

HORTI FAIR 2011 KNOWLEDGE REVIEW

Towards sustainable
horticulture



Horti Fair

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COLOPHON

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Writers: Jos Balendonk¹⁾, Chris Blok¹⁾, Pieternel Bouwman-van Velden²⁾, Tom Dueck¹⁾, Anne Elings¹⁾, Sjeff Enthoven³⁾, Arie de Gelder¹⁾, Silke Hemming¹⁾, Florentine Jagers⁴⁾, Roel Jansen¹⁾, Ronald Lohstrof⁵⁾, Daniel Ludeking¹⁾, Ruud Maaswinkel¹⁾, Leo Marcelis¹⁾, Rob Meijer, Erik van Os¹⁾, Margreet Schoenmakers⁶⁾, Cecilia Stanghelini¹⁾, Wouter Verkerke¹⁾, Martijntje Vollebregt¹⁾, Saskia Zeilstra⁷⁾.

¹⁾ Wageningen UR Greenhouse Horticulture, ²⁾ Krabbels, ³⁾ Bureau Enthoven, ⁴⁾ Hortinfo, ⁵⁾ Flynth, ⁶⁾ LTO Groeiservice, ⁷⁾ Product Board for Horticulture.

Final editing: Florentine Jagers, Hortinfo

Copyediting English: Andrew Rogers, Writewell

Contact: Frans-Peter Dechering, Horti Fair



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INTRODUCTION

From square metre to cubic metre



Horticulture offers global solutions to the worldwide challenges found in fields such as water, food, clean energy and wellbeing. And horticultural technology plays a major role, with horticulture being based on the three pillars of breeding, cultivation techniques and greenhouse technology. These are also the pillars of Horti Fair, the largest international horticultural fair with a focus on technology, innovation and inspiration.

Exhibitors and visitors from around the world – 67 countries in 2011 – come together at the Horti Fair to exchange knowledge on these subjects. This year's event had a new slogan – 'from square metre to cubic metre' – and offered far more than exhibition space alone. It was our response to the demand from exhibitors and visitors alike for more content, more knowledge, more experiences and more possibilities for networking.

One of the sources of additional content at Horti Fair 2011 was the first edition of the International HortiCongress. Leading speakers from around the world presented ways in which horticulture can offer solutions for the global water challenges. There was also a wide range of seminars where visitors could acquire knowledge about numerous topical horticultural subjects. Taken as a whole, these seminars addressed the crucial challenges faced by horticulture today and the various solutions on offer.

It is therefore my pleasure to present you with this publication, which contains reports of all the seminars. By posing questions and providing possible answers for the years ahead, our hope is that this will be a valuable contribution which stimulates knowledge development and exchange in horti-business even further.

Frans-Peter Dechering
Director International Horti Fair

INTRODUCTION

No success without knowledge



Horticulture in the Netherlands is renowned worldwide for its leading position and the sector has – together with plant breeding – been earmarked as a primary sector for the Dutch economy.

The Netherlands is also renowned for the way the horticultural industry and research & education institutes cooperate with each other and with the government. The open nature of our knowledge development and the easily accessible way in which all results are made available, together with the collective *modus operandi*, are important success factors and drivers for innovation in the knowledge-intensive horticultural sector.

In many cases innovations result from the way knowledge about processes is combined with available techniques and practical experience within and beyond the sector. This is why the organisers of Horti Fair explicitly chose to pay extra attention to knowledge exchange with input from research and industry in addition to the direct product presentations on the fair floor. The seminars formed an excellent platform for the interactive exchange of knowledge, practical experience and best practices on issues such as new sustainable production techniques, nutrition, and water, the central theme of Horti Fair.

The seminars at Horti Fair gave visitors from all over the world an excellent chance to jointly take steps forward to the sustainable development of horticulture. This publication offers an informative summary of the presented seminars.

Sjaak Bakker
Business Unit Manager Wageningen UR Greenhouse Horticulture

GLOBAL CHALLENGES

Worldwide solutions for water scarcity and food production

By Florentine Jagers, Hortinfo

Over the coming decades the world will have to face the serious challenge of feeding up to nine billion people. As speakers at the International HortiCongress made clear, horticulture can offer problem-solving approaches to challenges involving water and food supplies. Cultivation on substrates under protected conditions is one of the spearheads in this process. Speakers emphasised that, in addition to technology, socio-economic and political factors are playing a major role in the introduction of new horticultural techniques.

The world's seven billionth citizen was born in the first week of November 2011 and the prognosis is that there will be nine billion people on Earth in 2050. All these people will require access to healthy, safe and affordable food. And this is not the only challenge facing the world in the decades ahead. The unbalanced distribution of welfare and food and climate change demand new solutions for water and food supplies.

Golden triangle

"Meeting the challenge to feed nine billion people requires cooperation between the horticultural business community, knowledge institutions and government," said Professor Martin Kropff of Wageningen University and Research centre. "This so-called Golden Triangle is the strength of the high-tech Dutch horticulture sector, which has proven that it is fully capable of finding innovative solutions for the major issues." In this context Professor Kropff referred to examples such as, new packaging technologies, mobile cultivation systems, energy-producing greenhouses and the improved taste of tomatoes. He also made the following proviso: "We are increasingly realising that it is not only technology that is crucial, but socio-economic factors as well, particularly in regions where water is scarce. In Ethiopia, for example, horticulture is developing at a tremendous pace. The horticultural areas use water from the lakes and those lakes are being emptied far too quickly. Effective agreements must be reached quickly to deal with this problem, but this can be extremely difficult as many different governmental authorities are involved."

Closed greenhouses

Professor Gene Giacomelli from the University of Arizona took up the theme, explaining that some 1.8 billion people would be facing water-related problems in 2025: "We have to start work on solutions now that will enable us to produce sufficient food with little water in the future." The scientist is working on a number of projects involving cultivation under extreme conditions, such as at the South Pole or on Mars, where it is possible to grow vegetables and fruit in a completely conditioned environment. Giacomelli explained that water efficiency of almost one hundred per cent can be achieved in closed greenhouses where the crops grow in substrates. He referred to Houweling Nurseries in California, where high levels of tomato production are achieved in semi-closed greenhouses with very little water.



No GMOs

Kees Reinink, research director of RijkZwaan, approached the food problem from a completely different angle: "New techniques enable completely different methods of plant breeding. In the past, selection only used to be possible on the basis of external characteristics. But the new technology of sequencing now makes it possible for plant breeders to identify hereditary characteristics at gene level. This enables targeted searches for resistance in wild plants for example, or in plants of the same variety, such as cucumbers and melons. The result is a tremendous expansion of the prospects for plant breeding. As a consequence, we see no need to work with genetically modified organisms to increase production. GMOs are expensive and public opinion on the subject is far too negative. As a consequence it is extremely important for the breeding of horticultural crops that Plant Breeders' Rights remain intact."



More than technology

The conclusion that solving the food issue in arid regions requires more than technology alone was also echoed by Richard Tutwiler from the Desert Development Centre in Cairo. A great deal of hard work is going on in North Africa in order to reduce the dependency on rain. Horticulture offers options by improving cultivation systems. Tutwiler is convinced that the improvement of existing cultivation techniques will also improve the quality of life for people in the region. "Food security will rise, unemployment will fall and environmental pollution will be reduced," he argued. Tutwiler emphasised that horticulture involves more than just greenhouses in North Africa. "We also see great prospects for vineyards and woody crops in this region."



RIJK ZWAAN

FLYNTH
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WAGENINGEN UR
For quality of life

Peter Westerveld and Ole Shirim Sayialel of the Naga Foundation presented a clear and simple solution to make the desert green again. By digging ditches of one metre deep, rainwater can actually penetrate into the soil and the natural processes of the soil are revived. Congress chair Agnes van Ardenne concluded by saying that while horticulture can contribute many solutions in the technical sense, huge challenges remain with regard to making technology accessible for practical implementation, investments, the required management skills and marketing.

