Asparagus World

THE 100% ASPARAGUS MAGAZINE

#2
YEAR 2020

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Speed gives Australia an edge in Asia P.56

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by eurofresh REUSSIR Fruits & Légumes Christian BEFVE & CO Spargel & Erdbeer

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Editor's letter

by Guy Dubon,
Co-editor of *Asparagus World* and Editor of *Réussir Fruits & Légumes*

Christian Befve and Guy Dubon, co-editors

Asparagus World

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Asparagus World

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Worldwide coverage of the production, marketing and retail of asparagus

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Follow the instructions Page 36

After Covid-19

"The Covid-19 pandemic is the worst global crisis since World War II," said UN Secretary-General Antonio Guterres. He believes it is "a combination of a disease threatening the whole world and an economic impact leading to a recession unprecedented in the recent past."

As asparagus is grown all over the world, it is bound to feel the impact of the current situation (p.8-9). In some countries, especially in the Northern Hemisphere (Europe and America), the asparagus season has arrived at the same time as the peak of the disease, with people living in containment situations never before experienced and thousands of victims.

So asparagus has been hit hard by the crisis, as the evidence already indicates. In many countries, consumers have re-evaluated the importance of food, which has regained its place as a vital element in people's lives. It has surpassed online games or the latest sports shoes. Many consumers are now seeking out local products and farmers have won back the appreciation of the public.

The Covid-19 crisis also underlines the importance of health security. The diseases or plant pests that agriculture has to deal with on a regular basis affect humans too. Standards will be strengthened and "sanitary barriers" will be erected.

The cessation of numerous industrial activities has also demonstrated man's impact on the environment: a life-size demonstration of the dangers of over-globalisation. And the shortage of masks and medicines has prompted us all to ask questions of our politicians regarding "risk management" and "sovereignty". It is now a given that in the future we will be talking in terms of a before and an after Covid-19.

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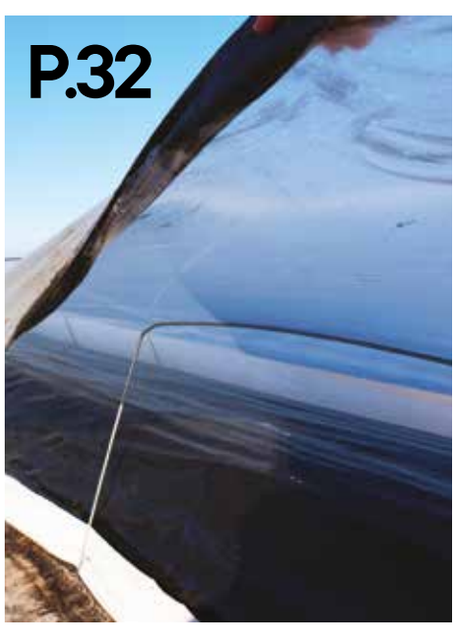

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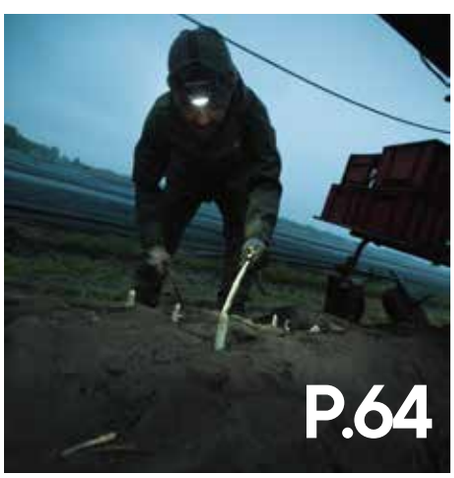

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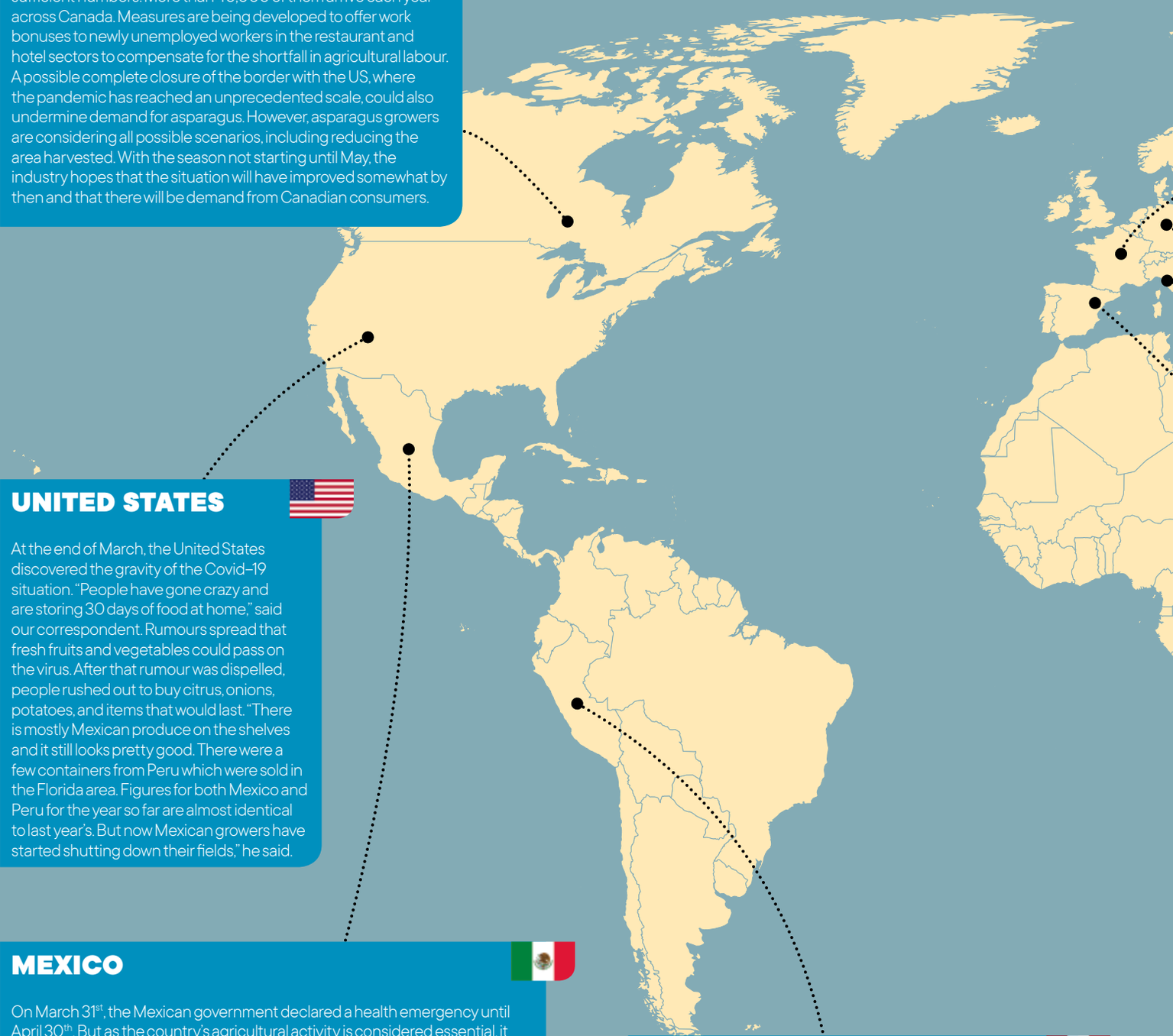
A Gourmet journey with Asparagus

© Jean-Claude Monin

ASPARAGUS

CANADA

On March 31, Ontario and Quebec alone, the two main asparagus producing provinces, accounted for 70% of all Covid–19 cases in Canada. Despite the rapid action of government authorities to facilitate the arrival of Mexican and Guatemalan workers, it is now obvious that this personnel will arrive neither in time nor in sufficient numbers. More than 40,000 of them arrive each year across Canada. Measures are being developed to offer work bonuses to newly unemployed workers in the restaurant and hotel sectors to compensate for the shortfall in agricultural labour. A possible complete closure of the border with the US, where the pandemic has reached an unprecedented scale, could also undermine demand for asparagus. However, asparagus growers are considering all possible scenarios, including reducing the area harvested. With the season not starting until May, the industry hopes that the situation will have improved somewhat by then and that there will be demand from Canadian consumers.



UNITED STATES

At the end of March, the United States discovered the gravity of the Covid–19 situation. "People have gone crazy and are storing 30 days of food at home," said our correspondent. Rumours spread that fresh fruits and vegetables could pass on the virus. After that rumour was dispelled, people rushed out to buy citrus, onions, potatoes, and items that would last. "There is mostly Mexican produce on the shelves and it still looks pretty good. There were a few containers from Peru which were sold in the Florida area. Figures for both Mexico and Peru for the year so far are almost identical to last year's. But now Mexican growers have started shutting down their fields," he said.

MEXICO

On March 31st, the Mexican government declared a health emergency until April 30th. But as the country's agricultural activity is considered essential, it has changed very little. However, Mexico's main customer, the US, is going through a bad period, which is having repercussions for different vegetables, including asparagus. Nevertheless, the 2020 season got off to a problem-free start in Sonora at the end of January and the beginning of February. Harvests and shipments were operating normally. As of March 31st, production in Baja California had not yet started significantly, as it was waiting for the end of the Caborca area's harvest. In Bajío, the harvest is still a long way off, with a large proportion of producers dependent on the rains that usually come in May. "We don't know how the situation will evolve in the coming days. The movement of harvesters within the country is very important, so if the government applies restrictions, agriculture could be affected," said our correspondent.

PERU

Peruvian asparagus production is adapting to the unexpected global situation created by Covid–19. This producing country has many export markets available, each differently affected by the pandemic. Peru produces several types of white and green asparagus for different uses: fresh, canned and frozen. The fields being harvested in the north are for canning (white), while the southern production (185 ha) will be for freezing and conservation. Moreover, unlike in Europe, where harvest times are dictated by the seasons, Peru's climate allows for production to be regulated by adjusting irrigation.

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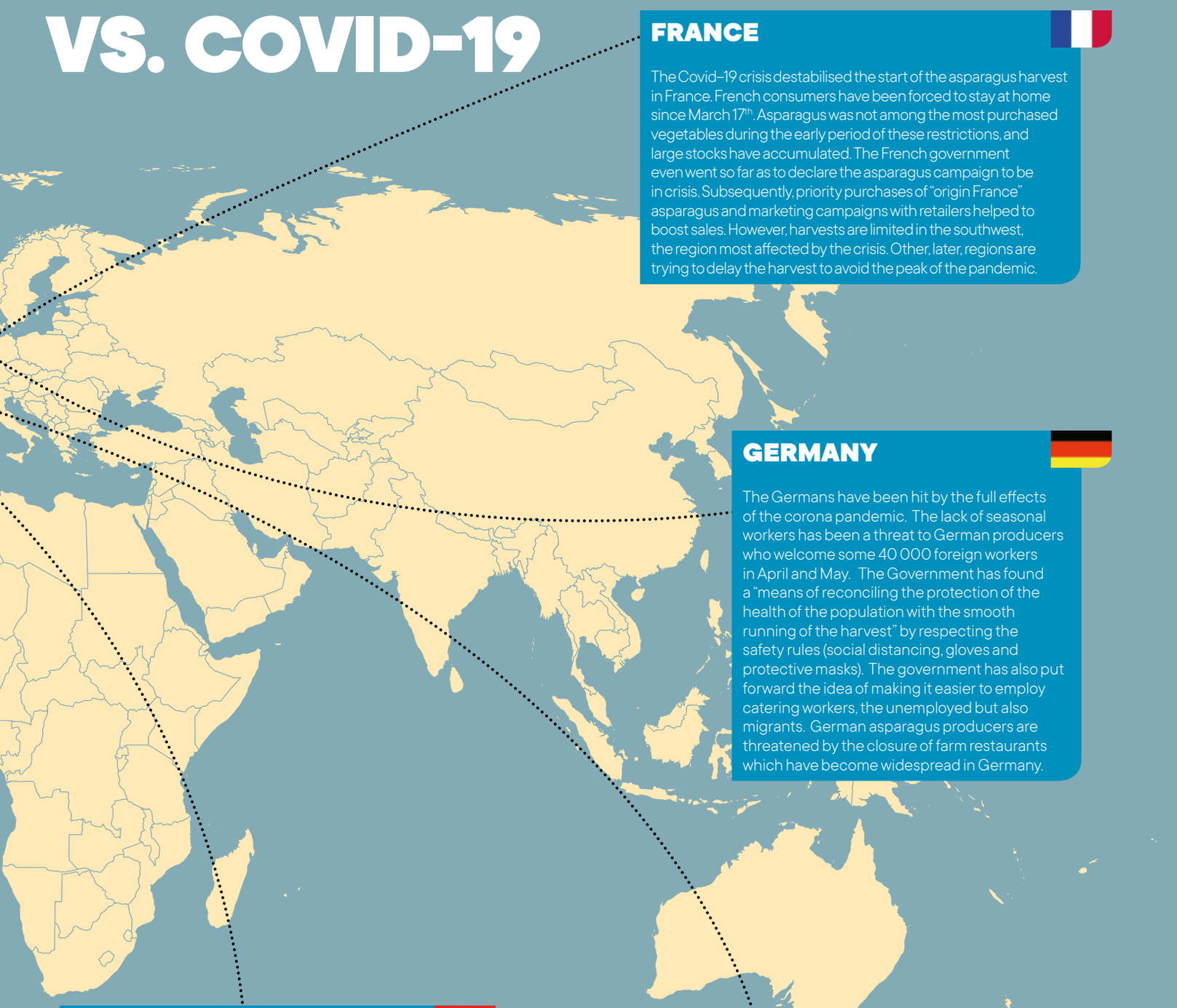

FRANCE

The Covid–19 crisis destabilised the start of the asparagus harvest in France. French consumers have been forced to stay at home since March 17th. Asparagus was not among the most purchased vegetables during the early period of these restrictions, and large stocks have accumulated. The French government even went so far as to declare the asparagus campaign to be in crisis. Subsequently, priority purchases of "origin France" asparagus and marketing campaigns with retailers helped to boost sales. However, harvests are limited in the southwest, the region most affected by the crisis. Other, later, regions are trying to delay the harvest to avoid the peak of the pandemic.

GERMANY

The Germans have been hit by the full effects of the corona pandemic. The lack of seasonal workers has been a threat to German producers who welcome some 40 000 foreign workers in April and May. The Government has found a "means of reconciling the protection of the health of the population with the smooth running of the harvest" by respecting the safety rules (social distancing, gloves and protective masks). The government has also put forward the idea of making it easier to employ catering workers, the unemployed but also migrants. German asparagus producers are threatened by the closure of farm restaurants which have become widespread in Germany.

SPAIN

The Covid–19 crisis hit Spain at the beginning of the asparagus harvest in March. Luís San José, a producer of organic white asparagus in Tudela de Duero, Valladolid, said, "It's something we were not prepared for." Sales to restaurants and distributers came to a sudden halt. "We've gone from selling 3,000 kg a day to 20 kg." Measures had to be taken to ensure workers' hygiene and discipline, such as wearing masks, limiting travel, etc. "We are also experiencing difficulties in obtaining tools and machine parts, as well as technical assistance, as many companies have seen their activities paralysed," said San José, who fears a serious economic crisis is on the way.

ITALY

Italy was the first European country to be affected by Covid–19. As of March 9th 2020, the Italian government imposed major restrictions on the movement of its people; this reduced by 70–80% out-of-home consumption and direct sales of asparagus to distributors and consumers. The sharp decline in sales drove down the selling price. As the virus spread, foreign seasonal workers returned to their countries of origin, which caused harvesting problems. The only operators to survive were the most organised private companies or producer groups in northern and southern Italy that were able to make significant investments, particularly in terms of mechanised packaging.

By Amélie Lachapelle, Ciria Quispe, Guy Dubon, Luciano Trentini, Luís San José, Peter A. Warren, Philippe Gautier, Thomas Kühlwetter, Veronica Bartranou

In memory of Jacques Poissonnier

A crown's calibre is a predictor of the energy it will have to help it to establish itself and ensure the emergence of stems.

How to
a good pl
of aspara

The production potential of the future asparagus bed depends on the crowns or seedlings that are planted. They bring the genetic potential and energy required for the crop to become well established.

BY GUY DUBON @ReussirFL

An asparagus bed can be established using different parts of the asparagus: the transplant seedling, the crown and the seed. However, it is quite rare to see crops set up from seed. This technique was first developed in Peru. Some examples can be found in green asparagus crops in the United States and in white asparagus in Germany.

Several categories depending on the weight of the crown

While the low cost of seed reduces the expenditure required to establish the crop, it is expensive and difficult to control germination and then breeding and maintenance of the crop before the first harvest. The seedling and the crown are therefore the essential bases of asparagus cultivation around the world. In both cases, the plant material used combines the genetic potential of the variety (contained

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in the seed - most varieties are hybrids) and the vegetative potential of the plant. The seedling and the crown are therefore the result of combining the breeder's and the nursery's creativity. Seedlings are mainly used in South America, Asia and southern Italy for green asparagus, and sometimes in Spain for white asparagus. The mini-plug plant offers an alternative to the transplant seedling, the only variation being the volume of soil used. The crown is mainly used in Europe. Although the

MORE INFO

Transplanting: raising the plant before harvesting

The transplant option involves planting plug plants from the seedlings of a given year between June and September. The main advantage of this method is that it compensates for a lack of crown availability. The technique might also make it easier to choose the variety or to order plants later. What's more, the plug allows planting while in growing conditions. It can also make it easier to plant in heavy soil. In terms of organisation, the gap between harvest and planting allows producers to make best use of their workforce. But the time savings during the planting year are offset by the additional year required to maintain the asparagus. More precise monitoring of irrigation is required to ensure the plug takes as it has lower reserves than a crown does. Some nurseries supplying transplants offer several types of plugs.

G.Roy

Care must be taken to ensure that the roots of plug plants do not accumulate or "bunch-up".

MORE INFO

Crowns are cultivated by specialists

The crowns are, mostly, lifted and shipped according to customer demand

Crown production is carried out in soils that are free of disease (e.g. Purple Rhizoctone and Fusariasis). These are either new soils that have never received asparagus or are long-rotating soils (more than 6 to 7 years) that have previously been disinfected. Seeding in March is carried out at a density of 220,000 to 260,000 seeds/ha, depending on the richness of the soil, the calibres of crowns sought, and whether the varieties produce larger or smaller crowns. The germination rate is quite low (75 to 95%) and germination time is long. Therefore, control of weeds is required in the nursery. This is carried out using pre-lift herbicides followed by mechanical weeding between rows and manual weeding on the rows. The process is repeated every month as competition from weeds severely penalises the growth of asparagus and thus the calibre of the crowns. Plant protection is applied and monitored closely to prevent any disease or pest harming the foliage. Crowns are collected in February and March before sprouting. Depending on the customers' requests, this may involve grubbing and direct delivery or refrigerated storage of crowns (for no more than a month) prior to shipment. The grubbing of crowns requires the use of specific equipment, which is available to European and US nurseries. This decisive step in crown production justifies the development of transplants in some countries. The crowns are soaked in an anti-fungal treatment, except in the case of organic crowns for organic plants.

current EU regulations require a minimum weight of 25g, the asparagus crowns typically supplied to professionals weigh at least 40g. Some nurseries even offer several categories depending on the weight of the crown (e.g. 40-70g and 70g+, corresponding to categories A and A+).

The planting process varies depending on whether a plant or a crown is used. In the case of a crown, the first phase of breeding lasts one year and is entrusted to a nursery (see box). The plant material is then planted by the asparagus producer. "The crown constitutes 'dormant plant material.' In the first year, the plant develops its foliage. The crown grows and then accumulates reserves at the end of its vegetative cycle (autumn)." explained Stephan Pohl and Martign Davids, Limgroup asparagus specialists. In the year after planting, a first harvest of 25% of the asparagus' potential is possible. Then, the foliage must be allowed to grow again. In "planting year +2", the harvest reaches 50% of the potential. "Thanks to its accumulated reserves, the crown makes it easy to establish an asparagus bed and then for the transplant to take," according to Limgroup specialists. Using a crown, the time spent maintaining the plot (irrigation, weeding) is shorter before the first harvest. On the other hand, the additional cost of the crown means an increase in plant investment (about +30% compared to the seedling).

COMPARISON FOR ESTABLISHMENT OF ASPARAGUS BED

	Comparison between	crown	transplant	direct sow
planting conditions	possibility of planting on heavy land	+++++	++	+
	necessity for drip irrigation	0	+++	+++++
	difficulty of weed control	+	++	+++++
during the positioning	number of hours spent in the positioning of the crop	50 hours	30 hours	10 hours
	difficulty of work	+++++	+++	+
roots	horizontal development	+++++	+++	+
	vertical development	+	+++	+++++
	root depth in metres, the first year	0.4	0.6	0.8
	root depth in metres, the fifth year	0.6	1.2	2.0
asparagus bed : lifespan	average in years	8 years	10 years	12 years
difficulty of positioning		+	+++	+++++

Transplanting requires greater technical skill

A transplanted seedling is put in place a few months after the seed is sown, using "living plant material". It is therefore important to plan to introduce water as soon as the seedling is planted. A seedling can be planted later than a crown

MORE INFO

Choosing a good crown

A crown's calibre is a predictor of the energy it will have to help it to establish itself and ensure the emergence of stems.
Every bit as important as the weight of the crown itself is the regularity of the weight among a batch of crowns as uniformity assists planting (especially with high densities) and ensures the homogeneity of the plot to come. The crown consists of a tray and a system of fleshy roots that make up the plant's reserves. Look for a spread, balanced tray to facilitate its future development, as well as a significant number of spear buds, on average 5 to 7 (variable depending on the variety). This number is an indicator of the number of stems that will emerge. Plenty of vegetation in the first year will ensure good implantation of the asparagus. Stocky crowns can also facilitate machine planting and/or positioning during high density planting (8 to 9 crowns per linear metre).

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GREEN
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ANTHOCYANIN FREE
- Bacchus F1

PURPLE
COLD AND INTERMEDIATE AREAS
- Erasmus F1

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GREEN
INTERMEDIATE AREAS
- Radius F1
- Atticus F1
- Verdus F1

GREEN AND WHITE
INTERMEDIATE AREAS
- Magnus F1

GREEN
INTERMEDIATE AND WARM AREAS
- Amadeus F1

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can. In some cases, it is even possible to collect a very early harvest from the old asparagus bed before replanting. The year of planting is reserved for the development of the seedling (crown and foliage).
"Planting year +1" is also reserved for the growth of the crown. Indeed, it is difficult to envisage a harvest, even a partial one, except for early, well-established plantations. The harvest in "planting year + 2" yields 50% of the production potential. Transplanting a seedling requires a greater level of technical skill and closer monitoring of the crop than is required when transplanting a crown. However, the actual planting is easier as it is possible to see the seedlings, while the crowns are buried in the soil. However, eventually the roots of the transplanted seedlings go deeper into the soil to explore a larger area. The purchasing price is lower for seedlings. On the other hand, in the first year after planting seedlings, the asparagus producer essentially becomes a crown producer. This requires precise control of irrigation and especially careful weeding. Therefore, the money gained from adopting the seedling technique must be invested in maintaining the crop. Moreover, the "non-productive period of the lot" lasts for an additional year, which implies additional land costs. *AW*

7 tips for planting

1 Order the crowns one year before planting to make sure you have the desired variety and quantity. Ordering a transplant requires about 4 months' delivery time.

2 Anticipate and plan ahead when planting as it may require preparatory work such as the opening of trenches and possibly the drainage, de-compaction, sub-soiling, addition and incorporation of organic matter and/or dressing manure. Soil disinfection and the destruction of perennials may also be necessary.

3 Upon taking delivery of the crowns, if the batches are heterogeneous, it is important to sort the crowns according to their calibre to avoid competition that could prove fatal for the smallest crowns, which might wither within a few years (2 to 3 years) after planting.

4 Store the crowns in a well-ventilated and dry shed by spreading the bags (de-palletised), or in a cold chamber (2–5 degrees Celsius). They can be kept for 5 to 7 days under these conditions. Transplants should be kept outside and the hygrometry of the plug should be maintained.

5 Plant crowns or seedlings as soon as possible. It's best to plant warm plants in warm soil.

6 Aim to plant in good conditions. Allow the soil to dry up if there has been too much rain or wait for it to warm up if it has been too cold. Planting/establishing the crop is a key step in the subsequent performance of the asparagus throughout its entire production period (8 to 15 years).

