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 fall symposium

Friday, December 9th, 2022
Telders Auditorium, Academy Building, Rapenburg 73, Leiden

09:30	**Registration and coffee / tea**
09:55	**Opening by Remko Offringa**
10:00	**Charles Underwood – MPI for Plant Breeding, Cologne** Engineering Apomixis: Clonal Seeds Approaching the Fields
10:35	**Martina Juranic – Wageningen UR, Plant Breeding** Title tbd
11:10	**Elevator pitch by exhibitors**
11:20	**Coffee / tea break**
11:40	**Kim Boutilier – Wageningen UR, Bioscience** New Morphogenic Gene Alleles for Plant Regeneration
12:15	**Wessel Holtman – Fytagoras BV, Leiden** Doubled haploid technology: from academic knowledge towards a practical tool for breeders
12:40	**Lunch**
13:10	**General members meeting**
13:50	**Danny Geelen – HortiCell, Ghent University, Belgium** Adventitious root formation in hypocotyls is controlled by a conserved cotyledon hypocotyl signalling pathway
14:25	**Coffee / tea break**
14.55	**Sander Hogewoning – Plant Lighting BV, Bunnik** Title tbd
15:30	**Michiel van Bennekom – Iribov BV, Heerhugowaard** Title tbd
16:05	**Closing drinks**

The costs for attending the symposium are € 30, to be paid by smartphone or 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 Monday, December 5th** via **info@nvpw.nl**

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Summaries of the lectures on the NVPW spring symposium, Friday, June 3rd, 2022
Wageningen UR Campus, OMNIA (building 105, Hoge Steeg 2)

Engineering Apomixis: Clonal Seeds Approaching the Fields

Charles Underwood – MPI for Plant Breeding, Cologne

Apomixis is a form of reproduction leading to clonal seeds and offspring that are genetically identical to the maternal plant. While apomixis naturally occurs in hundreds of plant species distributed across diverse plant families, it is absent in major crop species. Apomixis has a revolutionary potential in plant breeding, as it could allow the instant fixation and propagation though seeds of any plant genotype, most notably F1 hybrids. Mastering and implementing apomixis would reduce the cost of hybrid seed production, facilitate new types of hybrid breeding, and make it possible to harness hybrid vigor in crops that are not presently cultivated as hybrids. Synthetic apomixis can be engineered by combining modifications of meiosis and fertilization. I will review the current knowledge and highlight a major achievement toward the development of efficient apomictic systems usable in agriculture.

New Morphogenic Gene Alleles for Plant Regeneration

Kim Boutilier, Wageningen UR, Bioscience

Plants are developmentally flexible and can be induced to regenerate new tissues, organs and even embryos in vitro. This plasticity forms the basis for numerous applications in plant breeding and propagation, including in vitro embryogenesis and organogenesis. Improvements in plant regeneration protocols have largely been made using empirical modification of tissue culture parameters. More recently, a number of transcription factors have been identified that can be used to overcome plant regeneration barriers. However, use of these so-called morphogenic genes relies on stable or transient expression of gene constructs, which is subject to GMO regulations in many countries. We have used CRISPR-Cas9 mutagenesis to generate novel alleles of two morphogenic genes, BABY BOOM and LEAFY COTYLEDON1, that promote plant regeneration in vitro. The mutated regions are found in evolutionarily conserved non-coding nucleotide sequences, opening up the possibility for finding similar mutations in crop species.

Doubled haploid technology: from academic knowledge towards a practical tool for breeders

Wessel Holtman, Fytagoras BV

Protocols for production of doubled haploid plants have been developed for many plant species last decades. However, DH protocols published from an academic perspective often lack possibilities for practical application. A practical DH protocol for use in breeding also includes production of sufficient, unique, high-quality DH plants in an efficient way and at reasonable costs. Some hurdles, which Fytagoras solved in this respect will be discussed in the presentation.

Adventitious root formation in hypocotyls is controlled by a conserved cotyledon

hypocotyl signalling pathway

Danny Geelen, HortiCell, Ghent University, Belgium

Adventitious root (AR) formation is an adaptive developmental response that can be triggered by exogenous auxin application. We are using Arabidopsis etiolated hypocotyls and inflorescence stem segments to study the regulatory processes and role of auxin in de novo root organogenesis. To address underlaying processes of AR induction, we screened a collection of auxin-like molecules for AR specific induction. A molecule was identified that massively induces AR in etiolated Arabidopsis seedlings without pronounced effects on primary root growth and lateral root branching. The novel compound hysparin, for hypocotyl specific adventitious root inducer, does not trigger a typical molecular response of DR5-reporter activation or DII-Venus degradation. In fact, auxin response genes are not activated within the first 8 hours. Instead, hysparin activates the cotyledons in producing a signal that induces AR formation on the elongated hypocotyl. Formation of hypocotyl AR depends on the presence of cotyledons and hysparin does not induce AR locally. As hysparin induces AR on elongated hypocotyls of several other species including tomato and rapeseed, its bioactivity impinges on a conserved cotyledon hypocotyl communication leading to adventitious rooting. In an approach to reveal what genetic elements are involved in this communication, we found only a few hormone signalling elements contributing to hysparin mediated AR induction. The findings support the presence of a specific cotyledon signalling route controlling hypocotyl adventitious root induction.