WATER

WATER QUALITY

Growers should always start with good quality fresh water

By Erik van Os, Wageningen UR Greenhouse Horticulture

Good quality fresh water is an important starting point for every grower. While sodium is often the main contaminant, other problems such as algae and biofouling also have to be taken into account. The availability of good quality fresh water makes recirculation easier and minimises the discharge of waste water containing nitrogen, phosphorous and plant protection products into surface water or groundwater.



Stricter regulations require growers to minimise the emission of nutrients and plant protection products to surface water and groundwater. Reasons for discharge include;

- » excessive levels of sodium in the circulation water
- » the presence of growth inhibitors such as root exudates or micro-organisms
- » concerns about problems at the start of the cropping season
- » an accumulation of plant protection products
- » an unbalanced composition of the nutrient solution
- » technical failures.

Larger rainwater storage capacity (up to 3000 m³/ha) minimises the main problem of sodium accumulation. In Mediterranean countries that experience limited amounts and periods of rainfall, rainwater collection can also be useful.

Algae

Open rainwater basins are easily contaminated by sodium (via rain in coastal areas), plant protection products (via atmospheric deposition and condensation water) and bird faeces (nitrogen and phosphorous). This creates the right basic conditions (light, water, nitrogen) for algae growth, which not only results in a green soup, but also clogs the irrigation system (pumps, pipelines and drippers). In addition, decaying algae may result in insufficient oxygen levels.

LG Sound is a company that supplies equipment to eliminate algae via ultrasonic sound at wavelengths of 20kHz to 2 MHz. Especially the most frequently occurring algae (single cell and filamentous) are eliminated within two weeks of installation, after which the rainwater basin remains clean and free of algae with minimal maintenance. Fish, mosquitoes, daphnias and other organisms are not sensitive to ultrasonic sound, and humans cannot even hear it.

Clean water

Minimising the discharge of recirculated nutrient solution starts with the storage of good quality rainwater. Stored water must remain clean and ultrasonic sound waves help to keep the water free from algae.

Partners in this seminar: LG Sound,
Wageningen UR Greenhouse Horticulture

WATER

WATERPROOF

Horticultural production without emissions to surface water

By Margreet Schoenmakers, LTO Groeiservice

Emissions of nutrients and pesticides from greenhouses are exceeding the Water Framework Directive, the European environmental quality standards for surface water which will come into force in 2027. The Dutch growers' organisation, the water boards and the national government agreed upon a step-by-step reduction of the emissions via water in order to reach a 'practically emission-free glasshouse' by that time.

however, and purification techniques may help to reach the goal of zero-discharge. Both reverse osmosis and membrane distillation are being tested in commercial greenhouses.

Soil-grown

In the Netherlands a steady proportion of approximately 20% of total greenhouse horticulture is soil-based. Since greenhouse production occurs year-round and at a high technical level, the amounts of water and nutrients used are much higher than in field crops. This increases the likelihood of excess water and nutrients being emitted to groundwater and open surface water. Methods are therefore required to apply water and nutrients at rates equal to crop demand.

The approach to soil-grown crops differs significantly from soilless culture as the irrigation surplus is not always collected through drainage



Although the reuse of water is the prevailing standard in soilless systems, leaching water is usually discarded whenever there is any doubt about the quality. In the Dutch Waterproof project, partners are developing methods and techniques for longer reuse of the nutrient solution without loss of quality. One of the main reasons for discharging is to prevent growth inhibition. Growth-inhibiting factors can be eliminated with an advanced oxidation technique (UV with H₂O₂), and this has been demonstrated in commercial greenhouses with rose, gerbera, sweet pepper, cucumber and tomato.

Optimisation of nutrient and water management so that they are more tuned to the demands of the crop can be realised by further increasing the reuse of leaching water. In addition, ion-selective measures will enhance the degree of control over the fertilisation processes. There will always be reasons for (occasional) discharge,

systems. Moreover, when drainage systems are present, the drainage water can be easily mixed with water sources from elsewhere.

In response, a method is being developed to control the inputs of water and nutrients as much as possible. This 'emission management system' consists of a lysimeter to collect excess water and nutrients, water content sensors inside and outside the lysimeter, and models to determine, guide and predict evapotranspiration and leaching. The system has been implemented at eight commercial enterprises and the results are now being used to develop best practices for growers.

Partners in this seminar: Product Board for Horticulture, LTO Groeiservice, TNO, Wageningen UR Alterra, Priva BV, BLCG AgroXpertus, Wageningen UR Greenhouse Horticulture

WATER

OPTIMISATION

More crop per drop

By Jos Balendonck, Wageningen UR Greenhouse Horticulture

Agriculture is the largest consumer of fresh water resources and competition for water is continuously growing due to a rising world population and climate change. Both arid and humid regions need to change their water management drastically in order to produce more crop per drop of water.



Growers need good quality water with low EC and low sodium content as a starting point for good crop and irrigation management. Their major concern is how to obtain such water at acceptable costs while achieving zero emission. Efficient water use and reuse of waste or saline water sources will lower the water footprint and provide growers with a license to produce.

Technology

Several Dutch suppliers have developed new techniques for more efficient water utilisation. Aqua Terra Nova has designed a water management concept for 190 ha of greenhouses in the Westland area between The Hague and Rotterdam, responding to major problems such as a lack of surface water, regular flooding, high waste discharges and high water demands. The concept is based on a centralised drainage system, combined storage, buffering, treatment and irrigation. The benefits of the system are:

- » a 50% land use reduction resulting from water storage underneath the greenhouse
- » the reuse of waste water
- » zero emission of nutrients and chemicals.

In several pilot projects in the Netherlands, Lubron has shown that reverse osmosis is a reliable technique to remove dissolved ions, organic matter, particles and microbiological components. Nic. Sosef promotes the use of underground water storage and efficient irrigation equipment such as compensated non-leakage drippers and sprinklers. UV and H₂O₂ purification technology can help to reduce microbiological components, herbicides and pesticides, and prevent growth inhibition.

Salt-tolerant tomato

The Plant Breeding group of Wageningen University & Research Centre has developed a new salt tolerant tomato genotype based on gene mixing of modern and wild crop species. The new genotype showed higher yields in saline conditions than a regular crop and the genotype was also found to be the favourite of a taste panel due to its high sugar content. Although further research is needed to gain more information on issues such as disease tolerance, the new genotype is now in principle available for plant breeding companies.

Sustainable production

Worldwide greenhouse horticulture is not on its own in searching for good quality water. Suppliers and research institutes are doing their best to make integrated water management work in all conditions. Sustainability and economic feasibility can come together and 'more crop per drop' become a reality in order to let greenhouse growers earn their license to produce.

Partners in this seminar: Aqua Terra Nova, Lubron, Nic. Sosef and Wageningen UR Greenhouse Horticulture

WATER

AUTOMATION

How Precision Growing helps reduce nutrient losses

By Chris Blok, Wageningen UR Greenhouse Horticulture

Water use and emission restrictions in horticulture can be significantly improved worldwide. Precision Growing is a form of cultivation in which water, nutrients, crop protection products, energy and space are used efficiently. The method is matching the best available technology to keep water and nutrients within the cultivation system.

Suppliers Grodan and Priva have gained experience with such systems in the past years. They claim that, thanks to Precision Growing, Dutch industry can already comply with the Water Framework Directive, which will come in to force in 2027.



Three levels

Horticultural companies can improve water management on three levels, according to Grodan.

Step 1 is to start with the best possible materials:

- » water with the lowest possible sodium concentration to restrict drainage
- » sufficiently large basins, and drainage water storage
- » an inert and homogeneous substrate
- » an accurate trickle system
- » correctly placed drainage holes are required for substrate cultivation systems.