7 Soak transplants and crowns in humic acid and/or mycorrhizae solutions to improve establishment and to provide health protection against Fusarium, Erwinia and Phytophthora.

Planting asparagus at height

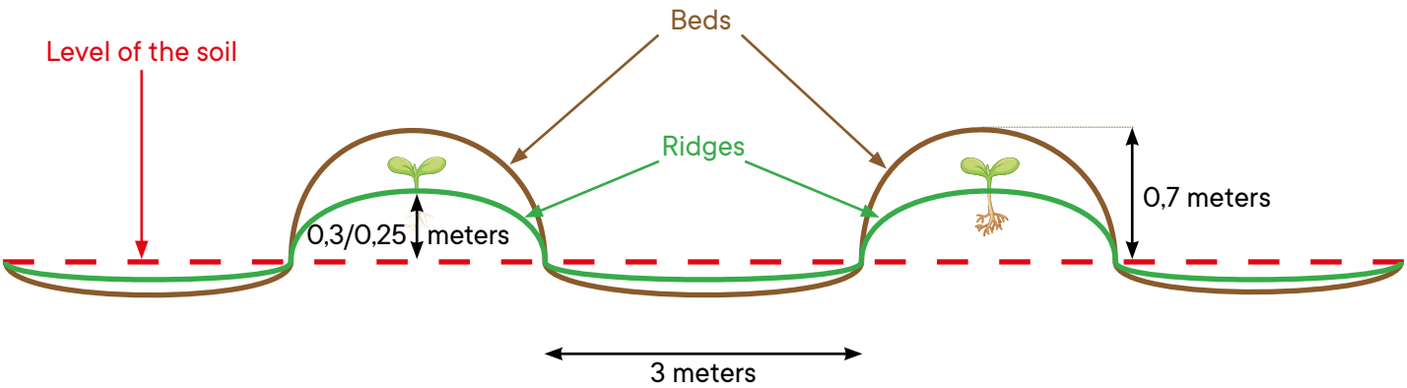
Ridge cropping makes more land available to the root system and promotes a high yield potential.

BY GUY DUBON @ReussirFL

The 70 cm-high beds provide a large root volume and thermal inertia, which increase and regulate the harvest.

The production potential of an asparagus field is conditional on the volume of good soil available to the root mass of each plant. In a plot, the 0-20 cm horizon is the richest. In soil analyses, it is not surprising to find that this first part of the soil has 3% organic matter, while at a 40-60cm depth, the organic matter rate is only 0.2%. In some cases, the plant will be unable to use this deep horizon because it is too sensitive to rises in the water table or is composed of hard rocks. The raised bed technique can respond to different situations. The objective is to take the good earth from across the entire surface area of the plot and bring it back to the ridge. The ridges are spread well apart, at least 3.50 m, and can be 30 cm in height. The planting is therefore done at between 25 and 30 cm above ground level. In this way, the space that can be explored by the roots is twice as large as for a traditional plantation. Also, from the first year of planting, the roots of the young crop find there way down to a depth of 0.70 m because the soil is rich and aerated. Usually, the roots only explore depths of up to 0.50 m. Ridge cropping also allows for natural drainage. Asparagus crowns are always found outside the wet zone during wet and rainy winters or springs. During the ridging-up of the crop, the earth from the inter-rows is brought in to form ridges of

DIAGRAM OF RIDGE CROPPING



The elevation of the beds does not necessarily require specific equipment, but does demand some adaptation of the conventional equipment

0.70 m in height. This large volume of soil, directly in contact with the thermal plastic, makes for a faster and more homogeneous warming of the ridge, which is 30-40% higher than normal. The extra heat stored allows for earlier and higher production, according to the ratio of 1°C extra equals a harvest gain of 30 kg per hectare per day during the early period. Ridge cropping also limits the raising of the crowns - the root plateau - which are already located in a comfort zone (aerated soil).

Concentrate moisture at the foot of plants

Growing in raised beds requires a great distance between rows in order to have the maximum amount of soil for the ridge and then for the bed. This constraint then turns into an advantage. In fact, the reduction in the number of rows per hectare means that the density of plants per linear metre has to be increased with a double-row planting. Fewer rows per hectare also brings savings on mulch and hoops and therefore in labour for harvesting and time spent on all maintenance work. The elevation of the beds does not necessarily require specific equipment, but does demand some adaptation of the conventional equipment with modifications that some manufacturers can offer. Tractors must have more ground clearance to allow them to straddle the beds. A higher bed also results in more exposure, resulting in faster drying. Plants will go deeper to look for moisture and compensate for some of this drying out. Localised irrigation is a must in order to concentrate moisture at the foot of the plants. About 10% more input will be required on the row and per hectare.

The technique developed in Peru by Christian Befve has now been adopted successfully in Europe, as Philippe Lebourg, an asparagus producer in the south-west of France, testified at the time of the IAD 2019 visits. *AW*

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An "out-of-the-ordinary" bed height

Philippe Lebourg, asparagus grower, and Jennyfer Lussan, crop manager, among the asparagus beds planted in an arc to follow the trajectory of the irrigation pivot.

The Lebourg family's asparagus is "out of the ordinary". Well spread-out beds, 70 cm high, in an arc around a watering pivot.

The Lebourg family is based in Cestas in the south-west of France, where it runs an 800 ha farm on which asparagus is a diversification crop, with 35 hectares planted in 2017 and 2018. Here, ridge cropping is justified because the layer of "alios", which limits the depth and drainage of the soil, is very close to the surface (40 or 50 cm deep). In 2018, the Lebourg family embarked on an "out-of-the-ordinary" project to make 70 cm beds in a semi-circle to follow the path of the watering pivot. The large gap between rows (more than 3.50 m) allows a large volume of earth to be brought into the bed. "And instead of planting 20 cm below the surface, we planted 20 cm above," explains Philippe Lebourg.

Modify and raise all equipment

"Large beds allow for more regular production because they reduce temperature contrasts. The first spring harvests have been slightly delayed, but volumes are rapidly becoming more stable," said Philippe Lebourg. In addition, the beds are covered with a double mulch: thermal mulch and tarpaulin. The planting was done in double rows at 30,000 crowns/ha, or 11 crowns per linear metre, mostly with Darzilla (70%), then Vitalim, Terralim, Cygnus and Prius. The biggest adaptation was to the hardware. "With beds 70 cm high, we had to modify and raise all of the equipment, from tractors to harvest assistance machines," said Lebourg. The move to a large gap has reduced the costs of setting up the crop as well as harvesting costs. In fact, going from 2.50 m to 3.63 m reduces the length of beds per hectare by 45%, from 4,000 to 2,875 linear metres (ml). There is a direct saving on the purchase of hoops and plastics. This also applies to the cost of harvesting, where there is a 30% gain: less distance covered and more spears to harvest per metre improve the hourly yield of the pickers. AW

MORE INFO

Also in Morocco

Ridge cropping has also been tested in Morocco, in the region of Kénitra. The area has shallow sandy soils with a concretion horizon of 30 cm. In addition, the rise of the water table in winter creates unfavourable conditions for the roots, with the risk of fusarium. This is why ridge cropping is practised on many crops, including fruit trees, mainly stone fruit, on raspberry, and, of course, on asparagus. Beds are made before planting to position the crowns 25–30 cm above point zero. The technique has elicited great interest in the asparagus sector. However, one limitation of the technique is the difficulty of making high beds for white asparagus production. On the other hand, the technique is very well suited to the production of green asparagus.

In Morocco, planting crowns at height helps to limit the risk of fusarium attacks due to excessive humidity in winter.

“The spore traps to the rescue”

Dealing with foliar diseases is the routine for every asparagus grower. However some new methods can now help to prevent earlier the occurence of them. Trials with spore traps have been done in Canada with interesting results.

BY AMÉLIE LACHAPELLE

The spore traps are installed soon after the end of the harvest

Over the last decade, consumers awareness of the agricultural use of pesticides around the world has greatly increased. This new reality has intensified the need for solutions to reduce our reliance to chemical pesticides. What if we could monitor and anticipate the arrival of pests and diseases before any sign of them in the field? Could we choose the best treatment and the most appropriate moment for spraying, considering in which conditions it will evolve? All this is essential to optimize fungicides applications, avoiding unnecessary treatments and, perhaps, moving forward toward a more sustainable production system. The spore trap is a device that anticipates fungal risks before visible signs of disease appear on plants in a given region. In fact, like pollen, a spore is a reproductive cell invisible to the naked eye which, carried by the wind, is deposited on the plant of the crop of interest. Its development gives place to the growth of fungal diseases such as rust (Puccinia asparagi), and purple spot (Stemphylium vesicarium) in asparagus. Currently, management strategies for these diseases are based essentially on visual observations in the field, guessing the best timing of fungicide applications. However, we already have all in hands to set up this method of integrated pest management in our own fields.

Purple spot and asparagus rust are well suited for spore sampling monitoring, because of their dispersion mode, spores coming from the crop residues at the surface of the soil. In this way, spore sampling, using the device installed near the ground, is at the forefront of capturing any spores that may emerge from the residues. There’re many different types

After every sampling period, a spore count is performed for both diseases collected with the device.

of spore sampling devices available and suited for different usage, each with their strengths and their weaknesses. In Québec, Canada, we decided to use Rotorod-type spore traps because of its relative universality. Sampling is conducted 3 days a week, with each sampling period being from 8:00 am to 2:00 pm. The device is working by solar energy and connected to a timer and a small motor, which makes turning an underlying bar at 2,400 rpm. Speed brings down two sticks from the bar by centrifugal force. Carried by the wind, the spore then adheres to the sticks integrated into the sensor in the field. After every sampling period, a spore count is performed for both diseases collected with the device.

Get answers quickly

With the help of the team of Hervé Van Der Heyden, phytopathologist at Phytodata Inc. here in Sherrington, Québec, the count is made with a microscope. Knowing that each fungus has is own DNA profile, we can hope that in a near future we will be able to speed up the count by using the PCR method like it's already used for other diseases in other crops like onions and potatoes. That way, once the sampling done, we can get a picture of what's going on in the field within 24 hours. From there, with the help of the closest weather station, we can target the optimal time to apply an appropriate disease-control product and more importantly, only if needed.

The first trials conducted in 2019 is very encouraging toward a better integrated management of purple spot and asparagus rust. A spore-sampling network at a regional scale between a group of asparagus growers would enhance the usefulness of the system, providing a clear picture of the evolution of these diseases during the season and over the years. Combined with other decision-support systems like field scouting and weather-based forecasters similar to TOMCAST used in North America, growers and crop advisors will be equipped for accurate decision making. At the key, a more precise positioning of the fungicide applications, leading to fewer sprayings, economy of scale, a more sustainable way of producing asparagus and improved social acceptability. During the next few years we will work to optimize the use of the spore traps by evaluating what is the best height to capture spores depending the period of the growing season because the location of the trap influences the amount of spores captured and the threshold of intervention. We will also working on understanding better the pattern of spore release which is essential to determining when and how long to sample to avoid underestimating the amount of spores; how can we use this to detect Fusarium spp. and other diseases that can affect the asparagus and developing a network in the major growing zones in Quebec. Lots of possibilities and interesting perspectives to come! *AW*

TESTIMONY

THE GROWER'S EXPERIENCE

Mario Rondeau, Asperges Primera, Green asparagus grower in St-Thomas, Québec, Canada

"The spore trap is a very interesting tool in reducing pesticides and improving the efficiency of phytosanitary treatment. It is still in development but very promising. We only have 1 year of experience with the sensor and the amount of information collected is important. With correlations with temperature, humidity, rains, etc., we will be able to predict the application period fairly well. We can also more clearly choose which mode of action of the fungicide suit best to the stage of development of the fungi as well. The use of the sensors will continue in 2020 with a lot of optimists!"

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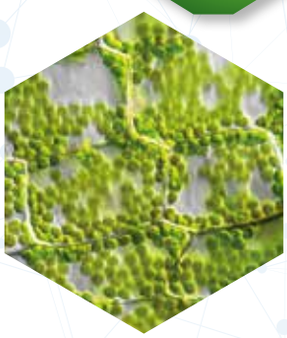

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Espárrago ORGÁNICO

Durante los últimos años la agricultura orgánica, biológica o ecológica ha tenido un aumento significativo a nivel mundial frente al sostenido crecimiento de la demanda de productos de origen orgánico.

BY VERONICA BARTRANOU

El espárrago por sí solo se ha posicionado como un ítem de prestigio y alta popularidad para todo tipo de consumidores. Si a esto le sumamos la condición de producto orgánico tenemos entonces un producto de demanda en continuo crecimiento.

Conceptos generales

Las preguntas más frecuentes entre los interesados en el manejo orgánico son ¿Cómo voy a reemplazar los agroquímicos necesarios para que mi cultivo sea rentable? ¿Conseguiré los mismos resultados utilizando productos orgánicos que agroquímicos convencionales?

Lo primero que hay que tener en cuenta es que no se trata de sustituir agroquímicos de síntesis con otros aprobados por los organismos correspondientes, se trata de un sistema completo y complejo de manejo del cultivo que involucra trabajar «en conjunto» con lo que la naturaleza nos ofrece para mantener el equilibrio y lograr producciones de calidad, en cantidad suficiente, sin producir contaminación de ningún tipo en el producto y en el ecosistema.

Una parte muy importante es tomar conciencia del hábitat que rodea al cultivo y cómo este nos puede ayudar en nuestro propósito. Vegetación autóctona, barreras naturales, topografía del terreno, condiciones climáticas, condición de los suelos, etc.

Con respecto al cultivo en sí, lo importante es tratar de que la planta desarrolle por sí misma la mayor cantidad de defensas posibles de manera tal que las aplicaciones fitosanitarias sean solo como ayuda y no el único método.

Las esparragueras que se desarrollen fuertes, equilibradas nutricionalmente, con la cantidad apropiada de agua y manejo adecuado de cosecha, estarán en mejores condiciones de resistir plagas, enfermedades y estrés. A su vez producirán la suficiente cantidad de espárrago como para que el cultivo sea rentable.

La incorporación de una buena fuente de materia orgánica en cantidades adecuadas, no solo dará la nutrición necesaria a la futura planta sino que también creará las condiciones óptimas para la proliferación de microrganismos benéficos

Cómo podemos lograr que todo esto ocurra? En primer término tomando conciencia que la agricultura orgánica es un sistema, no una receta y como tal hay que atender a todas las partes del mismo.

Manejo del cultivo

El espárrago es un cultivo que responde muy bien al manejo del agricultor. Esto nos da un plus con respecto a otros cultivos ya que todas las acciones que tomemos se manifestarán en el cultivo fácilmente. El espárrago orgánico tiene las mismas necesidades fisiológicas que un espárrago convencional. La forma de proporcionárselas será lo que deberemos adecuar para lograr la condición de orgánico.

Analizaremos los siguientes puntos :

Fertilización

La agricultura orgánica no centra la mayor importancia en los requerimientos de nutrientes de la planta, sino en la salud y fertilidad de los suelos. Fortaleceremos este concepto para asegurar la nutrición de la esparraguera de acuerdo a sus

necesidades y a la disponibilidad de nutrientes que un suelo sano pueda proporcionarle.
Lo importante es determinar la fuente de los diferentes nutrientes y las prácticas que podemos realizar para favorecer la fertilidad y sanidad del suelo. Las cantidades de nutrientes, estarán dadas por diversos factores inherentes a cada situación en particular (suelo, edad de las plantas, producción, etc.).
Las distintas prácticas que podemos realizar para favorecer la fertilidad del suelo son

- Asociaciones de cultivos o coberturas vegetales en los interfilares de la esparraguera. Siempre que se cuente con el agua suficiente, es una excelente práctica. Depende de las necesidades del suelo podremos consociar con leguminosas (inoculadas con rhizobium), cereales invernales, etc. esto también proporcionara al suelo la estructura necesaria para favorecer a los organismos benéficos. Estas asociaciones pueden ser temporarias o permanentes, cada agricultor verá la forma en que esta práctica le resulte más beneficiosa.
- Aplicar distintos tipos de compostas vegetales o animales, correctamente fermentadas, para evitar contaminación de suelo, agua o producto
- Aplicación de microrganismos
- Aplicación de minerales

Como en todos los casos, es importante contar con análisis de suelo y agua para saber en qué condiciones iniciaremos nuestro cultivo.
Igual que en cualquier cultivo de espárragos, especialmente en el orgánico, la fertilización de pre siembra es fundamental para el éxito
La incorporación de una buena fuente de materia orgánica en cantidades adecuadas, no solo dará la nutrición necesaria a la futura planta sino que también creará las condiciones óptimas para la proliferación de microrganismos benéficos de los cuales hablamos anteriormente. Podremos aplicar composta animal o vegetal. Además será muy importante agregar en este momento la cantidad suficiente de mineral fosfórico y si es necesario K como sulfato que se irán biodisponibilizando. También cualquier tipo de enmienda como por ejemplo yeso agrícola, sales calcáreas, o cualquier otra corrección que se requiera.
Es importante en este punto comenzar con la microbiología. Los microorganismos del suelo ponen nutrientes a disposición de las plantas (biodisponibilidad) a través de la descomposición de la materia orgánica y su reacción bioquímica con la porción mineral del suelo. Bacterias y hongos aeróbicos forman una relación simbiótica con las raíces de la planta proporcionándoles nutrientes fácilmente asimilables. Asimismo algunos, como las micorrizas, forman una capa protectora sobre la raíz que impide el ataque de patógenos. Otros producen antibióticos naturales como la estreptomicina, que destruye patógenos del suelo. Hay algunos organismos específicos que protegen las semillas y las plántulas contra varias enfermedades, varias especies de bacilos, trichodermas y pseudomonas que protegen las raíces de las plantas contra enfermedades infecciosas.
Existen en el mercado varios productos con mezclas de estos microrganismos benéficos con los que deberemos inocular el suelo y luego dar condiciones para su proliferación.
El suelo se compone de una cadena compleja de organismos. Su salud depende totalmente de que esa cadena se mantenga vibrante, activa y dinámica.
En esparragueras ya implantadas podemos utilizar una serie de productos para mantener la fertilidad de nuestro suelo. Podemos utilizar fuentes permitidas de N, P y K así como también micronutrientes. También es importante el agregado de ácidos húmicos y fúlvicos por las muchas ventajas que estos ofrecen.

En plantación se puede utilizar acolchados plásticos biodegradables para dar tiempo a la pequeña plántula a desarrollar fuerte y sana hasta poder competir con las malezas de forma efectiva.

Control de plagas y enfermedades

Partiremos de la base que una planta fuerte y equilibradamente nutrida será capaz de lidiar más fácilmente con cualquier plaga o enfermedad que quiera atacarla. Cuando las medidas preventivas, que incluyen controles culturales y físicos, no son capaces de controlar poblaciones de plagas y enfermedades, la última opción es el uso de productos permitidos.
El espárrago es un vegetal naturalmente rústico y con gran capacidad de adaptación lo que hace que sea bastante simple manejarlo de forma orgánica.
El monitoreo regular y sistemático de la esparraguera va a proveer de información acerca del estatus tanto de las poblaciones de plagas como de benéficos. Debemos saber identificar cuales son plagas, cuales son benéficos, y cuales son neutrales, sus ciclos de vida y qué comen cada uno de ellos. También nos permitirá evaluar si las medidas aplicadas para su control están dando el resultado esperado.
Si es posible, hay que elegir cultivares de espárrago que sean resistentes a algunas de las principales plagas y enfermedades en su área.
Identificar el daño temprano en el ciclo del cultivo, es una forma efectiva para reducir las poblaciones de plagas y el daño producido por ellas. Los insectos también pueden ser vectores de en-

fermedades, por lo que reconocer los síntomas de enfermedades comunes es fundamental para que el control sea integral.
El manejo orgánico de plagas puede incluir trampas (feromonas, adhesivas, de agua, de luz) la liberación de insectos benéficos, el uso de cultivos trampa, y otras técnicas agronómicas aprobadas para la producción orgánica.
El control de las enfermedades seguirá las mismas reglas. Prevención, observación y control integral.
El uso de pesticidas es un último recurso en la producción orgánica, y deberán ser productos aprobados e incluidos en el listado de productos permitidos. Pueden ser extractos de vegetales como piretrinas, neem, cítricos, chiles, etc. Productos minerales como azufre, cobre, arcillas, silicatos, caolín, aceites, jabón de potasa, etc.
La utilización del pirodiservo es de gran ayuda en lugares donde esté permitido el uso de fuego.

Control de malezas

No hay muchas opciones para el control de malezas, lo más seguro es el control mecánico o manual. Tener en cuenta que las malezas, bien llevadas, pueden ser un aliado en contra de plagas y enfermedades.
En plantación se puede utilizar acolchados plásticos biodegradables para dar tiempo a la pequeña plántula a desarrollar fuerte y sana hasta poder competir con las malezas de forma efectiva.
Existen herbicidas orgánicos pero no son selectivos y a veces tampoco muy eficientes.

Riego

El manejo del riego en la esparraguera orgánica no difiere de la de sistema convencional. Lo haremos de manera tal de incorporarlo al sistema ecológico que hemos creado para permitir la salud del suelo y por lo tanto de la planta.
Como vemos es todo un sistema que tenemos que manejar, o más bien llevar a las condiciones de equilibrio que logren que nuestro cultivo se desarrolle en condiciones óptimas.
La agricultura orgánica es una forma de vida, una diferente forma de pensar y actuar, que nos aportará no solo un interesante beneficio económico sino también la satisfacción de estar colaborando con la salud del planeta. *AW*

ABSTRACT

Veronica Bartranou,
Agronomist

Organic asparagus has the same physiological needs as conventional asparagus. It is how we meet these needs that we must adjust in order to achieve organic status. Organic agriculture places greatest importance on the health and fertility of soils. We need to strengthen these elements according to the asparagus' needs and the nutrients present in the soil so as to ensure the plant receives sufficient nutrition.

It is assumed that a strong and well-nourished plant will be able to deal more easily with any pest or disease that wishes to attack it. Regular and systematic monitoring of asparagus will provide information about the status of both pest and beneficial populations. Such supervision will also allow us to assess whether the control measures applied are giving the expected results. If possible, choose asparagus cultivars that are resistant to some of the major pests and diseases in your area.

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De nouvelles références pour les carences minérales

Les carences ont un impact majeur sur la réduction du volume et du poids des racines. Elles peuvent s'extérioriser de différentes manières et se confondent avec d'autres symptômes. Pour un diagnostic certain, une analyse foliaire, complétée d'une analyse de sol est nécessaire.

BY CARMEN FELLER AND GILLES L'EVEQUE

Les travaux de recherches ont permis d'induire des carences et d'en évaluer les impacts.

ABSTRACT

Carmen Feller, Leibniz Institute of Vegetable and Ornamental Crops Grossbeeren – Germany

Gilles L'Eveque, Consultant Asperge - France

In a context of genetic evolution of asparagus varieties and optimization of cultivation techniques, research work on the identification of asparagus deficiencies resumed in Germany in 2013 and 2014. This work confirms the references established by Bergmann for Magnesium, Sulfur and Zinc. They modify upwards (up to triple), the reference values of Calcium, Potassium, Boron and Manganese. In addition, they highlight the diversity of deficiency symptoms and the risk of confusion with other causes. Also and as a major fact, they demonstrate the impact of severe deficiencies on the reduction of root mass (except manganese).

L'évolution génétique, l'apparition de nouvelles variétés et l'optimisation des techniques culturales de ces dix dernières années, posent la question de l'actualité des références établies en matière d'alimentation minérale de l'asperge par Morse en 1916; Born en 1979, Follett en 1984, Benson et Paulsen en 1990, Hartmann et Warman en 1991, puis Bergman en 1993.

De nouvelles références pour quatre éléments

Aujourd'hui, les derniers travaux du Dr C. Feller et d'A. Müller du Leibniz Institute of Vegetable and Ornamental Crops, à Großbeeren en Allemagne, complètent et corrigent les travaux réalisés 12 ans plus tôt. Ces travaux ont été réalisés pendant deux années consécutives (2013 et 2014) selon une méthodologie permettant d'induire des carences et d'en évaluer les impacts. (voir encadré 1)

Au vu des résultats (voir taleau 1), les références établies par Bergmann en 1993 restent d'actualité. Pour le magnésium, elles sont comprises entre 0.15 et 0.30 %. Pour le soufre elles sont sont supérieures à 0.30% et pour le zinc entre 20 et 60 ppm. En revanche, les références analytiques établies par Bergmann en 1993 doivent être augmentées. Pour le calcium, elles passent de 0.40 % à plus de 0.80 %, le potassium de 1.5 à 2.5 %. Pour le bore, la référence de 50 ppm augment à plus de 150 ppm et celle du manganèse de 75 à plus de 100 ppm. Ces valeurs établissent ainsi de nouvelles références pour ces quatre éléments.

