COST Action CA18111 "Genome Editing in Plants"

Book of Abstracts

3rd PlantEd conference

5 – 7 September 2022
Düsseldorf, Germany

Sponsoring:

Logistics note

LOCAL ORGANIZERS

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Conference Program

3rd PlantEd conference

Dusseldorf, Germany – September 5-7, 2022

Monday September 5, 2022

Session Chair – Dennis Eriksson – Lecture Hall 6L

	09:00-09:15	Welcome **Local Organizer Götz Hensel**; HHU Dusseldorf/Germany
		Welcome **Dean Faculty of Mathematics and Natural Sciences Peter Kleinebudde**; HHU Dusseldorf/Germany
		Welcome **COST Action Chair Dennis Eriksson**
	09:15-09:40	**Keynote Andreas PM Weber**; HHU Dusseldorf/Germany *Tackling grand challenges with plant sciences*
What do we know? – Technological advances	09:40-10:20	**Keynote Jens Boch**; Hannover/Germany *TALEs, TALEN and TALE-base editors - tools, techniques and applications*
	10:20-10:50	**Coffee break – Botanical Garden**
	10:50-11:10	**Ian Godwin**; QAAFI Centre for Crop Science/Australia *Editing the way to resilient high-value cereals*
	11:10-11:30	**Uriel Urquiza-Garcia**, HHU Dusseldorf/Germany *Biodesign automation for optimal assembly of polycistronic sgRNAs and crRNAs*
	11:30-11:50	**Sruthy Maria Augustine**; Department of Plant Breeding, Giessen/Germany *Genome editing for crop improvement*
	11:50-12:10	**Sadiye Hayta**; John Innes Centre, Norwich/UK *Genotype Independent Wheat Transformation with GRF–GIF Protein Fusion*
	12:10-12:30	**José Hernandes-Lopes**; Universidade Estadual de Campinas/Brazil *Unlocking the genome editing potential for maize breeding in the tropics*
	12:30-13:30	**Lunch – Botanical Garden**
	13:30-13:50	**Jan Schaart**; Wageningen University and Research, Wageningen/The Netherlands *Which Cas-enzymes work best for induction of targeted mutations?*
	13:50-14:10	**Virginia Zahn**; Thünen Institute of Forest Genetics, Grosshansdorf/Germany *Combining bacterial and viral elements for efficient gene targeting in poplar*
	14:10-14:30	**Mark Smedley**; John Innes Centre, Norwich/UK *Deploying CRISPR-Cas tools to design targeted mutagenesis in wheat*
	14:30-14:50	**Evelien Waegneer**; Institute of Agriculture, Fisheries and Food Research, Melle/Belgium *CRISPR and natural variation: complementary approaches for Cichorium haploid induction*
	14:50-15:10	***Jillis Grubben***; Wageningen University and Research, Wageningen/The Netherlands *Inducing kilobase to mega base-sized inversions in tomato using CRISPR/Cas9: The larger, the rarer?*
	15:10-15:30	**Teodoro Cardi**; National Research Council, Institute of Biosciences and Bioresources, Portici/Italy *Modification of potato mitochondrial DNA through mito-TALEN and targeted base editing*
	15:30-16:00	**Coffee break – Botanical Garden**
	16:00-18:00	PlantEd Working Group meetings (WG1-WG5)
	18:30-22:00	**Social dinner – Botanical Garden**

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Tuesday September 6, 2022

Session Chair – Katrijn Van Laere – Lecture Hall 6L

What can we do? Applications of Genome Editing

09:00-09:40	**Keynote Rene Smulders**; Wageningen University & Research, Plant Breeding, Wageningen/The Netherlands *Applications of new genomic techniques in plant breeding*
09:40-10:20	**Keynote Matin Qaim**; Center for Development Research (ZEF), Bonn/Germany *Possible socioeconomic implications of plant genome editing*
10:20-10:50	**Coffee break – Botanical Garden**
10:50-11:10	**Cintia Marchetti**; Czech Advanced Technology and Research Institute (CATRIN), Palacký University, Olomouc, Czechia *Using CRISPR-Cas9 to study and modify root system architecture in barley (Hordeum vulgare L.)*
11:10-11:30	**Angelo Santino**; Institute of Sciences of Food Production, Lecce/Italy *CRISPR/Cas9 mediated genome editing to develop Vitamin D-biofortified tomatoes*
11:30-11:50	**Per Hofvander**; Swedish University of Agricultural Sciences, Plant Breeding, Alnarp/Sweden *Trait development for unique starch quality in potato by multiallelic, multigene CRISPR-Cas9 mutagenesis*
11:50-12:10	**Musa Kavas**; Ondokuz Mayıs University, Samsun/Turkiye *Application of genom-editing in tomato*
12:10-12:30	**Mahdi Morad Pour**; Tallinn University of Technology, Tallinn/Estonia *DNA-Free Transcriptional Activation of Heat Stress-Responsive Genes in Red Cabbage using CRISPR/dCas9 Ribonucleoprotein Activators to Enhance Heat Tolerance*
12:30-13:30	**Lunch – Botanical Garden**
13:30-13:50	**Alexander Fendel**; Thünen Institute of Forest Genetics, Grosshansdorf/Germany *Improvement of drought stress tolerance in poplars (Populus) by modification of candidate genes*
13:50-14:10	**Jeny Jose**; Centre for Agricultural Research, Martonvásár/Hungary *Harnessing S-gene candidates for conferring resistance against Ralstonia solanacearum in potato*
14:10-14:30	**Loredana Moffa**; Research Centre for Viticulture and Enology, Conegliano/Italy *New Plant Breeding Techniques to enhance grapevine sustainability*
14:30-14:50	**Kyoka Kuroiwa**; INRAE Avignon, Avignon/France *An iterative gene editing strategy broadens eIF4E1 genetic diversity in Solanum lycopersicum, triggering resistance to several potyvirus isolates*
14:50-15:10	**Allah Bakhsh**; Centre of Excellence in Molecular Biology, Lahore/Pakistan *Addressing cold induced sweetening of potato through knock out of vacuolar invertase gene*
15:10-15:40	**Coffee break – Botanical Garden**
15:40-16:25	**Keynote Thomas Jacobs**; VIB, University of Gent, Center for Plant Systems Biology, Gent/Belgium *Systematic optimization and development of plant genome editing techniques*
16:30-18:15	MC meeting