The main consideration is that slab water content and EC be accurately maintained at the desired values, with very low drainage amounts and virtually no discharge.

Step 2 is the use of properly positioned measuring systems for water and nutrient control. Graphic control via climate computers can keep water content and EC at previously set day/night ranges, even under widely varying climate conditions. The main principles of this strategy include;

- » a correct start and stop time
- » EC-radiation combinations
- » planned water content fluctuations.

Step 3 is to develop knowledge-based water/nutrient management activities, which requires knowledge exchange, research and support by consultants. This makes it possible to expand the method of operation with strategies for crop growth control.

Control

The right equipment and control programmes are needed to enable accurate control and dosing of water and nutrients. Priva is supporting growers in this. Adequate water management starts with water pre-treatment, pH neutralisation and UV disinfection. Processes have to be safeguarded as well as controlled, for instance by using flow protection. There are also various dosing installations available for the dynamic mixing of incoming water types and drainage water, along with the subsequent addition of nutrients to the final water.

Computer-based control programmes manage the interacting processes. For Precision Growing, Priva has added extra features to its computer programmes to allow growers to structure their water and nutrient management decisions. This enables growers to realise their own water management strategy and to keep an eye on every aspect of the operation.

Partner in this seminar: Horti Alliance

FEEDING THE WORLD

PLANT BREEDING

Responding to cultivation threats with high-tech horticulture

By Daniel Ludeking, Wageningen UR Greenhouse Horticulture

Plant breeders are working hard to prevent major problems in the cultivation of greenhouse vegetables. All their activities and vision on cultivation is focused on the prevention of crop losses caused by plant pathogens such as bacteria, viruses and fungi.

RijkZwaan presented a range of ideas, based upon the company's work on preventing and suppressing plant pathogen symptoms in tomato, cucumber and lettuce.



Protocol for healthy seed

After the first outbreak of the bacteriological disease *Clavibacter michiganensis* subsp. *michiganensis* in tomato in 2006, a committee of plant breeding companies was formed to prevent a second outbreak of this highly infectious disease by improving the propagation chain. This has led to a solid approach to managing the risks of *Clavibacter michiganensis* subsp. *michiganensis* in the tomato propagation and production chain by a Good Seeds and Plant Practices (GSPP) hygiene protocol and a GSPP certificate for seeds propagated according to the GSPP standard.

Virus in cucumber

Cucumber is grown in many countries, in different varieties and under various conditions. RijkZwaan has launched two concepts to suppress pathogen symptoms: Blue leaf (promotion of chlorophyll and suppression of yellowing) and BonDefence (highly resistant varieties to Cucumber Green Mild Mosaic Virus (CGMMV)). The breeder stresses that suppression of symptoms is not a cure for the disease. As varieties show symptoms if the pressure of virus particles is high, risk awareness and attention for hygiene during cultivation and crop change remain important.

Cultivation on water

Growers cultivating lettuce in soil are facing new challenges. Examples include the demands by supermarkets for lower residue levels of plant protection products (PPP) than laid down by law, reducing the risk of chemical contaminants from the soil, new regulations on phosphorus and nitrogen emissions to surface water, and consumer demands for sustainable products. Cultivation of lettuce on water might offer a solution. This system makes it possible to grow a residue-free product, to use water efficient, to prevent emission of water and nutrients to sewage system or surface water, and to decrease labour costs.

Many small steps

The chain has to overcome the abovementioned threats and new techniques in seed production, plant breeding and cultivation might provide the answers. The combination of numerous small steps can help to produce a healthy and sustainable high quality crop.

Partner in this seminar: RijkZwaan and Horti Alliance

FEEDING THE WORLD

CROP PROTECTION

Technology contributes to sustainable crop protection

By Rob Meijer, Wageningen UR Greenhouse Horticulture

The need for alternatives to make crop protection sustainable is greater than ever before. The number of available pesticides for crop protection in horticulture is diminishing due to complex and costly registration procedures and the lower efficacy caused by resistance development. The chemical age is over, and there is a need for new technologies and strategies. New technologies, such as crop protection by using the Clean Light technology which is based on UVC-therapy of the crop, can offer an alternative to chemistry-based solutions.



The challenges faced by crop protection in horticulture are enormous. Due to the stricter requirements for the registration of plant protection products (PPPs), and the high costs involved, the number of PPPs registered and available for horticulture is decreasing every year. Meanwhile, with both the market and society demanding reductions in pesticide use, horticulture needs to become less dependent on PPPs.

Views and experiences

Several solutions are being developed to deal with this situation. One of these is the Clean Light technology. This technology is suitable for disease management by a daily treatment in a low dosage application of UVC. CLM (the Centre for Agriculture and Environment) has conducted a project where this technology was successfully incorporated in the development of integrated sustainable strategies for crop protection in leeks, strawberries and pears. Klimrek has designed a logistic system for easy handling of the Clean Light technology for cucumber and Hortimec has constructed the technology on the gantry together with the automatic irrigation system. This is being used in the production of planting material and small pot plants, such as lettuce, herbs and Begonias.

Positive experiences with this new technology are not restricted to the Netherlands. UFO Supplies has had good experiences with a hand-cart deploying the technology in rose growing in Kenya.

Stronger plants

"It is clear that the chemical age is over," emphasises Harmen Hummelen of the Dutch growers' organisation LTO Groeiservice. Experts point out that a start with healthy, strong plants is essential for a sustainable production as it prevents a lot of problems. Clean Light technology can contribute to sustainable crop protection when used in combination with other technologies such as prevention, early detection, local action using detection devices and robots, disinfection and biological control.

Pesticides will have a less prominent role in horticulture crop protection in the future with many new technologies and strategies taking their place. The UVC technology will be one of these. Working on technology, however, is not the only way to avoid pests and diseases. According to Wageningen UR Greenhouse Horticulture, there is also an urgent need for new resistant varieties.

Partners in this seminar: Clean Light BV, Klimrek, LTO Groeiservice, Hortimec, Gelderland Province, CLM (Centre for Agriculture and Environment), UFO Supplies and Wageningen UR Greenhouse Horticulture

FEEDING THE WORLD

ARTIFICIAL LIGHT

LEDs lead to new perspectives

By Florentine Jagers, Hortinfo

LED lighting is a low-energy alternative for traditional HPS lighting in greenhouse horticulture. Application of LEDs requires matching the 'light recipe' with the crop. LED in conditioned rooms enables maximum production in a small space.

Light is one of the most important growth factors for crop quality as well as yield. In horticulture, lighting with LED (light emitting diode) lamps has received a lot of attention as a potential alternative to HPS lamps. More efficient lamp production techniques have resulted in a rapid increase in the performance of LEDs over recent years. This form of lighting is particularly interesting given its potential for energy saving.

Suppliers and research organisations are currently working towards making this technique ready for application in commercial greenhouse horticulture. Developments are now progressing rapidly and a number of companies are already providing LED solutions for horticulture.

According to Philips, the success of LED lighting depends on three factors;

- » the light recipe, i.e. the choice of LED lamp colour, and therefore wavelength, is crucial to crop development.
- » the electrical consumption of the LED lamp determines economic performance
- » the correct technical construction of the lighting system is essential – for instance the choice to install the system above or among crops.

Year-round production

With an increasing number of growers of vegetable crops in the Netherlands looking to produce all year round, lighting is a necessity, especially in the winter months. This is why LED lighting is currently receiving a lot of attention, especially in tomato cultivation, as a low-energy alternative to HPS lighting.