Un véritable impact sur le potentiel productif

Au-delà des conséquences sur la fonction chlorophyllienne (perte de surface foliaire), les résultats de cette recherche mettent en évidence la perte de masse racinaire, organe majeur de stockage des réserves glucidiques. Hormis la carence en manganèse, toutes les autres carences ont un impact majeur sur la réduction du volume et du poids des racines. Dans l'ordre, la carence magnésienne (Mg) et soufrée (S) sont les plus significatives avec une perte de masse racinaire de 60 et 57%. Viennent ensuite le potassium (K), le zinc (Zn) et le bore (B), avec respectivement 40%, 32% et 21% de perte. Elle n'a pas été mesuré pour le calcium (Ca), mais reste visuellement significative. Bien souvent les symptômes de carence se confondent avec d'autres symptômes. Ils n'ont pas les mêmes origines et nécessitent un examen approfondi. Les causes peuvent être nombreuses : maladies, insectes, sècheresse, gel, phytotoxicité d'engrais foliaires ou d'herbicides. Aussi, les carences peuvent s'extérioriser de différentes manières : chloroses, nécroses partielles ou totales, couleurs des cladodes et des fleurs, déformations et nanismes plus ou moins importants. Pour un diagnostic certain, une analyse foliaire, complétée d'une analyse de sol est nécessaire. Le tableau des résultats « Analyse des rameaux et des cladodes », peut d'ores et déjà servir de référentiel. AW

PLUS D'INFOS

Méthodologie des travaux du Dr C. Feller et d'A. Müller

Les asperges ont été cultivées pendant deux années consécutives (2013 et 2014). La 1ère année, les plants ont été cultivés en pots de 3l, remplis de terre. L'année suivante, ils ont été transplantés dans des pots de 12 litres, remplis de matière neutre (sable de quartz lavé). A compter de ce moment, les plants ont été fertilisés toutes les semaines à l'aide d'une solution nutritive contenant tous les éléments nutritifs essentiels, sauf celui qui entraînera la carence. Ils ont été comparés à un témoin normalement fertilisé. Les éléments manquants étaient soit le potassium (K), le magnésium (Mg), le soufre (S), le bore (B), le manganèse (Mn) ou le zinc (Zn). Les mesures ont été réalisées sur 3 variétés fréquemment cultivées en Allemagne (Gijnlim, Rapsody et Cumulus). En 2014, deux modalités supplémentaires induisant une carence en phosphore (P) et en calcium (Ca) ont été ajoutés sur la variété « Cumulus ». Ces deux éléments n'ont été examinés que visuellement. Pendant la culture 2014, tous les symptômes visibles de carence ont été enregistrées et photographiés. Fin 2014, les plantes ont été récoltées, puis analysées. Ces analyses ont été faites sur les cladodes, les rameaux et des racines. Elles ont été complétées par la mesure en degré Brix des racines (fin 2014).

ANALYSE DES RAMEAUX ET DES CLADODES

Résultats en % ou ppm sur Matière Sèche	% Calcium	% Magnésium	% Potassium	% Soufre	Bore (ppm)	Manganèse (ppm)	Zinc (ppm)
Valeur du TEMOIN	0.87	0.20	2.78	0.39	163	81	21
Sans Mg	0.62	0.05	2.92	0.31	140	72	27
Sans Mn	0.82	0.19	2.45	0.36	163	62	20
Sans K	1.51	0.42	0.42	0.34	203	140	31
Sans Zn	0.91	0.21	2.72	0.41	170	77	18
Sans B	0.82	0.20	2.68	0.41	31	83	22
Sans S	1.02	0.26	2.69	0.20	217	120	25
Ref. Bergmann 1993	**0.40 à 0.80**	**0.15 à 0.30**	**1.5 à 2.4**	**> 0.30**	**40 à 100**	**25 à 100**	**20 à 60**

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Brevet européen n° 1.754.412 délivré le 10 décembre 2008 (Procédé de traitement phytosanitaire biologique des végétaux notamment de la vigne et compositions adaptées)

Quels symptômes ? Quel rôle ?

CARENCE EN SOUFRE

Symptômes

» Entraîne une moindre production de chlorophylle.

» Couleur de la jeune végétation « vert fluo ».

» Perturbe la croissance et l'assimilation de l'azote.

» Plus visible (couleur vert pâle) sur les jeunes pousses. Tend à disparaître avec le vieillissement de la plante.

» Couleur très pâle des fleurs.

Rôle du soufre

» Participe à la production d'acides aminés essentiels et dans l'activation des enzymes liés à la croissance.

Pertes racinaires

» Réduction très importante du poids des racines : 57%.

CARENCE EN MAGNÉSIUM

Symptômes

» Sur pousses âgées : cladodes de couleur jaune or, voire desséchés si la carence persiste. La tige reste verte.

» Sur jeunes pousses, les symptômes sont moins marqués.

» Particularité : le magnésium est très peu mobile dans la plante.

Rôle du magnésium

» Elément important pour la synthèse de la chlorophylle et la photosynthèse.

» Participe à la synthèse des éléments stockés dans les racines (sucres, protéines...).

» Fondamental pour la construction cellulaire, principalement en phase de croissance de l'asperge.

Pertes racinaires

» Réduction très importante du poids des racines : 60%.

CARENCE EN BORE

Symptômes

» Visibles sur jeunes et vieilles pousses.

» Sur jeunes pousses : flétrissement brusque des extrémités, suivi d'un dessèchement et de la mort des cladodes.

» Sur vieilles pousses : cladodes courts et nécrotiques.

Rôle du bore

» Favorise la croissance en longueur des cellules et la stabilité des parois cellulaires.

» Favorise la production de sucres.

Pertes racinaires

» Réduction significative du poids des racines : 21%.

CARENCE EN MANGANÈSE

Symptômes

» Jeunes pousses chlorotiques et nécrosées.

» Jeunes pousses vertes et flétries.

» Déformations inhabituelles des pousses latérales.

» Décoloration blanchâtre des pointes des cladodes.

Rôle du manganèse

» Important pour la photosynthèse et la formation des chloroplastes.

» Favorise la production des jeunes racines latérales.

» Active la croissance en influençant la croissance en longueur des cellules.

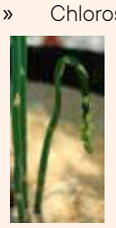
Pertes racinaires

» Poids des racines non affecté.

CARENCE EN CALCIUM

Symptômes

» Chlorose et nécrose des jeunes pousses.



» Augmentation de la production de graines, même pour les variétés mâles.

» Organes et racines raccourcis.

» Mort des jeunes pousses, avec production de nouvelles pousses qui meurent à leur tour en cas de carence sévère.

Rôle du calcium

» Stabilisation et construction des parois cellulaires.

» Influence l'activité des enzymes en lien avec les membranes.

» Favorise la croissance racinaire.

» Nécessaire à la germination des pollens.

Pertes racinaires

» Non mesurées, mais réduction visuelle importante.

CARENCE EN ZINC

Symptômes

» Entre nœuds raccourcis et distance entre cladodes fortement réduite.

» Nanisme, pousse en forme de rosette.

» Coloration foncée des cladodes.

Rôle du zinc

» Elément de constitution des enzymes qui jouent un rôle majeur pour la photosynthèse, le métabolisme respiratoire, la synthèse des protéines et la production des substances de croissance.

» Influence la production d'acide indole–3–acétique (AIA), important pour la croissance.

Pertes racinaires

» Réduction significative du poids des racines : 32%.

CARENCE EN POTASSIUM

Symptômes

» Décoloration du bout des cladodes presque identique au symptôme de carence en magnésium, avec un dessèchement plus prononcé.

» Pousses âgées : jaunissement et dessèchement de la végétation si la carence persiste.

» Particularité : la potasse est très mobile dans la plante.

Rôle du potassium

» Régulateur des stomates et de la transpiration.

» Améliore les réserves en sucre.

» Intervient sur la résistance au gel.

Pertes racinaires

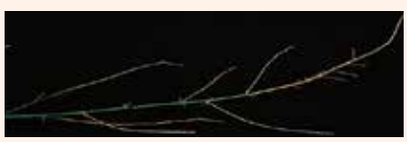
» Réduction importante du poids des racines : 40%

CARENCE EN PHOSPHORE

Symptômes

» Cladodes des vieilles pousses plus foncés et qui finissent par tomber

» Dessèchement et chutes des cladodes des bouts des tiges, en cas de carence sévère



Rôle du phosphore

» Elément de construction des acides nucléiques et de transfert de l'ATP.

» Joue un rôle de maintien dans la structure cellulaire.

» Favorise la floraison et la fructification.

Pertes racinaires

» Non mesurées.

Different applications in the wheelings; rye, straw and bare soil, respectively.

Sustainable soil management for asparagus stand longevity

Field operations associated with UK asparagus production (e.g. re-ridging, sub-soiling, spray operations, harvest traffic) can result in progressive and severe compaction of all inter-bed wheelings, which may have adverse effects on crop health and productivity. This compaction can increase soil erosion risk and have both environmental and economic consequences.

BY LUCIE MASKOVA, DR. ROB SIMMONS AND DR. LYNDA DEEKS (AHDB HORTICULTURE)

Lucie Maskova,
Cranfield University

Dr. Rob Simmons,
Cranfield University

In the UK, 'asparagus decline' due primarily to crown and root rot caused by Phytophthora asparagi and Fusarium species can result in up to 60% loss of stand amounting to up to £16M in lost revenue per annum. With key operations causing the damage, finding practical solutions to this problem is essential. Only a 10% reduction in yield losses due to 'asparagus decline' would amount to a saving of >£1.6M to UK asparagus growers per year.

A team from Cranfield University, in collaboration with Cobrey Farms, have been sponsored by AHDB (AHDB Horticulture FV 450a), to develop a suite of best management practices (BMPs) targeted at either preventing or remediating soil compaction in inter-bed wheelings. The main aims of these BMPs are to improve soil structure, reduce soil erosion risk, promote asparagus yields and stand longevity.

Soil management problem

The compaction caused by standard operational procedures, is often eliminated by sub-soiling in crop production. For asparagus, sub-soiling of inter-bed wheelings is used to promote infiltration of water, which reduces the amount of surface water run-off and therefore reduces the risk of soil erosion. However, sub-soiling as well as annual re-ridging are highly invasive. These operations cause damage to asparagus storage roots making the crop susceptible to crown and root rot promoting yield decline.

Experimental field trial

The length of field trial is critical to understanding the impact of management decisions. Changes, in particular improvements to soil structure delivered by modification to practices, can take years before their effect is fully appreciated. Therefore, in order to prove BMP advice, a long-term experimental field trial was established in April 2016 on a 4.5 ha asparagus field in Ross-on-Wye, south eastern Herefordshire, England. The trial comprises 48 experimental plots of the variety Gijnlim, which represents about 70% of UK field grown asparagus.

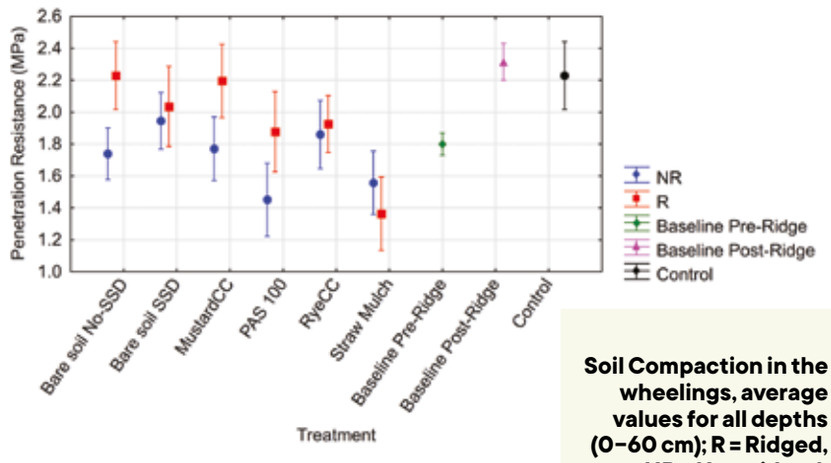
A range of soil management practices were established that included mulch applications in the wheelings, companion cropping, shallow soil disturbance (SSD, also called sub-soiling) and conventional ridging (R) practices against zero-tillage (not ridged nor sub-soiled) options.

The impacts of different soil management practices are being evaluated via measurements on asparagus storage root distribution, yields and general crop health observations. Changes to soil structure were assessed using a selection of grower-friendly soil structure indicators, such as speed of water infiltration, penetrative resistance and visual soil assessment.

Based on previous research undertaken by Cranfield University and Cobrey Farms, it had been established that SSD in association with straw or PAS 100 compost application reduced run-off and soil erosion by more than 80%. Therefore, PAS 100 compost and straw mulch were used in this experiment in SSD trials, to test effects of long-term mulch application on asparagus performance and soil structure.

Literature often highlights that the generation of biopores through a bio-drilling effect of cover crops and companion crops in compacted soils can result

SOIL COMPACTION IN THE WHEELINGS



Soil Compaction in the wheelings, average values for all depths (0–60 cm); R = Ridged, NR = Non-ridged, SSD = Sub-soiled, No-SSD = Not sub-soiled, Control = Conventional practice (Bare soil No-SSD Ridged), CC = Companion Crop; Vertical bars denote 0.95 confidence interval.

in increased yield of follow-on cash crops. Plant roots 'engineer' the soil structure by penetrating and displacing it, creating air pores, by depositing adhesive compounds which encourage soil aggregation, and via a range of other root deposits which provide energy and nutrient sources for soil biota. The importance of canopy cover, stem density and root density in reducing soil erosion has also been demonstrated. Use of companion crops therefore presents an opportunity to provide soil protection and erosion control within asparagus production systems as well as bio-remediate soil structure. Companion crops included in the trial are rye (Cereale secale), which is commonly used amongst North American asparagus growers and mustard (Sinapis alba), which was selected for its extensive rooting system and associated bio-drilling potential.
However, to date, companion cropping has not been adopted within UK asparagus systems as a common practice. Yet the use of companion crops in UK asparagus production as a replacement for conventional sub-soiling practices presents an opportunity to provide soil structural rejuvenation, alleviation of soil compaction and soil erosion control.

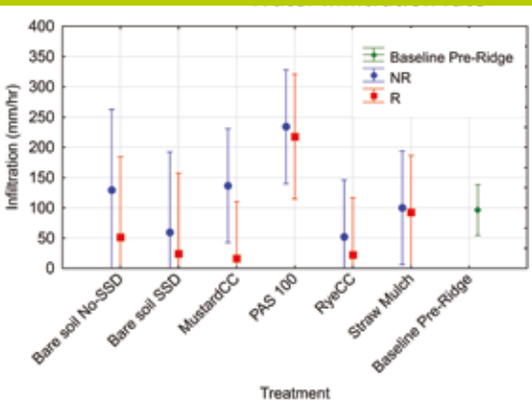
Management practice effects on soil structure

Three years after the establishment of the management treatments, meaningful differences can be observed between several BMP treatments. The Rye companion crop non-ridged (NR) did not alleviate soil compaction in any depth. It was in fact more compact than the bare soil zero-tillage treatment. The Rye NR treatment has also been consistently associated with lower yields than the bare soil zero-tillage treatment, suggesting that soil structure might be playing a crucial role in sustaining high asparagus yields.
In non-ridged treatments, there was generally good soil structure and high infiltration rates. As expected, soils that were less compacted were associated with increased infiltration rates and soil moisture. Although asparagus in general prefers light, well drained soils, it can temporarily tolerate wet heavier soil conditions. Problems may arise in the winter/spring when the water ponds on the surface, increasing risks of disease transmission (in particular Phytophthora crown rot). Mulches not only retain water in the deeper horizons, but also on the surface. The effect of high moisture soils on asparagus root systems and susceptibility to diseases is yet to be fully understood. Higher soil compaction in the inter-bed wheelings was in most cases associated with ridging. Sub-soiling partially alleviated compaction caused by ridging, however, improvements to soil structure were also seen with the zero-tillage treatments. Therefore, given the additional cost of two further passes required to sub-soil, the use of post-ridging sub-soiling is economically questionable.
Mulch applications (especially straw mulch) not only prevented soil compaction but also remediated the pre-existing baseline soil compaction. Straw mulch was the only treatment where ridging did not compact soil further. The use of mulches also lead to better soil structure than seen with the use of companion crops. This could be due to a higher observed abundance of earth worms and other soil biota, which were seen in the mulch plots, and have previously been proven to have a positive effect on soil structure. This will be further studied in 2020.Water infiltration was significantly better in PAS 100 compost plots as compared to other treatments. This also corresponded with observed improvements to soil structure.

Asparagus Root System

Although we cannot confirm yet whether size of the root system tells us anything about asparagus yields directly, several strong trends have been observed between root and soil data. Most notably we found that higher infiltration rate in inter-bed wheelings of ridged treatments was strongly associated with higher root masses at 30-60cm depths and 60cm distance from the crown. In contrast, where the soil compaction of the soil was higher, fewer roots (lower root masses) were found at 30-60cm depth at a distance of 30cm from the crown, while more roots (higher root masses) were found closer to the soil surface at 60cm distance from the crown. Initial results of this trial demonstrate that soil compaction and tillage operations affect the size of the root system. The trials will continue to investigate how this affects yield and stand longevity in future years. Over the next 3-4 years, this field experiment will continue to generate valuable insights on the efficacy of best soil management practices to prevent soil compaction and erosion and increase stand longevity. AW

WATER INFILTRATION RATE



Water infiltration rate on different treatments; R = Ridged, NR = Non-ridged, SSD = Sub-soiled, No-SSD = Not sub-soiled, CC = Companion Crop; Vertical bars denote 0.95 confidence interval.

Water logging in the inter-row wheelings.

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Plastic films not only mean gains in precocity but also help to manage the harvest of asparagus according to the weather forecast and market demand.

Plastic films boost asparagus

Plastic films form the basis for very important gains in precocity and profitability. The multiplication of films offers many combinations which have to be managed. Their use also has an increasingly high cost, which must also be controlled.

BY GUY DUBON @ReussirFL

The use of plastic cover films has brought asparagus cultivation into a new area. In the 1980s, a few microns of clear thermal plastic first warmed the soil more quickly to gain precocity, and then the widespread use of black/white pocket plastics in the 2000s profoundly changed production techniques. Today, the use of arches and the combining of plastics mean that production can be managed according to the meteorology, the production slots targeted, the availability of labour and market prices.

But plastic films are first and foremost used as a way to improve the yields of an asparagus crop. According to data compiled by Christian Befve, an asparagus consultant, each plastic and plastic combination brings a gain in production. They all allow yields to be doubled (see graph 1). Plastic films act first on the temperature of the soil. The rise in temperature depends on the ambient temperature but especially on the sunlight and the intensity of the light that passes through the thermal mulch. Temperature is a decisive factor in the growth of asparagus. Physiologi-

cal data indicate that asparagus wakes up when the temperature reaches 11 degrees at 10 cm below the root plateau for early varieties (Darlise, Vitalim etc), 12 degrees for mid-season varieties and 13 degrees for late varieties. Temperature also has a direct influence on productivity. At the beginning of the season a degree Celsius gained starting from when the plant wakes means an extra 30 kg/ha/day harvested, in mid-season it is 10 kg/ha/day. On the other hand, if the temperature exceeds 25 degrees C at 10 cm below the plateau, the yield can drop in the order of 10%. At above 35oC, production activity is almost nil.

The temperature in the mound is very important for the growth of asparagus, for the quantity harvested and the quality of the spears. According to established data, the asparagus must be in a "temperature comfort range" of between 18 to 20 degrees Celsius at 20 cm below the top of the mound. Below this, the asparagus grows little. Above, spear quality problems appear (pinking, flowering). The data provided by Engels Machines show that it is possible to regulate the temperature of the mound by managing the different plastics and their positioning. The management of plastics is conducted according to the temperature of the mound. This management is subject to different influences and depends on a variety of objectives: desire for precocity, reduction of production peaks, spread of production, regularity of quality, etc. and better management of the workforce.

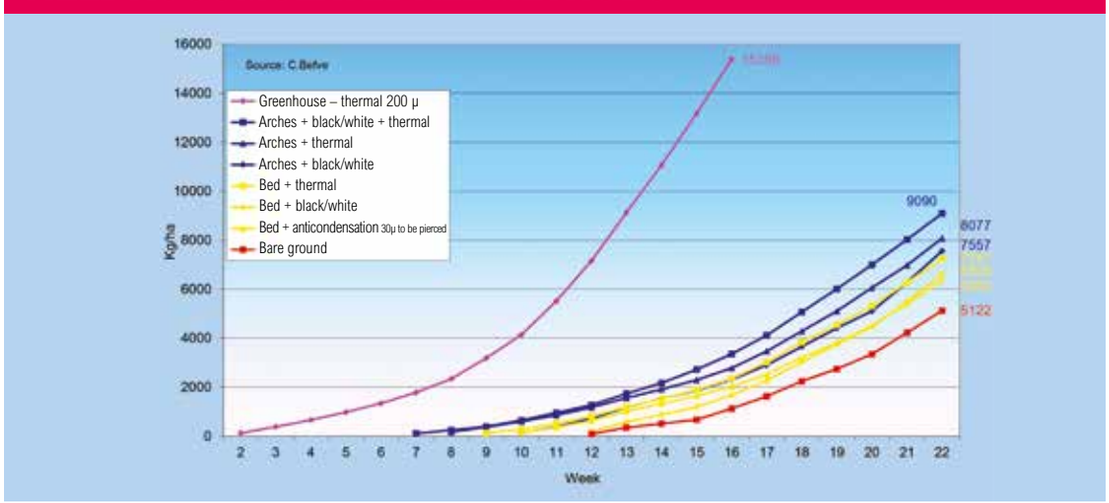
Playing with different configurations of films

The increase in temperature in the mound is related to the radiant heat reaching the mound. This can be modulated in different ways. Engels Machines has defined 6 installation combinations of three mulch films that can influence the temperature increase in the mound. Taking 100 as a base for the mini-tunnel+black plastic configuration, graph 2 shows a decreasing gradient of the thermal effect of different combinations. It can be noted that in all cases the white face reduces the thermal effect of the sun exposure the most. But it cannot be said that it cools the mound. This management of the various plastic covers can be carried out during the harvest with assistance machines with no additional working time. Regulation of the mound temperature requires forward planning by observing the temperature in the mound and taking into account the future climatic parameters (temperature, sunshine, rain, etc.). So Engels Machines has defined the management criteria and offers a plastics management service. It shows that it is possible to moderate the temperature of the mound in the plant's comfort zone, 18 to 22 degrees Celsius, by adjusting the different configurations of the films (see Graph 3). According to Tom Smolders of Engels Machines, who worked on establishing this data, a more stable temperature over 24 hours reduces the percentage of hollow stems. This qualitative problem occurs when the temperature difference between the top of the mound and the root plateau is greater than 4oC. The different plastic films are not only for gaining in precocity. On a late variety (eg Backlim) it is also possible to use a combination of high-performance film to group production and limit the harvest period in order to lengthen the growing period of the plant.

