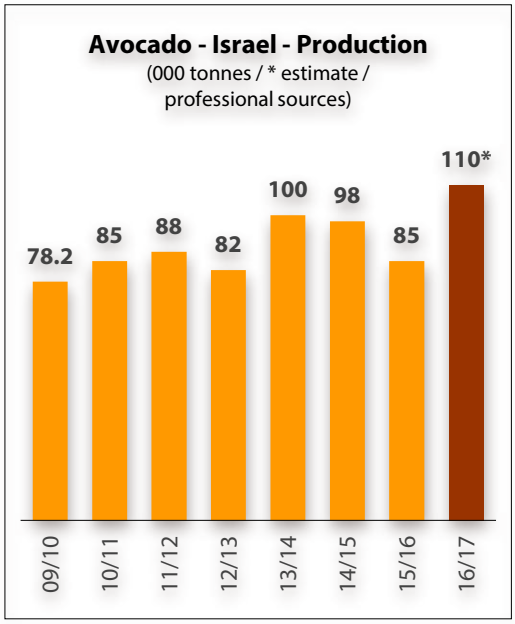
Avocado — Israel — Exports

tonnes	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
EU-28	38 522	38 512	40 355	35 117	42 844	46 086	34 995
Others	4 678	5 188	3 645	7 383	10 156	6 914	6 224
Total	**43 200**	**43 700**	**44 000**	**42 500**	**53 000**	**53 000**	**41 219**

Professional sources and Eurostat

ISRAEL

Cultivation area approx. 7 500 ha
60 % green varieties
40 % Hass
World no.6 exporter



Spain: feeling the effects of drought, but enjoying its time in the sun

The West Mediterranean producer countries will also enjoy a good production level again, despite very low rainfall in recent months. The Spanish harvest should be up by approximately 30 % from the "lean" 2015-16 campaign, to approach the record level of 2014-15 (approximately 55 000 t shipped to the EU-28 countries). This is a particularly considerable rise for green varieties, which were very scarce in 2015-16. The sizing should also be bigger. However, the lack of rain is worrying (spring 2016 fairly wet, but after a very dry winter, and followed by a near-total absence of rain from mid-May). The Viñuela dam lake, whose water supplies most of the crops in Axarquia, was only 40 % full in early September, whereas it should be at more than 50 % at this time of year. Good rainfall is required this winter in order to prevent a big adverse swing in production next season.

Avocado — Spain — Exports*

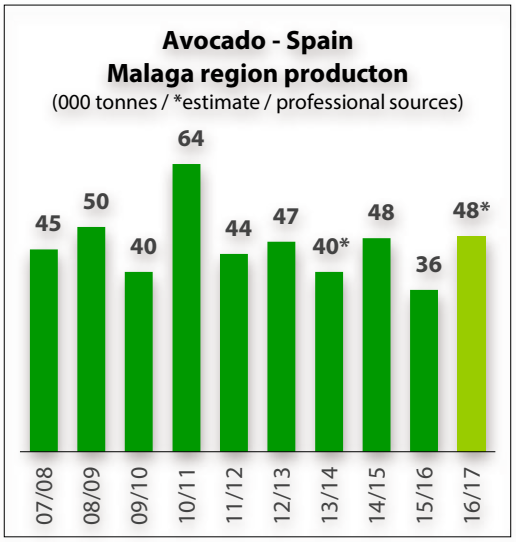
tonnes	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Intra EU-28	31 420	48 600	38 900	38 500	36700	50 600	37 700
Extra EU-28	4 980	1 804	4 750	7 717	3145	4 063	2 943
Total	**36 401**	**50 404**	**43 650**	**46 217**	**39 845**	**54 663**	**40 643**

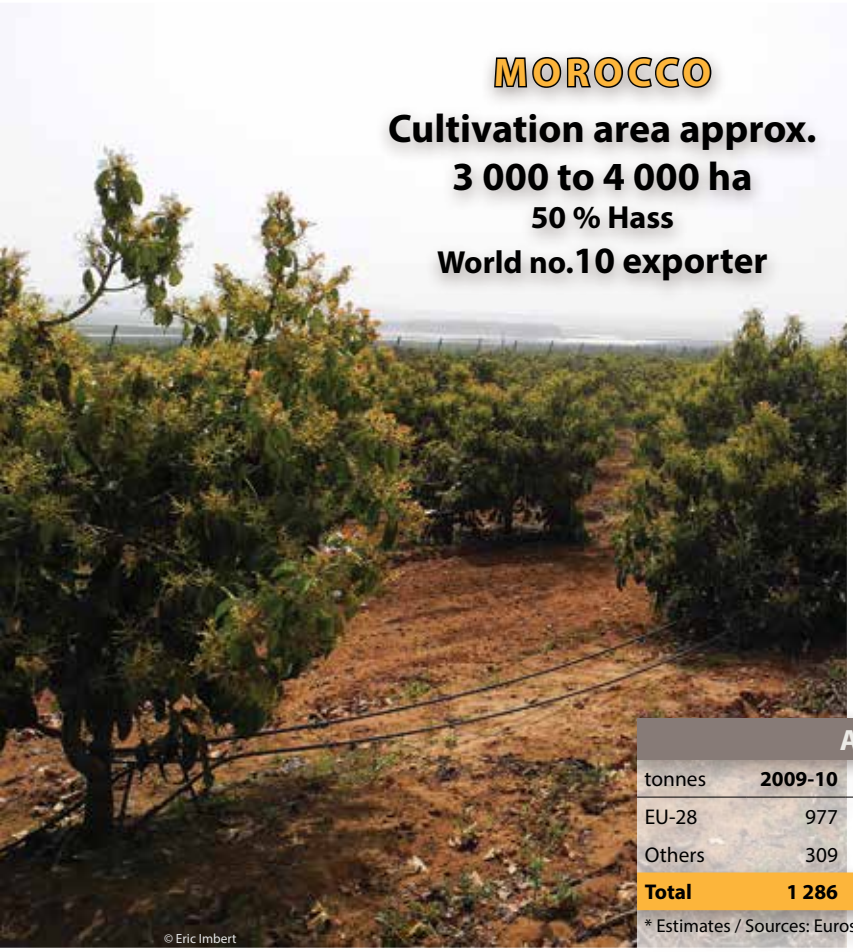
* Estimates / Professional sources and Eurostat

SPAIN

Cultivation area approx. 187 000 ha

World no.5 exporter





MOROCCO

Cultivation area approx. 3 000 to 4 000 ha

50 % Hass

World no.10 exporter

Morocco: young orchards beating the drought

The Moroccan Hass will also be more abundant in 2016-17. Exports maintained a practically stable level of approximately 7 000 t in 2015-16, with growth of the cultivation area offsetting the adverse effects of the 2015 spring heatwave. Production should be much more plentiful in 2016-17. Just as in Spain, the lack of rain will mean low yields for small producers. Conversely, medium to large facilities which have water storage reservoirs will enjoy a good harvest, especially with young orchards entering into production or coming into their prime.

Avocado — Morocco — Exports

tonnes	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16*
EU-28	977	3 346	2 803	840	4 766	7 293	7 100
Others	309	294	107	317	562	301	400
Total	**1 286**	**3 640**	**2 910**	**1 157**	**5 328**	**7 594**	**7 500**

* Estimates / Sources: Eurostat, Comtrade

Another fine season in Chile

Are Chilean producers emerging from the tunnel, after a long succession of meagre harvests because of the recurrent drought? Perhaps, since for the second consecutive season, production should register a good level. With an estimated 200 000 t, it should even exceed by 5 to 10 % the 2015-16 harvest. Without being plentiful, the rainfall level has been fairly good, and no extreme temperatures have hit the cultivation stock. The Community market will remain by far the main destination for the Chilean Hass. However, it should see little benefit from the production increase, with the earmarked volumes probably maintaining their 2015-16 level of close to 80 000 t. On the one hand, the local market should return a little more to the forefront, after a 2015-16 season marked by the effects of the economic slowdown on household consumption (approximately 40 % of Hass sold nationally, as opposed to 45 to 50 % in other seasons). On the other hand, Chilean exporters want to step up their presence in China and Argentina, lucrative markets where promotion actions have been budgeted. Finally, shipments to the United States, which dropped to approximately 10 000 t for the past two seasons, could climb back slightly thanks to a booming start to the season because of the lack of big Mexican fruits.

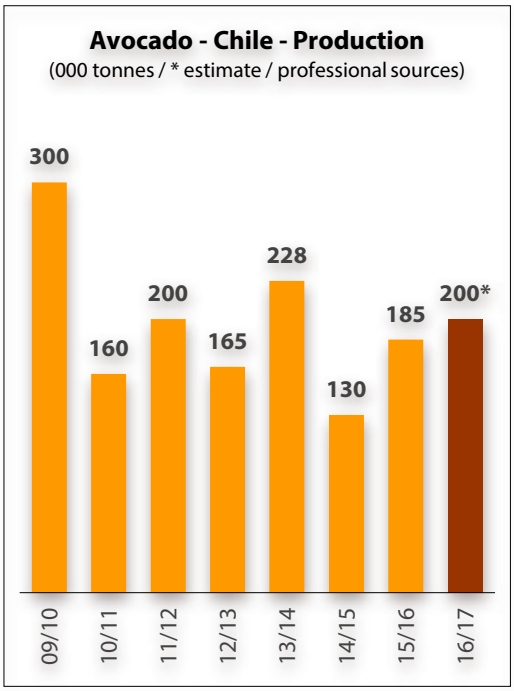
Avocado — Chile — Exports

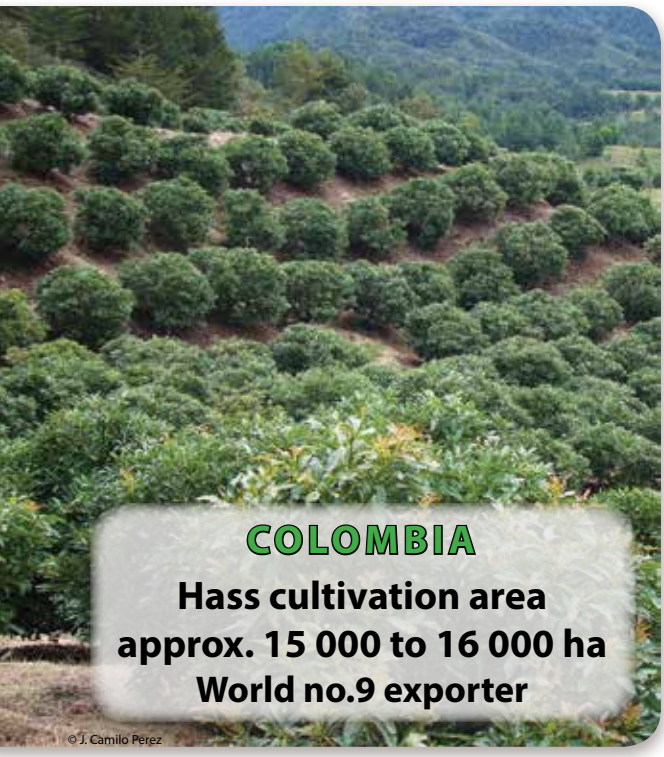
tonnes	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
EU-28	52 174	25 762	32 929	42 571	64 247	43 481	79 421
USA	134 596	54 383	73 795	14 710	53 297	12 341	11 428
Central Am.	5 971	5 900	7 342	8 888	11 735	9 943	15 762
Japan + Asia	1 703	393	1 638	1 283	1 978	1 877	5 878
Total	**194 444**	**86 439**	**115 703**	**67 452**	**131 257**	**67 643**	**112 489**

Source: Chilean Customs

CHILE

Hass cultivation area approx. 26 000 ha
of which 6 000 ha cut down
World no.3 exporter





Colombia: heading for another big stride forward

During the 2015-16 season, Colombia showed that it was among the key players, with exports to the EU-28 exceeding 10 000 t for the first time. This should be well and truly confirmed in 2016-17, with volumes potentially doubling. The young cultivation stock is flourishing, with production rising rapidly, sometimes even outstripping the technical level of certain producers: in particular, there is a problem of heterogeneous maturity for certain brands, due to mismanagement of the multiple flowering parts sometimes present on the same tree). While most of the Colombian professionals have attained international standards, the remaining segment needs to strengthen its brand image so that the whole industry can fully harness this source's enormous potential.