GreenQ Improvement Centre has been carrying out experiments with red and blue LEDs in tomato cultivation since 2007. The results showed that the tomato crop did not develop as desired when using LED lamps alone – the plants appeared not to receive enough heat or specific light wavelengths. In more recent experiments, GreenQ therefore combined

LED lighting with HPS lamps in a hybrid lighting system, which also comprised carefully adapted cultivation systems, row distances and climate controls. While the researchers at GreenQ are optimistic about the potential of this new solution, they do note that the electrical, and thus economic, performance of the system still needs improving.

Innovations

LED lighting also offers new perspectives for growers, such as multi-layer cultivation. This is put into practice at the Delicious greenhouses in the Netherlands, where Certhon is building a cultivation room together with Philips in which lettuce will be grown in a closed, conditioned environment in seven layers.

Changing over to LED lighting involves a considerable investment for growers which cannot be recovered until after the cultivation. Philips has therefore come up with a lease construction for growers who are prepared to invest in this innovation.

Partners in this seminar: Certhon, GreenQ Improvement Centre and Philips





FEEDING THE WORLD

LIGHT QUALITY

Spectrum of LEDs subject of debate

By Tom Dueck, Wageningen UR Greenhouse Horticulture

While recent findings from commercial LED installations provide ample evidence of their biological and commercial viability, there are a number of challenges linked to using such lights in greenhouse horticulture. Nonetheless, LEDs are already providing energy savings for leafy crops such as lettuce and herbs, and are also beginning to improve crop productivity and quality.

There is growing interest in the opportunities provided by LEDs in both Dutch and Finnish horticulture. Wageningen UR Greenhouse Horticulture and the Finnish company Valoya have made an inventory of the experiences of Dutch and Finnish growers and research. They conclude that, while the advantages of using LED lights are obvious, in practice their use has yielded mixed results

Learn to grow

Experiences with LED lights thus far show that spectral effects on plant morphology as well as on secondary plant components like vitamin C content can be of great importance for plant quality. Using LED installations with high-energy crops results in changes in the greenhouse climate and a plant response other than that normally experienced with HPS lighting. The conclusion is that growers need to learn more in order to optimise cultivation with LEDs, as the effects observed on plant temperature, production and energy saving have so far not always been positive.

Effects of spectrum

LED installations from Valoya are composed of LEDs in several colours, not only blue and red. This appears to be an advantage for a number of crops with lower light requirements. Designed to emphasise energy savings, these installations have allowed reductions in power consumption of up to 50%. In addition, several crops also showed growth increases, from 20% (lettuce) to 100% (dock), and improvements in plant quality. The time to flowering in strawberry was shortened by five weeks and LED installations were shown to reduce vernalisation time in some species. The influence of LED lights on crop growth and production ultimately appeared to be positive in most cases.

Not yet fully understood

A number of challenges still remain in the use of LED installations for crops with high light requirements. Their influence on the greenhouse climate, and therefore crop growth and production, are not yet fully understood and require further study. However, in other crops with lower light requirements, the positive influence of LED installations has been demonstrated and they are now being deployed accordingly.

Partners in this seminar: Valoya and Wageningen UR Greenhouse Horticulture



GREENHOUSE DESIGN

Adapting greenhouses to local conditions

By Cecilia Stanghellini, Wageningen UR Greenhouse Horticulture

Which greenhouse is the best? is a question easier asked than answered. The ideal greenhouse depends on factors such as the local climate, the price the grower expects to fetch for the product, the required investment and local regulations. Wageningen UR Greenhouse Horticulture has developed a method that objectively accounts for the various factors that have to be considered before the perfect greenhouse can be built.

Dutch greenhouse construction companies are letting opportunities slip on the international market due mainly to their overemphasis on glass greenhouses. While glass may still be the most versatile cover material, the payback period of a glasshouse often exceeds the typical five-year horizon of many investors. Construction, however, is not the only factor to consider – the knowledge and skills of the grower and available labour are even more important for determining profitability than greenhouse design, materials and fittings. The knowledge and experience of growers are critical and take a long time to acquire – according to consultant Peter Stradiot of Innogreen, proper training takes at least three years.

Local conditions

During his PhD at Wageningen UR, Bram Vanthoor developed a mathematical method for designing greenhouses ideally adapted to local conditions. The method delivers a greenhouse that yields maximum financial results while taking into account local climatic and economic conditions. Tested in the Netherlands and Spain, it has been proved to offer perspectives for the optimisation of greenhouse construction worldwide. While the method has primarily been developed for tomato, adaptation for other crops is also possible. Bram Vanthoor now lives and works in Mexico as a business developer for HortiMaX, where his expertise is used to develop greenhouses that are ideally suited to the local conditions.



Increasing yields

Intensive horticulture adapted to local circumstances can help increase yields, contributing to a resolution of the world food challenge. Wageningen UR has made calculations which show that greenhouse-produced tomatoes can use twenty times less farming soil and fresh water. The technology content of the growing system helps to increase resource use efficiency, but needs to correspond to the financial and technical ability of the grower.

Local for local

The global trend towards ‘local for local’ emphasises the need to produce high-quality greenhouse vegetables with the lowest possible environmental impact. This requires the development of greenhouses adapted to local socio-economic and climatic conditions and operated by well-trained growers.

Partners in this seminar: HortiMaX, Innogreen, University of Arizona and Wageningen UR Greenhouse Horticulture and Horti Alliance

FEEDING THE WORLD

URBAN FARMING

HortiHotel: Hydroponics in the city

By: Florentine Jagers, Hortinfo

Urban farming can shorten the distance between producers and consumers. There is growing interest worldwide in greenhouse construction in densely populated areas, on the roofs of buildings and on derelict urban land. New horticultural technologies offer the possibility of growing vegetables in this way with a minimum input of resources. The HortiHotel, which is now being realised in Amsterdam, is a prototype of this approach.



Inhabitants of large cities are starting to grow food in an increasing number of places, with urban farming already being a noted phenomenon in the United States. New technologies from horticulture can be deployed to grow high-quality products more efficiently. Grow Technology, Fytagoras and Sercom are currently developing HortiHotel, a closed production unit for growing vegetables and herbs. The first HortiHotel will be realised in Amsterdam in the RAI exhibition complex and will produce cress and lettuce for the restaurant.

Restaurants

“Vegetable cultivation on the roofs of offices and buildings (and especially in cities) offers perspectives for catering supplies,” says cress grower Rob Baan, who will be responsible for cultivation in the HortiHotel. “Cultivation of the product under controlled conditions guarantees quality and enables a daily supply of fresh vegetables and herbs.”

For the time being, experts do not consider the construction of greenhouses on existing buildings feasible for large-scale production of food, as heavy greenhouse constructions place high demands on the structure of buildings. Futurologists, however, see enormous potential for this approach to the world food problem and are dreaming about feeding the inhabitants of a metropolis such as New York with vegetables grown in greenhouses on top of buildings.

Technology

The HortiHotel is a prototype for urban horticulture developed by Grow Technology. Cultilene is providing a new cultivation concept without solid substrate for the HortiHotel by using the Nutrient Film Technique (NFT), while Saint-Gobain is supplying the hardware. In the HortiHotel crops will be grown under low-energy LED lighting.

Fytagoras is developing sensors for controlling crop cultivation, which will monitor parameters such as oxygen in the root environment, the pH of the nutrient solution, and evapotranspiration.

Many different cresses with varying climate requirements will be grown in the closed environment of the HortiHotel. Process control will be complex, making automation desirable. Sercom is supplying a process computer to optimise the climate for the various products.

Partners in this seminar: Cultilene, Fytagoras, Grow Technology, Hortiplan and Sercom

FEEDING THE WORLD

ALGACULTURE

Cross-pollination of valuable knowledge

By: Roel Jansen, Wageningen UR Greenhouse Horticulture

The potential of algae is often discussed and the benefits of algae production are clear: Co-production of food and fuel at a high productivity per unit of land area, with the possibility of using residual streams as a source of nitrogen, phosphorus and CO₂. There are a number of similarities between algaeculture and horticulture, with both disciplines able to learn from each other.

