

HydroSpecial

International hydroponics magazine | September 2015



Legro
Danish hydroponics
specialist



Great Lakes
Fresher-than-fresh
presentation in store



Shinjuku Vegeful
Chain collaboration
boosts sales

Sharing a healthy future

In this issue

8



Legro – Danish specialist

10



Artificial light

12



Chain collaboration in Tokyo

16



Fresher-than-fresh presentation

4-5

Interview with Marc Celis

6-7

Salatrio: a vegetable garden for consumers

14-15

Indonesians stir-fry lettuce

18

Hydro Assortment booklet

19

Greenbox





Dear **Customer,**

We are pleased to present to you this first issue of Rijk Zwaan's international hydroponics magazine.

Hydroponics is 'hot and happening' worldwide according to Marc Celis, Crop Specialist and expert on hydroponics within Rijk Zwaan. Our dedicated team of breeders is continuously working on new developments, resulting in an ever-expanding range of innovative varieties across all segments. You can see many of the varieties for yourself by visiting one of our demo fields around the world. For more detailed information and tailor-made advice, please contact your local crop specialist.

In this magazine you will find a range of articles, all related to hydroponics production-stories about passionate growers, innovative marketers and satisfied consumers.

On behalf of Rijk Zwaan, we wish you lots of success with your future hydroponic activities!

Crop Team Lettuce
Rijk Zwaan





Hydroponics is becoming an increasingly popular production method worldwide and Rijk Zwaan has already been involved in various hydroponics projects. To find out more about the benefits of hydroponics and the opportunities it represents for growers, processors, retailers and consumers, we spoke to Marc Celis, Crop Specialist Lettuce at Rijk Zwaan, who has particular expertise in hydroponics.

Interview with Marc Celis

“Hydroponics is ‘hot’ and happening worldwide”

Can you tell us more about hydroponics? What is it?

Hydroponics is a soil-free method of plant production. There are three main hydroponic growing methods: floating systems whereby the roots extend into a water/nutrient solution, aeroponics (the roots are exposed to misted air), and the nutrient film technique (NFT) in a gutter system.

What is the current status of hydroponic production around the world?

Hydroponics is already very common in various parts of the world including Scandinavia, the Benelux, Southeast Asia, Russia, Brazil, Japan and Australia. There has been a sharp rise in recent years; hydroponics is ‘hot’ and happening across Europe as well as in North and

South America. It makes commercial sense to invest in hydroponics because safe and clean food products are in great demand and retailers in some regions are prepared to pay a higher price for hydroponically grown lettuce.

How does automation and technology support hydroponics?

Growers do not always have the financial means or experience to immediately implement medium-tech or high-tech hydroponic systems so they often start out using low-tech ones. As production becomes increasingly successful and labour costs become an issue, growers switch to medium-tech or high-tech systems with more automation to improve their efficiency and hence competitiveness – such as by utilising

the available space more efficiently or improving lettuce transplantation. They can also use artificial light (see page 10) to stimulate production during winter, and some hydroponic systems (in multi-layered plant factories) operate without any natural light at all.

One short-term goal is to grow safe lettuce without using pesticides, and high-tech hydroponics systems are putting this within reach. Various trials currently involve fully controlled growing chambers which can eliminate all pests and diseases. Furthermore, LED lighting is replacing high-pressured sodium lamps (HPS) to some extent, which is further improving efficiency. LEDs enable the exposure to artificial light to be optimally adjusted in line with the lettuce requirements. However, in a multiple-layered plant factory, even LED

lighting can generate a lot of heat so not all lettuce varieties are suitable for this method.

In the near future, I also expect to see the emergence of the semi-closed greenhouse for hydroponics: a 100%-controlled environment ensuring the right temperature, humidity and CO₂ levels for lettuce production, with ventilation provided by climate chambers at the sides. This will make it easier to produce lettuce in humid or dry subtropical conditions like in Southeast Asia and in the Middle East.

Which benefits does hydroponics offer at the various stages of the fresh chain?