Avocado — Colombia — Exports

tonnes	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
EU-28	114	-	508	1 173	3 050	11 691
Others	10	7	30	38	1 450	100
Total	**124**	**7**	**538**	**1 211**	**4 500**	**11 791**

Source: DIAN

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Volumes available for Mexico to repeat its feat of 2015-16

Mexico was the surprise guest of the European 2015-16 season. The world's number one Hass producer, after re-emerging on the European market in 2014-15 after a protracted near-absence, unexpectedly took over as the number two winter market supplier in 2015-16. Is this source capable of repeating this fine performance in 2016-17? What we can say for sure is that the volumes are there. The shortfall in "Flor loca" production (the first and lowest-bearing of the four flowering periods), apparent since the beginning of the 2016-17 season, provides a false picture of the overall tree load, which is set for a good level, with huge surface areas of young orchards coming into their prime or entering production. Furthermore, although some of the cultivation area, bigger with every passing year, holds the precious certification to export to the United States, there are still very large volumes not earmarked for this market.

Avocado — Mexico — Exports

tonnes	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
USA	274 329	283 814	359 262	522 488	516 085	693 344	862 457
Japan	34 473	35 159	42 354	55 883	51 626	53 175	64 864
Canada	25 435	22 687	27 431	35 044	33 632	44 958	62 148
EU-28	10 807	3 155	4 153	9 137	5 690	12 996	47 689
Others	25 883	19 642	29 537	34 893	26 386	42 597	44 092
Total	**370 927**	**364 457**	**462 737**	**657 445**	**633 418**	**847 070**	**1 081 250**

Source: Mexican Customs

MEXICO

Hass cultivation area approx. 187 000 ha
World no.1 exporter


© Régis Domergue

No stranglehold by the US market over the Jalisco Hass, at least in the short term

Could the official announcement in late May 2016 of the opening of US borders to all approved orchards in Mexico, and no longer just those in Michoacán, pose a risk of the other big producer States diverting their produce away from the European market? This question applies in particular to Jalisco, whence a large part of the volumes bound for the Old Continent come. The answer is no, at least in the short term. The sanitary protocols to be applied are still under negotiation, and they will then need to be implemented. All of which takes time. It is difficult to imagine the effects of this opening being felt before Q1 2017, with the granting of precious approval to the most technically advanced producers.

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PERU CHILE MEXICO MOROCCO SPAIN

More and more European importers banking on Mexico again

The majority of European importers are wondering how to limit the high financial risk intrinsic in importing Mexican Hass. While this source represents the only pool of volumes during a period of high market tension, large-scale operations remain a challenge given the high cost of the fruits and the prepaid contract conditions. The answer lies in quality management. Hence certain importers are considering or have decided to send an agent in-situ in order to ensure the homogeneity and durability of the fruits earmarked for them. This is a particularly important point in a country with low integration of the production chain, and where the quality standards are those of the nearby US market, which is less demanding than Europe. Certain British operators also seem to be taking a closer interest in this source, hitherto barely present on its market.

Mexican Hass: saviour of the market supply, or its destroyer?

One final question is being asked regarding this source: if the volumes are in place, if importers are geared up and the market appears promising, should we not be worried about an oversupply of Mexican fruit? This is a legitimate question, since even with the 45 000 t from 2015-16, Mexican exports to the EU-28 represented only a tiny part of the country's production, evaluated at more than 1.6 million tonnes. The answer is clearly no, since the prepaid contracts for the merchandise are a solid safeguard. A fall in rates to below cost levels, which are already high, would immediately result in a cessation of orders.


© Carolina Dawson

Risk of volume transfer to the Continent because of Brexit?

If we boil down all the supply hypotheses presented above, and reckon on stable shipments from Mexico, the overall supply should rise by approximately 15 to 20 % from the 2015-16 season. A level very much compatible with maintaining high prices, if we consider the consumption dynamic from the latest winter and summer seasons. However, the question of the division of these volumes between the Continent and the United Kingdom is being raised this season, because of the financial consequences of the forthcoming Brexit. The pound sterling has lost approximately 15 % of its value against the euro since June. In this context, will the big suppliers to the UK during the winter season (Chile, Spain and Israel) abandon this market, less lucrative than the Continental one? If so, is there a risk of transfer of significant volumes to the other Community markets, which could lead to an oversupply? The question is significant, since the UK has established itself in recent years as Europe's number two consumption centre, with imports exceeding 80 000 t in 2015-16. All the professionals are agreed that Hass, a must-have variety, will not be lacking on British shelves. On the one hand, distributors want to make the most of this product increasingly in demand. On the other hand, exporters too are committed to banking on this market, currently Europe's main driving force.


© Régis Domergue

Avocado — 2016-17 production and exports forecasts

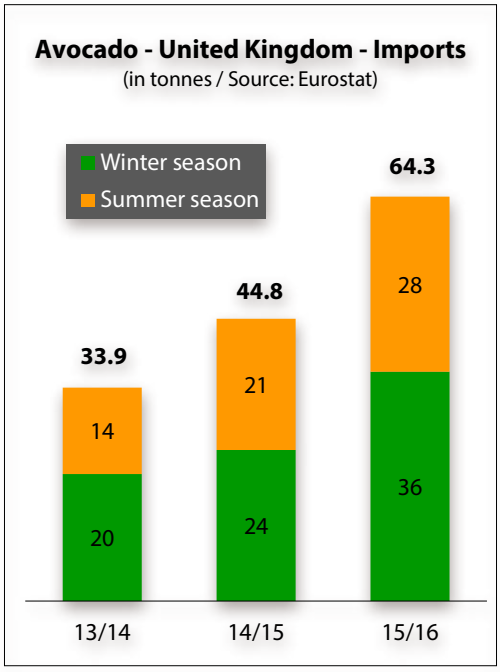
tonnes	2015-16 Production	2015-16 Exports	of which EU-28	2016-17 trend compared to 2015-16
Mexico	1 640 000	1 081 000	47 700	=
Chile	185 000	112 000	79 400	+ 5 to + 10 %
Israel	110 000	41 200	35 000	+ 30 %
Spain	-	49 800	42 500	+ 30 %
Morocco	na	7 500	7 100	↗
Colombia	na	11 800	11 700	+ 100 %
Total	**-**	**1 303 300**	**223 400**	**+ 15 % ?**

Professional sources

Avocado — United Kingdom — Imports

tonnes	2013-14	2014-15	2015-16
Total, of which	**33 912**	**44 836**	**64 250**
Winter season, of which	**20 171**	**23 978**	**36 415**
Chile	7 705	6 785	16 764
Israel	6 684	8 718	7 804
Spain	4 941	7 207	7 386
Colombia	182	492	2 648
Mexico	331	139	1 017
Dominican Rep.	329	638	796
Summer season, of which	**13 741**	**20 858**	**27 834**
Peru	7 498	9 196	16 268
South Africa	5 664	10 782	10 335
Kenya	390	559	665
Tanzania	189	322	566

Source: Eurostat



Comeback by the green varieties, with no major consequences for Hass prices

With bumper production again from Israel and Spain, the green varieties supply will return to a higher level. Fuerte, Pinkerton and other cultivars in this family still represent approximately 60 % of Israeli exports, and 15 to 20 % of Spanish exports. Could this comeback result in weighing down the Hass market, especially during the core season for the green varieties, i.e. from October to December? Probably not, since these two markets seem to be increasingly disconnected. On the one hand, demand for green varieties has become inelastic, given the increasingly limited number of distributors trading in this type of avocado (some discount stores and a few traditional chains). In high production years, the supply increases little over the October to December period, though the season is tending to extend. Prices of green varieties remain at their lowest point during this period, though they do not prevent Hass prices from climbing (see graph) and vice versa. The 2015-16 campaign also illustrates this disconnection: Hass prices tended to fall during the period in question, whereas those of green varieties saw a high point.

Fuerte

Pinkerton

© Guy Bréhinier

© Eric Imbert

Fruit shortage at the beginning of the season, with a moderate rise in supply at the end of the campaign

The season is starting in a climate of extreme tension (Chilean fruits scarce in Europe, and low production of "flor loca" in Mexico), with record price levels (approximately 13 euros/box for medium sizes). The start of the "flor aventajada" season in Mexico toward late September/early October should have a twofold impact: increase the availability of Mexican fruit for the European market, and trigger a comeback by Chile to the Old Continent. So the supply should climb from mid-October, starting its peak in mid-November with the beginning of the Mediterranean seasons. Availability should be only slightly higher than in 2015-16 during the late season: while Israeli and Spanish Hass should be more abundant, Mexican Hass could well be lacking. The US market should be very attractive from March/April, since there is every chance that the Californian harvest will be very limited (particularly dry climate).

Poor growth dynamic in the Mediterranean

The planting of new orchards during the 2015-16 season also confirmed a solid trend: the worldwide production dynamic retains a clearly South American nature. True, the production potential is developing in the Mediterranean, but at a limited tempo. In Spain, interest in the crop is stronger, after a succession of very good campaigns in economic terms, in a context where mango cultivation, though it is less water-consuming, is now scaring investors given the vast surface areas planted in recent years. Some new Hass plantations are appearing, especially in pioneering zones due to lack of water and land in the principal region Axarquia (partly in the province of Cadiz, Campo de Gibraltar in Huelva, and southern Valencia), though they are sometimes limited by climate or soil conditions. Large-scale water infrastructures would need to be developed (such as the project for the Iznajar dam supply canal, in northern Cordoba province) to give the industry a fresh impulse, as growth prospects are currently relying above all on investment aimed at increasing productivity. The dynamic is clearer in Israel and Morocco, though limited in scope (+ 300 to 500 ha per year in both cases). Doubts over the profitability of the big easy peeler orchards (Or variety) planted in recent years could lead to these surface areas being converted to the avocado, and boost growth in Israel, as long as the nurseries follow (more than one year's wait).

Yet ever more new orchards in Latin America

It is clearly South America that will provide the bulk of the fuel which will feed the Community market growth during the winter season. Mexican production is continuing to boom (see article). Colombia is also making great strides forward. Although the official statistics are lacking, a growth rate of approximately 1 500 ha per year in recent seasons appears to have enabled the Hass cultivation area to reach 15 000 to 16 000 ha. Furthermore, we are once more seeing surface areas expanding in Chile. The excellent economic results of the 2015-16 season, the good production level expected in 2016-17 and the slightly less restrictive climate conditions have restored some optimism to an industry whose production area has been practically halved in the space of a decade. These combined growth phenomena promise fine progress by Latin American production. This is all the better for the world market, which needs additional volumes during the winter season! ■

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Producer country file

The avocado in Jalisco (Mexico)

by Eric Imbert

Packed mainly into the south-east of the State, the Jalisco avocado sector has established the world's fifth biggest Hass cultivation area in barely more than ten years. The region enjoys multiple assets, chief among which is the marketing calendar of its flagship variety, Hass Mendez, with which it can take advantage of a very open and lucrative summer market window. The authorisation to export to the United States obtained in May 2016 and the extensive land reserves well suited to the crop should further reinforce the already very strong planting dynamic.