The market volume for algae is estimated at about € 1 billion. Researchers in Wageningen UR's Algae PARC (Algae Production And Research Centre) are developing knowledge, technologies and process strategies for a sustainable production of microalgae as feedstock for fuel, chemicals, food and feed on an industrial scale. They are working on photobioreactors, screen species, production strategies, long-term tests and dynamic process control. The main focus is on identifying bottlenecks such as the accumulation of oxygen.



Bioreactors

Dutch company LGem is among those working on the frontline of this exciting new development. LGem is focusing on the problems that occur when using conventional tubular photobioreactors, including the accumulation of dissolved oxygen and fouling. It has developed a new system which is ten times cheaper than traditional tubular systems.

Another interesting technique that is an offshoot from algaeculture is the Algae Wheel, developed in the US and introduced and explained by Grow Technology. Functionally, the wheel offers an environment where bacteria and algae work in a symbiotic way to synthesise living organic mass from nutrients.

Keeping an eye on the end product

According to Fytagoras, the creation of high-grade compounds makes it necessary to understand the metabolism of algae. There is a difference between the primary metabolism, which is responsible for growth, and the secondary metabolism, which is activated as a result of stress. Fytagoras is working on disposable bioreactors in which 10-15% of the costs are represented by the bag and 85-90% by the sensors. For high-grade algae, optical sensor technology seems to offer an affordable way to monitor important processes.

It is imperative to keep the end products in mind when cultivating algae. Production and refinery should go hand in hand, according to Algae Biotech. Refining can take place using several methods, such as spray-drying, extraction, supercritical CO₂-drying and freeze-drying.

Still in its infancy

In making the algae business profitable, one must focus on true figures. Compared to horticulture, algaeculture is still in its infancy. However, algaeculture shares similar interests and motivations with horticulture, allowing both disciplines to potentially help each other in their future development.

Partners in this seminar: Algae Biotech, Fytagoras, Grow Technology, LGem, Wageningen University

FEEDING THE WORLD

CHINA

The middle class desire for healthy, safe and affordable vegetables

By Florentine Jagers, Hortinfo

China is changing at an amazing pace. Cities are growing and the middle class population has more and more money to spend. A number of recent food scandals have contributed to an increasing demand for safe and healthy products. The food and agribusiness sectors are booming and there are significant opportunities for horticulture. Producers, investors and businesses are investigating the possibilities opening up in this enormous country.

The population of China is expected to rise to some 1.5 billion people by 2030. This means that food production needs to increase by some 100 million tonnes annually. Chinese authorities are seriously concerned about how this can be achieved with a decreasing acreage of usable agricultural land and an increasing shortage of water.



Vegetable land

China is currently the world's largest vegetable producer, with about 50% of total global production. The sector, however, is extremely diverse and cultivation is low tech. At the same time, sales via retail and supermarkets are showing strong growth.

Vegetables and fruit are extremely important in the Chinese nutrition pattern. Chinese retailers, however, find it very difficult to buy high-quality vegetables and fruit. About 70% of the population does not trust locally produced food. This is why the Chinese government is encouraging foreign investors to come to the country and focus on high-tech production.

Communication and culture

The Dutch horticultural industry is seizing this opportunity via several initiatives, such as G&C Group, a company that supports European businesses considering becoming active in Chinese food- and agribusiness. G&C Group collaborates with a number of strategic partners who can help in setting up turn-key projects in China. It stresses the need to be aware of cultural differences as doing business the Chinese way is quite different from the western approach.

The development of horticulture in China does not revolve around simply copying successes elsewhere in the world. This was noted by the RijkZwaan seed breeding company when, 25 years ago, it started investigating the opportunities in this market and discovered that the demands of Chinese consumers were totally different from those in, for instance, Western Europe. An extensive breeding programme yielded new varieties for China, such as the pink tomato. And knowledge about modern horticulture is not easy to transfer, either. This is why Van Hall Larenstein has developed a curriculum in which Chinese students spend two years studying in the Netherlands and two years in China.

When entering the Chinese horticultural sector, Dutch companies can also be supported by Greenport Holland International. This network organisation arranges cooperation between business, research and government and is initiating new horticultural projects in China.

Partners in this seminar: G&C Group, Greenport Holland International, Netherlands AgriBusiness Support Office, RijkZwaan, Van Hall Larenstein and RuiXue Global



FEEDING THE WORLD

BLACK SEA AREA

Making the most of opportunities in the Black Sea area

By Ruud Maaswinkel, Wageningen UR Greenhouse Horticulture

Turkey has been developing fast as a modern economy in the Black Sea area. The climate is excellent, there are possibilities for cheap energy (primarily geothermal) and there is a growing demand from supermarkets for local horticultural products. Ukraine and Romania also show increasing demand for excellent locally produced horticultural products.

International supermarkets are establishing new enterprises in the urban areas in the Black Sea area. However, the availability of high-quality horticultural products is insufficient. This offers new opportunities for the horticultural industry and the Dutch are exploring related opportunities in Turkey, Ukraine and Romania.

Rapid growth

Turkey has been developing into a modern economy very fast over the past years (2010 growth: 8.6%), and the demand for fruits and vegetables on the interior market is growing by 5% to 7% per year. The Turkish economy shows strong growth and has a strong financial sector. Many international supermarkets are establishing a presence. Modern horticultural nurseries are continuously being founded and doing good business, building on a long tradition of horticultural exports to Russia and the Middle East.

The total area of modern greenhouses (glass and plastic) in Turkey currently amounts to 750 ha. This is expected to grow to 1350 ha in 2015. Yields are high – the modern nurseries in the area of Izmir, for example, produce 44 kg of tomatoes per square metre – and production is expected to increase during the coming years. The mean interior price of vegetables in Turkey is so high that relatively small amounts of vegetables are exported. Similar developments are occurring in Ukraine and Romania, where there is also a shortage of good horticultural products in supermarkets.

Many major investors are willing to invest in modern nurseries in the Black Sea area. However, the lack of knowledge of the horticultural industry at a management level makes it very difficult to turn a horticultural enterprise into a success

Partners in this seminar: Dalsem Horticultural Projects, MeetIn, RijkZwaan and Wageningen UR Greenhouse Horticulture

ENERGY

MOBILISATION

Clever trading and smart growing decrease energy costs

By Leo Marcelis, Wageningen UR Greenhouse Horticulture

The energy market is very dynamic and the costs of the different energy sources continuously change and are unpredictable. This has an impact on the price of horticultural produce and growers can achieve huge savings by following smart strategies for buying and selling energy. In addition, new growing strategies can save 50% on the use of energy while increasing production.

In the Netherlands, energy costs often make up 15-30% of the total expenses of a grower. There are, however, many opportunities to



reduce these expenses. Trading on the energy market requires new skills but offers growers interesting opportunities to earn money. At the same time, it is possible to save energy via a newly developed strategy: Next generation cultivation.

Clear strategy

When investing money in energy, it is important for growers to define a clear strategy, says Roger Martinus, investment specialist of Rabobank Westland. Growers must ask themselves: What is my aim and which risks are acceptable? They have to be aware of the necessity to manage risk, and the fact that this may put limits on the maximisation of returns on investment. As such, investing can be very similar to trading on the energy market.

The energy market has changed dramatically over the last five years. Dutch growers now have access to different short-term and long-term energy markets, there are several options for buying and selling, and many new energy companies have come into play. The modern grower has become an energy trader. Internet trading floors like Powerhouse provide a great number of possibilities for Dutch growers to trade and to optimise their purchase of energy.