"Compromise solutions" between precocity and use

Given the strategic importance of plastic films, manufacturers have expanded their range with increasingly specific and technical films. The thickness of the films is increasing the main reason for which is the direction of laying on the arch. According to Daios, the film placed perpendicularly requires a thickness of 50 microns to ensure their maintenance. On the other hand, a film placed parallel to the arch must be of greater thickness of 70 microns. With the development of harvesting machines, this mini-tunnel technique is being widely developed because it allows the use of two plastic layers without increasing the time devoted to the laying and lifting of films. While the covering and uncovering of films placed perpendicular to the arches increase harvest time by 30%. The race

YIELD ACCUMULATED ALL METHODS



MORE INFO

Controlling with plastics

Early production: planting an early variety at shallow depths with several plastics and mini-tunnels

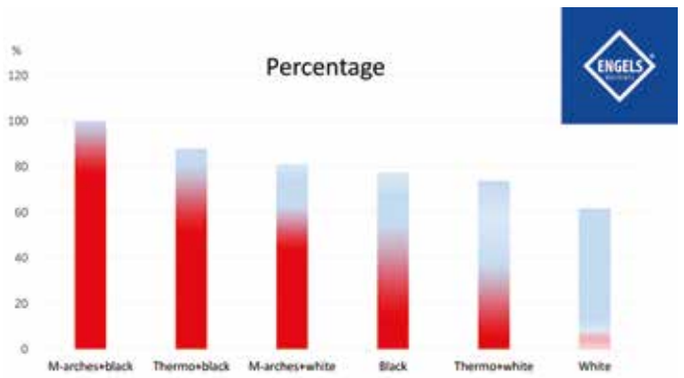
Late production: plant a late variety at depth and cover with white plastic

Grouped production: regulate the temperature of the soil at the root plateau (between 18 and 21 degrees Celsius) depending on the variety by managing the different plastic films

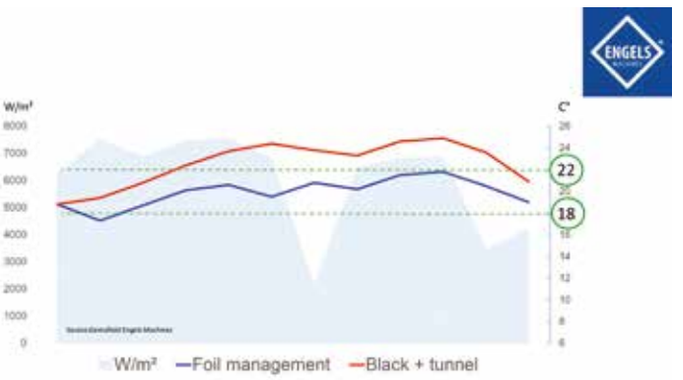
Spread-out production: plant several varieties at different depths and use several combinations of plastic films

Anticipating to limit temperature

Black mulch heats up more than white. White mulch limits the temperature in the mound despite a slight increase in temperature. It doesn't cool the mound. It is therefore necessary to anticipate the changeover of face well before temperatures in the ground become too high. To regulate the temperature of the mound moderately, after the black plastic + tunnel it is better to use the white face and keep the other plastic on the tunnel, rather than take the plastic off of the tunnel and keep only the black. This second technique causes too great a temperature range in the mound.



Graph 2: Decreasing gradient of the thermal effect of different combinations



Graph 3: Effect foi management

for the precocity brought about by the use of plastic films comes at a cost. It is quantified by adding the costs of plastic films, the depreciation of the arches and harvesting machines, the cost of refilling pocket films (estimated at 0.12 euros in France), laying and lifting, storage, etc. and the cost of recycling, which will only increase.
In response to this, some manufacturers offer "compromise solutions" between precocity and ease of use by welding together a black/white pocket plastic film and a thermal plastic one. This double film creates an air space between the black/white film and the thermal film that acts like a mattress and allows the mound to heat up. This double film can be placed on arches with a new insulating effect between the film and the mound. This area permits the condensation of moisture from the area to re-humidify the mound. According to Europlastic, the manufacturer of this film, the thermal film is enriched with UV stabilisers in order to increase its lifespan and make it equivalent to the black/white cover. The two films used together also have better resistance to handling that extends the life of the cover. Additionally, at the time of set up it requires one single filling of the pockets. It also means less rolls in storage post-harvest. So Europlastic is talking about an economical film.
In its range of mulch films, Reyenvas offers a 7-layer film using technology to incorporate a thermal layer inside the black-white film. Combining these properties gains 3 to 5 days of precocity compared to a conventional black/white film. This unique film limits the cost of refilling pockets, handling, and then storing. The 7-layer film is thicker (175 microns) and more resistant. There is a tendency evolving towards thicker films that will also be more resistant. Their lifespan will be extended to provide a partial solution to the plastic recycling problem. The lengthening of the film life, also offered by Daios, increases the years of film depreciation and reduces the cost of recovery taxes and disposal difficulties. It is becoming desirable for plastics to be more discreet. For this reason, manufacturers such as Daios and Reyenvas offer green/white films to better integrate into the landscape. According to Daios, these films would also provide temperature gains compared to black/white film. *AW*

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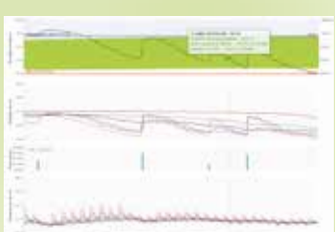

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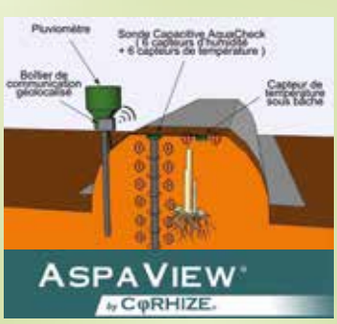

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Black/white foil 1 is placed directly on the asparagus bed with the black side facing up. Transparent foil 2 is placed over M-arcs 3 to create a tunnel.

Configuration 2

Black/white foil 1 is applied directly to the asparagus bed with the white side facing up. Transparent foil 2 is placed over M-arcs 3 to create a tunnel.

Configuration 3

Black/white foil 1 is applied directly to the asparagus bed with the black side facing up. Transparent foil 2 is placed directly over it.

Configuration 4

Black/white foil 1 is applied directly to the asparagus bed with the white side facing up. Transparent foil 2 is placed directly over it.

Configuration 5

Black/white foil 1 is applied directly to the asparagus bed with the black side facing up. Transparent foil 2 is placed next to the asparagus bed.

Configuration 6

Black/white foil 1 is applied directly to the asparagus bed with the white side facing up. Transparent foil 2 is placed next to the asparagus bed.

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Grâce à la chaleur et l'humidité concentrée sur le dessus de la butte le Multitech permet une poussent plus rapide des turions, un gain en calibre, et un effet de groupage des Asperges.

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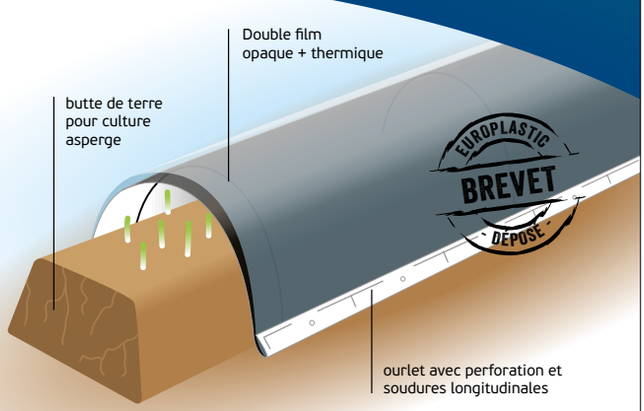
Meilleur ratio taux horaire/ kg/ asperge récolté et commercialisé.
Un seul film à remplir, un seul film à poser et à manipuler durant la saison. Un seul film à conditionner en fin de saison (économie de disque et tube d'enroulage). S'utilise sur tout type d'arceaux.



MORE INFO

Plastic and quality

The quality of the asparagus is made in the mound and on the mound. The use of plastics plays a big role in the quality of crops.
In the mound: It is important to limit the temperature range, between 18 and 21 degrees Celsius depending on the variety, to prevent the asparagus tip from flowering and to keep its tip closed.
On the mound: the temperature on the surface of the mound, and under the plastic, can get very high (60oC) causing the tip to burn.
To reduce the losses due to this problem, harvesting must be done early in the morning, the plastic blanket must be turned white face on the outside. It is possible to place hoops very close to the mound that create an air cushion between the mound and the black/white plastic.

Green asparagus needs transparency

More than precocity, plastic films used for green asparagus have a protective role against bad weather and pests.

To green asparagus, only transparent films are used, as the spear needs light to produce chlorophyll (green) or anthocyanins (violet, purple)

For the production of green asparagus, the use of plastic films meets different objectives to those of the production of white asparagus. In the case of green asparagus, only transparent films are used, as the spear needs light to produce chlorophyll (green) or anthocyanins (violet, purple). This film is placed on arches to create a tunnel where asparagus can grow. The precocious effect is sought by a warming of the soil that allows the plant to "wake up" earlier. For this, it is important to use a plastic with high thermal properties that will retain the calories at night which were stored during the day, as proposed by the company Europlastic. But the benefits of a plastic cover are elsewhere. The first step is to protect asparagus from the effects of climate, wind and rain, to improve its uprightness and visual appearance in order to obtain a premium quality.

Smoothing out temperature extremes

The plastic tunnel therefore acts as a mini-greenhouse. This protected area enjoys more moisture than the exterior air and is conducive to the quality of the asparagus. On the other hand, this small volume of air can quickly turn into an oven, reaching very high (or even too high) temperatures. In fact, in plots of green asparagus, films are usually removed in the morning and then replaced in the evening, which requires a lot of manipulation. To limit this labour time, film manufacturers offer a variety of solutions to avoid rising temperatures during the day. Europlastic offers a film which acts as a filter for short wave infrared radiation which is the source of the increase in temperatures. Daios uses the reflective power of ceramics added in a translucent film to reflect 30-40% of non-visible infrared rays. The aim of these films is to maintain the plastic cover for the duration of the crop by levelling out extremes in temperature. It is then possible to use harvest assistance machines in the same way as for green asparagus. The film is lifted and then replaced at harvest time, avoiding additional handling and reducing labour time. Another positive effect is that the tunnel becomes an enclosed space, which protects asparagus from diseases and pests, especially the asparagus beetle that has been on the rise in recent years. AW

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MORE INFO

Recyclability of plastics used to grow asparagus

BY BERNARD LE MOINE, SECRETARY-GENERAL OF CIPA

(INTERNATIONAL COMMITTEE FOR PLASTICS IN AGRICULTURE)

White, purple or green, asparagus is grown all over the world and, in the right season, is highly prized by consumers. They are probably unaware that cultivation techniques use plastic and that the quality of asparagus owes a lot to plastic!
Plastic brings many advantages to production, but it also imposes constraints on the producer after its use. In addition, the environment can pay the cost in the absence of an end-of-life management system. In many countries, professionals have organised themselves to eliminate these constraints.
The "asparagus film" is a low-density polyethylene film with the peculiarity of having pockets filled with soil to locate well on the mound. Black-white opaque films are sometimes covered with transparent thermal film. More than 700 kg of new plastics per hectare are required for 4 or 5 seasons in the case of opaque films and 2 to 3 for thermal films. After the end of the film life, 4 to 5 tons of used plastics must be removed from the field and recycled, taking into account the soil in the pockets. Polyethylene is a perfectly recyclable material. However, when very soiled its recyclability is greatly diminished, and costs are increased. However, after use, it is possible to give the plastic a second life, in another form, in another product. To achieve this, several steps must be taken. Removal techniques must ensure that as much soil as possible is left in the field. Mechanical pre-treatment of the soiled film after removal may be necessary before delivery to the recycler. Despite this, the technical, efficient and inexpensive solution has yet to be found to improve the quality of used asparagus film in order to restore its full value and for it to become a real resource. European plastic manufacturers have launched research and development projects to meet this need.

After the end of the film life, 4 to 5 tons of used plastics must be removed from the field and recycled

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A world of new products for asparagus

The cultivation, harvesting and packaging of asparagus are the source of many innovations. Manufacturers and suppliers have also proposed many new products over the past year at various events such as International Asparagus Days, ExpoSE, SIVAL and Fruitlogistica. Asparagus World presents some of them here.

BY GUY DUBON @ReussirFL

Lots of materials and equipment are presented in exhibitions in many countries, such as here at "International Asparagus Days 2019" in Angers (France).

Corhize

A tool to aid decision-making

Corhize is offering Aquatech, a capacitive sensor that allows temperature measurements in the ground every 10 cm to which is added a free sensor on the surface to give the temperature under the mulch. In addition to water consumption, horizon by ground horizon, the probe allows better management of plastic films. The probe can be connected to a platform with an asparagus-specific module, Aspaview, with values to estimate the risk of burns, flowering, predicting performance at Day+1 and Day+2, calculating hours of cold and degrees days.

Jautrou

Makes bunches more easily

Rapido Bottes, built by Jautrou, makes it possible to make bunches from a circular tray mounted on an electric motor. A gauge allows the shaping and weighing of the bunch. The system which is simple enough for small organisations to implement, allows 1 to 4 people to work and ensure the manufacture of 800 bunches per hour. The company also offers a cover to protect the crates from wind and sun to limit the dehydration of asparagus as well as a soaking system for soaking the crates in water.

Engels

For film management

Using two plastic films, one thermal and one black/white, Engels offers a combination of six positions. These options allow the films to be managed according to the weather conditions to ensure good stability of the mound temperature. The system also allows a reduction in the time spent in handling plastics and an improvement in the quality of the harvest. The company is working on a model of "management" of plastic films in order to optimize the temperature in the mound, between 18–20 degrees Celsius at the root tray level and below 35 degrees Celsius under the plastic. It should also allow the harvest rate to be determined in line with market trends.

Naturagriff

Mechanical weeding by brushing

Already a specialist in mechanical weeding in arboriculture, now offers a machine specifically for asparagus cultivation. The machine is mounted on a pendulum frame and a hydraulic power pack rotates and controls the brushes. Each brush is independently adjustable for tilt, gauge and depth of work. The machine allows weeding right up to the edge of the plastic and to the sides of the mound. It can work between 10 and 15 km/h.

Base

Solar battery recharging

Sellande by Base offers a charging system not connected to the electrical grid from photovoltaic panels on harvest assistance machines. According to the manufacturer, the power generated of 400 watts prevents the batteries from being recharged daily and limits their premature wear. For this increase in range, Base offers a kit for existing machines with different purchasing options.

Medinbio

Managing asparagus beetle

Medinbio, a specialist in natural alternatives, reasserts the interest of its combined NEMATRIDENT and AQUANEM solutions for efficient and cost-effective management of asparagus beetle. NEMATRIDENT (entomopathogenic nematodes) is an approved biocontrol solution composed of specific strains of Steinernema feltiae nematodes. They paralyze the asparagus beetle larvae quickly with close to 100% efficiency, thanks to the addition of AQUANEM a re-hydrator approved for organic agriculture. The combination of these two products and the specific application methods developed by our teams improve the efficacy and longevity of nematodes during the phase of hunting the beetle larvae. After application, the larvae become deformed (loss of appetite) and then disappear quickly.

Cyklop

Tying and labelling bunches

Cyklop offers the Elastobinder: a machine that binds asparagus bunches with two thin elastic bands (Stepper®) paired with a label printer. The machine combines the two operations at the same time and can fix 20 links per minute. According to users, the kit is easy to set up. The printer can use pre-printed labels but also ensure full printing with barcode and in several languages.

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Farmax

Deep ground working

The Dutch manufacturer Farmax offers a "special asparagus" spader allowing working on a width of 1.60 m and at a depth of 0.60 m. The machine replaces ploughing and avoids creating a "sole." It ensures good aeration of the soil and a homogeneous mixture of organic material inputs favourable to the establishment of the crop. Varying from 80 to 12 rotations per minute allows it to advance at 2 km per hour.

Besnard

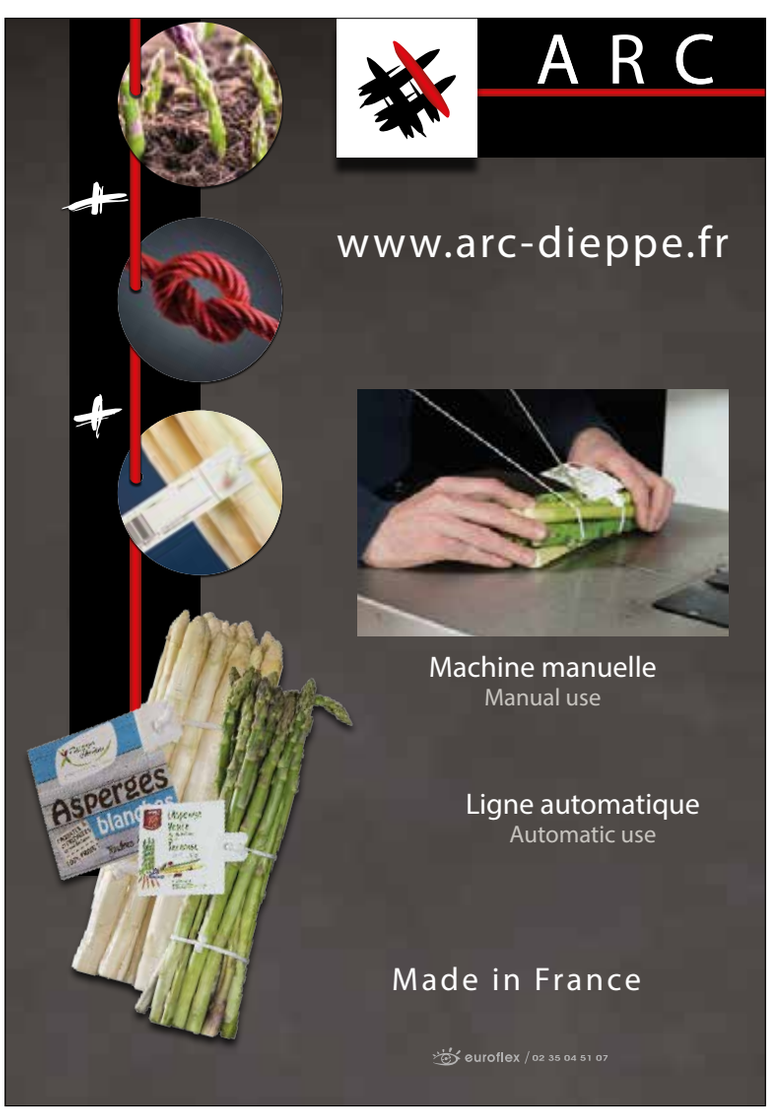
Improved calibration machine

Besnard has improved its electronic washing/calibration line with the addition of a water jet just before the spear cutting blade. This adaptation allows for better cutting quality and protects teeth from premature wear. A foam wheel also allows for better maintenance of the asparagus as it is cut. At the other end of the chain, a new, more intuitive and personalised control screen makes it easier to adjust the machine. An internet connection also allows remote adjustment and troubleshooting.

Keragro Dusting Lines

an ally for protecting and cleaning up your crops

Keragro manufactures a range of powder applications capable of preventing certain invasions and cryptogamic diseases. Drying, Dessication, Protection and Scarring Over, these are the virtues of seaweed and trace elements that make up these formulas developed for asparagus growers. KeraSoufre has a proven track record for its repellent and fungistatic effect, KeraSilice for its moisture absorbing effect and strong scarring power. For those who do not have dusting lines, Keragro manufactures specialities for spraying made from medicinal plants and algae, aimed at strengthening and stimulating crops to regulate Biotic and Abiotic stresses.



Reyenvas

Seven layer in one Film

The manufacturer offers a wide range of plastic films including the Rey Pro mth+. This black/white hemmed thermal film is composed of 7 layers interspersing a thermal layer inside the black and white film. According to the manufacturer, it provides 3 to 5 days of precocity and its thickness (175 microns) improves its duration of use reducing the problem of recycling (less waste/tax). Reyenvas is also innovating by offering Rey Pro nature a green/white hemmed film which has the same advantages as all opaque two-tone films, while improving its integration into the landscape and reducing its visual impact.

Harlander

Weeding the sides of the mounds

The SDS 70 front-mounted tine harrow has been designed to mechanically weed both sides of asparagus mounds. This 2.20 m wide kit is adjustable to adapt to the height variations of the mounds (thanks to its central wheels), their width (with a hydraulic system). Springs reinforce or decrease the pressure of the crowns on the mound.

SDD Solar

Photovoltaic greenhouses

The activities of SDD SOLAR are involved in development of solar projects, financing, operating and maintaining renewable energy power plants. SDD SOLAR has developed an innovative concept of horticultural greenhouses which can be adapted to different crops including white and green asparagus. There are multiple advantages to this concept: securing production subject to unpredictable climatic conditions (rain, wind, excess heat, low temperatures), control of parasites and pests, optimising yield, precocity, improving working conditions.

Hepro

Peeling and fresh cut machine

Hepro offers a compact vertical white asparagus peeler which allows for an "industrial quality" approach. The machine peels up to 2000 asparagus per hour. It can be used as a base for the use of the Hepro RSS, which allows white or green asparagus to be cut into cylindrical chunks. The pieces are cut by a fixed knife block. The head size is about 20 mm or 25 mm (standard version). Middle and end head pieces can be removed separately on request. The cutting of asparagus allows mixtures, white/green, in sachets.

Strauss

One sorting machine for all asparagus

The Optisort G-Series from Strauss is the most preferred asparagus sorting machine. Different customised machine sizes allow the processing of white and green asparagus by one machine. To prepare the asparagus for the optical sorting, first it is cut to a certain length by a sophisticated aligning and knife system, developed through long experience. Afterwards it is cleaned with a lot of water at very low pressure. Low water consumption is achieved through recycling. Then the asparagus is singled and transported individually to the optical quality recognition unit in its own cup thus avoiding incorrect classifications and, from there, to the appropriate collecting container, subdivided into different quality levels. Optisort G-Series methodology allows for every piece of asparagus to be individually checked.

Tenrit

Cutting machine

The TAC70/R is a specialised cutting machine for asparagus. It is used for cutting asparagus into cylindrical chunks with asparagus which has already been peeled. The machine allows to cut the asparagus between 1 and 7 cm and the cut can be straight or diagonal. This machine is especially suitable for direct sale and customers are given the chance to consume asparagus differently (wok, pie, soup, etc.).

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In der vergangenen Saison organisierte die Landwirtschaftskammer Nordrhein-Westfalen eine Vorführung verschiedener Erntetechniken auf dem Betrieb Sterthoff

Von der Spinne bis zum Vollautomaten

BY THOMAS KÜHLWETTER

Wie sieht die Zukunft im Spargelanbau aus? Für viele Betriebe ist es eine Reise zwischen Hoffen und Bangen. Dem Hoffen, dass die Arbeiter auch tatsächlich zeitgerecht zur Ernte anreisen und bis zum Ernteende oder dem vorgesehenen Zeitpunkt auf den Betrieben bleiben und dem Bangen, dass steigende Löhne die Rentabilität nicht noch weiter in Frage stellen. Besonders bei der Ernte sind viele Arbeitskräfte gefragt. Bleiben sie zu Hause oder reisen vorzeitig in ihre Heimatländer bzw. zu attraktiveren Arbeitgebern in andere Bereiche der Wirtschaft ab, bleibt Spargel auf den Feldern.
Steigender Kostendruck und die Unsicherheit bei der Verfügbarkeit motivierter Arbeitskräfte werfen die Frage nach Alternativen zur Unterstützung der Ernte bis hin zum Vollernter auf. Doch wie funktionieren die einzelnen Techniken, welche Möglichkeiten bieten sie und wie weit sind sie für den Einsatz in der Praxis ausgereift?
In einer Vorführung auf dem Betrieb von Bernhard Sterthoff in Wadersloh wurden einige nicht selektiv arbeitende Maschinen zum Ende der Saison 2019 im Rahmen einer Veranstaltung der Landwirtschaftskammer Nordrhein-Westfalen vorgeführt. „Wir wollen zeigen, wie die Maschinen arbeiten und wie die Qualität des geernteten Spargels ist. Schließlich ist es für die Anbauer wichtig, dass sie ein eigenes Bild von der Arbeits- und Funktionsweise der Maschinen erlangen“, erklärt Spargelberater Ralf Große-Dankbar bei der Vorführung.

ABSTRACT

Thomas Kühlwetter,
Editor of Spargel & Erdbeer Profi

Rising costs and uncertainty in the availability of workers are leading to the search for mechanical and robotic alternatives to harvest asparagus. In 2019, a demonstration in the Rhineland showed how the machines work and how well asparagus is harvested. Two well-differentiated technologies are used by these different machines, one is non-selective with a total harvest of asparagus in the mound. Sorting is done afterwards. The other is selective using sensors that attempt to reproduce the manual harvest.