Hydroponically produced lettuce enables growers to better meet retailers' quality and food safety demands since it is a very clean method. It also facilitates the development of new added-value products and concepts such as Salatrio. Processing companies around the world have already recognised the benefits of hydroponically grown lettuce; fewer chemical residues remain on the product, saving time and costs involved in rinsing. Additionally, their yield is more stable since the harvest is less susceptible to the natural climate conditions. This is also a benefit for retailers, since they can now collaborate with suppliers of hydroponically grown and processed lettuce based in countries like South Africa. Other advantages for retailers and consumers alike include the lack of pesticides and the longer shelf life – especially when the product is sold with its roots still attached. Consumers also appreciate the fact that the lettuce is clean, with no dirt inside, which makes it safer and more convenient for them.

How is Rijk Zwaan involved in hydroponics?

Rijk Zwaan has been involved in hydroponics for many years, and over time our highly skilled lettuce breeders have developed very good varieties



which help growers to achieve maximum efficiency. But, as in every business, you need to be proactive to stay ahead of market developments so we are continually working to further expand our hydroponics activities together with growers. We regard our growers as our long-term partners and invest in maintaining very good relationships with them in order to minimise 'teething problems' for them and boost their commercial success. Therefore, at Rijk Zwaan, advice and support to help growers get the best out of our varieties is all part of the service. Ideally we prefer to be involved with new projects right from

the start so that we can help our partners make the right decisions.

What's the outlook for hydroponics?

As LEDs become cheaper and more methods of safe and chemical-free production are developed, I expect the pace of growth for hydroponics for lettuce to further accelerate all over the world. Within 6 to 8 years from now, maybe the majority indoor lettuce will be grown hydroponically. And at Rijk Zwaan, we are set to embrace the changes in this dynamic area of lettuce production.



Salatrio is sold to consumers as a 'living lettuce', with its root ball – containing a reserve of water and valuable nutrients – still attached for a longer shelf life. Hence, hydroponics is the ideal production method.



Salatrio: a vegetable garden for consumers

Sempre Fresco was one of the first companies to work with hydroponics in Italy. It embarked on a high-investment and technically complex project which entailed close collaboration between Sempre Fresco and Rijk Zwaan. Ivan Digiuni and Giuliano Belli of Rijk Zwaan Italy and Marc Celis, Crop

Specialist Lettuce at Rijk Zwaan, helped the growers to get started and identify suitable varieties.

Salatrio represents a completely new concept for Italian consumers: a head of not one but three types of lettuce – oakleaf, batavia and Salanova® – on

one root ball. Nevertheless, the Sempre Fresco Group has faith that this attractive product with a long shelf life will generate plenty of interest; when kept in its packaging, Salatrio stays fresh for over a week. The combination of 3 varieties produces an attractive lettuce 'bouquet' with an interesting mix of colours and

leaf shapes. Meanwhile, thanks to the inclusion of 'convenience lettuce' Salanova®, Salatrio makes it quicker and easier for consumers to prepare salads – they simply remove the required number of leaves, leaving the rest of the lettuce intact for maximum freshness. As a result, the concept works perfectly in both the fresh and the convenience segments.

Hydroponics

Sempre Fresco, a group of important Italian lettuce growers, took the bold step of producing Salatrio in a mobile gully system which allows the distances between the gutters to be adapted to the size of the lettuces. This offers optimum efficiency and hence higher production levels. Compared with conventional growing, the hydroponic system yields up to three times as many plants per square metre. This is a first for Italy, and an exemplary project for Rijk Zwaan. Marc Celis, one of whose areas of expertise is hydroponics, advised on varieties, the climate, irrigation and plant nutrition.

In-store promotions

Salatrio is currently being sold in Italian supermarkets such as Bennet and Penny, supported by in-store promotions to increase consumer interest in the product. Mario Gandini: "We're handing out leaflets featuring the slogan 'The vegetable garden for at home' and containing storage and preparation instructions. People value the environmental aspect of Salatrio. The root ball and even the packaging material can be disposed of as organic waste."

Sempre Fresco

The Sempre Fresco Group comprises six major growers in and around Guidizzolo: Nicolai Ernesto, Spazzini Luigi, Porrini Lino, Dino, Porrini Stelio, Flavio, Cimarosti Massimo, Fabrizio, Gandini Enrico and



Mario. They are gradually learning how to get the best out of the new Salatrio in their specific growing conditions and are keenly looking for the right sales channels for this innovative lettuce product.