Less consumption and higher yields

Next generation cultivation allows greenhouse growers to realise a substantial reduction in energy use. This concept starts by looking at the demands of the crop and only supplies the minimum needed. Energy losses can be reduced by insulation with screens or covers. Air humidity is efficiently controlled by using a controlled inlet of outside air. Temperature control is also a possibility, although it is strongly dependent on outside temperature.

These energy saving techniques may involve additional costs. Researchers are therefore looking for solutions to increase yield at the same time. An example is using screens that make incoming light diffuse or allow more light to enter the greenhouse.

Although energy is an asset for a greenhouse nursery, it needs to be mobilised. The opportunities for buying and selling should be continuously monitored and energy use attuned to crop demand.

Partners in this seminar: Powerhouse, Rabobank and Wageningen UR Greenhouse Horticulture

ENERGY

NEXT GENERATION

New cultivation systems lead to higher production with less energy

By Florentine Jagers, Hortinfo



The Dutch greenhouse sector has been working on energy savings for some ten years now. A new cultivation strategy has been developed, which allows production of top quality tomatoes, sweet peppers and cucumbers using 30% less energy.

Dutch growers have made agreements with the government stipulating an annual reduction of 2% in energy use per unit of produce. By 2020, this will result in a 50% reduction of CO₂ emissions by greenhouse enterprises compared to 1990. Furthermore, 20% of the energy consumption in Dutch greenhouses must come from sustainable energy sources by 2020. A large stimulation programme has been started to meet this goal, in which research institutes, industry and government jointly work on new techniques and cultivation methods.

Ten experiments with tomato, cucumber and sweet pepper have been carried out at the GreenQ Improvement Centre over the last five years. This research has yielded a new strategy called 'next generation cultivation', which has shown that it is possible to save 30% or more on the use of fossil fuels without negatively impacting production or quality.

Instruments

Several instruments are deployed in next generation cultivation. Good insulation of the greenhouse with one or two screens provides the basis. Ludvig Svensson has developed several types of screens for this purpose. And ventilation is restricted to a minimum in the new

strategy. These two measures affect the greenhouse climate, which is why an active ventilation system (AVS) is needed for dehumidification. This involves tubes underneath the gutter taking dry heated air into the crop. Installation companies, including Van Dijk Heating, have already developed two different systems for this. Systems were initially constructed with one tube per row of crop, an expensive solution that was replaced when it became apparent that good results can also be obtained with one tube per house (8.0/9.6 metre).

Next generation cultivation requires extra attention for water management in order to restrict evaporation. Rockwool supplier Cultilene recommends the use of modern types of substrate that allow better water distribution. A correct position for the drain holes in the slab is another important point.



Focal points

The next generation cultivation system is still in full development. The vertical and horizontal temperature differences in the greenhouse are a problem from a technical point of view. In addition, the fruits are sometimes colder and plant load may become excessive, increasing the risk of Botrytis infestation. Another point is that the new techniques still require a high initial investment. This is why suppliers and research organisations are currently working on simpler installations.

Partners in this seminar: Cultilene, GreenQ Improvement Centre, Van Dijk Heating, Philips, Ludvig Svensson

RESPONSIBLE WITH ENERGY

GREENHOUSE DESIGN

Sustainable high-yield production with new control systems

By Silke Hemming, Wageningen UR Greenhouse Horticulture

Future challenges in greenhouse production include producing enough food for a growing world population, reducing the consumption of resources, saving water and fertiliser, and developing energy-efficient and pest and disease-free production systems. A new generation of greenhouses is needed with highly efficient and fast control systems.



One of the solutions for a sustainably high yield in greenhouses under difficult climate conditions has been developed by Kubo together with Priva and Ludvig Svensson. The result is the so-called Ultra Clima greenhouse, realised for tomato grower Houweling's Hot House in California.

Overpressure

The greenhouse concept consists of a glass greenhouse with a pressure controlled air outlet and an air inlet through a mixing chamber, which includes an evaporative pad with drippers, modulating fans and a heating block where air can be mixed at any temperature and humidity level. The conditioned air is then blown from the mixing chamber through double tubes underneath each tomato gutter inside the greenhouse. The overpressure inside the greenhouse and minimisation of the ventilation opening greatly reduces the risk of the crop being affected by pests and diseases.

The fast control system, designed by Priva, operates automatically to create the perfect climate for the crop. Screens are essential in order to reduce energy consumption and increase sustainability of the greenhouse concepts. According to Ludvig Svensson, several traditional bottlenecks hampering the optimum use of screens such as high humidity levels, an inactive crop and condensation on screens, have been overcome in the Ultra Clima greenhouse.

100 kg tomatoes per m²

Casey Houweling, owner of Houweling's Hot House, states that operating greenhouses in the extreme climate in the Californian desert is an enormous challenge. His dream of getting rid of viruses has, however, come true with the new greenhouses with limited ventilation. He explains that growing with the new technology has required a considerable amount of learning. The challenge now is to increase productivity to a yield of 100 kg fresh tomatoes per m² per year. Sustainability is taken very seriously at Houweling's Hot House, where heat is extracted from the irrigation water, stored, and used for low temperature heating, while solar panels are used for electricity production so as to make production as energy-neutral as possible. All water is recycled and reused.

The Ultra Clima greenhouse shows the importance of adapting greenhouse design to local conditions. It is also vital to start collaborating with the grower, dealers and installers in the design phase. All in all, the new system is expected to be a good solution for many crops when used by highly knowledgeable growers.

Partners in this seminar: Houweling's Hot House, Kubo, Ludvig Svensson and Priva



ORGANIC GROWING

Many obstacles on the road to sustainability

By Arie de Gelder, Wageningen UR Greenhouse Horticulture

The PuraNatura Foundation promotes horticultural innovations that lead to more sustainable large-scale greenhouse production in the Netherlands. The foundation also works on branding for flavourful products grown organically without chemical fertilisers and on a natural substrate.

PuraNatura is an initiative of three Dutch growers (Agro Care, 4Evergreen and Royal Pride Holland), several marketing specialists and Koppert Biological Systems. Since 2006, the organisation has been working on a new cultivation method that is safe and fair while showing respect for product, people and planet. The USDA 100% Organic Certificate guarantees the high quality of the products, which are currently exported primarily to North America.

Introducing new sustainable concepts requires a novel strategy and communication. Koppert Biological Systems is developing various cultivation strategies, especially for fertilisation and for the major problem in sweet pepper cultivation, aphid control. PuraNatura has been working on the marketing of the tomatoes and sweet pepper produced according to the new philosophy.

Storytelling

Products will be positioned in the market with a strong story. Information about sustainable production, combined with their taste and appearance, will stimulate the perception of consumers.

PuraNatura is a member of the International Federation of Organic Agriculture Movements (IFOAM) and its products are approved as organic by USDA. European rules for organic cultivation, however, require a product to be soil-grown and PuraNatura uses a natural substrate.

PuraNatura aims to be a strong independent brand for its own organically grown products. The Dutch Minister for Agriculture and Foreign Trade, Henk Bleker, recently referred to the systems approach of PuraNatura as an important development and highly encouraging step. The Minister also announced a study into the lifecycle analyses of this concept.

Cultivation practice

Major progress in fertilisation was explained by PuraNatura. In addition to supplying fertilisers, the growers have focused on creating an active system of microorganism growth in the substrate. The method of applying nitrogen to the substrate and its slow release were optimised to improve the availability of nutrients for the crop.

Not only the new way of fertilisation is getting attention. Pest management is also an item of concern. Aphid control in pepper cultivation is particularly difficult, requiring too many natural predators to be economically feasible and making chemical correction necessary.

PuraNatura is continuously working to improve its growing concept and the branding of its products on the European market. Special attention will therefore be given to ongoing developments in Brussels. High-quality and a strong background story will be important characteristics of vegetables produced and sold in Europe. The foundation expects the total acreage used for its products to remain stable at 8 ha in 2012, with the ultimate aim of growing to over 800 ha in the Netherlands in the years thereafter.

