Nederlandse Vereniging voor Plantenbiotechnologie en -Weefselkweek
Netherlands Society for Plant Biotechnology and Tissue Culture
KvK nr. 40121960 NL42INGB0004240007 www.nvpw.nl info@nvpw.nl

NVPW autumn symposium

Friday, December 14th 2018

FORUM (building 102), Lecture hall C0214 (on the second floor), Wageningen UR Campus, Droevendaalsesteeg 2, Wageningen

09:30 **Registration and coffee / tea**

09:55 **Opening**

10:00 **Dr. Pankaj Dhonukshe – Dümmen Orange – Cell Biology Laboratory**
Dümmen Orange Innovation Platform for Cell Biology and Tissue Culture

10:35 **Huayi Li MSc. – Wageningen UR – Plant Breeding**
SWEET genes mediate sugar influx and translocation in roots of in vitro raised Arabidopsis thaliana plants as a key step of growth

11:10 **Elevator pitch by exhibitors**

11:15 **Coffee / tea break**

11:30 **Dr. Feike R. van der Leij, professor Health & Food, Van Hall Larenstein University of Applied Sciences / Inholland University of Applied Sciences**
A Piece of Potato (Solanum tuberosum L.): 20th century starch genetics revisited

12:05 **Dr. René Klein Lankhorst – Wageningen Plant Research – Wageningen UR**
Photosynthesis 2.0

12:40 **Lunch**

13:40 **Prof. dr. Hans de Jong – Plant Cytogenetics, Laboratory of Genetics, Wageningen University**
Genetics and genomics of highly polyploid crop species

14:15 **Dr. Marc Kreuger – Seven Steps To Heaven B.V.**
Indoor farming as the next step in agriculture

14:50 **Coffee / tea break**

15.05 **Dr. Annemieke Breukink, Patent Examiner Life Sciences at the Netherlands Patent Office, part of the Netherlands Enterpise Agency**
Protecting your innovation – yes or no?

15:40 **Koen Pelgrom MSc. – Schoneveld Breeding B.V.**
Schoneveld Breeding, be the best under all weather conditions

16:15 **Closing drinks**

The costs for attending the symposium are € 25, to be paid in cash. This includes the lunch, coffee/tea and closing drinks. The printed day programme and abstracts will be handed out at the symposium.

Please subscribe **before Wednesday December 12th 2018** via **info@nvpw.nl**

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Summaries of the lectures on the NVPW autumn symposium, Friday, December 14th 2018
Wageningen UR Campus, FORUM (building 102), Lecture hall C0214, Droevendaalsesteeg 2

Dümmen Orange Innovation Platform for Cell Biology and Tissue Culture

Dr. Pankaj Dhonukshe – Dümmen Orange – Cell Biology Laboratory

Dümmen Orange is a worldwide leader in breeding and development of flowers and plants with 7700 employees worldwide, 90 different crops in breeding portfolio, and annual turnover of about 360 million euro. R&D is the main driver for innovation and comprises of approximately 200 FTE. Dümmen Orange is building a state-of-the-art Breeding Technology Centre (BTC) in the Netherlands for further strengthening its R&D capabilities whereby all research functions in the fields of trait discovery, diagnostics, physiology, genomics & genetics and cell biology are centralized. Cell biology and tissue culture activities remain vital at Dümmen Orange for speeding up classical vegetative mass propagation approaches and for innovating state-of-art novel technologies to create, stabilize, and (accelerated) release of genetic variation in time efficient manner for offering superior products to customers worldwide. Dümmen Orange performs in vitro activities in Netherlands, Germany, Spain and Taiwan and also via external service providers such as in developing economies. This presentation will provide overview of Dümmen Orange Cell Biology and Tissue Culture actives ranging from cells to tissues to organs to organisms with advances made in mutant creation, rescue, whole plant reconstitution and rapid mass propagation.

SWEET genes mediate sugar influx and translocation in roots of in vitro raised Arabidopsis thaliana plants as a key step of growth

Huayi Li MSc. – Wageningen UR – Plant Breeding

Micropropagated explants are growing in vitro on artificial media supplemented with a carbohydrate source, mostly sucrose. However, whether sucrose translocation in vitro in roots takes place through the apoplast or in another way has not been demonstrated yet and neither has the role of sucrose transporter genes. We are interested in investigating the sucrose translocation process in roots in vitro from an external source provided by the medium. For this, we looked at gene expression levels of SWEET and SUC genes (different classes of carbohydrate translocators) in leaves and roots both from in vitro as well as from ex vitro plants, we determined carbohydrate levels biochemically, and studied growth measuring fresh weight and dry weight. To support or reject our hypotheses we included mutants, in particular mutants in SWEET11, SWEET12 as single mutants, and one double mutant sweet11;12. We found that SWEET11, SWEET12 and SUC1 were highly expressed in roots in vitro. The mutant sweet11;12 seedlings displayed roots with a higher primary root length and a higher amount of soluble sugars. We also studied the translocation process of the fluorescent sucrose analogue esculin in roots of seedlings as well as in mesophyll protoplasts. Our results imply that SWEET11 and SWEET12 play an important role in external sucrose uptake from the medium and translocation to the vascular system.