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Wednesday September 7, 2022

Session Chair – Götz Hensel – Lecture Hall 6L

What do we think? – GE perception	09:00-09:45	**Keynote Gabi Waldhof**; Leibniz Institute of Agricultural Development in Transition Economies (IAMO), Halle/Germany *A Message of Hope? – Mitigating Polarization of Moral Debates about Genetic Engineering*
	09:40-10:30	**Keynote Ewa Woźniak-Gientka**; Institute of Bioorganic Chemistry, Polish Academy of Sciences, Poznan/Poland *Public perception of plant gene technologies worldwide in the light of food security*
	10:30-10:50	**Ayrton André Rosado Huaynasi**; KU Leuven, Leuven/Belgium *Interpreting Precision Breeding: Key legal concepts under international law and current domestic regulatory approaches*
	10:50-11:15	**Coffee break – Botanical Garden**
	11:15-11:45	**Ruth Fisher**; F1000 *Open Research Europe, the European Commission's Diamond open access publishing platform*

Session Chair – Vladislava Galovic – Lecture Hall 6L

STSM Session	11:45-12:00	**Aurelia Scarano**; CNR, Institute of Science of Food Production, Lecce/Italy *CRISPR/Cas9-mediated genome editing for Vitamin D biofortification in Solanaceous species*
	12:00-12:15	**Pouneh Pouramini**; University of Osnabrueck, Osnabrueck/Germany *Increased recombinant protein accumulation by targeted mutagenesis of HorB1 using CRISPR/Cas technology*
	12:15-12:30	**Tetiana Kyrpa**; Institute of Cell Biology and Genetic Engineering of NASU, Kyiv/Ukraine *Potato gene editing for improved pathogen resistance*
	12:30-12:45	**Alessia Cuccurullo**; Italy *Characterization of root architecture and of interactions with AM fungi of tomato edited lines for the strigolactone biosynthesis*
	12:45-13:00	**Poster prizes**
	13:00-14:00	**Lunch – Botanical Garden**

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Abstracts

Poster 12

Ankica Kondić-Špika, Dragana Miladinović, Ana Marjanović Jeromela, Dragana Trkulja, Svetlana Glogovac

Institute of Field and Vegetable Crops, Novi Sad, Serbia

Genome Editing and Machine Learning Models – Promissing Tools for Precision Breeding in Wheat

Wheat is a cool season crop and its optimal daytime growing temperature during reproductive development is 15°C and for every degree Celsius above this optimum a reduction in yield has been observed. Furthermore, at different growth stages, abiotic stresses can impact different physiological processes and as a consequence different yield components that are being set at that stage, reducing yield potential. Having that in mind, we evaluated the effect of individual stresses such as: heat, drought, salt etc., as well as their combined effects (salt and N nutrition, heat and drought, etc.) on winter wheat both at cellular and plant level under controlled laboratory conditions and in a greenhouse. The genotypes, identified in these studies as potential sources of drought and other abiotic stresses tolerance (NS 40S, NS Avangarda, Subotičanka) are to be further investigated and used for the improvement of wheat production in unfavourable conditions caused by climate change. For that purpose combination of prediction models based on machine learning (ML), advanced molecular techniques and genome editing will be used for target gene identification and introgression. In initial steps, machine learning models will be used for prediction of future climate scenarios and to select a set of traits that wheat may need to cope with changes in the environment and enable stable food production. In genome editing experiments ML will be used to reduce need for the experimental screening of potential sites to optimise Cas9's activity as well as for prediction of possible off-target mutations, thus increasing the efficiency of targeted wheat improvement. This combinatory approach to wheat improvement should enable more rapid gene/trait discovery and their incorporation in cultivated varieties, thus contributing to overall resilience of wheat production and related agri-food systems.

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