Sempre Fresco's hydroponically grown Salatrio comprises of red oakleaf lettuce, open Batavia and green Salanova® Crispy. These three varieties grow at roughly the same speed and ultimately form a

nice single head together. Attractively packaged and with a leaflet included, the product is ready for immediate display on supermarket shelves.

Growing enthusiasm in Germany and France

Thanks to the efforts of growers and traders Salatrio is gaining in popularity throughout the whole of Europe, with Germany and France being the latest countries to show a clear rise in demand. As German and French food retailers follow in the footsteps of their Belgian, Dutch, British, Italian and Scandinavian counterparts, the product looks set to secure a place for itself on supermarket shelves in these countries too.

The standard mix contains a lollo bionda, a lollo rossa and a red oakleaf. Different varieties of these lettuce types which are produced in different seasons ensure the availability of a uniform product all year round. Rijk Zwaan is keen to see this innovative concept become a success, not least because it increases diversity and consumer choice within the category. Therefore, the company is now focusing on further developing the range and improving harvest reliability.

Legro – Danish specialist in hydropon



Rijk Zwaan is committed to breeding varieties of high quality. The decision if a new product or a new variety is of interest to the respective grower is a long process at the end of which there is, of course, the consumer at the supermarket, the weekly market or the farm shop. However, before lettuce and tomatoes reach these outlets there are further important players involved.

Inquisitive growers are indispensable for our product development. Cooperation with growers opens the gate to trade for us. The grower Legro (www.legro.dk) in Karlslunde, Denmark, is a reliable partner with whom we have been trialling numerous new varieties and products for years.



onics

Hydroponics

At Legro, lettuce and herbs are cultivated in hydroponic systems on a greenhouse surface of 30,000 m². This cultivation method has a number of advantages. Apart from an optimal exploitation of the glasshouse area, water and fertilisation can be applied in exact doses. Recirculation creates a closed system without the risk of undesired drainage into the soil. Furthermore, there are a lot of possibilities for automation. Up to ten sets of lettuce can thus be produced per year.

Herbs

Parsley, basil, dill and chives are the main herbs at Legro. However, the assortment is steadily being widened by new specialties. In this regard, the location and the proximity to the food service market in Copenhagen are a definite advantage as the interest in special products is the biggest there. The short distance between the greenhouse and the plate on the restaurant table ensure a daily fresh product. The herbs are offered in pots as well as loose in trays.

Lettuce – with or without root ball

Rijk Zwaan's main interest is in lettuce. At the beginning of the cooperation, the focus of lettuce production was mainly on butterhead lettuce and, later, on open Batavia varieties (so-called Grand Rapid varieties) as well. A lot has changed in the last 25 years. Today, a number of different varieties or combinations of two or three varieties per pot are produced. Rijk Zwaan is currently well represented with the varieties Carmoli RZ and Crunchita RZ.

Lars Högholt, one of the Legro owners, is keen to emphasise, "We grow the products our customers can sell and would like to sell." But who decides that? Who provides the ideas for new products? Lars Högholt says, "It is very important for us to test new varieties or types. Our buyers are mainly various chains. They visit us regularly. On these occasions, we can take the opportunity to present a new product."

This spring alone, Rijk Zwaan has sown up to 20 different varieties as single products, Saladuo or Salatrio on five different dates at Legro.

What matters most?

Selecting a variety for greenhouse hydroponics is, to a large extent, based on the recommendations for cultivation in soil. Important criteria, among others, are:

- good growth, short development period
- compact growth
- no or little risk of tipburn
- red varieties with good colour intensity
- healthy and stable leaves, easy to pack

Whereas Bremia is no issue in greenhouse hydroponics, aphid resistance does play an important role. The Salanova® varieties especially come up to these requirements. Varieties such as Exact RZ, Codex RZ, Descartes RZ, Seurat RZ, Cook RZ and Yacht RZ are either already in cultivation or have demonstrated their potential in trials. Red cos Thurinus RZ, Crunchy Cos Verodita RZ and Chicarita RZ are further interesting candidates.

In addition to the lettuce varieties mentioned, other new varieties have also been tested at Legro.

Together with our partners we have the opportunity to present our products to trading companies and, thus, to be able to get our products into retailers' fresh produce displays.



Saladuo and Salatrio are becoming increasingly popular with consumers.