Nicht selektive Spargelernte

Während der Vorführung wurden drei Geräte zur nicht selektiven Spargelernte vorgestellt. Die „Molly“ von Böckenhoff wurde im Zeitraum 2010 bis 2012 entwickelt und gebaut. Im Vergleich zu den anderen nicht selektiv arbeitenden Geräten hat Böckenhoff bei der Konstruktion der „Molly“ auf ein anderes System gesetzt. Bei diesem Verfahren wird der Spargeldamm von zwei vertikal laufenden Sechscheiben in einer genau definierbaren Höhe oberhalb der Kronen unterschnitten und die Erde von einer nachfolgend angeordneten, rotierenden Walze aufgenommen und gelockert, sodass die abgeschnittenen Spargelstangen leicht aufgenommen werden können. Die Sechscheiben können in der Höhe genau auf das Alter der Anlage sowie auf den Zustand von Pflanze und Boden eingestellt werden. Neben dem Antrieb über Räder ist optional ein Kettenlaufwerk lieferbar, das unter schwierigen Bodenverhältnissen seine Vorzüge ausspielen kann. Eine Person ist zur Bedienung der Maschine erforderlich. Sie und bis zu drei weitere Personen nehmen die abgeschnittenen Spargelstangen auf. Eine Person ist verantwortlich für das Einfädeln bzw. Ablegen der Spargelfolie am Reihenanfang und -ende sowie für den Kistentransport. Im hinteren Bereich der Maschine sorgt ein hydraulisch angetriebener Dammformer dafür, dass der Damm wieder sauber aufgebaut wird, wenn gewünscht auch höher als zuvor.

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Die „Molly“ von Böckenhoff in Heckansicht: Der Spargeldamm wird mit hydraulisch drehenden Tellerscheiben nach der Ernte wieder aufgebaut

© Kühlwetter

Beim Arbeiten mit der „Molly“ können die Spargelstangen leicht aus der gelockerten Erde entnommen und in Kisten abgelegt werden

Am Vorgewende werden ungefähr 4 m Wendekreis beansprucht, die „Molly“ wird über den Mittelpunkt der Hinterachse, über die auch der Antrieb erfolgt, gedreht. Angetrieben wird das Gerät durch einen 30-PS-starken Dieselmotor von Hatz. Die Folie wird am Reihenbeginn manuell eingefädelt, über das Dach geführt und am Heck des Gerätes wieder abgelegt. Ein Faktor für die Geschwindigkeit, mit der die „Molly“ über die Dämme fährt, ist – neben der vorhandenen Erntemenge - die Arbeitsleistung der Personen, die den Spargel aus dem gelockerten Damm heraus aufnehmen.

Wird im Anschluss an eine Durchfahrt mit der „Molly“ weiter manuell geerntet, trägt der locker aufgebaute Spargeldamm nicht nur zur Erhöhung der Produktqualität z.B. durch einen geringeren Anteil berosteter Stangen bei, er ermöglicht auch deutlich höhere Ernteleistungen und senkt die körperliche Belastung für die Erntekräfte.

Firmeninhaber Bernhard Böckenhoff betonte, dass beim Einsatz mechanischer Erntehilfen einige Aspekte besonders zu beachten sind. Dazu zählen die aktuelle Markt- und Wetterlage sowie die Wetterprognose. Eine weitere Frage lautet: Bestehen für kurze Stangenlängen Absatzmöglichkeiten oder sollte mit der Durchfahrt möglicherweise noch ein oder zwei Tage gewartet werden, bis die meisten geernteten Spargelstangen wieder etwas länger sind? Wichtig ist auch – so Bernhard Böckenhoff – auch, dass der Einsatz der Maschine in ein Gesamtkonzept integriert werden muss und nicht als Einzelmaßnahme verstanden werden darf.

Hans Kalter stellte das Chrisje von Christaens vor. Im Gegensatz zu seinem größeren Bruder

Chris, der mit einem Raupenfahrwerk ausgestattet istmit einem Raupenfahrwerk, wird Chrisje durch Räder angetrieben. Bei der Arbeit mit Chrisje werden die Spargelstangen durch Sechscheiben von der Pflanze abgetrennt und gemeinsam mit dem Boden von einem Siebband aufgenommen. Bei der Weiterbeförderung fällt der Boden nach unten ab und die Stangen werden am Ende des Siebbandes auf ein Transportband übergeben, von dem eine Person, die auch die Maschine steuert und lenkt, sie bequem in eine Kiste ablegen kann. Wenn die Maschine einmal eingestellt ist, steuert sie sich selbst entlang der Spargeldämme selbst. Die Leistung von Chrisje ist – ähnlich wie auch bei anderen Maschinen – ist von mehreren Faktoren abhängig. So ist die erste Durchfahrt in einer Saison zeitraubender als die nachfolgenden Durchfahrten. Ein nicht zu unterschätzender Faktor ist auch die Reihenlänge, denn je länger die Reihen sind, je desto seltener muss am Vorgewende gedreht bzw. die Folie eingelegt oder wieder abgelegt und fixiert werden. Hans Kalter beziffert die Durchschnittsleistung an einem Acht-Stunden-Arbeitstag auf 1 ha Spargelfläche, die mit Chrisje beerntet werden kann.

Im Vergleich zum radangetriebenen Chrisje kann die größere Ausfertigung Chris unter nahezu allen witterungsbedingten Rahmenbedingungen auf Grund des vorhandenen Raupenfahrwerks fahren. Das Wirkungsprinzip entspricht dem gleichen System, die Leistung ist aber deutlich höher. Bis zu vier Personen können bei der Ernte mit Chris den Spargel abnehmen, eine Leistung von bis zu ca. 3 ha Spargelfläche sind in acht Stunden möglich, so Hans Kalter.

Beide Maschinen sind geeignet, eine Spargelfläche vom Anfang bis zum Ende der Saison zu 100 % mechanisch zu beernten oder eine Kombination von Handernte und mechanische Ernte – so wie sie auch auf dem Betrieb Sterthoff mit der Kirpy praktiziert wird – durchzuführen.

Bernhard Sterthoff hat selber schon erfahren, dass der Rostbefall an Spargelstangen bei nachfolgender Handernte sinkt, wenn zuvor einmal der Damm mechanisch beerntet wurde. Durch die Lockerung des Dammes und das Heraussieben von Ernteresten und Steinen steigt die Leistung bei der Handernte nach vorausgegangener mechanischer Ernte durchschnittlich um mehr als 25 %. Zudem ist die Handernte für die Arbeitskräfte wesentlich einfacher durchzuführen. Wenn man sich dazu entscheidet, ausschließlich mechanisch zu ernten, ist der Zeitpunkt des nächsten Erntedurchganges abhängig nach Wetter- und Absatzlage in einem Zeitraum von fünf bis 14 Tagen (wenn die Stangen witterungsbedingt nur langsam wachsen) erforderlich.

Wer ausschließlich maschinell ernten möchte, muss die Sortenauswahl anpassen: In Frage kommen Sorten, die dickere Stangen mit sehr gut geschlossenen Köpfen bilden. Mit Chrisje ist es nicht möglich, Doppelreihensysteme zu beernten, für Chris stellt die Doppelreihe kein Problem dar. „Ich denke, dass für einen Unternehmer das mechanische Ern-

© Kühlwetter

Hans Kalter von Christiaens betonte, dass beim Einsatz nicht selektiver Erntemaschinen darauf geachtet werden muss, dass Sorten, die zur Bildung dicker Stangen mit gut geschlossenen Köpfen neigen, verwendet werden sollten

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„Chrisje“ von Christiaens in der Seitenansicht. Der Fahrer, im Heck sitzend, bedient das Gerät und nimmt die geernteten Spargelstangen von einem Band und legt sie in Kisten ab

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Beim Einsatz der gezogenen Kirpy wird die Folie seitlich am Gerät vorbeigeführt

tegerät ein sinnvolles Instrument ist, mit dem er seinen Betrieb und die Ernte zusätzlich steuern kann. Dies dient nicht nur der Qualitäts- und Leistungsverbesserung, sondern ermöglich es auch, die Ernte in Richtung bestimmter marktrelevante Erntetermine zu lenken", erklärte Hans Halter. Angetrieben wird Chrisje durch einen 34-kW-starken Hatz-Dieselmotor, das Gerät kostet ca. 60 000 €, für Chris sind ca. 130 000 € zu zahlen. Gegenwärtig sind sieben Chrisje und drei Chris auf Spargelbetrieben im praktischen Einsatz.

Im Gegensatz zu den vorgestellten Selbstfahrern wird Kirpy im Betrieb Sterthoff von einem Schlepper gezogen. Optional ist Kirpy aber auch als Selbstfahrer, z.B. aufgebaut auf einem Braud-Geräteträger, lieferbar. Christian Bornstein, Geschäftsführer der ai-Solution, die Kirpy vertreibt, erläuterte die Funktionalität des Gerätes. Bei der Durchfahrt wird der Damm komplett gereinigt, alte Strünke, Steine, Kluten werden herausselektiert. Nach der ersten Durchfahrt mit der Kirpy haben die Betriebe einen schönen lockeren, sauberen Damm. Die Berostung der Stangen geht nach der Durchfahrt mit dem Kirpy zurück, ihre Qualität wird gesteigert.

In Deutschland wurden ca. 20 Kirpy-Maschinen verkauft, viele von ihnen kamen in der Saison 2019 zum Einsatz. „Vorher waren sie eher ein `„Angstmacher´" für die Erntehelfer", berichtet Christian Bornstein. „In diesem Jahr haben wir gemerkt, dass sich die Einstellung auf vielen Betrieben geändert hat und die Maschine in Kombination mit der Handernte vielfach zum Einsatz kam."

Auch bei Kirpy durchtrennen zwei gegenläufige Sechscheiben den Spargeldamm oberhalb der Pflanzenkrone, die Höhe der Schneidwerkzeuge kann vom Fahrerstand aus justiert werden. Dann werden Erde und Spargelstangen über eine Siebkette aufgenommen. Abhängig von der Bodenbeschaffenheit kann der Freiraum zur Kette

Christian Bornstein, ai-Solution, erläutert die Funktionsweise der Kirpy. Der Spargel kann je nach Ausführung von bis zu sechs Arbeitskräften von einem Ablageband aufgenommen und abgelegt

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Um den Wenderadius zu reduzieren, verfügt die Kirpy über eine Lenkachse

© Kühlwetter

Chris Engels demonstriert die Funktionsweise der Spargelspinne in einer M-Bogen-Anlage. Über 10 000 Spargelspinnen sind bislang verkauft worden

zwischen den Ketten optional durch ein eingeschobenes Blech eingegrenzt werden, um den Stofffluss bis zum oberen Wendepunkt der Siebkette zu gewährleisten. „Wir sehen, dass Betriebe, die schon sechs oder sieben Jahre mit der Maschine arbeiten, deren Potential immer besser nutzen und ihre Abhängigkeit von den Arbeitskräften reduzieren konnten, stellt Christian Bornstein heraus. Neben den begehrten Spargelstangen werden auch Strünke und andere abgestorbene Pflanzenteile oder Steine auf dem Siebband abgelegt und können ausselektiert werden. Vor denIm Anschluss an die erste Durchfahrt werden bei weiteren Erntedurchgängen nur noch Spargelstangen auf dem Siebband abgelegt.

Je nach Ausführung können vier bzw. sechs Personen am Siebband arbeiten. Christian Bornstein berichtete von einem Praxisbetrieb, der die Hälfte seiner 50 ha großen Spargelanbaufläche im Zweischichtbetrieb ausschließlich mit der Kirpy beerntet. Die gezogene Variante der Kirpy ist ab ca. 70 000 € lieferbar, mit Folienführung kostet das Gerät ca. 80 000 €. Bornstein rät Interessierten, den Einsatz des Gerätes auf Praxisbetrieben einmal anzuschauen, um so einen eigenen Eindruck zu gewinnen.

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Der „Sparter“ von Cerescon in einreihiger Ausführung, hier als gezogene Version. Im Jahr 2020 soll erstmals ein einreihiger Selbstfahrer mit einem Raupenlaufwerk zum Einsatz kommen

Der „Sparter“ ist mit zwei Ernteelementen ausgestattet, die innerhalb von 2 Sek. eine Spargelstange aus dem Boden entnehmen und zur Seite hin ablegen

© Kühlwetter

Die Spargelspinne

Im Unterschied zu den nicht selektiven Erntemaschinen wird beim Einsatz der Spargelspinne manuell geerntet. Seit Einführung der Technik hat Engels Machines über 10 000 dieser Erntehilfen verkauft und gilt damit als Pionier in der Branche. Mit der Spargelspinne kann sowohl die Schwarz/Weiß-Folie als auch die Thermofolie aufgenommen werden und die Erntehelfer können sich komplett auf das Stechen der Spargelstangen konzentrieren. Dies erhöht die Ernteleistung im Vergleich zur klassischen Handernte deutlich und reduziert die körperliche Belastung der Erntehelfer.

Angetrieben wird die Spargelspinne über einen Lithium-Ionen-Akku, dessen Energie auf die Antriebsräder bzw. einen Raupenantrieb übertragen wird. Mittels einer Sensortechnik folgt das Gerät automatisch beim Ernten der Fortbewegung der Erntekraft, lediglich am Vorgewende muss manuell gesteuert werden. Die Ablage der geernteten Spargelstangen erfolgt auf kurzem Arbeitsweg in mitgeführte Kisten.

Seit Einführung der von Engels entwickelten und patentierten M-Bögen können mit der Spargelspinne auch Spargelflächen beerntet werden, die mit einem Minitunnel bedeckt sind. In Kombination mit dem M-Bogentunnel soll die Ernteleistung nach Angaben von Engels auf 150 % und mehr im Vergleich zur traditionellen Handernte unter Mini-

tunnel gesteigert werden können. In der Praxis bedeutet dies eine Reduzierung des Personals. Der Einsatz moderner Sensortechnik zur Ermittlung der Dammtemperatur und die Vorausschau auf die Witterungs- und Marktentwicklung bilden eine Grundlage für ein konsequentes Folienmanagement zur Steuerung von Ernte, Ertrag und Stangenqualität, um das maximale Potential einer Anbaufläche zu erzielen. Die Spargelspinne bietet mit sechs möglichen Folienkombinationen den Betrieben die Voraussetzung zur Ausschöpfung dieses Potentials. Darüber hinaus gilt der Elektroantrieb des Gerätes nicht nur als besonders umweltfreundlich, auch die Arbeitskräfte schätzen die nahezu geräuschlose Fortbewegung der Spargelspinne.

Selektiver Ernteroboter

Vor wenigen Jahren hat das niederländische Unternehmen Cerescon erstmals den selektiv arbeitenden Ernteroboter „Sparter" vorgestellt. „Das Gerät ist ein echter Roboter, der nicht unter festgelegten, standardisierten Bedingungen in einem geschützten Raum, sondern unter stetig wechselnden äußeren Einflüssen für die Ernte eines Naturproduktes eingesetzt wird", sagte Cerescon-Geschäftsführer Ad Vermeer. „Dabei ist die Detektion der Spargelstangen im Damm, kurz bevor sie die Dammkrone durchstoßen haben, eine ganz besondere Herausforderung". Neben einem mechanischen Tastenmechanismus setzt Cerescon zu diesem Zweck eine Technik zur Ermittlung der Stromspannung in einer vorher vorgegebenen Höhe des Spargeldammes ein. Diese Spannung wird verändert, wenn die Spargelstangen nach oben wachsen. Geerntet wird mit zwei unabhängig voneinander agierenden, elektrisch betriebenen Ernteeinheiten. Um in die Erde einzudringen, die Spargelstange abzuschneiden, aus dem Boden zu entnehmen und sie für den weiteren Transport abzulegen, benötigt eine Ernteeinheit ca. 2 Sek. Anschließend wird der Damm mit Hilfe einer vertikal drehenden Scheibe wieder geglättet.

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Cerescon-Geschäftsführer Thesen van Vinken und Ad Vanmeer haben für die Zukunft noch große Pläne und wollen den „Sparter" wettbewerbsfähig für den Einsatz in der Praxis fortentwickeln

Zur Saison 2019 wurde der interne Transport der Spargelstangen sowie der gesamte Ernteprozess nochmals verbessert und weiterentwickelt, auch die Folienführung wurde optimiert. Der Schwerpunkt der Arbeit lag auf der Verbesserung der Arbeits- und Erntequalität.

Völlig neu ist jetzt ein einreihiger, selbstfahrender „Sparter" auf einem Raupenfahrwerk, der in der Saison 2020 erstmals eingesetzt werden soll. So können Traktor und Fahrer eingespart und die Arbeitskosten reduziert werden. Das Gerät ist auch unter schwierigen Bodenverhältnissen einsatzbereit und benötigt deutlich weniger Platz zum Wenden am Reihenende im Vergleich zur vorherigen gezogenen Version.

Bei Vorführungen hat die Technik bewiesen, dass sie funktioniert. Dennoch – so eine persönliche Einschätzung des Autors – wird noch weitere Entwicklungsarbeit erforderlich sein, um den „Sparter" in einen Leistungsbereich zu bringen, der ihn bei den nicht zu unterschätzenden Anschaffungskosten wettbewerbsfähig erscheinen lässt. Doch dies ist – wie bei so vielen technisch herausfordernden Projekten – wahrscheinlich nur eine Frage der Zeit.

Neben Cerescon arbeitet ein weiteres niederländisches Unternehmen an der Entwicklung eines voll automatischen selektiven Spargelernters. Arno van Lankveld hat mit seinem Unternehmen AvL Motion eine raupenbetriebene, selbstfahrende Erntemaschine entwickelt. Die Ernteaggregate werden über eine Pneumatik bedient. Das Gerät ist im elterlichen Spargelbetrieb seit zwei Jahren im Test. Van Langfeld will aber erst dann eine Ausführung auf den Markt bringen, wenn die Technik nach seiner Auffassung praxisreif ist. Wie lange dies dauert, ist offen. *AW*

Arno van Lankveld führte auf der Hoffläche die Wendigkeit des von ihm entwickelten Prototypen zur vollautomatischen, selektiven Spargelernte vor

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The country's asparagus is reputed to be among the best in world, but the sector is heavily dependent on seasonal migrant labour, mainly from Eastern Europe.

Asparagus in the age of Brexit

The UK asparagus sector views the new migration restrictions with trepidation, as the struggles to recruit pickers seem set to continue alongside spiralling costs.

BY RICHARD WILKINSON

Britain's asparagus sector is at a critical juncture, with its very survival in the balance, assailed on all sides by a combination of rising costs and labour shortages fuelled by political uncertainty. The sector had previously been in a healthy state, having grown rapidly in the past 15 years, from 1,000 hectares in 2005 to 3,200 hectares in 2019, making it northern Europe's largest producer. There are around 150 asparagus producers in the UK growing exclusively green varieties. The country's asparagus is reputed to be among the best in world, but the sector is heavily dependent on seasonal migrant labour, mainly from Eastern Europe. The British fruit and vegetable sector relies on up to 80,000 seasonal workers arriving from the EU each year. While once the country was awash with applications for work on its farms, the post-Brexit climate in the UK is less accommodating of these migrants and a less appealing work destination. Indeed, labour agencies report a significant drop in interest in 2017 and 2018, with Romanian and Bulgarian workers in particular opting to go elsewhere in the EU where communities are more welcoming and employment conditions involve less uncertainty. The new immigration reforms recently announced by the government specifically restrict entry to the UK to unskilled labourers and appear highly likely to exacerbate the current problems faced by the agricultural sector.

UK losing its shine as an employment destination

Besides the less welcoming environment in the UK for foreign workers, there are also financial reasons for these migrants to look towards the UK's neighbours instead. The fall in the value of the British pound against the Euro makes salaries in Germany and France more attractive. And the lack of workers could lead to a form of internecine warfare within the UK farming sector. As Doug Amesz of AG Recruitment points out, it is the entire UK agricultural industry that is facing

labour shortages, so British asparagus producers are not only forced to compete with other asparagus producers to hire workers but also with producers in other sectors. "There are increasing immigration dossier constraints and increasing competition from other sectors," said Amesz at the 2019 British Asparagus Conference.

"No migrant labour, no asparagus"

There has been a shortfall of around 10,000 workers over the past two seasons, which has forced farms to increase wages and bonuses. British farms typically pay workers the national minimum wage of £7.83 an hour plus performance-related bonuses. According to Concordia, a labour agency charity that recruits EU pickers for British farms, UK agriculture is entering a period of crisis. Speaking to Reuters, chief executive Stephanie Maurel said, "No labour means no harvesting, which means no fruit and no vegetables on the shelves of British supermarkets." And the country's retailers appear unlikely to rush to the aid of the struggling producers, as sales volumes are negotiated in advance for the season and prices are fixed, barring exceptional circumstances.

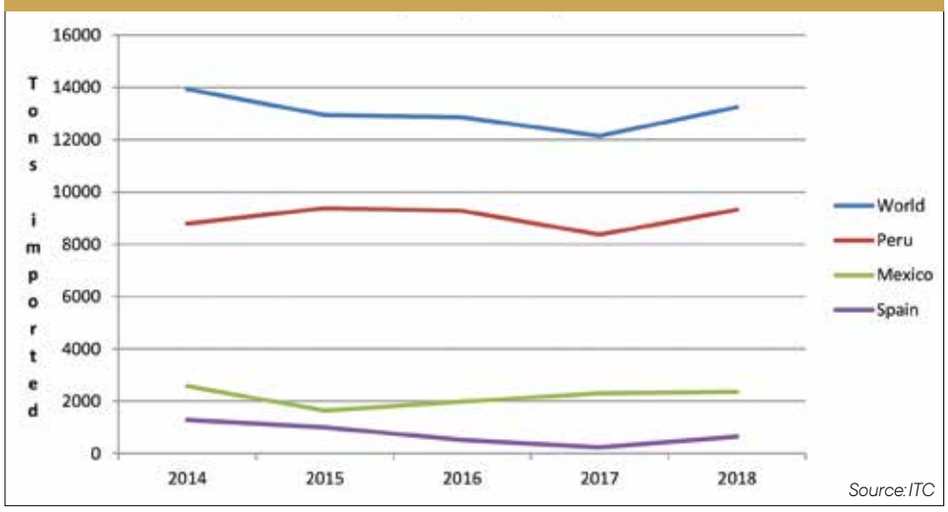
New sources of labour in the East

The working conditions currently on offer have so far been unable to attract British workers to fill the gap left by the migrants and this is likely to remain the case for the foreseeable future, as the lure of the agriculture sector struggles to compete with that of other sectors. In a bid to overcome the lack of workers from the EU, the British government has recently sanctioned a pilot trial for 2,500 workers to enter the country from Russia, Ukraine and Moldova for up to six months over the next two years. This new pool of labour could prove to be just the lifeline that the benighted sector needs right now. The bottom line is that if there are no migrant workers in the UK, there will be no locally grown asparagus and, ironically, after Brexit, the British people will actually become more dependent than ever before on Europe if they wish to continue to enjoy the vegetable that they so adore.

Opportunities for Peruvian asparagus

The UK is a net importer of asparagus – in fact, none of the precious home-grown product is sold abroad. Total imports reached just over 13.9 million tons in 2014, before steadily falling to approximately 12.1 million tons in 2017, then

UK ASPARAGUS IMPORTS



Source: ITC

> **"There are increasing immigration dossier constraints and increasing competition from other sectors"**

As Doug Amesz, AG Recruitment

VALUE OF UK ASPARAGUS IMPORTS (THOUSANDS OF US DOLLARS)

Exporters	Imported value in 2015	Imported value in 2016	Imported value in 2017	Imported value in 2018	Imported value in 2019
World	77,313	77,966	75,698	75,684	73,742
Peru	61,090	62,081	57,504	59,574	55,258
Mexico	7,671	8,812	12,012	10,948	15,004
Spain	3,013	2,241	1,120	1,286	1,002
Netherlands	1,059	866	751	560	737

Source: ITC

recovering to around 13.2 million tons in 2018. The main source is Peru, which ships between 8,000 and 10,000 tons to the UK every year, worth around US$60 million. Some distance behind Peru comes Mexico (around 2,000 tons per season), followed by Spain (around 1,000 tons). The total value of the UK's asparagus imports fell from US$77.3 million in 2015 to 73.7 million in 2019. Producers in these countries will no doubt be keeping a close eye on developments in the lucrative UK asparagus market over the coming months.

A British speciality

The British are fiercely proud of their asparagus; so much so that when UK retail chain Tesco began selling imported Peruvian asparagus in the Vale of Evesham, Worcestershire (considered the heart of the UK's asparagus sector), shoppers threatened to boycott the supermarket over its lack of support for British farmers. Britain's asparagus season is relatively short, traditionally beginning on St George's Day (23rd April) and ending on Midsummer Day (21st June). During this period, premium British asparagus is in great demand, with £23 million spent on green varieties. It is believed that asparagus was first introduced to the island by the Romans, but the varieties grown today are the French type of asparagus that arrived in Britain in the seventeenth century. The southern British climate is ideal for the slow growth of a sweet and tender asparagus. Demand for home-grown product is so high that there is never anything left to export outside the UK. The asparagus season is celebrated across the country; the Vale of Evesham holds an annual week-long festival with auctions of the best crop and locals dressing up as spears of asparagus. British consumers are still less familiar with white asparagus, which is so highly prized in parts of Europe continent, but this kind is now becoming something of a gourmet product in UK retailers and trial programmes have been run in growing the product in the UK, such as at Cobrey Farm, in the Wye Valley, Herefordshire. *AW*

MORE INFO

The same concerns

Asparagus is mainly produced in the south of the UK on different-sized farms, from just a few hectares to 800 hectares in area. Regardless of size, they all face the same concerns : rising costs and labour shortages. As is the case everywhere in Europe, harvesting and packaging represent the most costly activities for British asparagus producers, with costs roughly equivalent to those of French producers.