A Piece of Potato (Solanum tuberosum L.): 20th century starch genetics revisited

Dr. Feike R. van der Leij, professor Health & Food, Van Hall Larenstein University of Applied Sciences / Inholland University of Applied Sciences

In the past few years, both Bernard Witholt and Will Feenstra, ground breaking professors with regard to the biochemistry and genetics of starch formation in higher plants, passed away. An important part of their research in their active years in Groningen covered classical mutagenic as well as modern biotechnological approaches for crop improvement, especially in potato. New variaties, such as those that lack amylose, were obtained and these were later bred to commercially available potato varieties for the starch industry. The development and molecular characterization of the potato equivalent of waxy maize, the amf (amylosefree) potato, will be discussed along with its relevance for basic and applied science and education.

Photosynthesis 2.0

Dr. René Klein Lankhorst – Wageningen Plant Research – Wageningen UR

The human population is expanding and getting richer, which will result in an increased demand for food. We also need to diminish our dependence on fossil-carbon, transitioning to a sustainable source of liquid fuels and organic feedstocks. To this, we can add the need to manage climate change by sequestering atmospheric carbon dioxide. Meeting these challenges will require a revolution in agricultural productivity. Agriculture produces most of our food and it also produces energy-rich, organic biomass, all of which are derived from plant photosynthesis. The revolution we need in

agriculture will depend on substantially increased photosynthesis. The Photosynthesis 2.0 Initiative aims to develop our future crops that will combine strongly increased yields with excellent resource use efficiency and a high climate resilience.

Genetics and genomics of highly polyploid crop species

Prof. dr. Hans de Jong – Plant Cytogenetics, Laboratory of Genetics, Wageningen University.

After completing the genome sequencing and assembly of most plant model species, researchers are now facing the challenge of analyzing multi-Gb crops, including wheat, barley and maize, with genomes containing huge numbers of LTR retrotransposons and long arrays of tandem repeats. A second class of very complex genomes are the highly polyploid crops species, often with more than 100 chromosomes in their cell complements. In my presentation I will discuss recent genome initiatives of two tropical crops, sugarcane, *Saccharum* ssp. (2n=112) and okra, *Abelmoschus esculentus* (2n=130). In my presentation I will explain how cytogenetics reveal some clue of the number of genomes and haploid chromosomes, and why traditional genetic mapping programs are not suitable to reveal linkage maps. I will also describe the tools for sequencing and assembly in order to unravel the complex genomic nature of these crops.

Indoor farming as the next step in agriculture

Dr. Marc Kreuger – Seven Steps To Heaven B.V.

Indoor farming can contribute to the world food production in the coming decades. Indoor growing would greatly reduce the need for water and pesticides to grow crops and enable the production of safe, clean, nutritious and affordable food. However, to realize the yields needed some of the plant's requirements must be met. For this a climate system was designed where light, temperature and evaporation are controlled independently. In the modular system a laminar airflow controls evaporation, independent of light levels and without impact of infrared light. Together with crop models, calculations and predictions of yields can be made, which are necessary to define commercial success in advance. In this presentation is described how a different view on plant growth, combined with integrated technology offers the opportunity for a scalable indoor farming solution. The creation of a climate, perfectly fit for plants will secure the high yields that are necessary for both food production and profitability. Only when both are realized indoor farming can deliver on the promise many people feel it has.

Protecting your innovation – yes or no?

Dr. Annemieke Breukink, Patent Examiner Life Sciences at the Netherlands Patent Office, part of the Netherlands Enterpise Agency)

You have spent a great amount of time creating a new biotech method or a new tulip variety. So, what's next? Are you going to protect your innovation or not? Or maybe you are thinking about combining both strategies? In my presentation I'll give you an overview of the different intellectual property or IP rights, the costs of these rights and various IP strategies. The presentation will also focus on the opportunity of obtaining free, online information and inspiration from IP databases to improve your innovation trajectory.

Schoneveld Breeding, be the best under all weather conditions

Koen Pelgrom MSc. – Schoneveld Breeding B.V.

Schoneveld Breeding, who are we and what is our daily business. I also want to show that we, as a small-to-medium enterprise (SME) in the floriculture sector, still can make use of the latest breeding techniques by uniting ourselves in a consortium (BreedingAccel). In addition, I would like to present the results of a recent study in which we looked at the consequences of the extreme weather influences on seed production in one of our crops. In recent years we have seen more and more deviating quantities in seed yield and we wanted to know whether these differences in seed yield were cause by the temperature fluctuations during production.

Exhibitors:

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