Artificial light in hydroponic produ

Hydroponic lettuce production is expanding at breathtaking speed worldwide due to various reasons: water shortage, contaminated soil or lack of light. In regions such as the Benelux and Scandinavian countries, hydroponic systems have been a firm part of lettuce production for many years. Which considerations are associated with the use of artificial light in hydroponics.



Is the use of artificial light worthwhile for my company?

The following questions can help to clarify the situation:

1. What is the UV transmission of the greenhouse cover?
The highest possible UVA and UVB transmission – no matter whether glass or plastic cover – improves compactness and colouration of the produce as well as thickness of the leaves. Thus, shelf life is prolonged whilst susceptibility to internal tipburn is reduced. With only small-scale investment into the cover quality, large additional benefits can ultimately be achieved.
2. What is the optimal artificial light for my company? High pressure sodium lamps (HPS) or LED, or a combination of both systems?

Energy savings up to 70% with LED

When seeking energy-optimised light systems, the focus remains on LED light. Manufacturers quote energy savings of up to 70% compared to traditional high sodium lamps at the same or even increased performance. Further advantages are longer service life and the possibility to optimally

adapt the LED spectrum to the plants' requirements. However, LED light systems are about twice as expensive as high pressure sodium lamps according to the manufacturers.

Heat radiation by artificial light

The heat output of traditional high pressure sodium lamps exceeds that of an average LED lamp by 400 times! Therefore, it is important not to underestimate the amount of heat generated in a greenhouse. In contrast, LED lamps alone emit hardly any heat radiation to the plants. This leads to a lower leaf temperature which must be compensated by an increase of the heating set point. But there is no standard solution – individual company solutions adapted to the requirements of the respective crop are needed here.

the production process are favourable and ensure the optimal colouration of lettuce crops.

Is LED technology the key to the future?

Today, LED technology is very often used in so-called plant factories. These are highly efficient closed cultivation systems with clearly defined production conditions (light, temperature, humidity, CO₂) to ensure constant and continuous production. Currently, high investment costs for LED light systems must be weighed against relatively low maintenance costs and better product quality. Whether a switch to LED technology is worthwhile mainly depends on the individual production conditions in the respective company. Furthermore, it is important to monitor the price development of LED technology.

What are the benefits of combined solutions?

Practice shows that specially designed solutions combining high pressure sodium lamps at the beginning of the crop with LED technology at the end of

LED versus high pressure sodium lamps

LED

- + Light yield
- + Energy consumption
- + Service life
- + No heat radiation
- Price

High pressure sodium lamps

- Light yield
- Energy consumption
- Service life
- Heat radiation
- + Price

+ = good ◦ = satisfactory – = high

Chain collaboration boosts sales lettuce in Tokyo



The traditional Japanese cuisine, called 'Washoku', was recently placed on the UNESCO World Heritage list. One thing that makes this cuisine so special is its focus on vegetables – the diversity of vegetable-based dishes is enormous! Therefore, the unique and tasty Salanova® lettuce is right at home in Japan, and the collaboration between Shinjuku Vegeful, Agri Green and Rijk Zwaan has resulted in Salanova® being launched there very successfully.

Thanks to its attractively shaped leaves, delicious flavour and long shelf life, Salanova® lettuce is popular with retailers and food-service customers alike.

of convenience

In Japan, over 70 percent of all vegetable products are sold through wholesalers. One of the major players in Tokyo is Shinjuku Vegeful, and that wholesaler has been very enthusiastic about Salanova® lettuce ever since its launch in 2010.

Hydroponics

Since 2010, Yoshio Yunoki, Rijk Zwaan's Chain Manager for Japan, and Fumio Kitamura of Sumika Agrotech, Rijk Zwaan's Salanova distribution partner in Japan, have been working together with grower Agri Green. This company is among the biggest hydroponic growers in Japan and a preferred supplier of spinach to Shinjuku Vegeful. Yoshio: "Agri Green was already cultivating Salanova, and was particularly impressed by the uniqueness of this convenience lettuce. Also, thanks to its high-tech cultivation methods, the company always produces high-quality lettuce." Therefore, the launch of Salanova through Shinjuku Vegeful was a logical step for both parties. The grower ensured supply of a top-quality product and Rijk Zwaan provided promotional material to introduce it to Japanese consumers.