Partners in this seminar: Koppert Biological Systems, PuraNatura and Str3tch



WELLBEING

EHEC

Food safety: Overcoming emotional reactions

By Wouter Verkerke, Wageningen UR Greenhouse Horticulture

While the EHEC crisis of 2011 caused no fatalities in the Netherlands, it generated a veritable tsunami of negative media reports. The risks of microbial contamination were widely discussed while the disadvantages for human health of not consuming fresh vegetables were hardly given any attention. Communication about and trust in the product are crucial.



Food and traffic safety are similar in the sense that one hundred per cent safety can never be guaranteed. While the fresh chain has developed a regulatory system for restricting health risks to an acceptable minimum, food safety remains loaded with emotion and the media are eager to report on allegedly unsafe food.



The dynamics of the EHEC crisis surprised all parties in the chain. A thorough evaluation showed that an exceptional combination of factors had led to the EHEC outbreak, which resulted in about 50 deaths, mainly in Germany. GLOBAL-GAP certificates could not prevent consumers from losing their faith in fresh produce for some time, which led to the destruction of lots of healthy food and a prolonged period of low prices for primary producers.

Communication

Even though several independent research institutes identified the contamination route via various indirect evidence, the damage to the trust in fresh produce had already been done. Although the current certificates remain important, they were found to offer no protection against such a unique infestation, nor against the corresponding effect on consumers and the chain. The role of acknowledged scientific agencies that can inform consumers with authority via the media is very important in times of crisis in the field of food safety. The chain needs such figureheads.

Food safety is widely considered as a shared responsibility of all chain partners. Sterile cultivation of vegetables is not generally considered as an option to improve consumer trust. Some stakeholders consider communication about food safety as an opportunity for Dutch products whereas others question the usefulness of national promotion, arguing that consumers want safe chains rather than safe countries.

Basis for trust

In the current context, with food safety technically at its highest level ever, any media hype that damages trust in products can be a real problem. This makes the maintenance of the bond of confidence between chain and consumer important. In this context, a cast-iron technical guarantee of food safety is an absolute minimum requirement demanded for all products.

Partners in this seminar: Dutch Product Board, CLM (Centre for Agriculture and Environment), Horticoop, FresQ, FrugiVenta, St. Natuur en Milieu, RIVM, Voedingscentrum, Wageningen UR Greenhouse Horticulture

WELLBEING

SUPPLY CHAIN

The vital importance of digital information

By Saskia Zeilstra, Product Board for Horticulture

International standards for information and logistics are very important to retail organisations. This conclusion was drawn at the First Global Digital Greenport Forum. Growers and traders need to provide digital product information based on international standards. “Don’t do it for your costs, but for your licence to deliver,” says Bernd Hallier, president of European Retail Institute.

Hallier explains that retailers need digital information based on international standards in order to conduct good category management. Retailers demand more and more product information, and are therefore the driving force behind the development of international information standards. Hallier informed the Dutch horticulture industry that the quality of information is, or will soon become, even more important than product quality.



Solutions

Working with information standards is not new in horticulture. Bert Buis, consultant at Florecom, introduced the audience to product coding in flowers and plants. Several different standards have been developed in the past, and the conflicting criteria have caused huge problems. Research found over 50 difficulties in the supply chain of flowers and plants due to there being several dozen different systems of product coding. Right now, the sector is working on a uniform product standard, based on the international GS1 standards. Bert Buis invited the horticultural sector to settle on one information system: “Get the data to the standard and the standard to the data.”

Another question is how much information needs to be registered with each product. Henk van Dijk of Royal Fruitmasters explained that information that belongs with the product needs to be connected to the correct product identification code. The next step is to share this information in the supply chain by using standard product messages. If every partner in the supply chain uses these standards, information becomes available to the complete supply chain.

Uniform standards

Retailers demand more and more information on product and production methods, based on information standards. A striking fact is that different people from different countries and different sectors share the opinion on which information standards should be used in the development of the supply chain. This gives a uniform standard potential in the horticultural sector.

Partners in this seminar: Florecom, Product Board for Horticulture

WELLBEING

COOPERATION IN THE CHAIN

Innovation as a result of co-creation with consumers

By Sjef Enthoven, Bureau Enthoven

Breeders, suppliers and growers are continuously searching for new ways to improve their organisation and products. At the same time they are looking for better ways to serve the market. Greater efficiency and higher profits can be gained when efforts from all parties are combined.



“Horticulture can learn from other branches,” stated Leo Swart from Modiform, producer of plastic pots and trays. “We can ensure that we do not make the same errors.” Professor Ard-Pieter de Man from the University of Amsterdam underlined this statement. He showed how working together in the automobile and fashion industry chains has actually resulted in more innovation and a better return on investment. Peter Christoph from 999 games explained that being in touch with the market always proves to be worthwhile as the company has regular meetings with the gamers to find out how they actually play.

Listen to consumer

Janny Meemelink from ConceptFactory presented a case from the horticultural industry in which Modiform has been cooperating closely with a grower and consumers. Started in 2010 and still being implemented, the project actively involves the grower in the process of developing new trays. By working together with the user of the final product, ConceptFactory has efficiently developed a new line of trays and concepts that match the needs of the market to a greater extent. The grower is already receiving a better price for its product.

Leo Swart concluded that it is useful in the horticultural business to listen better to final consumers instead of just producing and pushing more and more products onto the market. “We have to realise that one can increase turnover by better fitting the product to the demands of consumers and in doing so get a better price instead of just increasing production.”

Partners in this seminar: Modiform, ConceptFactory

OVERPRODUCTION

Foodlog presents future vision for Dutch horticulture

By Pieterneel Bouwman-Van Velden, Foodlog

Dutch growers are looking for new perspectives to secure the future of their companies. Growers, journalists and other stakeholders from the horticultural sector use the Foodlog internet forum to discuss new opportunities. Foodlog general editor Dick Veerman delivered a speech at Horti Fair on the state of the industry, analysing the problems in Dutch horticulture and proposing solutions to overcome the financial deadlock.



Dutch growers are facing serious market problems. They are stuck in a trap created by a past tendency to produce increasing amounts of the same product. The market is spoiled by produce of good quality but little variety. Marketing organisations find it impossible to add value and the number of buyers is too low. This is the view of the so-called Council of Eleven, a think tank consisting of leading growers, consultants and researchers in Dutch horticulture.

Decrease the acreage

In the view of Foodlog, it is time for change. Bulk production volume must be decreased to create better marketing possibilities. This can be achieved at short notice by discarding about 5% of the greenhouse production acreage. In addition, bulk growers must be stimulated to develop brands, not only for the internal market but also for the important export market.

According to the forum, there are plenty of possibilities. The future holds a wide variety of opportunities for product marketing that tells the story of the product in combination with increasing positive feelings towards it among customers. These measures make it necessary to abandon collective thinking and strict collective sales structures.

Find new markets

“Differentiate, internationalise, keep a broad development basis in the Netherlands, but expand abroad based on our knowledge lead,” insists Dick Veerman. “The all-important basis is that people trust all links of the chain. This trust has disappeared and needs to be recreated.”

Robert Flipse of Ubifrance provided information on the ‘Label Rouge’, a quality label introduced in 1968 which guarantees superior quality. Small-scale enterprises each apply their own unique production methods while receiving a fair price for their efforts. The Label Rouge, which represents many products, is definitely past the niche stage today.

Council of Eleven

The speech on the state of the industry is an initiative of Foodlog (Dick Veerman and Pieterneel Bouwman-van Velden) and the Council of Eleven. The eleven members of this organisation are active in horticulture. Foodlog will henceforth be presenting an analysis of the market situation every three months.