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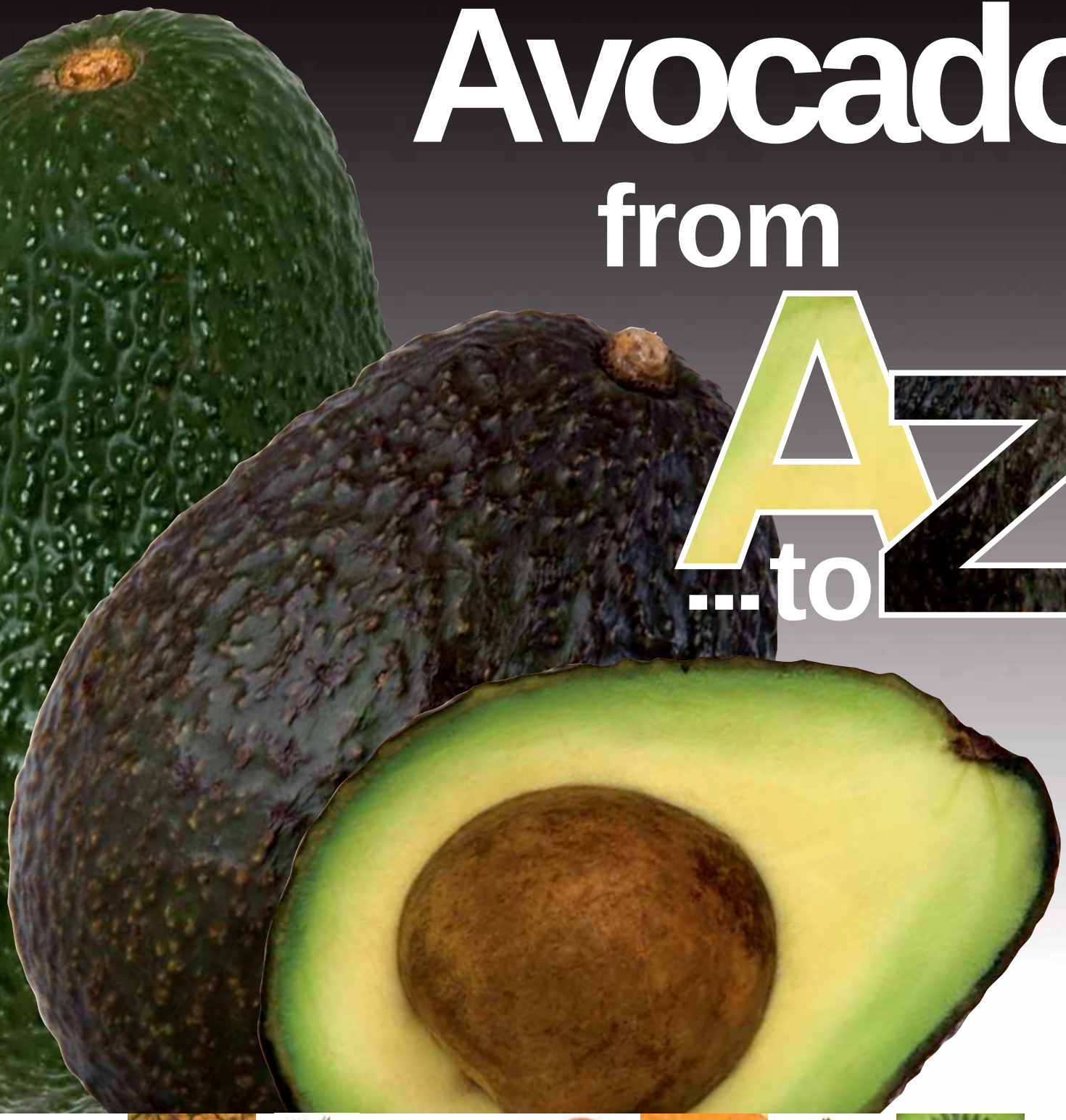
Avocado from A to Z



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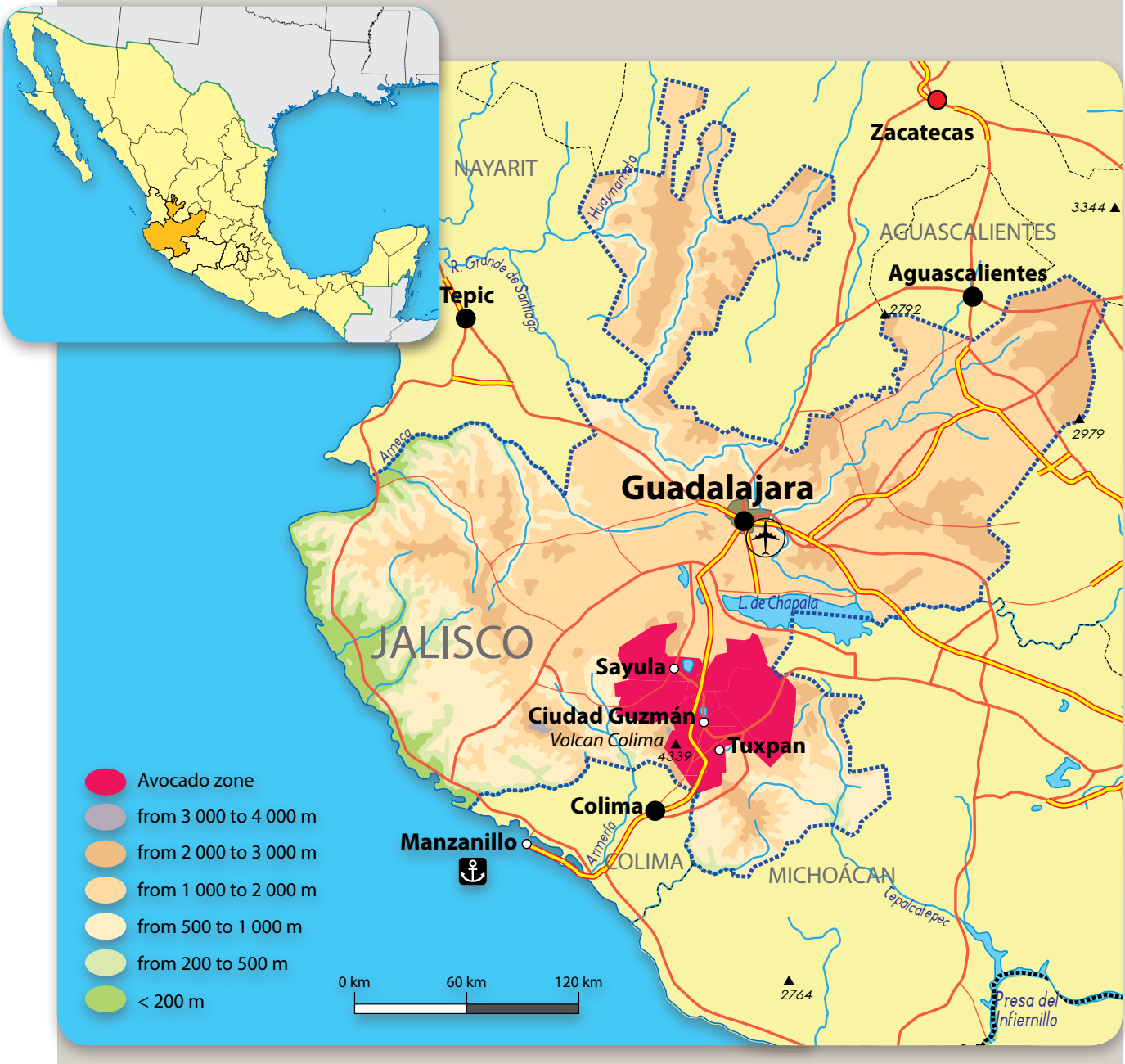
Avocado — Jalisco

Location

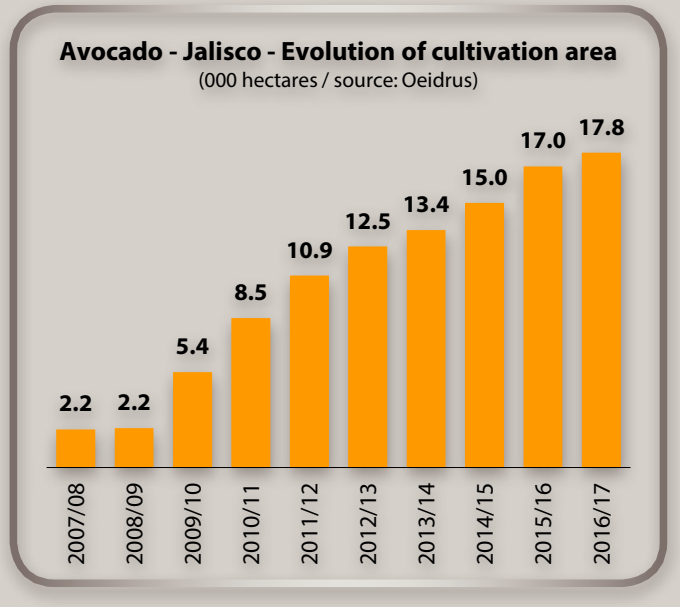
The 17 000 ha of young orchards are packed mainly into the south-east of the State. Approximately 85 % of the plantations are situated around Ciudad Guzmán, within a radius of approximately 50 km. The main cultivation centres are situated to the west (Zapotitlán, San Gabriel, Tapalpa, etc.), to the north (Sayula, Gómez Farías, etc.) and to the east (Concepción, Mazamitla, etc.). The plantation altitudes range between 1 200 and 2 500 m, with Mendez generally planted on the lowest levels (1 200 to 1 800 m). In most zones, the soils are volcanic in origin and are very good for avocado cultivation (sandy texture and rich in organic matter). They can be more clayey and less favourable in certain parts of the State (Sayula). The scale of the production facilities is larger than in Michoacán (around 8 to 10 ha), and they have a higher technical level. Hence nearly three-quarters of orchards are irrigated, enabling yields of between 15 and 25 t/ha to be achieved (average of around 18 t/ha). The Association of Jalisco Avocado Export Producers (APEAJAL) governs the bulk of the region's 1 300 producers.



Avocado — Jalisco

Production

Unlike Michoacán, the avocado is not a traditional crop in Jalisco, whose agricultural sector is focused mainly on industrial crops (sugar cane, agave, maize) or certain horticultural specialities such as the tomato. The very first commercial avocado orchards were set up by two regional agricultural groups in the early 1980s. After a period of relative stability, the plantations saw an initial surge toward the middle of the last decade, with producers moving in from Michoacán in an effort to make up for their lack of production during the summer by planting an early clone (Mendez) in warmer zones. Surface areas went from less than 1 000 ha in 2004 to approximately 17 000 ha in 2016, with the avocado replacing sugar cane or agave plantations, or prairies and primary pine forests. Growth, already extremely high in recent years (approximately 1 000 to 2 000 ha/year), should pick up further with the strong commercial prospects due to the opening of the US market. The political climate is more favourable for investment than in neighbouring Michoacán, and land reserves are still substantial, although the best land is already occupied and the competition with other high added-value crops such as the blueberry is significant.



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Avocado — Jalisco

Exports

Exports have expanded rapidly in recent years, reaching a level of around 50 000 t in 2015-16. Until then, they were mainly aimed at the Japanese, Canadian and European markets. Authorisation to enter the United States, officially decreed in late May 2016, and which should take effect during the summer, should both provide a distinct increase in export volumes and a switch toward this market where doing business is easier, due to its proximity and greater flexibility than Japan or Europe in terms of fruit size or appearance. The 5 700 to 6 000 ha accredited by the USDA should enable between 45 000 and 50 000 t to be shipped to this destination from the 2016-17 campaign. Around fifteen packing stations are operational, one of which is US-owned (Calavo).

Production calendar and varieties

Mendez, an early cultivar of Hass, is Jalisco's major asset. Its harvest can begin in early June in the warmest low-altitude zones (August to October for higher-altitude zones). This variety reportedly represents approximately 40 to 50 % of production. The rest of the cultivation stock comprises Hass, with plantations primarily concentrated in the highest altitude zones.