Chain collaboration

A recipe for success! When asked about Salanova's benefits, Shinjuku Vegeful mentions its attractively shaped leaves and colour, delicious flavour and long shelf life. The wholesaler now sells the lettuce through distributors to retailers and food-service customers, mostly in Tokyo. The distributors report that their clients are enthusiastic about this leafy product and such feedback helps Shinjuku Vegeful to stay informed about customer requirements and consumer reactions to new products.

Enthusiastic customers

Thanks to the chain collaboration outlined above, Japanese consumers are increasingly able to find Salanova on the shelves in mid-sized supermarkets and greengrocer stores. The fresh lettuce is also used by many restaurants, such as the oyster bar chain called 'Jack Pot' which is especially popular among Tokyo's young female inhabitants. Here, the chefs make the most of the various shapes and colours available to produce delicious creations. In addition to Salanova's versatility, they notice that it helps to reduce waste. Thanks to the 'one cut, ready' principle, plus the product's shelf life both as a whole head and when cut, less lettuce is thrown away.



Shinjuku Vegeful Co. Ltd.

Shinjuku Vegeful is the result of a merger between two wholesalers, Tokyo Shinjuku Seika and Tokyo Yodobashi Seika, in 2005. Since then, the company has been based at Tokyo's Yodobashi Wholesale Market. Shinjuku Vegeful employs 262 people and generates annual revenues of approximately USD60 million through the sale of fresh and processed fruit and vegetables.

The Salanova® varieties sold by Shinjuku Vegeful are all sourced from grower Agri Green. The listed varieties include Cook RZ, Exact RZ, Bellagon RZ and Triplex RZ.

Indonesians stir-fry lettuce as ‘C

Lettuce consumption is on the rise in Indonesia, especially since more people are learning how to stir-fry it, and a cleaner product has become available. Lettuce is being produced using the nutrient film technique (NFT). Excelindo, the company which sells the necessary equipment, sees satisfactory results – crunchy, hydroponically grown Rijk Zwaan lettuce – every day.



The Excelindo team expects NFT lettuce production to really take off here.

'crispy veggies'

People in every layer of Indonesian society, whether rich or poor, are becoming increasingly aware of the importance of vegetables in a healthy diet, resulting in a rise in vegetable and in particular lettuce consumption. In Indonesia, lettuce has traditionally been grown outside, in soil, which has not always produced the best quality. However, it has now been proven that alternative methods are possible. When ultra-clean heads of hydroponically grown lettuce from neighbouring countries became available on the market, Excelindo brought NFT to Indonesia.

Clean lettuce

Excelindo now expects lettuce production to really take off. "Thailand already has 200 hectares of NFT production, Malaysia has over 150 hectares and Australia tops the list with 250 hectares. Consumers really love the product: there's no dirt on it, no browning on the leaves and hardly any pesticide is necessary. We're only selling to local supermarkets at the moment, but demand is already outstripping supply. That also makes it easier to launch new products."

Crunchy varieties

The new products are a good fit with the latest way of preparing lettuce: stir-frying. In Malaysia, 50% of all lettuce consumed is stir-fried. Extra-crunchy varieties are needed to ensure that the leafy vegetable remains crispy after removal from the wok, which is why Excelindo is cultivating Rincon RZ, a medium-sized romaine, among other varieties in his demo greenhouse. Excelindo is also conducting trials with Crunchy cos, a type which is better suited to warm climates than regular iceberg lettuce. To stimulate consumer interest, Excelindo prefers not to call his vegetables 'lettuce' but rather 'crispy veggies'. According to the company the choice for Rijk Zwaan was only logical: "The varieties are slow to bolt, stress-resistant and they look fantastic...perfect for local conditions."

Living lettuce

NFT entails a shallow layer of water mixed with nutrients continually flowing through narrow cultivation gutters. The gutters are inclined at 2% with the nutrient solution being fed in at one end and collected at the other. "The Rijk Zwaan

advisors helped us to set up this system. We had some teething problems in the first few months. For example, the water temperature was too high, which caused the lettuce roots to turn brown. We worked together to get the situation under control. Now, we even sell 'living lettuce': a lettuce in its pot. People love it! The lettuces look great and last for 3 to 4 weeks. Consumers can pick a few leaves every day. A concept like that turns lettuce into a premium product."

