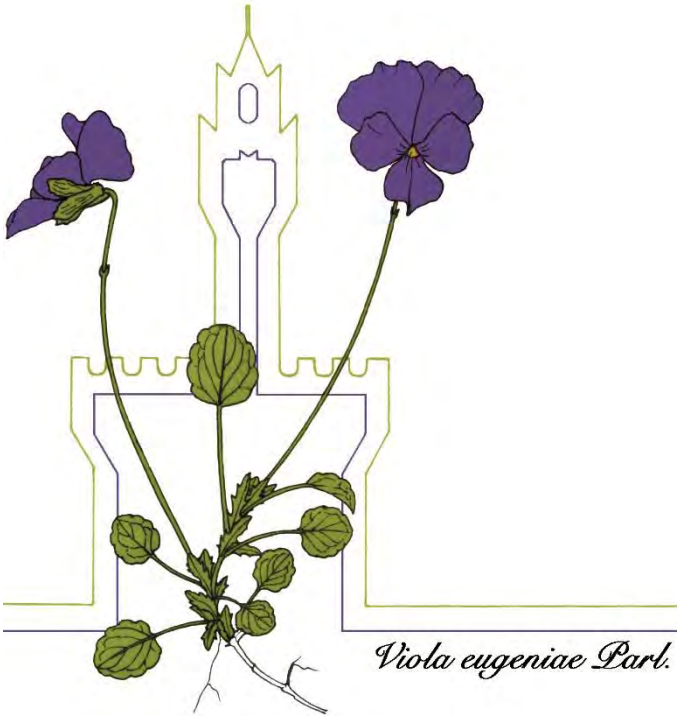
116° Congresso della Società Botanica Italiana

VII INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)

ONLINE, 8 - 10 SEPTEMBER 2021



ABSTRACTS

KEYNOTE LECTURES, COMMUNICATIONS, VIDEO ABSTRACTS

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VII INTERNATIONAL PLANT SCIENCE CONFERENCE (IPSC)

Online, 8 - 10 September 2021

Programme

Wednesday 8 September 2021

BRIDGING SESSION BETWEEN THE ITALIAN BOTANICAL SOCIETY AND MEDPALYNOS
on platform Clickmeeting
(Chairpersons: A. Chiarucci and A.M. Mercuri)

9:00-9:20 Opening of the 116th SBI Congress - announcement of the MedPalynoS closing ceremony

9:20-9:50 **Scott Mensing**, Edward Schoolman, Adam Csank, et al., University of Nevada, Reno, USA (30 min)
"The challenge of combining historical archives with paleoenvironmental data to create robust explanations of environmental transformation through time"

9:50-10:00 Questions

The 116° Congress of the Italian Botanical Society continues on platform Webex

SYMPOSIUM

"ENVIRONMENTAL AND PRODUCTIVE CHALLENGES IN PLANT CELL BIOLOGY AND BIOTECHNOLOGY"
(Chairpersons: L. Navazio and M.S. Lenucci)

Key words plant cell biology and molecular biology, plant biotechnology, plant growth and differentiation, plant-environment interactions, productive challenges

10:00-10:30
- **Salma Balazadeh**, Leiden University, The Netherlands; Max Planck Institute of Molecular Plant Physiology, Potsdam, Germany. (25 + 5 min)
"Mechanisms of thermomemory in plants"

10:30-13:06 **Communications**

- **Erika Bellini**, Luca Paoli, Stefania Bottega et al. (10 + 2 min)
"New insight on thiol-peptides: are they involved in cadmium extracellular secretion?"
- **Ignacio Ezquer**, Maurizio Di Marzo, Vívian Ebeling Viana et al. (10 + 2 min)
"New insights into the role of cell wall modifications induced by α-XYLOSIDASE1: The impact in seed and fruit size in *Arabidopsis thaliana*"
- **Lavinia Mareri**, Claudia Faleri, Luigi Parrotta et al. (10 + 2 min)
"Insights into the mechanisms of priming and thermotolerance in tobacco pollen"
- **Antonella Muto**, Emanuela Talarico, Ernesto Picardi et al. (10 + 2 min)
"Genome-wide analysis of the H3K27me3 epigenome and transcriptome in the ovule developmental stages during pollination of *Ginkgo biloba* L."
- **Lorenzo Ferroni**, Andrea Colpo, Alessandra Molinari et al. (10 + 2 min)
"Quantitative assessment of the thylakoid membrane appression in the chloroplast of *Selaginella martensii* Spring (Lycopodiophyta)"