NUMBERS

150
Number of UK asparagus producers

3,200 hectares
Area of UK asparagus

£23 million
Turnover of UK asparagus industry

0
Exports

£15.50 per kilo (March 2016)
Highest wholesale price of home-grown asparagus in UK

Green only
Varieties

Mainly in southern counties
Location of production

April 23rd - June 21st
Season

80,000
Number of seasonal workers needed for fresh produce sector

10,000
Shortfall of seasonal workers

Demand for French asparagus and consumer interest in direct selling boosted plantations and replanting in all production basins between 2014 and 2018, with about 5,000 ha now in France.

France cultivates tradition

France grows its own asparagus. Once served at the table of the French kings, asparagus has now become a festive product that consumers are buying more often. The vegetable's development is also due to the high level of technology employed by producers and the marketing strategies.

BY GUY DUBON @ReussirFL

Over 20,000 tons of asparagus is produced in France each year; according to Agreste, output reached 20,700 tons in 2018 and 21,600 tons in 2017. Asparagus is part of France's agricultural and gastronomic culture.

Producers' great technical expertise

For producers and consumers alike, asparagus has now become an established part of the heritage of many French regions. It used to be grown only in the south of country, because asparagus is a Mediterranean plant, but the kings of France also tasted asparagus from the Loire Valley. The variety Asparagus d'Argenteuil (a city near Paris) won awards in 1878 at the Universal Exhibition in Paris. Asparagus has been grown in many parts of France such as the Loire Valley, Languedoc, Aquitaine and Alsace. In the 1960s, asparagus developed in the south-east of France alongside its vines. This is an early harvesting area thanks to its warm spring climate. But fusariasis has largely decimated this culture. In the 1980s, French production found refuge in the sandy lands of the Landes on the ocean front. New soils and especially the development of the use of plastic films have allowed the south-west of France to become the country's leading asparagus production area, with almost 25% of the surface.

The climatic issues presented by the south-western region have been overcome by a winning combination of the producers' high level of technical know-how, early planting of varieties, and the use of multi-film coverage. This year, the first French asparagus was harvested in early February in the Landes. French asparagus has long been in competition with Spanish asparagus, which is always earlier and often cheaper on the French market, with the extra cost of transport offset by the lower labour costs in Spain. With the drop in the production of Spanish white asparagus (now converted to green), French asparagus has regained its domestic market. Demand for French asparagus and consumer interest in direct selling boosted plantations and replanting in all production basins between 2014 and 2018, with about 5,000 ha now in France. The asparagus grown in the south-west is mainly intended for large-scale distribution (hyper markets, hard-discounters). The region has two producer groups, Coopadax and Maïsadour, associated with Primeurs de France (formerly Prim'co) for marketing. It also

MORE INFO

Asparagus Associations

Asparagus accounts for only 2% of France's vegetable production area, but the place it occupies in the country's heart is much larger. For consumers, it is the first vegetable of spring. For professionals, asparagus is a high-tech culture that requires great financial investment and management of labour resources, and one which can offer good profitability (depending on the year). In commercial terms, asparagus is a high-end vegetable, with (often) comfortable margins. Asparagus is a vegetable that is grouped within the Association of Asparagus Producers' Organisations of France. The association consists of seven groups, representing a combined 1,100 ha and 5,300 tons of asparagus - or about 30% of overall production (2019 data). Its missions are to study production and markets, to develop consumption, to respond to production problems (agronomy, crop protection, etc.) and to be the producers' representative in dealings with the government and administrations. Other independent producers are also grouped within the association Asperge Avenir, while organic asparagus producers have formed an association of their own. These two structures together account for about 30% of French production.

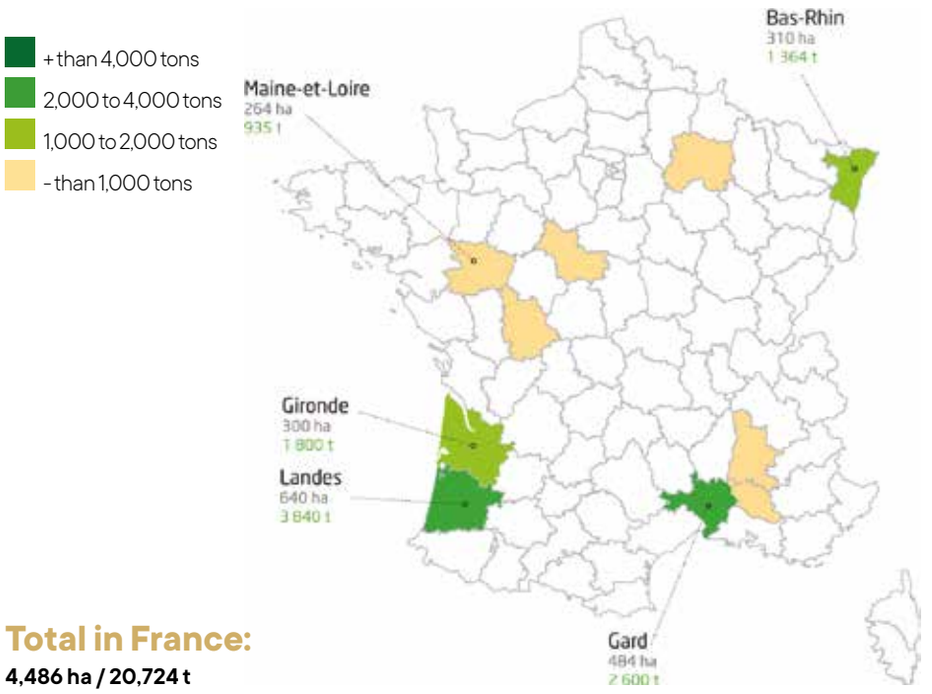
has large independent producers. The region has been recognised as a PGI (protected geographical identification) "Asperges des Landes" since 2005, which brings together 2,500 tons of asparagus from 60 producers. Further north, the Blayais region has also benefited from the "Aperges du Blayais" PGI since 2016.

Standing out from a taste point of view

The Val de Loire is another developing region. In Maine et Loire, asparagus growers, consolidated in the Fleuron d'Anjou cooperative, have specialised and increased their production area. There is also production in the Loir-et-Cher region, where the cultivation of green asparagus is organised within the Axéréal cooperative.

In Languedoc too, asparagus has regained some momentum, with new green asparagus plantations (accounting for a third of the 2017 and 2018 plantations). Green asparagus is often produced by specialised producers under shelters (some heated) and in mini-tunnels to achieve high quality levels. The Camargue is another asparagus area with light, sandy and sometimes salty soils that make for a production with a very different taste quality. The Cofruid'oc cooperative highlights this quality with the "Celestin" brand of white asparagus and "Wild" brand of green asparagus. Alsace has also planted asparagus. Producers there have developed the use of a double mulch (black/white mulch + thermal mulch) to make gains of a few days in terms of precocity while also benefiting final yields. Alsace asparagus is consumed in the region, with more

DISTRIBUTION OF THE FRENCH PRODUCTION IN 2018



Total in France:
4,486 ha / 20,724 t

Source: FranceAgriMer

MORE INFO

How to get young people to eat asparagus?

Around 81% of asparagus eaten in France is consumed by people over the age of 50, with only 5% eaten by the under 35s. This has led the French asparagus association "Asperges de France" to carry out a study to encourage young adults to consume more. The results show that under 35s tend to buy asparagus because it is a vegetable that "celebrates the arrival of spring", which is "rare and seasonal", and which is "fun". The reasons they don't buy it are because "it's not on the shelf," "it's expensive", or "it's not good quality". The majority of young people buy bunches because they are "fast, practical and aesthetic". They love novelty and new uses like green asparagus. 71% of them are inspired by a dish they have eaten in a restaurant to prepare a meal at home. But asparagus is almost never seen on restaurant menus in France!

C'Zon

Sébastien Ruth, C'zon director: "C'Zon mainly imports green asparagus"

C'Zon is an importer in the French asparagus market. Asparagus accounts for 25% of the company's turnover. C'Zon mainly imports green asparagus, about 750 tonnes by plane or refrigerated truck to ensure maximum freshness. C'zon green asparagus is, in general and all year round, of Peruvian origin, Mexican from mid-June to mid-April and Polish at the end of the season. Partner producers are selected based on the quality of the products they grow, but also on their Global Gap and BRC or IFS certifications. "100% of C'ZON producers also have ethical certification focused on improving working conditions such as Fairtrade or Ethical Trade Initiative," says Sébastien Ruth, C'zon's Managing Director. Today, C'Zon has the intention of developing a seasonal product from France by seeking partnerships with French producers.

Fruidor

Stéphane Hoffmann: "Asparagus integrates into the group's strategy"

Fruidor holds the position as the second largest asparagus operator on the French market with a potential of 1200 tonnes of mainly white asparagus. In particular, the company markets the production of two producers, Planasa and Famille Lebourg, with the aim of diversifying its supply. "Fruidor has integrated asparagus into its group strategy of moving towards new consumer trends," explains Stéphane Hoffmann, International Sales Director. For example, Fruidor has been marketing zero pesticide residue asparagus, HVE-labelled (High Environmental Value) asparagus since 2019. Fruidor, which supplies mass market distribution and export, packs 60% of its asparagus into a Flow-pack. "We are already looking for solutions to meet future environmental rules, especially in the area of plastic reduction," comments the official. The company exports 15% of its asparagus to Europe but also to Asia and the Middle East via its Overseas Export division based in Paris.

than 70% of the volume going to direct sale. The asparagus is generally peeled at the time of sale, as is also the case in Germany.

Potential for growth in consumption

The highly favourable technical and commercial environment enjoyed by French asparagus over the past ten years is now starting to shift. However, asparagus consumption can be promoted through packaging innovations such as flow packs to improve shelf life, or peeled asparagus to offer greater convenience, or green (and purple) asparagus for greater product innovation. The French asparagus sector can also play the "natural" card with consumers who care about their health, and the "local" card with consumers who want to buy locally. Increased volumes, an extended production schedule, and marketing campaigns can also create opportunities for openings in Europe, as well as in markets further afield thanks to improved conservation techniques and logistics. But 2020 will be a year marked by the Covid-19 crisis, which is hitting the campaign and the consumption of asparagus in France. *AW*

Primeurs de France

Bertrand Guivarch, commercial director: "Primeurs de France wants to influence the asparagus market"

"Asparagus is a fragmented production which we want to influence with a planting strategy based on a limited varietal choice and the use of plastics and mini-tunnels," said Bertrand Guivarch, commercial director of Primeurs de France. Under the Priméale brand, Primeurs de France sells 4,500 tons of asparagus, or 1/5 of the overall national production. The company sells the production of the cooperatives Coopadax and Maïsadour. In recent years, its plantations have been developed in search of precocity. "Our new tonnages have helped to advance the production schedule to have 80 days of marketing available, from March 1 to June 15," said Guivarch. Today, Primeurs de France sells 90% of its asparagus on the domestic market. "50% of our sales are pre-packaged. Selective permeability packs maintain the freshness and hygiene of the product. This is a vital criterion this year," said Guivarch. The organisation has also diversified its range and now offers 200 tons of green asparagus.

Fruidor, spécialiste de la mise en marché de l'asperge française

- sélectionnée avec soin auprès de nos producteurs partenaires,
- riche de saveurs uniques, puisées dans les sols sablonneux de Gironde,
- un produit d'exception commercialisé sous 3 marques :

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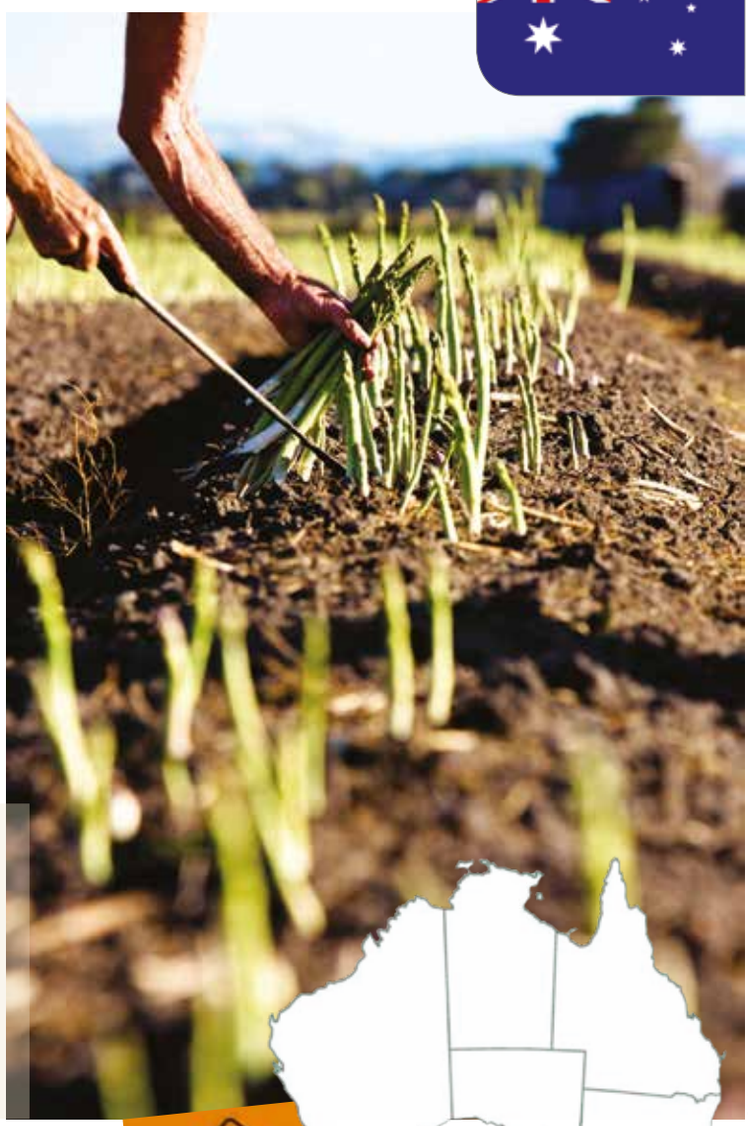
Contact : s.hoffmann@fruidor.fr / www.fruidor.fr

Speed gives Australia an edge in Asia

Asparagus is Australia's second biggest fresh vegetable export.The lion's share of exportation goes to Japan. Could China be its next big asparagus export destination?

BY JULIE BUTLER @FreshScribe



Around 98% of Australia's tonnage is grown in the south-eastern state of Victoria and the vast majority of it in Koo Wee Rup

AAC

Asparagus can be cut in the field in Australia and on sale in Japan 30 hours later. This second to none access to markets in Asia is one of Australia's fortes and maximises the freshness, quality and shelf life of its spears. Via direct flights, the majority of the country's asparagus exports not only reach countries such as Japan and Singapore fast, they benefit from minimal tariff restrictions. But Australia also faces challenges – such as the high cost of labour and of this rapid air freight – and it has just ended a "rollercoaster" of a season dogged by adverse weather, explains Australian Asparagus Council president Adrian Raffa.

Japanese now have yen for thicker Aussie spears

Asparagus is Australia's second biggest fresh vegetable export, though it contributes just 1.8% of the total volume while carrots lead with 53.6%. The Southern Hemisphere grower is among the world's top ten asparagus producers but ranks lower by area, arguably due to yields higher than the global average. The official figures are not yet in for Australia's 2019/20 asparagus season, but ITC Trade Map data shows Australia exported 3,245 tons of fresh asparagus (HS code 070920) in the 2019 calendar year. Of that total, the lion's share (70%) went to Japan, Singapore 7%, Taiwan 6.5%, Korea 6.3%, Hong Kong 5.6%, China 3% and Malaysia 1.3%. Raffa, who is also export coordinator at exporter Momack Produce, said around 50-60% of the spears for Japan are sent loose in 10kg wooden boxes, with 30-40% in the standard Japanese retail format of 100g barcoded and banded bunches. In Japan, the Australians usually ship to trading companies who onsell to retailers. The Aussie export season – usually mainly from about September to December – coincides with a time when there is still a lot of production in Japan and Taiwan despite being the counterseason. Raffa said Australia has managed to turn to its advantage something that 10 years ago was a problem – the fact that its spears have a much bigger diameter than the very skinny ones grown locally in these markets and imported from Mexico. Now, in both its domestic and export markets, consumers are learning to associate Australia's thicker asparagus with a softer, juicier product with less fibre per spear. "We offer a different eating experience you can really only get from Australia," he said.

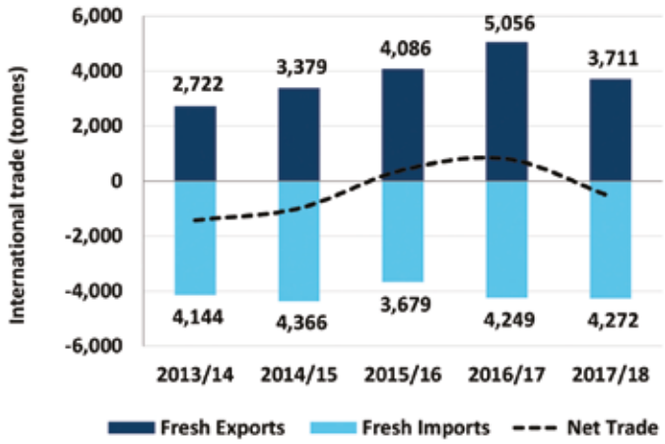
High-end segment in China beckons

So far, Australia sells insignificant volumes to China (mainly Beijing and Shanghai) but the Asian giant is well on its radar because unlike other markets in the region, most of which are quite mature and saturated, "it is slowing transforming into more and more growth for Australian asparagus," Raffa said. China has so many growing regions that it has domestic supply for much of the of year and a very low cost base compared to Australia's high labour and air freight costs. "But if we can highlight our quality there's a lot of potential in China's retail channel," he said.

Room for domestic demand to rise

According to the 2017/18 Australian Horticulture Statistics Handbook, only a third of Australian households bought asparagus

NET FRESH ASPARAGUS INTERNATIONAL TRADE



Source: 2017/18 Australian Horticulture Statistics Handbook

Trudy Kelder (Schuringa) for Australian Asparagus Council

Koo Wee Rup is known for its "black gold" – a unique and highly fertile black peat. Like the ideal 'terroir' for wine, it grows asparagus with great quality spears.

in the year to June 2018, buying an average of 233 g of asparagus per shopping trip. The supply per capita was 326 g, based on the volume supplied. Raffa said consumption is growing but with plenty of room for more of this versatile vegetable in the Aussie diet. Fresh asparagus – 99% green – is marketed through central wholesale markets in all states of Australia and also sold direct to supermarkets and foodservice. Raffa said the standard retail format is now a 150g bunch with bands at the top and bottom. Many years ago it was 250 g but retail pressure to hit certain price points has seen it shrink. The national market predominantly prefers spears of 9-15 ml diameter.

> **"We offer a different eating experience you can really only get from Australia."**

Counter season imports from Mexico, Peru

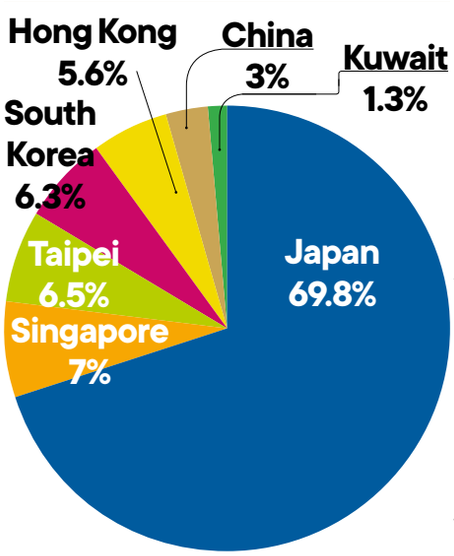
Generally about 60% of domestic asparagus production is consumed within Australia, with the local product usually available from August to December and then mid-January through to April. Over the Australian winter, when local asparagus is not available, imports arrive from Mexico mainly but also Peru and as of August 2019, both must undergo pre-shipment methyl bromide fumigation. Australia also imports small amounts from the US to meet seasonal and variety niches, and Thailand. Imports generally arrive pre-packed for Australian specifications.

Around 98% of Australia's tonnage is grown in the south-eastern state of Victoria and the vast majority of it in Koo Wee Rup, which is known for its "black gold" – a unique and highly fertile black peat asparagus thrives in. Like the perfect 'terroir' for wine, this asparagus hub also has ideal air, water, climate and terrain for great quality spears. Mildura, in north-western Victoria, is the second-biggest production area and has a slightly earlier crop thanks to being an average 5C warmer. Compared to asparagus producers elsewhere in the world, Australia generally enjoys environmental benefits such as low chemical use and relative freedom from pests and diseases.

UC157F1 favoured for Australian farrows

There are typically two asparagus harvests: a spring cut, which supplies premium quality spears (known for their sweetness, Raffa says) mainly for the export market; and a summer cut, primarily destined for the domestic market. In Victoria, the spring harvest is usually from about August to late December (with peak availability in October). The summer cut runs from mid January-mid April. By far the main variety is the high yield UC157F1, with Mildura also growing some Ida Lea. The asparagus is grown in raised beds which keep lots of water in the furrows during high rain periods in spring and the plants out of flooding. "The last season was quite a rollercoaster," Raffa said. Very wet weather at the start of the 2019 spring season reduced volumes and Koo Wee Rup faced unprecedented amounts of cold weather and hail storms in mid-October. All this combined with other adverse weather reduced volumes and created challenges in maintaining quality and reliability. On the positive side, the bushfires which razed many other regions over summer did not reach these areas though smoke haze made visibility quite low, he said. While it was once focused on canneries, competition from much-cheaper China has seen Australia predominantly supply fresh spears. And where once there were over 100 growers nationally, consolidation and farmer retirement has shrunk that to about 20. On the potential impact of the COVID-19 pandemic, Raffa said the Australian industry is very reliant on air freight exports and foreign workers. "The potential to be without either for the upcoming season is very concerning and we're looking at ways to address that," he said. AW

FRESH ASPARAGUS EXPORTS BY COUNTRY IN 2019



Based on ITC Trade Map volume data for 2019 calendar year

US asparagus faces increasing competition from Mexico

Mexican asparagus imports cause a reduction in the areas of asparagus grown in the United States, notably in California.

BY NADIA VENTICINQUE @EUROFRESHD

Increasing competition from foreign asparagus has strongly impacted US acreage. USDA data shows that in 2019, the area planted in the country totalled 21,900 acres, which produced 75.3 million pounds, down from 2017 levels of 27,600 acres and 84.1 million pounds, respectively. The main area affected, especially by the increasing entry of Mexican asparagus, is California, whose cultivation in 2007 covered 20,000 acres, reaching a harvest volume of 58 million pounds. By 2019, growing area was down to 5,300 acres and output was only 18.2 million pounds. The state of Michigan was the country's leading asparagus producer in 2019, with 10,000 acres and 28.2 million pounds, followed by the state of Washington, with 4,500 acres and 22.5 million pounds of asparagus harvested. AW

Christopher Ramirez

Altar Produce

develops East Coast to increase US presence

Altar Produce has 3 offices in the US: a central office in the city of Calexico, one in San Diego, and a newly opened one in Miami, from where it is developing its penetration strategy along the East Coast. Christopher Ramirez, president of Altar Produce, said, "It is a challenge to change the mentality on the East Coast, which is dominated by Peruvian asparagus, but we believe that we are doing a good job with the supermarkets who appreciate Mexico's year-round stable offer and supreme quality. Another great advantage we have in Mexico is the freshness that we can deliver for our US customers, being just on the other side of the border. Peruvian asparagus faces several challenges: old fields, logistical problems with maritime transit times of up to 2 weeks, and the fact that it has to be fumigated." Every year, Mexico is supplying fresh product in ever greater volumes. The US represents 60% of the volume sold by the company, which records annual production increases of 20–25%. "There are certain periods of the year when Mexico has a high volume of asparagus. That is why we have to sell to the entire US, rather than only to the West Coast." As of this year, the firm will begin offering organic asparagus - the result of an initial project of 500 hectares. Moreover, Altar is testing biodegradable materials for packaging. "We have to be up to date with viable technologies," said Ramírez.