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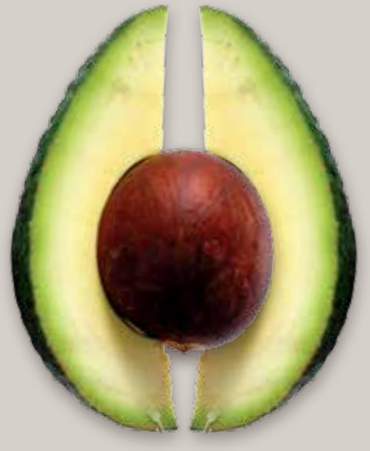

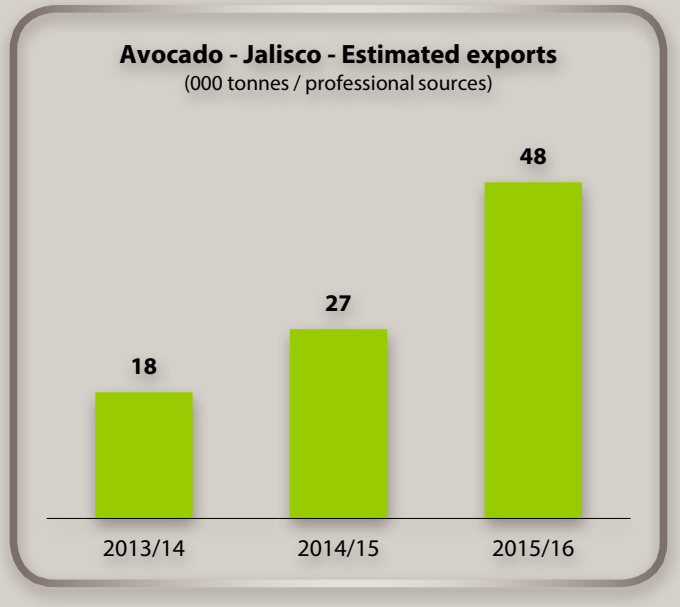

Avocado — Jalisco

Outlets

The majority of produce is sold fresh on the local market, where the Mendez variety can take advantage of the high prices charged from June to August during Michoacán's production trough (25 to 30 pesos/kg wholesale, as opposed to 15 to 20 pesos at the beginning of the year). However, exports are tending to rise steeply. An oil plant was set up in 2015 in the south of the State (Mevi avocados, which purchases approximately 600 t/week for processing, according to the local press).

Logistics

Fruit aimed at the Japanese market is transported by lorry to the port of Manzanillo, less than 200 km away on the Pacific Coast (2 hours' journey). The sea voyage takes just around twenty days. Europe is served from the Atlantic Coast via the port of Altamira, approximately 900 km away (which takes about 11 hours). The sea voyage takes approximately 20 to 25 days to the North European ports. Exports to Canada are made by road-freight (more than 4 000 km, taking approximately 5 days). The US market will also be served by road-freight (around twenty hours to the Texan border).

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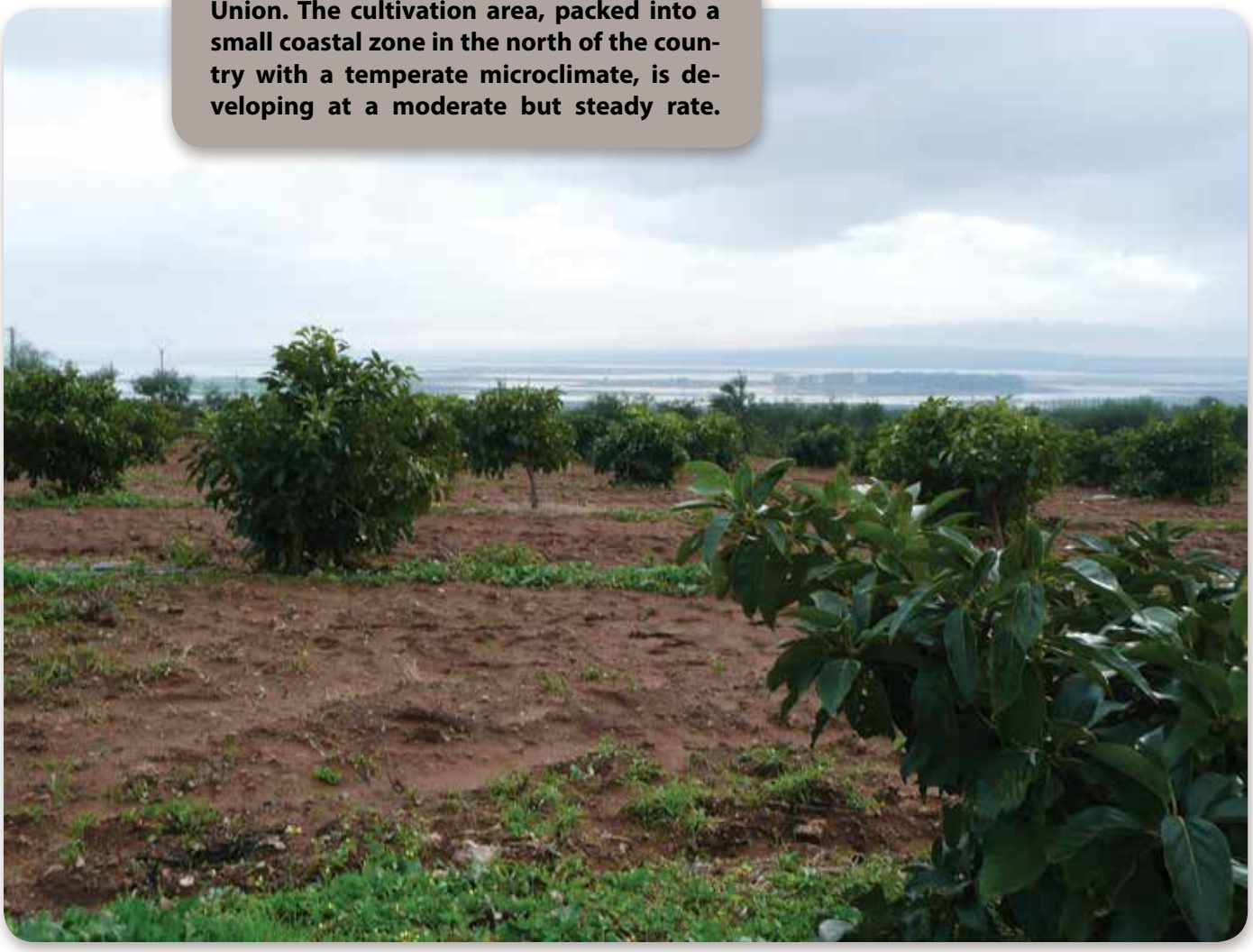
Producer country file

The avocado in Morocco

by Eric Imbert

After entering the international avocado scene around a decade ago, Morocco remains a modest player, with exports of between 5 500 and 7 500 t in recent campaigns, practically entirely aimed at the European Union. The cultivation area, packed into a small coastal zone in the north of the country with a temperate microclimate, is developing at a moderate but steady rate.



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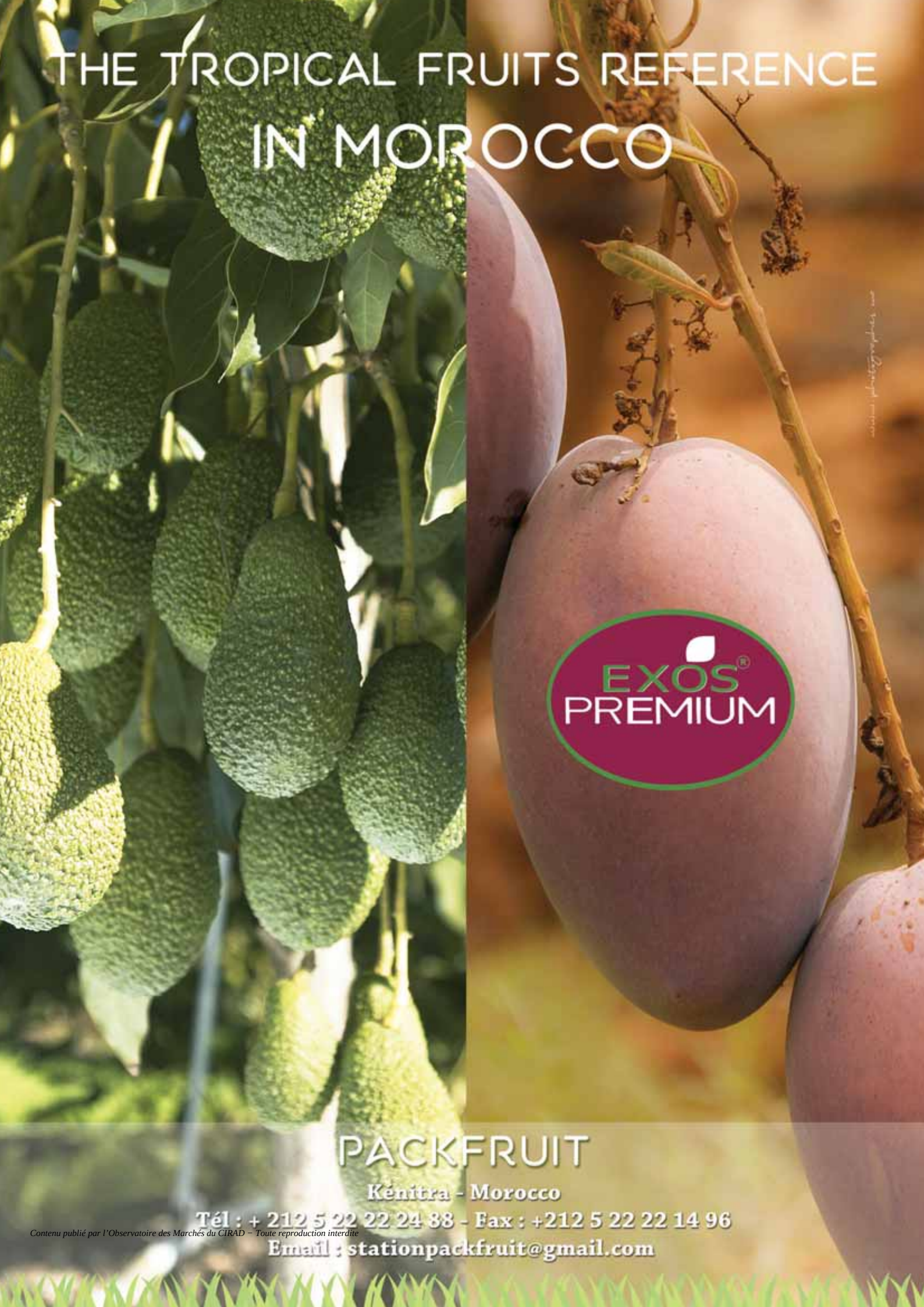


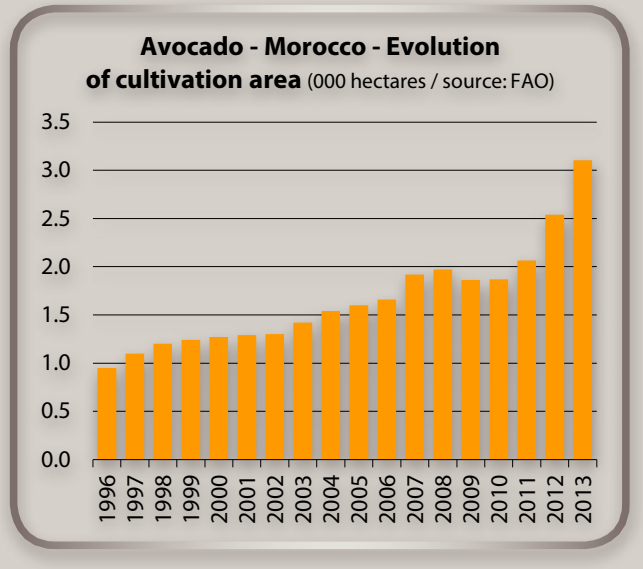
Avocado — Morocco

Location

The cultivation area, estimated at 3 000 and 4 000 ha, is located mainly in the north of the country, in the Gharb region. The cultivated surface areas are practically all packed in between Kenitra in the south and Larache in the north, on a coastal strip approximately 130 km long and 7 to 8 km wide. The prevailing microclimate in this zone, which is temperate thanks to the immediate proximity of the sea and several lagoons (Merja Zerga, etc.), is well suited to the crop, although frost protection is advisable. Furthermore, the soils, generally sandy and well drained, limit the risks of *Phytophthora*. The decreasing rainfall, which has been between 350 and 800 mm in recent years, is enforcing use of irrigation. Agricultural water resources are good in the north of the zone (from Moulay Bousselham to Larache) thanks to the irrigated area of Loukkos, supplied by the river of the same name and the reserve lake of the El Makhazine dam. They are tending to dwindle further south (from Moulay Bousselham to Kenitra), where irrigation is based on wells dug into the R'mel water table. Some moderately sized plantations have also been established south of Casablanca, in the Azzemour region. The production facilities comprise 80 % small or medium plantations, which range between 1 and 20 ha. The average yield of an adult orchard is 10 to 12 t/ha. Sanitary problems are very limited, given the dispersal and young age of the cultivation area.

