webinar series
SFR QUASAV (Angers, France)
on Recent Advances in Seed Health and Vigour

Date: April 22nd 2021 : 15h30-17h00 (Paris time)
Guest speaker: Dr. G Welbaum, Virginia Polytechnic Institute and State University
Local speakers: N Denancé and J Malabarba

How to connect:

Via Zoom at https://inrae-fr.zoom.us/j/4852803048, Meeting ID: 485 280 3048
Via a SIP protocol : 4852803048@zoomcrc.com
Via mobile phone : find your phone number at : https://inrae-fr.zoom.us/u/ahAso3MQE
Via H.323 protocol
162.255.37.11 (US West coast)
162.255.36.11 (US East coas)
213.19.144.110 (Amsterdam, The Netherlands)
213.244.140.110 (Germany)
Meeting ID: 485 280 3048

Scientific program:

15h30-16h00 :
LabField™ as a Tool for Predicting Field Emergence of Diverse Melon Genotypes

Gregory E. Welbaum, Stephanie R. Welbaum, Michael Beall and I-Mo Fu
School of Plant and Environmental Sciences, Virginia Polytechnic Institute and State University, Blacksburg, VA, USA.

Many vegetables have specific climatic requirements with relatively narrow temperature and moisture optima for best establishment and production. Global climate change threatens food crop production in some areas because of shifts in temperature and moisture distribution. Identifying germplasm with greater environmental adaptability will help sustain global vegetable production. LabField™ tables were developed to test seed germination and plant growth in soil maintained at constant temperature or along a gradient of temperatures in a laboratory. The LabField™ eliminates using multiple growth chambers to test the same broad range of environments. In this study, we compared field emergence of five melon (*Cucumis melo* L.) with emergence of the same genotypes on a LabField™ table and using standardized Association of Official Seed Analysts germination tests on paper towels. The objectives were to identify genetic variation in germination performance and to test LabField™ as a tool for accurately predicting field emergence.

16h00-16h30
Seed-borne pests: a bibliographic resource to evaluate the risk of transmission through seeds

Nicolas Denancé
GEVES, SNES, Laboratoire de Pathologie, 25 rue Georges Morel, 49071 Beaucouzé, France.

Food security is threatened by harmful pests whose impact may strongly differ between crops, agricultural practices and world regions. Among seed-borne pests, some can be transmitted from seed to plantlets and

induce diseases on seedlings or plants. For those, seed is a pathway of dissemination, which makes international movement of seed a possible mean of entry in new geographic areas. The ISTA Reference Pest List is a pathway-initiated study contributing to pest risk analysis, providing scientific knowledge on seed-borne pests and their possible dissemination through seeds in 11 major food and agricultural crops. It should be a valuable resource for risk assessors and policymakers. It also revealed the need for more research in characterizing various pathosystems for which seed pathways is not proven.

16h30-17h00
How can DNA (de)methylation act on the heat stress response in seeds?

Jaiana Malabarba
Univ Angers, Institut Agro, INRAE, IRHS, SFR QUASAV, F-49000 Angers, France

Seed development needs the coordination of multiple molecular mechanisms to promote correct tissue development, seed filling, and the acquisition of germination capacity, desiccation tolerance, longevity, and dormancy. Heat stress can negatively impact these processes and upon the increase of global mean temperatures, global food security is threatened. Here, we explored the impact of heat stress on seed physiology, morphology, gene expression, and methylation on three stages of seed development. Notably, Arabidopsis Col-0 plants under heat stress presented a decrease in germination capacity as well as a decrease in longevity. We observed that upon mild stress, gene expression and DNA methylation were moderately affected. Nevertheless, upon severe heat stress during seed development, gene expression was intensively modified, promoting heat stress response mechanisms including the activation of the ABA pathway. By screening mutants defective in epigenetic regulation, we observed that the lack of DNA demethylation in the *repressor of silencing 1 (ROS1)* mutant impaired seed germination by affecting germination-related gene expression. Also upon severe stress, a large proportion of differentially methylated regions (DMRs) were located in the promoters and gene sequences of germination-related genes. To conclude, our results indicate that DNA (de)methylation could be a key regulatory process to ensure proper seed germination of seeds produced under heat stress.