Dan Miller

JMB Asparagus

invests in acres and new packaging in California

Jacobs Malcom & Burtt started out as a wholesale fruit operator, and when Leo Ronlandelli purchased the company in the 1960s, it pioneered the shipping of fresh asparagus to the East Coast and the Pacific Rim. "We have taken a seasonal commodity and made it a year-round available product with our own production and importing primarily from Mexico," said Dan Miller, worldwide production & grower relations manager. "We are one of the last shippers of asparagus from California, where JMB represents 30% of the asparagus acreage. We also ship from Canada and South America, managing on a yearly basis over 8 million pounds." Last year, JMB's California growers have invested in more than 150 new acres of asparagus, and more than US$1 million of automated packing equipment to reduce costs. Overall, the company and its suppliers have invested more than US$4 million to improve its packing facilities and food safety operations in California and Mexico. Regarding new demand trends, Miller explained that "purple asparagus has become a specialty variety, especially among gourmet chefs, but the green asparagus still leads the category."

Michigan asparagus

an industry focused on value-added products

Michigan State has over 100 firms involved in commercial asparagus production on 9,500 acres. For years, its production has been stable, between 20.5 and 22.5 million pounds, ranking, together with Washington State, as the largest or second largest producer in the country, depending on the year. The most significant thing about Michigan production is that it still has a very viable processing market. Last year, 30% was either canned or frozen, while the remaining 70% was sold in the fresh market. This year's harvest season will start in May, with similar volumes to 2019 expected. "Our focus is on value-added products. Instead of just sending asparagus in the traditional 5–kilo boxes, we will offer something like a microwavable bag, or focus on larger-sized spears, which are better for grilling and roasting," said John Bakker, executive director of the Michigan Asparagus Advisory Board. Michigan growers are always looking for new and better varieties. "The majority of the industry has planted a variety using our materials called Millennium, and now we are starting to see a new variety from the same breeding programme called Guelph Eclipse. We have started to plant the Dutch variety called Spartacus, a New Zealand variety called Pacific Challenger 2, and we are carefully monitoring a couple of new varieties from the LimGroup programme," said Bakker..

Greek asparagus season

Greece is the fourth largest European asparagus producing country. Very specialized in the cultivation of white asparagus, some companies are diversifying their production towards green asparagus.

BY GABRIELE ORSI @EUROFRESHD

Greece's asparagus production area is around 5,000 hectares in the Kavala and Agrinio regions, mainly marketed fresh to other EU countries. Although 97% is dedicated to white varieties, this year, for the first time, some pioneer companies are also growing green asparagus. The 2020 asparagus season in Greece kicked off 10 days early this year, as the warm weather across South-Eastern Europe accelerated the growth of the product and brought good quality. Consequently, all calibres of white and purple asparagus are available earlier than normal. Peru is the only competitor currently on the market with higher volumes. But as Greek producers' sustainable packaging meets the requirements of most German retailers (the main market), they are ahead of their South American rivals. AW

Delta Spar

positive early season

Delta Spar has made a positive and early start to the asparagus season in the Greek region of Kavala: "Thanks to the good weather we have had in Greece, the season will start early and should end in early May. The product quality is essentially of the same level as that of last year, both for the 12 gauge and for the 14 and 16 gauges," said Anastasios Papargyriou. Available exclusively in the white and purple type, Delta Spar's asparagus is mainly destined for the major European supermarket chains in Germany, Italy and Spain.

Assos

asparagus from protected cultivation

The Assos Cooperative supplies asparagus from the Greek region of Kavala produced using protected and heated cultivation methods: "We essentially produce white asparagus, and have recently started to use protected and heated cultivation techniques, which allow us to harvest earlier than other production areas. We also offer new, cheaper and more sustainable packaging to meet the needs of large retailers," said the cooperative's president, Leonidas Kafetzopoulos. At the outset of a season that promises to be a positive one and in line with the previous campaigns, Assos' asparagus is destined mainly for export, especially to Germany, France and Italy.

Michalis Xekarfotakis

Coop Kavala

Starts producing green asparagus

Coop Kavala is preparing to introduce green asparagus alongside its production of white to expand its range: "In the last 5–6 years, the asparagus sector has seen major changes, with the arrival on the market of new producers who have replaced old ones. Today we have reached the point where resources have to be optimised. This is why we have chosen to take on the challenge of introducing green asparagus, with the certainty that the asparagus produced in our region has an incomparable taste," said general manager Karkatzalos Tasos. With a combined 150 hectares divided between approximately 50 producer members, Coop Kavala is the main Greek producer of asparagus. The product is mainly exported to the major European markets, such as Italy, Slovakia, Switzerland, Austria, France, Poland and above all Germany.

Nikos Emmanouilidis

Agiasma

with organic and green asparagus

Agiasma expects a positive asparagus campaign in Eastern Macedonia and Thrace, and anticipates the arrival of the first green varieties: "For 27 years we have been cultivating exclusively white asparagus. This year's favourable weather conditions will allow us to bring forward the harvest to mid-February for asparagus grown in the field. From next year, we are also thinking of introducing the first green asparagus and starting organic production," said the firm's president, Nikolaos Emmanouilidis. Agiasma's high-quality product is destined primarily for European markets, with 20% going to Italy, another 20% to the Netherlands, and the remainder to southern Germany.

Die deutsche Spargelsaison 2019 verlief gleichmäßiger

BY MICHAEL KOCH

Anfang März hat die Spargelsaison 2020 in Deutschland mit dem Verkauf des ersten Spargels aus dem beheizten Anbau begonnen. Die durchschnittlichen Großhandelsabgabepreise lagen zu Saisonbeginn auf einem höheren Niveau als im Vorjahr. Das ist schon einmal als gutes Vorzeichen für die spätere Saison zu werten, auch wenn im weiteren Saisonverlauf natürlich noch viele andere Faktoren Einfluss auf Angebot, Nachfrage und Preisentwicklung nehmen.
Im Jahr 2019 war schon die Vermarktung von Heizspargel schwierig, und die Preise haben schon früh in der Saison nachgegeben. Als dann das Angebot im Mai aufgrund niedriger Temperaturen eingeschränkt war, ist es nur bedingt gelungen, die Preise wieder anzuheben. Trotzdem ist durch das Ausbleiben von Übermengen im Mai die Saison viel gleichmäßiger verlaufen als noch im Extremjahr 2018.

The assumed per capita consumption of asparagus in Germany in 2019 has fallen slightly. In contrast, the degree of self-sufficiency was largely stable at 85 %.

ABSTRACT

Michael Koch, assistant editor of the horticultural department of AMI

The 2019 asparagus season in Germany was more evenly spread than in the previous year. Restrictions on the area under cultivation, low temperatures in May and the drought in the summer of 2018 were the main factors behind a smaller harvest. The asparagus harvest in 2019 was 10 % lower than in 2018, and imports of asparagus to Germany were only slightly down on the previous year. In the long-term trend, imports from Spain, Italy and Mexico in particular increased. Imports from all three countries are mainly green asparagus. Due to the smaller domestic harvest, the assumed per capita consumption of asparagus in Germany in 2019 has fallen slightly. In contrast, the degree of self-sufficiency was largely stable at 85 %.

Die Spargelernte blieb hinter dem Vorjahr zurück

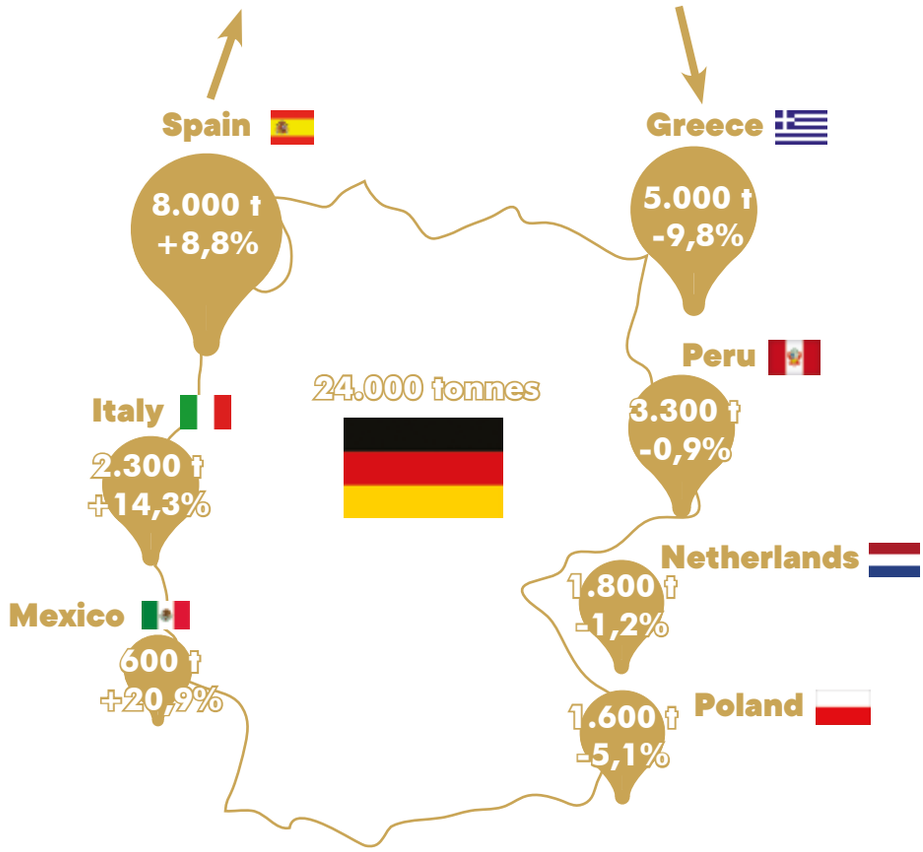
Flächeneinschränkungen, niedrige Temperaturen im Mai und die Trockenheit im Sommer des Vorjahres haben dazu geführt, dass in Deutschland 2019 weniger Spargel geerntet wurde als im Vorjahr. Bezüglich der Flächenentwicklung hat nach dem Extremjahr 2018 ein Umdenken eingesetzt. Erstmals seit vielen Jahren wurde die Spargelanbaufläche in Deutschland 2019 eingeschränkt. Dabei fallen die statistisch erfassten Flächeneinschränkungen nicht so deutlich aus, wie direkt im Anschluss an die Saison 2018 zu erwarten war. Nach vorläufigen Angaben des Statistischen Bundesamtes wurde die Anbaufläche von Spargel im Ertrag 2019 nur um gut 2 % gegenüber dem Vorjahr einschränkt. Damit stand Spargel auf einer Fläche von 22.900 ha im Ertrag. Im Vergleich mit dem Durchschnitt der vergangenen fünf Jahre bleibt aber ein Flächenplus von gut 4 %. Flächeneinschränkungen gab es vor allem in Bayern, Niedersachsen und Brandenburg.
Neben der Entwicklung der Anbaufläche haben auch die Durchschnittserträge einen Einfluss auf die Erntemenge. Nach vorläufigen Angaben war der bundesweite Durchschnittsertrag mit 5,33 t/ha so niedrig wie seit 2013 nicht mehr. Hierbei spielen insbesondere zwei Faktoren eine Rolle. Nicht alle Spargelflächen konnten in dem trockenen und heißen Sommer 2018 ausreichend bewässert werden. Somit sind die Pflanzen mit weniger Reserven in die Saison 2019 gestartet. Das spiegelte sich vielfach in einem recht schnellen Rückgang der Stangendicke wider. Zudem waren die Temperaturen insbesondere im Mai unterdurchschnittlich, und es fehlte Einstrah-

lung, so dass die Dämme kühl blieben. Damit stiegen die Tageserntemengen nicht übermäßig stark an, und das Gesamtangebot blieb begrenzt.
Für Deutschland insgesamt haben die Flächeneinschränkungen und die niedrigeren Erträge dazu geführt, dass die Rekordernte des Vorjahres um gut 8 % verfehlt wurde. Nach vorläufigen Angaben wurden insgesamt 122.000 t Spargel geerntet. Nur 2017 und 2018 war die Spargelernte größer. Die diesjährige Ernte entspricht genau dem Mittel der vergangenen fünf Jahre. Wird der Vergleichszeitraum, wie vom Statistischen Bundesamt, auf sechs Jahre erweitert, bleibt ein leichtes Plus von rund 2 %.

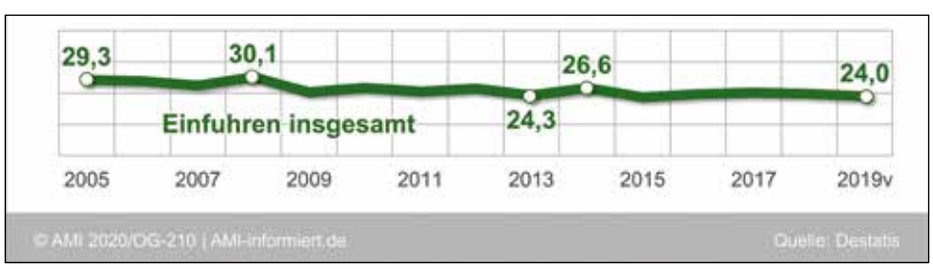
Importe aus Spanien legen weiter zu

Nach vorläufigen Angaben des Statistischen Bundesamtes wurden 2019 insgesamt 24.000 t Spargel nach Deutschland importiert. Damit blieb die Importmenge um rund 3% hinter der des Vorjahres zurück. Durch Nachmeldungen könnte die Menge aber doch noch an das Vorjahresergebnis von knapp 25.000 t anknüpfen. Auch im Vorjahr hatten bei den vorläufigen Angaben rund 3% zum endgültigen Ergebnis gefehlt. Damit würden die Einfuhren weiterhin auf einem recht konstanten Niveau liegen. Auch wenn grüner Spargel in der Außenhandelsstatistik nicht getrennt ausgewiesen wird, dürften sich die Anteile in der gesamten Importmenge doch immer weiter in Richtung Grünspargel verschieben. Das zeigt sich auch bei der langfristigen Entwicklung einzelner Herkünfte.
Von den gesamten Spargeleinfuhren kamen 2019 rund 33 % aus Spanien. Damit hat Spanien nicht nur die Führungsposition weiter ausgebaut, Spanien ist auch die einzige Herkunft, bei der sowohl kurzfristig als auch im Zehnjahres-Trend die Einfuhren nach Deutschland gestiegen sind. Aus Spanien wird überwiegend Grünspargel nach Deutschland importiert. Zwischenzeitlich sah es danach aus, als ob sich die Einfuhren aus Griechenland, überwiegend weißer bzw. weiß/violetter Spargel, wieder stabilisieren würden, allerdings ist die Einfuhrmenge 2019 wieder zurückgegangen. Trotz des Rückgangs bleibt Griechenland die zweitwichtigste Herkunft. Auf dem 3. Platz folgt Peru, allerdings mit einem Rückgang sowohl gegenüber dem Vorjahr als auch im Trend der vergangenen 10 Jahre. Aus Italien wurde 2019 zwar weniger Spargel importiert als im Jahr zuvor, der Zehnjahres-Trend ist für Italien jedoch positiv.

TONNAGES AND ORIGINS OF ASPARAGUS IMPORTS INTO GERMANY (IN TONNES AND % BETWEEN 2009-2019)



Imports of asparagus to Germany have declined in ten years, but imports of green asparagus from Spain, Italy and Mexico are on the rise.



Ungarn und Mexiko gehören noch nicht zu den großen Spargellieferanten, aber die Einfuhren aus Ungarn weisen 2019 einen starken Anstieg gegenüber dem Vorjahr auf. Die Einfuhren aus Mexiko sind in den vergangenen 10 Jahren um durchschnittlich 21 % pro Jahr gestiegen und daher erwähnenswert. Bei grünem Spargel macht Mexiko Peru Marktanteile streitig.

Rechnerischer Pro-Kopf-Verbrauch ist leicht rückläufig

Der rechnerische Pro-Kopf-Verbrauch von Spargel in Deutschland ist 2019 gegenüber dem Vorjahr leicht zurückgegangen. Das ist aber nicht weiter verwunderlich, weil die Einflussgrößen einer Versorgungsbilanzrechnung in einem starren Verhältnis zueinander stehen. Und da bei der Erntemenge in Deutschland rund 10.000 t gegenüber dem Vorjahr fehlten, spiegelt sich das auch entsprechend im Pro-Kopf-Verbrauch wider. Aus der Inlandsproduktion und den Importen standen dem Markt in Deutschland 2019 rund 146.00 t Spargel zur Inlandsverwendung zur Verfügung. Allerdings gelangt nicht die gesamte Menge zu den Verbrauchern. Die Exporte und Verluste, die entlang der Wertschöpfungskette anfallen, müssen noch abgezogen werden. Nach Abzug dieser Verlust und der Exporte blieben für den Inlandsverbrauch 109.500 t. Diese Menge wird durch die Bevölkerung geteilt. Da die Bevölkerung nochmals etwas gewachsen ist, führt auch das dazu, dass der rechnerische Pro-Kopf-Verbrauch sinkt. Mit 1,32 Kilogramm war er um 8 % niedriger als im Vorjahr. Unverändert blieb dagegen der rechnerische Selbstversorgungsgrad mit rund 85 %. AW

ASPA, owned by Jacques Guironnet, can be considered the earliest asparagus producer in France and in Europe.

Luxury white asparagus has a name: ASPA

In France, ASPA, led by Jacques Guironnet, produces a very early white asparagus thanks to the use of a hot-water network. The product's very regular taste quality is greatly appreciated in gastronomy, making it a high-end product.

BY GUY DUBON @ReussirFL

Loire Valley Asparagus has been grown for centuries in the deep sandy soils of the ancient riverbed of the kings of France. But since 1995 in Avoine, it has benefitted from an added advantage: hot water. This is provided by the tertiary network of the EDF nuclear power plant. ASPA, which specialises in the production of white asparagus, takes advantage of this hot water by using a 200-km pipeline network under the asparagus mounds. 30oC water is distributed across 20 hectares of asparagus grown under different types of shelter, and without producing any greenhouse gas emissions.

Heating pipes in the mound

"We grow 5 hectares under plastic greenhouses and 15 hectares in open field," said Jacques Guironnet, who bought the company in 2012 and created ASPA2. The temperature in the mound can be raised to 18-22 degrees Celsius in the middle of winter. "We aim to start production in mid-January by starting heating 20 days before," said Guironnet, who can be considered the earliest asparagus producer in France, and in Europe, too. After acquiring the farm, Jacques Guironnet modified the production technique by switching to a 3-metre-wide gap plantation, and a density of 25,000 crowns per hectare in double rows. Establishing the asparagus field required a significant investment and a great deal of work in installing the heating pipes, which do not allow mechanical planting. Faced with the lack of area, Jacques Guironnet started replanting asparagus on asparagus, which in this case required the removal of the old heating system. A lot of extra work.

The temperature in the mound can be raised to 18–22 degrees Celsius in the middle of winter thanks to the channelling of water at 30 degrees Celsius.

Backlim was traditionally the variety planted in the area. Nowadays, it is Vitalim, chosen for the fact that it performs better in cold conditions and because the plant's rest period is shorter. When the asparagus grows, the harvest is constant thanks to the controlled heating and the buffering effect of the shelters. "We are not required to handle the black/white and thermal plastics very much because the cool weather conditions are more stable than those of April or May," he said.

"La Délicate" is a premium-quality asparagus from Aspa with a special packaging.

So tender that there is nothing left on the plate

"Even in the cold weather, it is important not to overheat the mound, as the excess temperature can lead to a loss of quality," said Guironnet. Early production followed by an early end of harvest ensure a very long growing period that begins in mid-April. These additional two months allow great potential for accumulation of reserves for the following year. In summer, the cultivation is carried out in the same way as for a classic asparagus crop by aerating the shelters as much as possible. Most importantly of all, the crop is protected against thrips. The regular growth of ASPA asparagus gives it a remarkable quality. Indeed, this is what led Jacques Guironnet to come up with the slogan: "So tender that there is nothing left on the plate". ASPA customers appreciate this asparagus for its great tenderness, its very slight fibrousness, its sweetness and absence of bitterness, and its very regular taste quality. ASPA also pays great attention to the visual quality of its asparagus, which is very white and hand-peeled for extra quality. The supply period runs from mid-January to mid-April, with 50% of sales being in France to wholesalers, specialty distribution, and food service. The other half is exported, mainly to Asia, through importers who supply a high-end clientele from the gastronomic world. ASPA asparagus is available in 5 kg and 2 kg packs as well as in 500 g bunches. *AW*

The goal of the night harvest is to optimise conditions for the preservation of asparagus during and after collection.

Harvesting asparagus at night

Night harvesting is as yet still undeveloped among asparagus growers. Yet it offers certain advantages, as evidenced by those who have adopted it.

BY GUY DUBON @ReussirFL

5 benefits of the night harvest

1. Colder asparagus: between 3 and 8 degrees less than during the day harvest
2. Better quality, resulting especially from fewer burnt tips
3. No pinkness due to darkness, higher relative humidity and often less wind.
4. Knowledge of harvest volume facilitates organisation of sorting work
5. Better knowledge of the offer and better daily valuation.

The night harvest would seem to be a complex operation. Yet the producers who have tried out the experiment in different countries have all done so successfully. Today, it represents a trend that is spreading in several parts of the world.

Natural temperature lowering

The goal of the night harvest is to optimise conditions for the preservation of asparagus during and after collection. It avoids the light (colouring of the tips), heat, low humidity, and wind that often lead to the rapid dehydration of asparagus. Depending on how the work site is set up, the process starts either at the end of the day or in the middle of the night. In both cases, the aim is to have the bulk of the harvest completed by between 6 and 8 am in order to start washing and packing early, and, above all, so as to know the precise quantity and quality of the asparagus to be marketed. The night harvest takes advantage of the natural lowering of the temperature. Asparagus harvested in this way can be 3 to 8 degrees cooler than asparagus harvested during the day. This makes cooling easier and improves the preservation and quality of the product. The night harvest hinders the bud growth that appears under plastic after the day's temperature peak. As a result, the percentage of burnt spears is lower. Asparagus harvested at night is whiter. Its development in the mound happens during the day, and the tip appears later. Once harvested, the spears are no longer exposed to light.

Knowing the volume allows better marketing

Nocturnal conditions also provide higher relative humidity, which limits dehydration that can result in pinking. Moreover, there is little or no wind interference when handling the plastic covers. As the reports

show, most teams of pickers enjoy working in cooler and less demanding conditions. The night harvest also optimises the management of packaging, which is particularly important as once sorting teams start work, they have to handle large volumes. The station manager can also adapt the number of operators to the volume of the night's harvest as the available volumes are known very early in the day. This improved knowledge of the offer makes it possible to make the most of the daily harvest. *AW*

Asparagus harvested in the night can be 3 to 8 degrees cooler than asparagus harvested during the day.

Night picking revolutionises harvest in Alsace

Spanish seasonal workers brought night harvesting to France.

As soon as they get out of the van, the small group disperses into the plot. It could be 7:00 in the morning, but it's actually 7.00 in the evening. This is the usual time when the working "day" begins. Emmanuel Dollinger, manager of Dollinger Farm, welcomes his first group of eight Spanish seasonal workers for the 2018 season. The farm has completely overturned its harvesting routine, which used to start at 6 am and end at noon, or sometimes later. "Last year it was very hot. After ten days, Juan, the team leader suggested starting work at 7 pm or 7:30 pm, telling me that at night, you don't suffer from the heat, and that you are more efficient and quieter," recalls Dollinger. At first, the farm manager was reluctant but was eventually persuaded to give it a try using headlamps. The test results provided such positive results that within a fortnight, the group had become familiar with the single 10-hectare plot. Today, Dollinger is completely free to manage his time and harvest according to the weather, "as long as I have the maximum amount of asparagus waiting for me in the morning in 6 kg crates. Juan knows his stuff. He is 47 years old and has twenty-eight years of experience in asparagus." For Dollinger, the 2018 campaign represented a revolution in crop management. "I'm a winner in every way," he said. "When I start my day at 7:00 am, all I have to do is count the crates to instantly know how much volume I have for sale." Sales have increased and some customers have pointed out that the quality of asparagus has improved.