Avocado — Morocco

Production



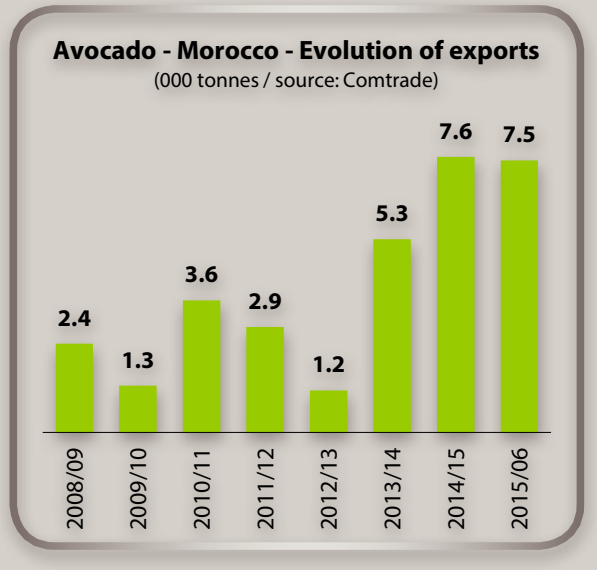
Though some planting trials on a significant scale were conducted in the early 1960s, the Moroccan Hass industry only developed very recently. The first dedicated export orchards were set up in the early 2000s by Abaz, the country's main architect of the industry's boom. The avocado cultivated area, estimated at approximately 1 500 ha in 2010, apparently at least doubled in recent years. The "Maroc Vert" plan did not have a decisive effect on this growth, as the avocado was not part of the targeted products (aid limited to a significant subsidisation of the irrigation system). The development of the industry was built around the agronomic potential of the Gharb zone and the prospects offered by the proximity of the developing Community market, where the Moroccan market enjoys special access conditions (zero customs duty, no entry price). This high added-value crop attracts a growing number of producers, especially since the region is among the poorest in the Kingdom and one of its economic pillars, namely the strawberry industry, is facing major commercial problems. The cultivation area is expanding by approximately 200 to 300 ha/year. The plants are imported (especially from Spain) or produced locally in the country's only specialised nursery (Brokaw in Moulay Bousselham). While large surface areas are still available, land law remains a real obstacle to development (paucity of agricultural investments due to the absence of long-term leases, extensive parcelling-up of land still largely belonging to the State and under collective management). Furthermore, the low technical level of most producers and the absence of a national support body could pose problems in the future, when technical management of the crop will become more complex. Producers have a representative authority, the AMPEA (Moroccan Association of Avocado Exporting Producers), but at present it is dormant. The emergence of a cooperative sector could help organise production, manage technology transfer and better defend the interests of the small and medium producers. However, the statutes of this type of organisation currently in force in the country must be modernised, to be more like a private business.


© Eric Imbert

Avocado — Morocco

Exports

Morocco is still a modest player on the international scene. Exports have been between 5 500 and 7 500 t in recent seasons, though they are tending to increase. Approximately 90 % are aimed at the EU-28 in a normal production year, and are mainly imported via Spain, France and Germany. Those volumes shipped out of the Community market are aimed above all at the Arabian Peninsula (United Arabian Emirates and Saudi Arabia in particular). The sector is concentrated around two main players which each have a specialised packing station: Abaz, the country's only big producer/exporter, and Tropical Millenium. Three other stations, which handle more limited volumes, also process the avocado on a spot basis via service contracts or purchased batches.



Production calendar and varieties

Hass currently occupies approximately 50 % of surface areas, and is tending to increase its share. Fuerte is the main green variety. Mature from late October/early November, it can remain on the market until February. Zutano and Bacon, both used as pollinators, have a small presence in October.

Avocado — Morocco — Production calendar

Varieties	O	N	D	J	F	M	A
Hass							
Fuerte*							

* local market

Avocado — Morocco

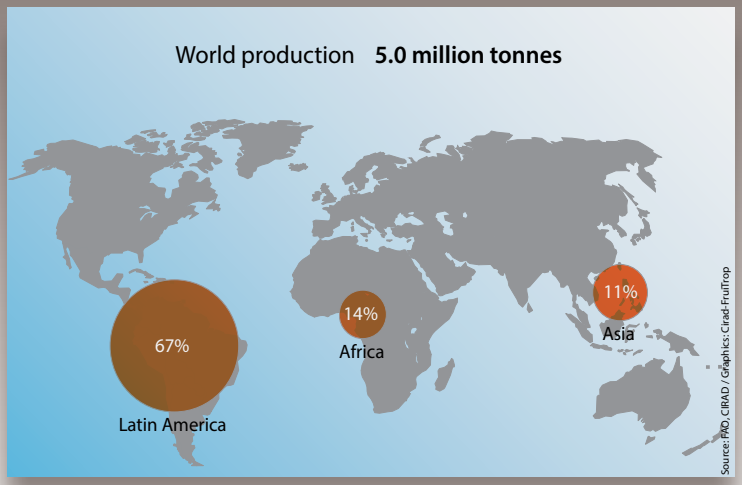
Outlets

Hass production is aimed primarily at the export sector. Nonetheless, the local market consumes increasing volumes of green varieties and small Hass, produced locally or imported (approx. 7 000 to 9 000 t/year). The fruits are often consumed in the form of smoothies (known locally as Panachi).

Logistics

Fruits bound for the EU-28 are exported in refrigerated lorries, which can reach the main West European markets in 48 hours.

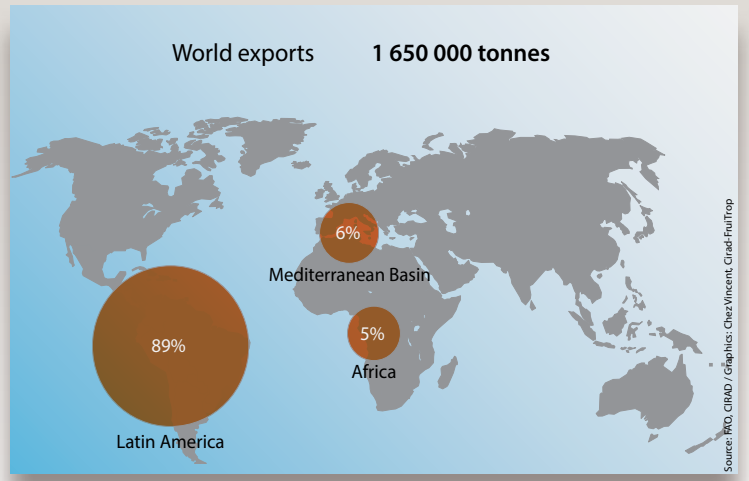
AVOCADO - Production (2015-16 or 2013)



Avocado — The top ten producer countries	
tonnes	**2015-16 ou FAO 2013**
Mexico	1 640 000
Dominican Republic*	387 000
Peru	349 300
Colombia	303 000
Indonesia*	276 000
Kenya*	191 000
Chile	185 000
United States	178 000
Brazil*	157 000
Rwanda*	149 000

Sources: FAO*, USDA, professionals

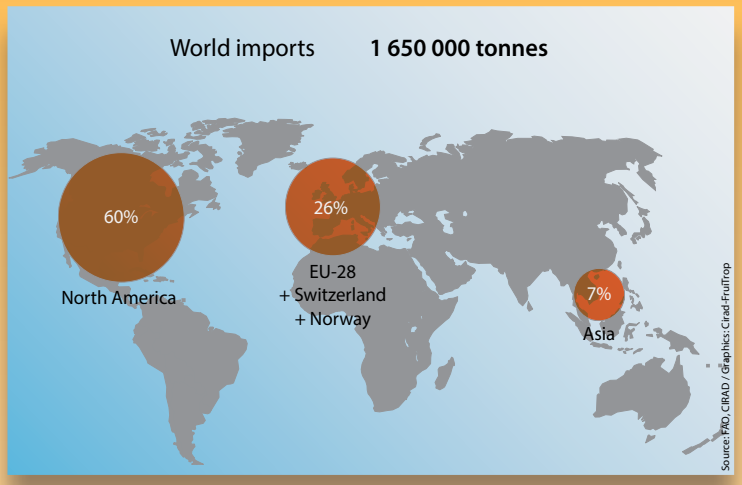
AVOCADO - Exports (2015-16)



Avocado — The top six exporter countries	
tonnes	**2015-16**
Mexico	1 081 000
Peru	174 300
Chile	112 500
Southern Africa*	50 100
Spain	45 500
Israel	41 200

*South Africa, Namibia, Swaziland / Sources: national Customs, professionals

AVOCADO - Imports (2015-16)



Avocado — The top six importer countries	
tonnes	**2015-16**
United States	917 667
Netherlands	202 400
France	99 000
Spain	76 300
Canada	69 950
United Kingdom	69 500

Source: national Customs

USA - Imports - Main supplier countries						
tonnes	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total	**351 120**	**462 777**	**561 892**	**603 160**	**780 412**	**917 667**
Mexico	281 672	360 924	515 143	512 276	686 404	853 617
Peru	137	9 157	15 860	21 617	64 448	46 284
Chile	54 355	74 701	14 721	53 305	10 600	10 362
Dom. Rep.	14 956	17 204	16 150	15 958	15 548	7 393
Bahamas						
New Zealand		791			3 356	

Source: USDA

Canada - Imports - Main supplier countries						
tonnes	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total	**34 182**	**36 320**	**47 185**	**46 139**	**57 089**	**69 950**
Mexico*	22 687	27 431	36 299	33 451	44 958	62 150
USA*	8 443	4 843	7 372	8 910	5 649	4 491
Peru	1 266	2 483	2 282	2 905	5 542	2 627
Dom. Rep.	314	255	351	456	534	483
Others	132	253	222	156	341	196
Chile	1 340	1 055	659	261	65	3

Source: COMTRADE and *national Customs

South America - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**19 088**	**18 881**	**15 048**	**17 670**	**18 403**	**21 125**	**21 760**
Argentina	3 494	8 357	5 493	9 179	9 621	13 208	10 807
Chile	678	303	1 880	698	3 882	2 659	9 285
Colombia	12 501	9 044	7 190	6 023	3 904	3 128	1 130
Ecuador	2 416	1 177	485	1 770	996	2 130	538

Source: COMTRADE

Central America and Mexico - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**28 683**	**35 956**	**27 486**	**42 132**	**42 266**	**38 184**	**38 777**
El Salvador	11 163	9 308	9 262	13 754	12 666	12 213	12 269
Honduras	8 939	9 032	6 426	10 412	11 405	10 263	11 379
Costa Rica	6 809	9 638	9 958	13 731	13 061	12 424	11 187
Guatemala	1 772	1 380	900	3 312	2 923	3 211	3 942
Mexico	0	6 598	940	923	2 211	73	-

Source: COMTRADE

European Union - Imports - Main supplier countries						
tonnes	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total, of which	**244 220**	**232 201**	**261 757**	**306 997**	**348 856**	**412 817**
Total N. Hemis.	**123 266**	**120 259**	**128 772**	**157 205**	**167 617**	**219 900**
Chile	25 244	32 637	41 074	62 968	42 797	78 244
Mexico	3 371	2 909	9 085	6 293	12 918	45 593
Spain	48 600	38 900	38 500	36 700	50 600	37 700
Israel	38 512	40 448	35 175	42 844	46 086	34 995
Colombia	121	121	486	1 142	3 740	11 189
Morocco	3 346	2 803	840	4 766	7 798	7 115
Dom. Rep.	3 621	1 312	2 451	1 749	2 910	4 027
Greece	446	1 029	474	740	765	987
Total S. Hemis.	**121 067**	**112 021**	**133 291**	**150 092**	**181 686**	**193 414**
Peru	56 345	66 155	62 618	86 260	101 971	114 337
Southern Afr.*	47 800	27 375	49 083	45 165	56 713	50 887
Kenya	14 123	15 028	17 078	13 313	15 604	20 802
Brazil	2 665	3 006	3 959	3 928	5 265	3 535
Tanzania	21	6	133	968	1 643	3 278