Coffee Break

- **Federica Della Rovere**, Camilla Betti, Laura Fattorini et al. (10 + 2 min)
"Roles of Brassinosteroids on *Arabidopsis thaliana* rooting in the presence of Cadmium"
- **Enrico Cortese**, Alessio G. Settimi, Mattia Franceschi et al. (10 + 2 min)
"Effects of plasma-activated water on signalling pathways underlying plant self-defence responses"

Roles of Brassinosteroids on *Arabidopsis thaliana* rooting in the presence of Cadmium

Federica Della Rovere[1], Camilla Betti[2], Laura Fattorini[1], Nicoletta Girardi[1], Diego Piacentini[1], Giuseppina Falasca[1], Maria Maddalena Altamura[1]
[1]Department of Environmental Sciences, "Sapienza" University of Rome, Piazzale Aldo Moro 5, 00185 Roma, Italy; [2]Department of Medicine, University of Perugia, Piazzale Menghini 8/9, 06132 Perugia, Italy

Brassinosteroids (BRs) are plant hormones that belong to the class of polyhydroxy steroids. BRs can regulate multiple physiological functions, such as embryogenesis and seed germination, cell division and elongation, microspore germination and growth of pollen tubes, differentiation of tracheary elements and polarization of cellular membranes. However, BRs not only regulate different physiological and morphogenetic responses in plants, but also act in various biotic and abiotic stresses through a modulation of both synthesis and signalling. The role of BRs in stress management, including heavy metal stress, has been explored in many species. In particular, BRs treatments can reduce cadmium (Cd) accumulation and toxicity in *Brassica juncea*, which belongs to the same family of the model plant, *Arabidopsis thaliana*. The global aim of this research is to demonstrate whether BR hormones, still little known for their effect on rhizogenesis, have a positive role on root development and if this also occurs in the presence of a heavy metal pollutant, such as Cadmium (Cd). To this aim, Arabidopsis wild type seedlings were grown *in vitro* in the presence of different concentrations (1nM to 1µM) of the most active BR, epi-brassinolide (eBL) and in the presence of absence of 60 µM $CdSO_4$, known to cause damage to the Arabidopsis root system. To favor AR formation, the plants were grown vertically for 9 days in continuous darkness and then exposed to 16 h light/8 h dark photoperiod for 7 further days. At the end of the cultural period every component of the root system (primary root, PR; lateral roots, LRs; and adventitious roots, ARs), were morphologically and anatomically examined. In particular, PR and hypocotyl length, as well as LR and AR densities, were measured and an anatomical analysis of LR and AR apices have been conducted.
The results show that BL plays an important role in the development of the root system in Arabidopsis by stimulating the formation of LRs and ARs, thus helping to increase the root system extension in the substrate thereby increasing the plant functional well-being. In particular, the lowest BL concentrations used (i.e. 1nM and 10 nM) promoted root induction both by the PR and the hypocotyl, responsible for the formation of LRs and ARs respectively. However, anatomical analyses showed that the optimal BR concentration for rooting induction (10 nM) negatively interferes with the regular construction of the stem cell niche and its quiescent center (QC) in the AR, differently from what is observed in the LR where a regular organization of the niche is observed. The 10 nM eBL concentration perfectly counterbalances the inhibitory effect that $CdSO_4$ has on root production, restoring the self-promoting ability of both ARs and LRs production. However, this mitigating effect of BL hormone is not observed in the organization of the stem cell niche. Therefore, further analyses will be carried out using QC fluorescent markers. In addition, to precisely dissect BR effect on rhizogenesis, the research will also focus on the possible link between BRs and nitric oxide (NO), other important mediator molecule of plant development and response to abiotic/biotic stresses. Experiments in absence and presence of $CdSO_4$ are being carried out also using the NO-donor compound sodium nitroprusside (SNP), followed by NO epifluorescence tissue localization using the NO probe, DAF-FM DA, and NO quantification.