Night-harvesting asparagus in Spain

San José and his wife Pilar Chaqui, produce 25 hectares of organic white asparagus in Tudela de Duero, near Valladolid, Spain. They market their asparagus for direct sale and to restaurants. It is harvested at night by groups of Andalusian workers. Report

There are several reasons for harvesting asparagus at night. One of the main ones is that it assists pickers - a key consideration given that Spain has very few machines to assist in harvesting. Our Andalusian labourers find that the plastic is soft in daytime temperatures and doesn't handle well. Also, as asparagus harvesting is a laborious task, the workers feel less fatigue at night, which allows them to work at a better pace. For night vision purposes, they use headlamps. However, handling asparagus is a delicate endeavour that requires care and precision to ensure the quality and integrity of the product is maintained throughout the production process. This is why we always employ expert and reliable pickers. The harvesting usually starts at 10 pm and ends between 4 and 7 in the morning, depending on the amount of asparagus.

Another benefit of harvesting asparagus at night concerns the quality of the product. Picking the plant at this time allows the asparagus to come out cooler and whiter as it avoids contact with sunlight. This in turn ensures a better appearance and taste - key considerations for retailers and consumers alike. The third major factor relates to operational organisation. When all of day's production is carried out early in the morning, you can start organising the storage house very early and begin processing the production for sale and delivery. This ensures the product arrives on the market as fresh as possible. So, we feel there are more advantages than disadvantages relating to night collection. We should never forget, however, that the pickers' expertise and skills are at the heart of the process.

A hot water treatment to limit postharvest pink discolouration for white asparagus?

Aspect of the spears 24 hours (D+1) after the start of simulated point-of-sale conditions.

A quick hot water treatment of asparagus by dipping or spraying after harvest is efficient in preserving the white colour. A follow-up study should determine how the results of trials carried out by French research institute CTIFL can be implemented in packing stations.

BY CTIFL

Aspect of the spears of the variety Vitalim after 24 hours (D+1) in point-of-sale conditions for the treatments TecH = immersion in hot water at 55 °C/2 min + hydrocooling by spraying at 2 °C/20 min (left) and H = hydrocooling by spraying at 2 °C/20 min (right).

After harvest, white asparagus undergoes physiological and biochemical changes that rapidly lead to a loss of quality. The main effects are higher fibrosity, water loss, and the development of a pink discolouration due to an increased synthesis of anthocyanins. The pink discolouration is a criterion that depreciates product quality and, depending on the distribution channel, may entail downgrading to a lower class, with a possible price loss of 5 to 15% for the grower, according to a survey by CTIFL (2017).

Spears immersed in hot water show practically no pink discolouration

Several studies have shown the advantage of rapidly lowering the temperature of asparagus with cold (6-8°C) or iced water by spraying or immersion (hydrocooling) in order to delay the appearance of this pink tint. In an article published in Infos Ctifl nr. 353 (July 2019), Patricia Sanvicente, Sophie Annibal and Valérie Mérendet write that "rapid cooling after harvest is currently the most widely used technique in France." Based on literature (see boxed text), new studies were conducted by CTIFL in 2017 and 2018 in order to assess the interest of hot water treatments applied to white asparagus varieties. Thus, in 2017, the hot water treatment of the varieties Darlise (little susceptible to pink discolouration) and Vitalim (highly susceptible) was applied by immersion of the spears, followed or not by a hydrocooling treatment using spraying. The core temperature of the spears during the trials was maximum 47-50°C for immersion treatments at 55 °C. The spears returned to their initial temperature after 30 minutes at room temperature (18 °C) or were cooled to the core at 3° C in less than an hour if the hot water treatment was followed by hydrocooling (2°C/20 min). In the trials, the spears immersed in hot water showed practically no pink discolouration, whereas the control spears, hydrocooled and immersed in water at room temperature, took on a pink tint after 5 to 6 hours in simulated point-of-sale conditions, with the discolouration further evolving over the three days of exposure to

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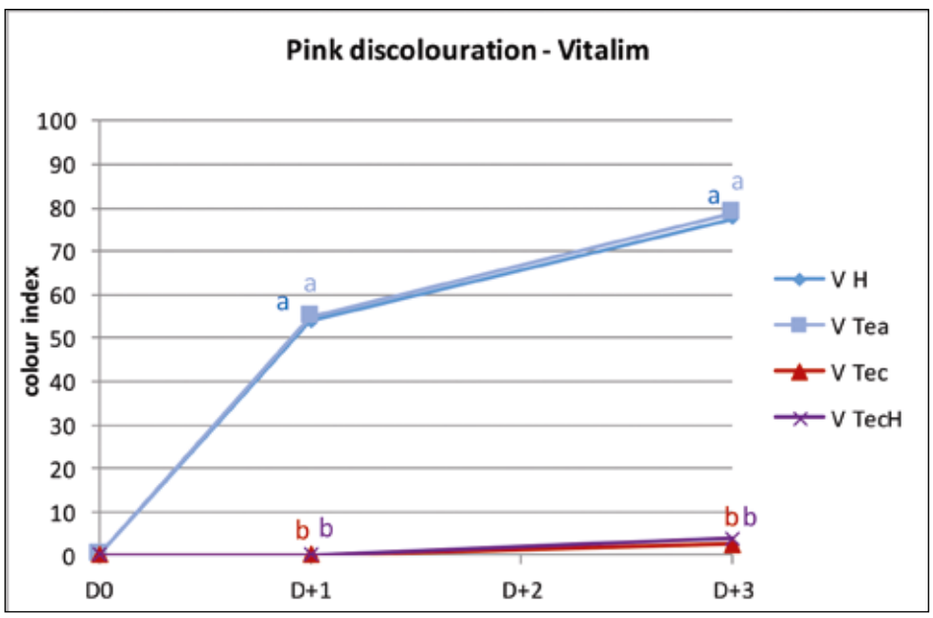
Why does white asparagus turn pink?

Anthocyanins are pigments that filter light; they accumulate in plant tissue in response to the action, joint or separate, of various environmental factors, such as light (Leyva 1995), low temperatures (Christie et al. 1994, Dixon 1995) or nutritional stress, e.g. a phosphorus deficiency (Kakegawa et al., 1995). As a reaction to those factors, the activity of phenylalanine ammonia-lyase (PAL), a key enzyme in the pathway of anthocyanin biosynthesis, is stimulated (Dixon 1995, Flores et al, 2005). In the case of white asparagus, research indicates that there is an increase in the activity of PAL, and therefore enhanced postharvest anthocyanin synthesis, after an initial stimulation by light, independently of temperature and lighting conditions during storage, thus causing the appearance of a pink tint (Siomos et al. 1994, Siomos et al. 1995a, Siomos et al. 1995b; Siomos et al. 2000; Siomos et al. 2001, Flores et al. 2005).

Example of the development of pink discolouration

of the spears by visual observation, expressed as colour index, according to the applied treatment



H = hydrocooling using spraying 2 °C/20 min.
VTea: immersion in temperate water at 10°C/6 hours
VTec: immersion in hot water at 55°C/2 min
VTecH: immersion in hot water at 55°C/2 min + hydrocooling by spraying at 2°C/20 min

light (Figure 1). As the authors observe, "pink discolouration of white asparagus is strongly delayed by immersion in water at 55 °C."

Towards a large-scale implementation?

In the experiments, techniques combining a hot water treatment applied by dipping or spraying within 3 or 4 hours after harvest, followed by hydrocooling or immersion in temperate water (Mérendet & Annibal 2015) offer the best compromise in order to limit pink discolouration and water loss. Using this method, the core temperature of asparagus decreases rapidly and the spears are quickly cooled down before storage. As the authors of the article state, "Before those techniques can be applied on a large scale, the growers will have to confirm the feasibility of introducing the various steps into the organisation of the packing stations, as well as the positioning of the existing equipment." If one of the two proposed methods is deemed to offer perspectives for implementation, the advantage of a hot water treatment will have to be validated at the grower's facility using existing or specifically adapted equipment. *AW*

FOCUS

Spraying or immersion?

Hot water treatment by spraying

Hot water treatment by immersion

In 2018, hot water spraying was tested by CTIFL in order to determine if this method was as efficient as immersion in limiting the appearance of a pink tint in asparagus. The technique was assessed using several combinations of temperature/duration, systematically followed by hydrocooling through immersion (1 °C/5 min). In the spraying treatment, asparagus spears in plastic crates were placed under two spraying nozzles supplied with water heated and regulated at the desired temperature. As in the "immersion" trials, the spears in the "control" batch and the "hydrocooled" spears took on a faint pink hue within a few hours of their transfer into point-of-sale conditions. After 24 hours in said conditions, 90 to 100 % of the spears showed a fairly marked pink discolouration (colour index 70 to 80). However, spraying with hot water 3 to 4 hours after harvest, followed by hydrocooling through immersion, limited the appearance of a pink tint. The best results for each tested treatment temperature were obtained with the longest exposure. On the other hand, a heat treatment 24 hours after harvest was less efficient than a treatment within 3 or 4 hours after harvest. In the experimental conditions, the temperature/duration combination of 58 °C/90 sec was the most efficient to avoid pink discolouration of the spears. Unlike the results of the "immersion" trials, which showed a very slight dehydration of the spears (0,1 to 0,2 %), the heat treatments using spraying did not entail any weight loss. On the contrary, the spears gained an average of 2 % of their initial mass by absorbing water during the treatment.

MORE INFO

Existing data

Research in the Netherlands showed that a hot water treatment (50 °C/2 min) limits the appearance of a pink tint in white asparagus (Poll 1998). More recently, Siomos and his team (2005, 2010) confirmed that, in experimental conditions, heat treatment by immersion in hot water is efficient in preserving the white colour of asparagus spears. A treatment by immersion in hot water at 55 °C for 2 to 3 minutes, followed by an immersion in water at room temperature for 10 minutes, is efficient against pink discolouration in the varieties Atlas and Dariana. Similar results were obtained in preliminary research conducted by CTIFL in 2015 on the variety Grolim (Mérendet & Annibal 2015).

These "asparagus industry" players have mainly chosen Namibia, Ethiopia and Madagascar to produce asparagus on the African continent.

Asparagus to conquer Africa

Africa discovers asparagus production, with investors establishing the new culture there. Plantations in Namibia, Ethiopia and Madagascar are mainly for processing.

BY CHRISTIAN BEFVE

Asparagus for processing, canning and freezing is subject to different production constraints from asparagus for the fresh market. Two parameters are decisive for this type of culture. The availability of deep, sandy land with good water resources is a primary agronomic parameter. The availability of labour at the lowest possible cost is a second determining economic criterion. The history of asparagus production is marked by the industry's migrations driven by changing labour costs and availability, while at the same time maintaining the same distribution markets in North America and Europe. Canned or frozen asparagus left France in the mid-1980s, when Spain entered the Common Market and was able to offer lower labour costs and receive subsidies.

Large numbers of workers and low labour costs are key to new asparagus plantations in Africa.

Motivated by low labour costs

In 1995, the Spanish asparagus industrialists set up in Peru attracted by the availability, cost and efficiency of Peruvian workers. This explains why there is no longer an asparagus canning industry in Europe with the exception of the PGI Asparagus of Navarra. Faced with the rising costs and scarcity of Peruvian labour in around 2005, some of the companies decided to set up in China. But China's economic and industrial boom over the past decade has seen a steady flow of workers leaving the countryside to be absorbed by the construction and industrial sectors. Now, new asparagus manufacturers or the same companies that were in Spain, Peru and China are setting up in Africa. These players have mainly chosen Namibia, Ethiopia and Madagascar for various reasons. Each of these African countries

already has between 100 and 400 hectares in place in less than 5 years with a projected 400 to 600 hectares more in the future. The primary driving force for these new implantations is the low labour costs available. Thus, the average daily cost including expenses is estimated at US$3 per worker in Madagascar and Ethiopia and $5 in Namibia, compared with $10 in China, $20 in Peru and $60 in Spain. The availability of a large number of workers is also critical to the decision.

Need for mulch in asparagus production

Another asset the African continent has is access to good, deep, virgin land at reasonable prices. Prices are about $5,000 to $10,000/ha. However, these are fallow lands that require a lot of work to grow crops. While Peru enjoys very stable temperatures throughout the year (between 12 and 30 degrees) these African countries, in contrast, have much greater climatic ranges, going from 5 to 30 degrees Celsius in Madagascar, up to 35 degrees Celsius in Namibia, and up to 40 degrees Celsius in Ethiopia. The winter period does not allow production, and summer temperatures are too high (especially in Ethiopia and Namibia), slowing or stopping production. It is therefore obligatory to use mulch for warming and to ensure the production of asparagus in the spring and autumn. Even if asparagus crops are at altitude (between 1,000 and 2,000 m) in order to escape the excessively high summer temperatures, the soil must be refreshed with irrigation water. Water is available in sufficient quantity and quality from dams or deep boreholes. On the other hand, the rains are irregular and difficult for the local meteorological services to predict. For Madagascar and Namibia, located in the Southern Hemisphere, the period of precipitation is between November and March. For Ethiopia, in the Northern Hemisphere, it rains the most between June and September. These rains can interrupt water stress and complicate harvesting and health protection. Without special measures, these new zones can only produce 3 to 5 months a year, which impacts heavily on the returns on the very high investment costs for asparagus fields.

Essential technical adaptations

With the benefits, however, come certain constraints and difficulties. Indeed, while the workforce is often plentiful, skill and motivation levels may be low or entirely absent. For many workers, asparagus is a totally unknown crop, which requires time for training and learning. Careful management is crucial if the expected economic gains are to be achieved. Even if local, this workforce is often very scattered, with no means of transport. The company must therefore implement transport logistics to move its workers and sometimes even house them, which in turn requires constructing housing. Untouched asparagus-friendly land may also be land which has been poorly cultivated previously. The parcels sometimes require levelling work as well as the construction of basic infrastructure (roads, wells, etc.) to make production possible. These «new Eldorados» also require technical adaptations and new expertise in cultivation to adapt to climatic conditions that are different from areas already cultivated in the world. In some cases, climate data is deficient or non-existent. These new destinations for asparagus have no nearby bases for the supply of inputs. It is therefore necessary to import all means of production, storage and packaging, which involves time delays that sometimes require order growing equipment 7 to 10 months in advance. The resulting costs can very quickly reduce or even wipe out the expected economic gains. In addition to the very high cost of air cargo, between $1.5 and $2/kg, it is also important to take into account the remoteness of international airports, the average regularity of domestic flights, the few tarmac roads, and the numerous tracks; remoteness of ports for sea freight (1 to 2 day's transport). Also, it is almost impossible to export fresh asparagus. In order to get the best value from the product, it must be transformed either by appertisation (canning) or, more riskily, by freezing. Both cases require very costly agro-industrial equipment. *AW*

In Madagascar, asparagus is grown by a large number of small farmers

Italy freezes its asparagus

Italy is Europe's leading asparagus processing country. Much of the production is for freezing, in accordance with the standards required by the "Quality Controlled QC" label.

BY LUCIANO TRENTINI

With 700 hectares of asparagus cultivation for processing, Italy now ranks first in Europe. In recent years, the Emilia-Romagna region has developed a regulation for integrated production of asparagus which governs both fresh and processed products. Compliance with these regulations means that the packaging can be labelled «Quality Controlled QC», with guarantees for the environment and for the health of consumers.

In the case of asparagus, the varieties suitable for vegetable preserves must have specific characteristics, including a uniform white or green colour, homogeneous calibre, and resistance to the sterilisation process. When peeling, the waste rate should not exceed 10% of the gross weight. After blanching, the product undergoes a sterilisation phase. Then, 90% of the can's content weight should consist of asparagus. Asparagus can also be stored by deep freezing, with the tips very quickly reaching the temperature of -18 C. Unlike with normal freezing, deep freezing ensures that the cooling speed causes the formation of microcrystals that do not damage the biological structure of the food. Keeping the temperature below -18 degrees Celsius significantly slows down chemical and enzymatic reactions and microbial activity becomes almost zero. The organoleptic and nutritional characteristics of frozen vegetables remain unchanged from the original product. If the cold chain throughout the asparagus' frozen life is scrupulously respected, deep freezing is the best storage system and is capable of offering the consumer a product that can compete with the fresh product. Freezing requires a high-quality product. Spears must have a closed tip and a regular, straight shape so that the frozen product can be packaged (in cans or bags). The colour should be a homogeneous white or green, with red-purple hues not persisting after blanching. To optimise freezing, spears must be at least 130 mm long and have a homogeneous calibre divided into three categories: 7 to 10 mm; 10.1 to 15 mm; 15.1 to 20 mm. *AW*

Freezing requires a high-quality product. Spears must have a closed tip and a regular, straight shape.

Danper, *three markets for Peruvian asparagus*

Danper's director, Jorge Aranguri

Danper has been processing white asparagus for canning since 1994. In its early days, the company sourced from the producers of its own region. It was not until 2002, after acquiring some land, that it began producing and marketing white asparagus for fresh export markets. "Fresh white asparagus has to be of a high quality level and there must be total control of the production chain until shipping," said Danper's director Jorge Aranguri. Then, in 2004, the company invested in its own freezing unit, mainly to freeze green asparagus. Today, Danper has over 1,100 ha of its own asparagus, with an additional 1,000 ha belonging to various partner producers. The average yield of asparagus is around 10 tons/ha. Asparagus production takes place all year round, which means three markets can be supplied: fresh, canned, and frozen, according to the different qualities of asparagus and market prices. "Our peak production of white asparagus for the fresh market runs from August to December," said Aranguri. For this market, calibres above 14 mm are preferred. For canning, calibres of 9 to 12 mm after peeling are desirable. "We have different opportunities due to the different quality requirements. This allows us to make the best use of all types of asparagus and to adjust to the markets," said Aranguri.

Where in the world is asparagus processed?

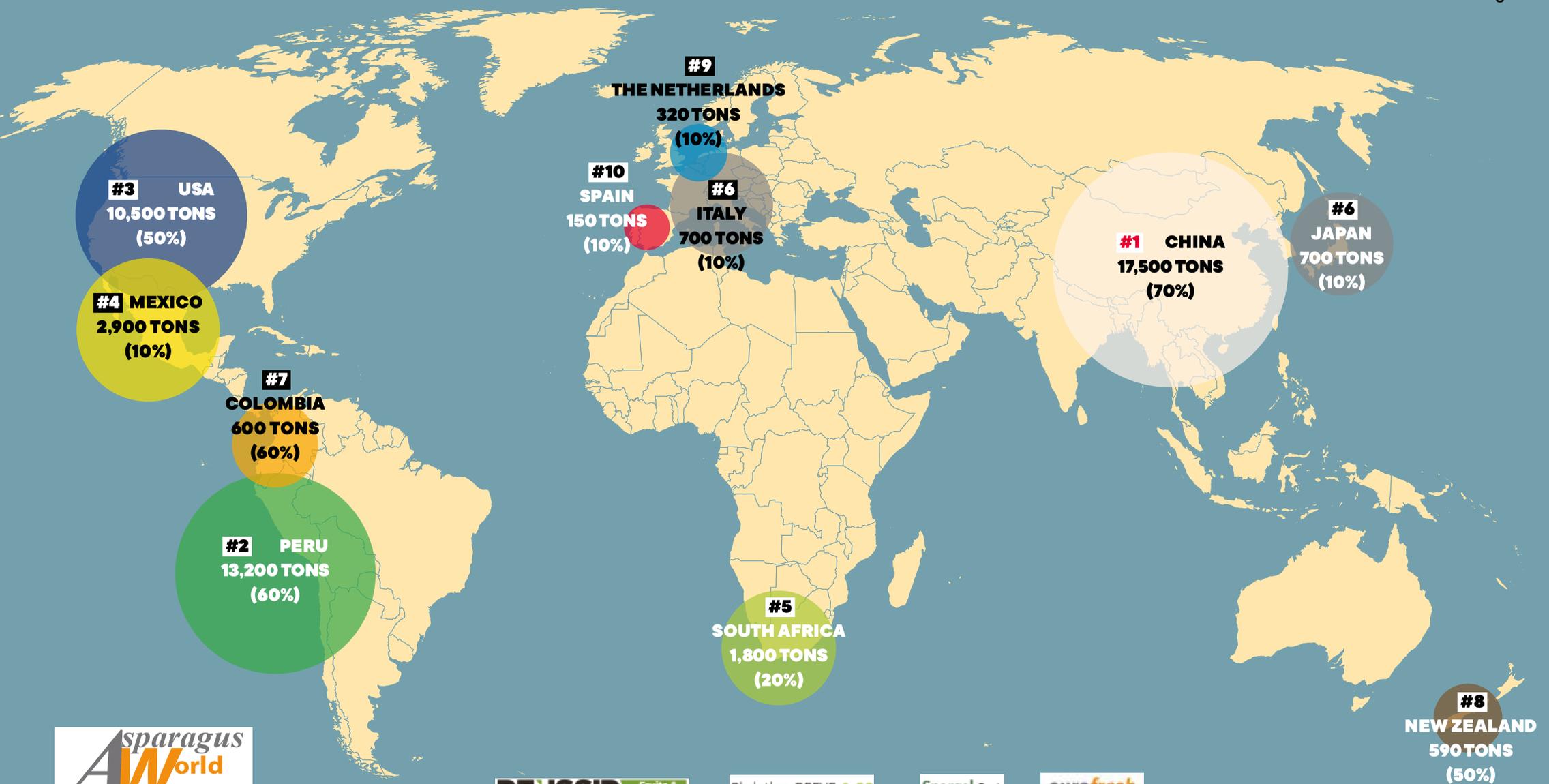
Canned or frozen, the processed asparagus market represents an outlet for a third of the world's asparagus crops, with China, Peru and the United States leading the way.

BY GUY DUBON

Asparagus should be considered a "global" crop; the world's asparagus cultivation currently comprises 210,000 hectares, with a high concentration in Peru (20,000 ha), Mexico (20,000 ha) and China. In Europe, Germany (22,000 ha), Spain (14,000 ha) and Italy (9,000 ha) are the main producing countries. The processing sector is divided into two major markets: canning and freezing. The asparagus produced in China is largely intended to meet the need for freeze-dried and frozen asparagus. Peruvian production is also very oriented towards the processing market. In fact, it was to meet the demand for processing that asparagus was first grown in Peru. Approximately 13,200 ha (or 60%) of the 22,000 ha of asparagus produced in Peru is for processing. The United States processes half of its asparagus crop (10,000 ha), mostly green and frozen. China, Peru and the United States therefore represent the world's top-three processed asparagus producers. South Africa also devotes a significant proportion (70%) of its crops to processing, that is to say, more than 1,800 ha. Other African countries are also developing their processed asparagus industries (see previous page). On a smaller scale, New Zealand processes 50% of its crops (about 600 ha). By contrast, Europe no longer produces much asparagus for processing. Spain processes only a small part of its production of Navarra PGI asparagus and Italy sends some green asparagus for freezing. *AW*

TOP 10 ASPARAGUS-PRODUCING COUNTRIES

Volume of asparagus for processing (tons) and share of national production (percentage)



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A Gourmet journey

This asparagus veiled in a gelée of Tosazu sauce is an invitation to travel far to Asia. Umami, the fifth flavour, accompanies the perfect combination of asparagus and carpaccio of St. Jacques scallops.

Steamed and rolled in a leaf of fish, accompanied by condiments and lemon confit. This "asparagus of the sea" brings the flavours of the open seas.

Christophe Girardot is the owner and chef of the Paradoxe Restaurant in Cenon near Bordeaux (France). "I look forward to asparagus every year, because it means the spring has arrived and because we are right in the terroir of the Landes and Blayais asparagus." He finds in asparagus just what he expects from all the products he chooses for their freshness, their season and their nature. Asparagus inspires him. He prepares it in many ways using different methods. He has a boundless creativity drawn from his meetings with various Michelin-starred chefs, including Michel Guérard and his long-haul trips, starting with a world tour on the training ship La Jeanne d'Arc.

with Asparagus

Broiling, cooking without water, concentrates the flavours of asparagus that rival the powerful aromas of the Colonnata Bacon, all the way from Tuscany. Another travel memory.

Here, the terroir is superimposed. Uppermost, French caviar, from the Gironde. In the middle, "the perfect egg." All resting on a bed of asparagus mousse and asparagus tips. A perfect balance of flavours.

Wild garlic, which is collected in the spring from the forest floor, along with the asparagus also provides a long-awaited breath of spring air. Here they are married with another seafood: lobster.

Christophe Girardot designs his work as a team, in sharing and transmission, values common to rugby which he loves. Solenn, second in command in the kitchen, has a key role in the Paradox team. Christophe's accomplice around the stoves, Solenn is also the winner of the title of best apprentice of France in 2014 and of the Philippe Etchebest Trophy 2017.

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