* South Africa, Zimbabwe, Swaziland / Source: Eurostat

Other West European countries - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**9 568**	**11 538**	**13 644**	**14 779**	**17 148**	**20 600**	**23 746**
Norway	4 046	5 154	6 555	7 090	8 787	10 496	11 673
Switzerland	5 340	6 152	6 789	7 340	7 915	9 516	11 376
Iceland	183	232	300	349	446	588	697

Source: COMTRADE

Russia - Imports - Main supplier countries							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**5 827**	**8 367**	**9 474**	**11 156**	**13 948**	**14 404**	**11 837**
Total N. Hemis.	**3 479**	**5 345**	**6 221**	**6 999**	**9 097**	**8 969**	**7 972**
Israel	3 316	5 135	5 794	6 674	8 716	8 762	7 867
Spain	163	183	405	251	281	73	
Chile		27	22	74	100	134	105
Total S. Hemis.	**2 224**	**2 861**	**3 087**	**3 934**	**4 545**	**5 208**	**3 763**
South Africa	1 445	1 984	1 321	2 345	2 678	3 994	2 197
Peru	438	597	1 475	1 259	1 462	982	1 069
Kenya	342	280	291	330	405	232	497

Source : COMTRADE

Other East European countries - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**844**	**1 254**	**1 529**	**1 948**	**2 636**	**2 749**	**3 619**
Ukraine	694	1 026	1 249	1 623	2 068	1 852	2 000
Belarus	113	177	229	255	482	744	1 441
Serbia	37	51	51	70	86	153	178

Source: COMTRADE

Japan - Imports - Main supplier countries						
tonnes	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total	**39 043**	**47 734**	**62 687**	**56 836**	**57 372**	**67 243**
Mexico	35 733	40 722	56 373	50 278	52 758	63 986
New Zealand	546	2 032	639	695	1 704	2 467
Chile	334	1 014	535	892	786	683
USA	2 430	3 966	5 140	4 971	2 124	80

Source : douanes nationales

Other Asian countries - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**3 534**	**4 616**	**5 308**	**6 190**	**8 285**	**13 826**	**30 156**
China	1 293	1 976	2 446	2 870	4 223	8 524	24 043
Singapore	978	1 285	1 497	1 691	2 015	2 815	2 991
South Korea	325	457	402	534	722	1 097	1 515
Malaysia	274	359	523	565	773	956	1 075
Thailand	664	540	440	530	552	434	532

Source: COMTRADE

Oceania - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**9 551**	**9 415**	**14 695**	**9 629**	**10 967**	**19 889**	**15 214**
Australia	9 509	9 287	14 695	9 627	10 941	19 889	15 214
New Zealand	42	128		2	26		

Source: COMTRADE

Persian Gulf - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**4 120**	**10 859**	**9 228**	**16 985**	**22 604**	**26 993**	**35 259**
Saudi Arabia	682	1 610	2 056	7 736	10 156	10 312	16 697
UAE	2 442	4 160	5 347	7 352	10 077	13 250	*14 500*
Kuwait	400	4 494	1 001	857	1 247	1 601	1 791
Qatar	338	366	360	486	598	904	1 280
Barhain		9	116	266	382	726	791

Source: COMTRADE

Africa - Main markets							
tonnes	2009	2010	2011	2012	2013	2014	2015
Total	**8 942**	**11 045**	**10 277**	**11 790**	**15 675**	**11 517**	**10 815**
Morocco	6 927	8 055	6 683	8 817	9 130	7 627	6 749
South Africa	1 381	1 976	2 156	1 660	2 308	1 962	2 246
Burkina Faso			679	683	589	1 046	1 436
Namibia	564	569	674	518	734	802	284

Source: COMTRADE

Avocado quality defects

Parasite disorders

The most common: Anthracnose
(black rot due to *Colletotrichum*)

Anthracnose interne légère

Severe internal anthracnose

Severe internal anthracnose

Mild to severe external anthracnose

Final-stage external anthracnose

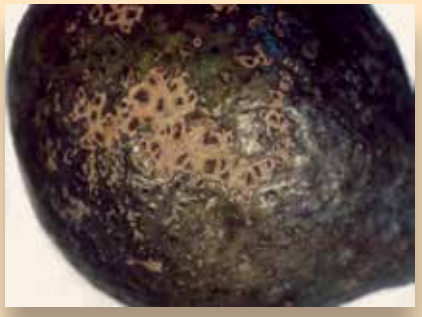
Stem-end necrosis
Fusarium spp., Lasiodiplodia theobromae, Dothiorella gregaria

Stem-end necrosis due to *Fusarium*

Stem-end necrosis

Stem-end necrosis

Epidermal disorders



Surface disorder due to *Sphacelma persea* - Scab

Surface disorder due to *Sphacelma persea* - Scab

Photos © Pierre Gerbaud and E. Laville

Physiological disorders

Internal damage, early development

Internal damage, mid-stage development

Internal damage, late development

External damage

Lack of O2 and excess CO2

Damage caused by the cold
Poor regulation of controlled atmosphere

Mechanical and other problems

Variation in coloration and maturity

Mechanical bruising

Cork-like patch due to friction

Cork-like ridges due to friction

Burst nodules due to friction

Variation in coloration and maturity
Mechanical bruising

Photos © Pierre Gerbaud and E. Laville

The main avocado varieties

Avocado is a dicotyledon of the genus Persea of the Lauraceae family. More than 200 varieties are divided between three races. The Mexican race is of little commercial interest as most of the fruits are too small. However, its agronomic qualities mean that it is widely used as rootstock or as a parent. Practically all sales of fruits of the West Indian race are on domestic markets. International trade handles mainly varieties belonging to the Guatemalan race or crosses between the Guatemalan and Mexican races.

The Guatemalan race

Persea nubigena* L. Wins var. *guatemalensis

This race probably originated not only in the highlands of Guatemala but also in the Chiapas in Mexico. The leaves are large and uniformly dark green on both faces. Although it is not as tolerant to cold as the Mexican race, it is useful for marginal cultivation zones. The fruits are roundish and have thick, very hard warty skin. The size may vary considerably but they are generally larger than fruits of the Mexican race. The seed is fairly small and almost always clings. Pulp oil content is medium at 10 to 20%. Flowering to harvest time is 8 to 10 months. It can be longer in the cold parts of California (12 to 14 months). The race is a good parent for crosses (contributing genes for small seeds). Nearly 40% of avocados belong to this race, including 'Anaheim', 'Corona', 'Sharwil' and the major commercial varieties such as 'Edranol', 'Gwen', 'Hass', 'Nabal' and 'Reed'.

The West Indian race

Persea americana* Miller var. *americana

In spite of its name, this race probably originated in Colombia. It is well suited to humid tropical regions where it is used to supply local markets. The tree has large green leaves. The fruits are elongated, usually large and weigh 400 to 900 g. The epidermis is fairly thin (0.8 to 1.5 mm) and is smooth and shiny, soft green or greenish yellow or reddish when mature. The pulp is watery with a low oil content (< 10%). The seed—often free—is large and has a more or less corrugated surface. All these characteristics make the fruits delicate. They often display pulp browning (caused by chilling injury) at the temperatures generally used for the storage and refrigerated transport of fruits of the other races (+ 6°C, + 8°C). The race is the most sensitive one to cold and aridity but the most tolerant to salinity. The flowering to harvest time is only 5 to 7 months. The West Indian race groups about 15% of avocado varieties and the best known among them are 'Peterson', 'Pollock' and 'Waldin'.

The Mexican race

***Persea americana* Miller var. *drymifolia* Schlecht and Cham.**

This fairly hardy race is adapted to low temperatures originated in the Mexican highlands. It differs from the two other races in several botanical characteristics:

- the leaves are generally small and release a characteristic aniseed odour when crumpled;
- flowering is earlier than in the other races and the flowering to harvest time is 7 to 9 months;
- the fruits are small and elongated and rarely weigh more than 250 g. The skin is very thin and smooth.

The pulp is often fibrous and has a high oil content (> 15%). The seed is generally large and sometimes free. This race is very sensitive to salinity. In contrast, it tolerates high temperatures and comparatively low relative humidity. Furthermore, it has greater tolerance to *Phytophthora cinnamomi* than the other races. It thus forms good rootstock and its genetic potential is well exploited in hybridisation breeding programmes. Finally, its high lipid content is an interesting feature when the fruits are used for oil production. About 20% of varieties belong to this race. The best known include 'Duke', 'Gottfried', 'Mexicolo', 'Topa Topa' and 'Zutano'.

Hybrids

A large proportion of the varieties of interest for international trade are hybrids. These are generally natural crosses and in rarer cases are the result of breeding exploiting the inter-fertility of the three races. The main selection criteria are agronomic (resistance to pests and diseases, especially *Phytophthora*, tolerance to salinity and cold, productivity, etc.) and those related to fruit quality (size, high pulp percentage, flavour, absence of fibres, oil content, etc.). 'Bacon', 'Ettinger', 'Fuerte' and 'Lula' in particular are natural Mexican x Guatemalan hybrids. Guatemalan x West Indian hybrids, mainly from Florida, include the varieties 'Ajax', 'Booth', 'Choquette', 'Collinson' and 'Simpson'. Mexican x West Indian hybrids such as 'Indian River' are very rare. Other varieties resulting from inter-race crosses are possible.

Hass

Guatemalan race

Flowering type: A
Fruit shape: pyriform
Skin: dark green and brown at maturity, not very thick, warty
Oil content: 18 to 20%
Average weight: 250 to 350 g
Seed:skin:pulp ratio: 16:12:72 (small seed)

'Hass' has replaced 'Fuerte' as the sector standard. It is currently the most commonly planted avocado in the world. It was selected by Rudolph Hass in California in the early 1920s and registered in 1935. The tree is vigorous and highly productive. The fruits vary in shape in some production regions, ranging from pyriform to ovoid. Average fruits size is fairly small in hot regions. Keeps well on the tree. The skin turns from dark green to purplish brown at maturity. It is easy to remove from the pulp. The organoleptic qualities are excellent. Rich flavour (nutty taste) and buttery nonfibrous pulp.

Fuerte

Mexican x Guatemalan hybrid

Flowering type: B
Fruit shape: obovate
Skin: green, matt, smooth, medium thickness. Pliable and tough, it is easy to remove
Oil content: 16 to 18%
Average weight: 250 to 400 g
Seed:skin:pulp ratio: 15:10:75 (large seed)

This variety was long the most commonly planted in the world and originated in Mexico (Atlixco). The tree is vigorous with fairly good frost resistance (to 4°C), but is particularly temperature-sensitive during the flowering period. Productivity is generally good in temperate zones but it displays strong alternate bearing. The fruits are easy to peel and have excellent organoleptic qualities (buttery pulp).

Ettinger

Mexican x Guatemalan hybrid

Flowering type: B
Fruit shape: narrowly obovate
Skin: bright green, fine, fairly smooth
Oil content: 18 to 22%
Average weight: 250 to 350 g
Seed:skin:pulp ratio: fairly large seed

This variety was bred from 'Fuerte' in Kefar Malal in Israel, where it is mainly grown. The tree is very fertile and vigorous with an erect habit. The fruits are similar to those of 'Fuerte'. The skin is susceptible to problems of corky areas and tends to adhere to the pulp. The pulp is buttery and fibreless and has good organoleptic qualities.

Reed

Guatemalan race

Flowering type: A
Fruit shape: spheroid
Skin: medium thickness, slightly rough, pliable
Oil content: 19 to 20%
Average weight: 400 to 500 g
Seed:skin:pulp ratio: 17:11:72

This variety of Californian origin was selected by James Reed. Registered in 1960, the patent expired in 1977. It has succeeded in conserving the qualities of its parents 'Nabal' and 'Anaheim' without their negative features. It is fairly productive and alternate bearing is not marked. Its resistance to cold is comparable to that of 'Hass'. The fruits are large and a singular round shape. They keep well on the tree. The organoleptic qualities are excellent and the buttery pulp has a slight nutty taste and does not blacken after slicing. Peeling is also easy.