To help you grow lettuce hydroponically under low-tech conditions, we have written a guide with tips and advice on how to produce the lettuce optimally. Please contact your local Rijk Zwaan representative for further information.





A special lettuce deserves a unique display. John Bonner and Tim Ryan from Great Lakes Growers wanted a presentation format that recreated the greenhouse setting as closely as possible. In collaboration with retailers, they have developed a living lettuce display that allows shoppers to freshly pick their own head of Salanova® lettuce – without leaving the store.

The ball is in the retailers' court now, say John Bonner (left) and Tim Ryan (right) from Great Lakes Growers.



Salanova®

Boost to lettuce sales

‘Living lettuce displays’ offer fresher-than-fresh presentation

At least 65 supermarkets in the US states of Ohio, Pennsylvania and Michigan have already got a ‘living lettuce display’. These ‘store-friendly’ displays keep the Salanova® lettuces neat and tidy while they wait to be purchased by shoppers – who, just like the retailers, are wildly enthusiastic. After all, lettuces don’t get much fresher than that. “We only supply to order,” explains Bonner, head of growing at Great Lakes. “Retailers are assured that the lettuces they receive from us have been picked that very same morning. They go straight into the living

display, root ball and all. Ultra-fresh in the store and ultra-fresh into consumers’ homes; providing the Salanova is refrigerated immediately, it stays fresh for two weeks. A living lettuce like this really can’t be beaten on shelf life.”

Ultra-clean Salanova® lettuce

“And let’s not forget how gorgeous this lettuce looks! The living displays enable shoppers to appreciate its pure and simple beauty. Growing it hydroponically involves no soil, just water (enriched with nutrients). We combine this with the

attractive structure and vibrant colour of Rijk Zwaan’s Salanova varieties. The convenience aspect of the Salanova lettuce makes our product even more appealing: with just one cut, the lettuce separates into countless tiny leaves, ready for use! It’s just as easy as opening a salad bag, but with the added advantage that our fresh Salanova tastes much better. It’s deliciously sweet.”

Collaboration with retailers

“To be honest, it’s a win-win situation, retailers enjoy a huge boost to lettuce

sales while consumers can buy fresh, locally grown lettuce all year round. The living lettuce displays also reduce the need for packaging, which is good for the environment. Our greatest challenge lies in maintaining the displays: the living displays need to be kept clean, otherwise all the benefits are lost. Since we can't be in all the stores at once, we have to rely on the retailers themselves – the ball is in their court, but we've developed the living display concept in close collaboration with our retail customers; hopefully they are just as proud of the programme as we are and they will keep the display trays clean and remove any lettuces that are past their best. We're now working on fine-tuning the displays. After all, it's a tricky business, presenting fresh lettuce without refrigeration."



The living lettuce display keeps hydroponically grown lettuces ultra-fresh.



GREAT LAKES
growers

Great Lakes Growers produces, sells and markets top-quality lettuces and herbs in the North East of the USA. All products are grown hydroponically in greenhouses.

In addition to investing in technology and automation, Great Lakes has also developed various in-store displays and food service packaging. The company makes no secret of its ambition to become market leader in the eastern United States. With an astute marketing strategy and a pioneering approach, 'the sky's the limit'. Great Lakes intends to continue on its path to growth until the company can meet all the market requirements, in terms of both capacity and product innovations, and collaboration agreements with equally impassioned chain partners are indispensable to its approach. Rijk Zwaan's unique Salanova® teamed with Great Lakes' living lettuce display is guaranteed to deliver mutual success.

Hydro Assortment booklet

Assortment 2015



Assortment
2015



Hydroponic
Lettuce

Sharing a healthy future



Would you like to have a complete overview of our international lettuce range for hydroponic cultivation? The Hydroponic Assortment booklet provides the lettuce varieties that are suitable for cultivation on water, including a description of the crop type, characteristics and resistances for each one. Please contact your local representative for your own copy of the assortment booklet.

Sharing a healthy future

Green Box

Want to get more out of your RZ varieties?



On Green Box we provide you with tips, advice, news and latest developments in hydroponic cultivation. Green Box is an online platform for Rijk Zwaan's hydroponic growers and other partners.

Contact your local representative for login information or send an email to greenbox@rijkszwaan.nl





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