COOLED SUPPLY CHAIN

Packaging and monitoring fresh products with care

By Martijntje Vollebregt, Wageningen UR Fresh Food and Chains

The distribution chains of perishable products can benefit from the application of information technology and innovative packaging. NVC Netherlands Packaging Centre, Wageningen University and the industry at large are developing technical solutions that can contribute to a reduction of losses and maintenance of high quality in the chain.

The worldwide annual losses in perishable food products amount to US\$35 billion. This is the main motivation for the PASTEUR project, in which researchers are developing a wireless multi-sensor monitoring system for fresh products. The sensor platform will be based on an intelligent RFID package in which multiple sensor technologies will be incorporated. By adding such devices to packaging solutions (crates, containers, boxes, etc.), one can guarantee the quality of a product more easily and effectively throughout the whole logistic chain.

Sustainable transport

One of the main challenges is to obtain prognoses on product quality from the data. Trade in perishables is becoming more and more global and the demand for sustainability leads to an increasing interest in more environmentally friendly, but slower, transport modes (road and boat instead of air transport). However, these trends result in more variation in the quality and freshness of the delivered products.

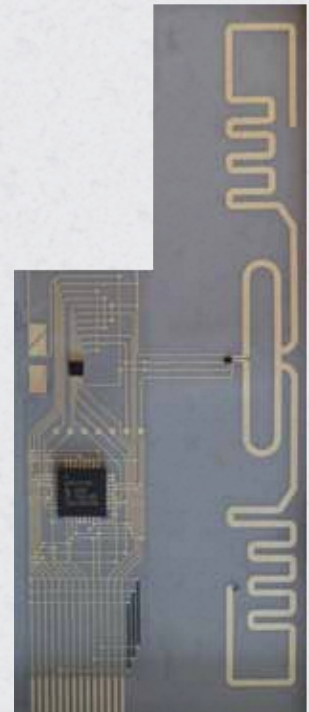
The market demands, however, high and constant quality at a competitive price. To obtain reliable quality prognoses, it is essential to take quality at the time of harvest and calculate how it will change based on the presumed impact of time, temperature, processing, etc. In the PASTEUR project, Wageningen University is developing temperature and gas condition algorithms to interpret this raw data in a useful way and predict quality change in the product during distribution and storage. This project will lead to more efficient and effective distribution chains and to new strategies allowing reduced product losses.

Quality and promotion

The PASTEUR project is not the only project focusing on quality in the chain. Dyzle has introduced a solution to monitor real life temperature, relative humidity and CO₂, as well as G forces, door openings and diesel levels during distribution. Power consumption analysis and route design services are offered as well. The monitoring system is supplemented with automatic warnings triggered at higher levels in the organisation in case the warnings do not lead to a resolution of the problem. The HACCP regulations form the main motivation for customers, especially for high-value and temperature-sensitive products. Application in food and flowers is feasible as well, however.

Besides offering protection, packaging also contributes to the promotion of the product. Pagter Innovations knows that the power of good display and presentation must not be underestimated, as consumers decide within seconds whether they will buy a product. The company therefore provides package solutions which can contribute to prolongation of shelf life, savings on transport, reduction of waste and sustainability.

Partners in this seminar: Dyzle, NVC, NXP, Pagter Innovations and Wageningen UR Food & Biobased Research



WELLBEING

KENYA

Producing ornamentals and vegetables with Dutch expertise

By Anne Elings, Wageningen UR Greenhouse Horticulture

Kenya has some 3,000 hectares of flower production and 100,000 hectares of open field and protected vegetable crops. The country's climate and environment provide ideal growing conditions. In this context, new horticultural technologies can help to achieve sustainable production that continuously safeguards the welfare of people and the environment.



Green Farming is a programme that aims to combine Dutch technology and experience with East African production needs. The purpose is to customise Dutch greenhouse technology for East African horticulture. Kenyan growers have shown a great deal of interest, with many joining a trade mission during which highlights of the Dutch horticultural sector were visited.

Water and climate

Water was the most prominent issue brought forward. Kenya has two seasons with heavy rainfall, which calls for rainwater harvesting to limit run-off and to have easy access to irrigation water during the dry season. Measurement and maintenance of the quality of irrigation water need continuous attention, as do the costs of bore hole operation, water disinfection in recirculation system, and disposal of drain water. Solutions have to be found with a limited financial budget, and at a technology level that is suitable for Kenyan circumstances.

Another major issue is climate management, in particular humidity management. Humidity is very high in the rainy season and in the early morning, stimulating Botrytis and mildew. On the other hand, humidity is too low in the dry season.

Solutions

Both water and climate management need an integrated solution, in which sensor technology is used to base management decisions on facts. Technical modules are available to build a tailor-made integrated system.

Management of the quality of incoming water provides a good starting point, enabling repeated recirculation and reduced drainage, for instance. It can also reduce the size of rainwater storage systems, although this requires a disinfection unit. The application of nutrients should be based strictly on the needs of the crop, thus reducing costs and improving drain water quality. Good horizontal and vertical air circulation can reduce the leaf wetness period, while computer-guided misting is an alternative to labour-intensive hosing.

Tailor-made

Kenyan greenhouse horticulture can benefit from greenhouse technology from the Netherlands tailored to the local circumstances. Training of staff and management should be an integral part of the solution.

Partner in this seminar: Green Farming

INTERNATIONAL CONTRACTING

The challenges of legal accounting

By Ronald Lohstro, *Flynth adviseurs en accountants*

Dutch horticultural companies are doing more and more business abroad, and international contracts are necessary when closing deals with foreign companies. When a company does business with partners in other countries, it is important to enter into clear arrangements with the customer or supplier.

A number of issues should be kept in mind when drafting an international contract:

1. Make optimal use of the freedom of contract that will apply with the other party. Check whether there is freedom of contract if the contract is based on a legal system other than that of the Netherlands.
2. In the interests of good faith during the pre-contractual stage, specify at the start of the negotiations that the result is subject to approval from the management.
3. Agree on which legal system to apply. This should preferably be Dutch law, with the explicit exclusion of international treaties. If this is not possible, try to agree on applying the Vienna Convention (United Nations Convention on Contracts for the International Sale of Goods) in sales contracts.
4. Agree on a choice of forum, preferably Dutch courts. A good alternative is to settle on arbitration procedures, in which case an arbitration agreement should be signed and rules agreed.
5. On signing the agreement, it is advisable for both parties to submit a legalised power of attorney.
6. Agree on a currency and method of payment. In case of advance payment, it is advisable to insist on a bank guarantee, to be submitted on the signature of the contract.
7. Use the Incoterms.
8. During price negotiations, allow for any import and export duties and turnover tax and specify what is included in the price.
9. Agree what the original language will be.

Incoterms

There are thirteen Incoterms or delivery terms which govern the rights and obligations of buyers and sellers internationally. Incoterms are an aid to reaching agreements with foreign suppliers and ensure that standard rules apply in the following areas:

- » What are the obligations of the buyer and the seller?
- » Who is responsible for insurance, licences, permits and other formalities?
- » Who provides transport and to where?
- » When is the critical point at which the risks and costs of the supply of goods pass from the seller to the buyer?

Export credit checklist

Finance can be a major sticking point for achieving export ambitions. By ensuring that its credit application is properly prepared, a business increases its chances of obtaining finance for an export plan. The Netherlands Business Support Offices EVD has drawn up a detailed checklist for this purpose in conjunction with the Dutch Banking Association (NVB).

Involvement of specialists

Bear in mind that making choices and entering into agreements can have major consequences when doing business internationally. Obtain good advice in advance.

Flynth adviseurs en accountants, EBH Elshof Advocaten and Horti Alliance





 *Horti Fair*