Pinkerton

Mexican x Guatemalan hybrid

Flowering type: A
Fruit shape: pyriform
Skin: dark green, rough, tough and pliable, medium thick, easy to peel
Oil content: 18 to 25%
Average weight: 270 to 400 g
Seed:skin:pulp ratio: 10:13:77 (small seed)

A recent variety bred in California by John Pinkerton and registered in 1975. It is probably the result of a Hass x Rincon cross. The tree is very vigorous and tolerates temperatures of -1/-2°C to 30°C. Production is good and alternate bearing is little marked. The fruits may suffer from ringneck if the tree is under conditions of stress. The organoleptic qualities of this variety are excellent (nutty taste). The pulp is smooth, buttery and fibreless.

Photos © Guy Bréhinier

Avocado

post-harvest

Post-harvest management of fruits is of prime importance. It affects both quality and yield as losses can range from 5 to 50%.

The special features of climacteric fruits

Climacteric fruits have special physiological characteristics. They must be harvested after reaching a sufficiently advanced stage of development and hence of maturity. It is only then that they are capable of synthesising sufficient amounts of ethylene to be able to start ripening (a strong increase in respiration that physiologists refer to as 'climacteric' marks the start of deep-seated physiological changes). Only mature fruits will display satisfactory organoleptic characteristics once they have ripened. Avocado is a singular climacteric fruit. It can only start the ripening process after it has been picked. One of the best ways of storing the fruit is therefore to leave it on the tree. Some varieties can remain on the branch for several months, depending on the season. Suitability for 'tree storage' is generally very small or non-existent for West Indian cultivars but marked for hybrids, especially for Guatemalan x Mexican crosses. Nevertheless, prolonged storage can have a negative effect on production in the following season. These physiological considerations highlight the importance of the harvest date. Several variables that depend on the variety and the producer country concerned are to be taken into consideration to judge the optimum stage of maturity. Visual appraisal, fruit weight and diameter and the number of days after flowering give useful information but this is not accurate enough. Determining the matter content—strongly correlated with the oil content—is the most commonly used method. Appraisal of the stage of maturity is completed by analysis of enzyme activity, electrical conductivity, aromatic compounds or precursors or by tasting tests when the fruits have ripened.

Photos © Eric Imbert

Storage

Cooling

The temperature is lowered to slow the metabolism of the fruit so that it can be stored. This slows ethylene synthesis and its effects. It is therefore sought to bring the fruits to the best temperature for storage as rapidly as possible after harvesting (ideally in less than 6 hours). The duration of cooling depends on the initial and final temperature of the fruit and on the ambient air conditions (temperature, wind velocity and relative humidity). The time necessary varies from 8 to 10 hours. It is important to halt the cooling phase 2°C before the final temperature desired to be sure not to reach temperatures that are too low and that might damage the produce.

Refrigeration

Optimum storage temperatures vary according to the variety, the period of the season (maturity) and the storage period desired. In general, the temperature for mature avocado ranges from 5 to 12°C with atmospheric relative humidity of 85 to 95%. The more delicate end-of-season fruits are stored in the lower part of the temperature range. For 'Hass', physiologists advise maintaining fruits at 5 to 7°C at the beginning of the season and 4.5 to 5.5°C at the end. More than four weeks of storage at these temperatures is not recommended. The optimum temperature range for 'Fuerte' is 6 to 8°C but for no more than three weeks. In practice, professionals keep all the classic commercial varieties at between 5 and 6°C. Temperatures must be strictly controlled to prevent any fluctuation. Movement of air is also regulated. Heat is released during the beginning of the ripening process and this must be taken into account. Maintaining the cold chain is of crucial importance.

Controlled atmosphere

Controlled atmospheres are widely used for long transport and can lengthen the duration of storage. Low O2 levels combined with high CO2 reduce respiration and ethylene production. An O2 content of 2 to 5% and CO2 of 3 to 10% are generally used. The main classic commercial varieties can thus be stored for 5 to 6 weeks and even longer for 'Hass'. The effects of unsuitable O2 and CO2 levels are described in the paragraph entitled 'Main types of post-harvest physiological deterioration' below.

Alternative technologies for long storage

Treatment with 1-MCP. Application of 1-MCP (1-methylcyclopropene) is reported to limit the internal symptoms of chilling injury (dulling of the pulp, vascular browning) in fruits stored for more than four weeks. The technique is said to give good results especially for the green varieties that are less suitable than 'Hass' for long storage (with regard to the standards in force). It has been used on a proportion of the South African harvest for three years.

Step-down temperature. This technique has been used in the South African avocado sector for several years to conserve fruit quality and reduce internal symptoms of chilling injury. The storage temperature is lowered in steps (1 to 2°C each week) during transport, with care taken not to descend below 3.5°C. There are procedures (temperature and duration) for the different cultivars and regions of South Africa.

Photos © Eric Imbert

Packing

Fruits with the desired maturity index are sorted, washed and graded before packing. Each market has its own packing requirements.

Avocado — USA — 11.34-kg box 43 x 32.6 x 17.50 cm	
Weight (g)	Size
422	28
377	32
340	36
298	40
241	48
196	60
156	70
122	84
102	96

Avocado — USA 5.67-kg box	
Weight (g)	Size
422	14
377	16
340	18
298	20
241	24
196	30
156	35

Avocado — Europe — 4-kg box 35 x 28.5 x 9 cm	
Weight (g)	Size
461-475	8
366-400	10
306-365	12
266-305	14
236-265	16
211-235	18
190-210	20
176-189	22
156-170	24
146-155	26

Avocado — Japan — 6-kg box 43.9 x 33.1 x 11 cm	
Weight (g)	Size
340	18
298	20
241	24
196	30
156	35

Photos © Eric Imbert

Ripening

The ideal temperature for ripening is 15 to 20°C. Above 25°C, ripening is irregular, unpleasant flavours appear and the risk of rot increases. This natural process can also be controlled. Treatment with ethylene (100 ppm at 20°C for 12 to 72 hours depending on the maturity of the fruit) speeds up ripening by 3 to 6 days. It is possible to obtain fruits at an even stage of ripeness in chambers in which temperature, relative humidity and ethylene content are the main parameters controlled. Nevertheless, ripening still depends on the initial stage of maturity of the fruit.

The main precautions to be taken in shops

Avocado fruits are very sensitive to impacts and to pressing by consumers. Ripe and nearly ripe fruits must be stored at lower temperatures (1 to 6°C). Misting is not recommended.

Main types of post-harvest physiological deterioration of avocado

Storage-related damage

Chilling injury. This damage is caused by low temperatures—generally lower than 3°C—or by prolonged storage. The symptoms may appear three days after packing during storage and more often when the fruits are removed from the cold room. Two forms of chilling injury are observed. The symptom of internal chilling injury is a browning of the pulp starting at the base of the fruit and sometimes vascular browning in the same area. In 'Fuerte', this disorder takes the form of small dark spots in the pulp. The symptoms of external chilling injury are irregular black spots on the epidermis. They may appear during storage and most frequently when the fruits are removed from cold storage.

O2 deficit and excessive CO2. Too great a decrease in the O2 level (in particular to less than 1%) can cause irregular brown spotting of the epidermis that can spread to the pulp. Too high a CO2 level (over 10%) can cause discoloration of the epidermis and the development of unpleasant flavours, especially when the O2 level is low.

Fungal infection in the field revealed during or after storage

The control of fungal diseases requires effective orchard management and appropriate pre-harvest treatments. Any bruising of the fruits must be avoided at the post-harvest stage, they must be refrigerated rapidly and the cold chain maintained.

Anthracnose. This is the most frequent disease during storage and is caused by infection of the fruit by Colletotrichum gloeosporioides in the orchard and appears only during ripening. It causes serious necrosis. Ordinary small, scattered injuries develop into large circular brown spots on the epidermis. The underlying pulp blackens and the rot reaches the stone. The rate of development of this rot depends on the transport and storage temperature and above all the state of maturity of the fruits.

Stem-end rot. This disease is also caused by infection by a fungus, Botryodiplodia theobromae. Small pale brown spots appear initially in the stem zone. The rot spreads rapidly to the rest of the fruit. The pulp is then infected to the stone. Any injury in the epidermis favours infection by the pathogen.

Avocado — Post-harvest diseases caused by pathogenic fungi

Pathogens	Diseases
Alternaria spp	Black rot
Botryodiplodia theobromae	Stem-end rot
Botryosphaeria ribis (*Dithiorella gregaria*)	Stem-end rot
Colletotrichum gloeosporioides	Anthracnose: Black rot
Fusarium spp	Stem-end rot
Penicillium expansum	Blue mould
Pestalotiopsis perseae	Brown spots
Phomopsis perseae	Brown rot
Phytophthora citricola	Small surface injuries
Pseudocercospora purpurea	Soft rot
Rhizopus stolonifer	Corky patches on epidermis
Trichothecium roseum	Pink rot

The harvest stage in the case of climacteric fruits

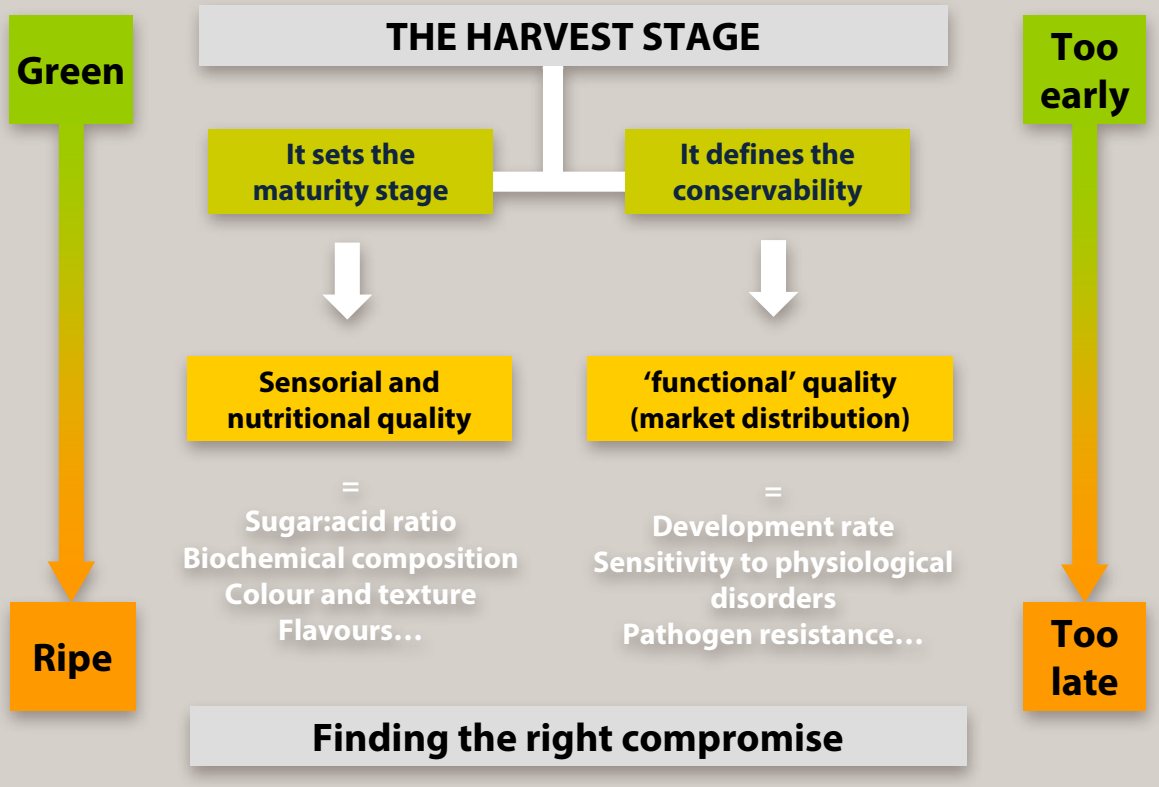
This stage is particularly important since the state of maturity of the fruit is "set" upon harvesting (see FruiTrop No.198, page 29, maturation article). The impact of the harvest stage is split into two aspects (see diagram):

- in qualitative terms, the earlier a fruit is harvested, the less taste properties it will exhibit, with a fairly low sugar content (enrichment in sugars is linked to the length of time on the plant) and a poor ability to develop flavours;
- in commercial terms, a fruit harvested at a stage too close to the fruit's true maturity will have a lower conservability. But if the fruit is harvested too early, its ability to ripen may be insufficient, and it will not be able to go through the correct maturation development.

Importers are dependent on the compromise which may be found to reconcile taste quality and market distribution. Defining an optimum harvest stage is a real challenge, since there are not necessarily any clear visual descriptors indicating with acceptable precision the stage of maturity before maturation of climacteric fruits (known as the preclimacteric stage).

In parallel, with the markets constantly changing, the development of triggering (avocado, mango) becomes singularly complicated: how to be sure that the fruits have reached their ability to ripen? How to adapt the triggering process to the fruit's stage of maturity, in the knowledge that the batches are heterogeneous?

There are possible alternatives for improving batch homogeneity, but this calls for a high degree of interaction between the production and distribution industries. Eventually, we will need to take into account the changes to cropping techniques on fruit physiology (conservation, metabolism of maturation). We will also need to assess the possibility of sorting fruits using non-destructive measures, to obtain homogeneous batches in order to adapt and ensure the performance of the triggering techniques.



Wholesale market prices in Europe

July/August 2016

					EUROPEAN UNION - EURO				
					Germany	Belgium	France	Holland	UK
AVOCADO	Air	HASS	MEXICO	Box				13.75	
		TROPICAL	BRAZIL	Box			13.50		
			DOMINICAN REP.	Box			13.20		
	Sea	ETTINGER	PERU	Box			9.00		
		FUERTE	KENYA	Box			10.50	14.00	10.38
			PERU	Box			11.00		
			SOUTH AFRICA	Box			12.00	13.38	14.25
			SWAZILAND	Box					13.13
		HASS	BRAZIL	Box					14.32
			CHILE	Box			14.00		11.63
			COLOMBIA	Box				12.25	
			KENYA	Box			10.08		
			MEXICO	Box			11.00	13.00	
			PERU	Box	12.00	13.00	10.92	12.25	
			SOUTH AFRICA	Box	12.00	13.00	10.83	12.25	13.28
		PINKERTON	SOUTH AFRICA	Box		13.00	11.50	13.63	
		RYAN	SOUTH AFRICA	Box			12.50	12.25	
		EDRANOL	SOUTH AFRICA	Box				13.75	
		NABAL	PERU	Box				9.75	
BANANA	Air	RED	ECUADOR	kg				5.25	
		SMALL	COLOMBIA	kg			7.58		
			ECUADOR	kg				5.67	
	Sea	SMALL	ECUADOR	kg			1.85		
CARAMBOLA	Air		BRAZIL	kg					5.23
			COLOMBIA	kg					4.61
			MALAYSIA	kg		6.11	5.34	5.04	
	Sea		MALAYSIA	kg			3.14		
COCONUT	Sea	NOT DETERMINED	COTE D'IVOIRE	Bag			12.25	11.58	14.71
			SRI LANKA	Bag		16.00			8.84
		YOUNG	THAILAND	Bag				15.00	
		GREEN	COSTA RICA	Bag				16.50	
DATE	Sea	BAHRI	ISRAEL	kg				3.45	
		DEGLET	ALGERIA	kg			5.20		
		KOUAT ALIGH	TUNISIA	kg				1.88	
		MEDJOOL	ISRAEL	kg			10.38	7.20	
			SOUTH AFRICA	kg				8.74	
		NOT DETERMINED	ISRAEL	kg			5.50		4.13
			TUNISIA	kg					1.79
		GOLDEN	PERU	kg				4.00	
		STONELESS	TUNISIA	kg				2.75	
GUAVA	Air		BRAZIL	kg			6.50		
	Sea		BRAZIL	kg					2.83
KUMQUAT	Air		SOUTH AFRICA	kg				4.69	5.52
LIME	Sea		BRAZIL	kg	1.56	1.64	1.87	1.58	1.59
			MEXICO	kg	1.90	1.64	2.01	1.65	1.56
			GUATEMALA	kg				1.61	1.54
LITCHI	Air		MEXICO	kg				5.38	
			VIETNAM	kg				5.38	
	Sea		INDIA	kg					1.19
			ISRAEL	kg					1.16
MANGO	Air	KEITT	MEXICO	kg			4.50		
		KENT	ISRAEL	kg			5.00		
			MEXICO	kg			4.44	4.46	
		NOT DETERMINED	ISRAEL	kg			4.20		
		NAM DOK MAI	THAILAND	kg				12.50	
		KASTURI	ISRAEL	kg				3.18	
		MAYA	ISRAEL	kg				3.50	
		SHELLY	ISRAEL	kg				2.92	
	Sea	ATKINS	BRAZIL	kg	1.03		1.35	1.22	
		KEITT	BRAZIL	kg	1.25		1.38		
			PUERTO RICO	kg				2.00	
		KENT	BRAZIL	kg	1.25			1.75	1.36
			SENEGAL	kg	1.44		1.38	1.78	
		NOT DETERMINED	BRAZIL	kg					1.18
		PALMER	BRAZIL	kg			1.50	1.50	
		SHELLY	ISRAEL	kg				1.94	

					EUROPEAN UNION - EUROS				
					Germany	Belgium	France	Holland	UK
MANGOSTEEN	Air		INDONESIA	kg			9.80		
			THAILAND	kg			9.80	8.88	
			VIETNAM	kg				9.25	
MANIOC	Sea		COSTA RICA	kg			1.45	1.31	
MELON	Sea	CHARENTAIS	MOROCCO	kg			0.80		
PAPAYA	Air	FORMOSA	BRAZIL	kg			3.50	2.73	
		NOT DETERMINED	BRAZIL	kg		3.68	3.65	3.71	4.00
			JAMAICA	kg				2.86	
			THAILAND	kg				5.25	
	Sea		BRAZIL	kg					2.41
PASSION FRUIT	Air	NOT DETERMINED	COLOMBIA	kg	4.75	5.38	5.63	5.75	5.12
		PURPLE	BRAZIL	kg					4.61
			KENYA	kg		5.38			
			SOUTH AFRICA	kg			6.40	5.50	
			VIET NAM	kg			9.10		
			ZIMBABWE	kg		5.13		6.25	
			SWAZILAND	kg				5.75	
		YELLOW	COLOMBIA	kg				8.33	
PHYSALIS	Air	PREPACKED	COLOMBIA	kg			15.00	6.67	10.35
	Sea		COLOMBIA	kg				5.83	8.56
PINEAPPLE	Air	MD-2	BENIN	kg			2.10		
		VICTORIA	MAURITIUS	Box				14.00	
			REUNION	kg			4.35		
	Sea	MD-2	COLOMBIA	Box				10.63	
			COSTA RICA	Box	11.00	10.75		13.20	10.74
			COSTA RICA	kg			1.08		
			COSTA RICA	Piece					1.04
			COTE D'IVOIRE	kg			1.19		
			COTE D'IVOIRE	Piece					1.10
			ECUADOR	Box				11.81	
			PANAMA	Box				11.27	
PITAHAYA	Air	RED	ISRAEL	kg				5.50	
			THAILAND	kg			8.25		
			VIET NAM	kg			8.25	7.67	
		YELLOW	ECUADOR	kg				9.80	
			ISRAEL	kg				6.25	
PLANTAIN	Sea		COLOMBIA	kg			1.15		
			COSTA RICA	kg				1.30	
			ECUADOR	kg			1.00	1.05	
			WINWARD ISL.	kg					1.50
POMEGRANATE	Air	NOT DETERMINED	EGYPT	kg					1.19
		WONDERFUL	CHILE	kg			2.47	2.28	
			PERU	kg			2.10	2.30	
			SOUTH AFRICA	kg			1.80		
	Sea	NOT DETERMINED	EGYPT	kg					2.04
			SOUTH AFRICA	kg			3.50		
		WONDERFUL	CHILE	kg			2.55		
			EGYPT	kg				2.21	
			PERU	kg			2.00		
		EARLY RED	ISRAEL	kg				3.29	
			TURKEY	kg				2.17	
		EMEK	ISRAEL	kg				3.57	
RAMBUTAN	Air		THAILAND	kg			9.00		
			VIETNAM	kg			9.00	11.00	
			GUATEMALA	kg				8.75	
SWEET POTATO	Sea	NOT DETERMINED	ECUADOR	kg					1.31
			EGYPT	kg				0.96	0.76
			HONDURAS	kg					1.29
			SOUTH AFRICA	kg			1.60		0.76
		RED/RED	HONDURAS	kg				1.16	
		RED/WHITE	HONDURAS	kg				1.45	
		WHITE	HONDURAS	kg			1.57		
TAMARILLO	Air		COLOMBIA	kg				7.10	
TAMARIND	Air		THAILAND	kg			3.08	3.45	
TARO	Sea		CHINA	kg			2.10		
			COSTA RICA	kg			2.45		
YAM	Sea		BRAZIL	kg			2.15		1.20
			GHANA	kg				2.75	

Note: according to grade

These prices are based on monthly information from the Market News Service, International Trade Centre UNCTAD/WTO (ITC), Geneva.
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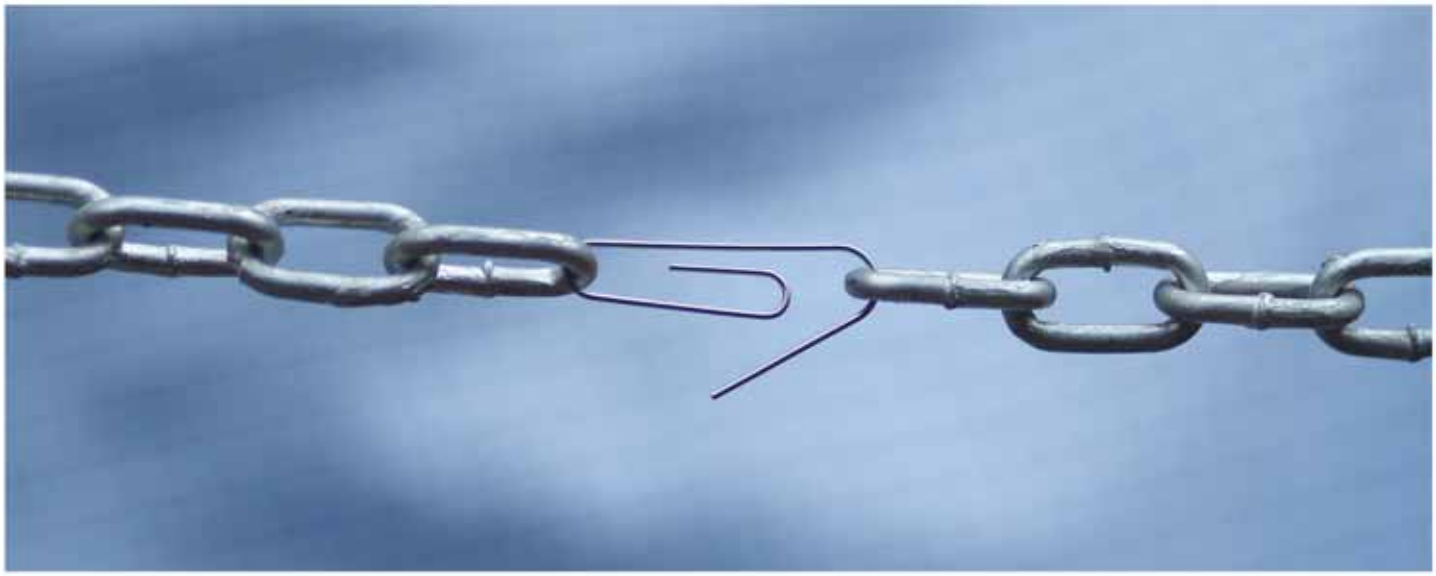
Information... your weak link?



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