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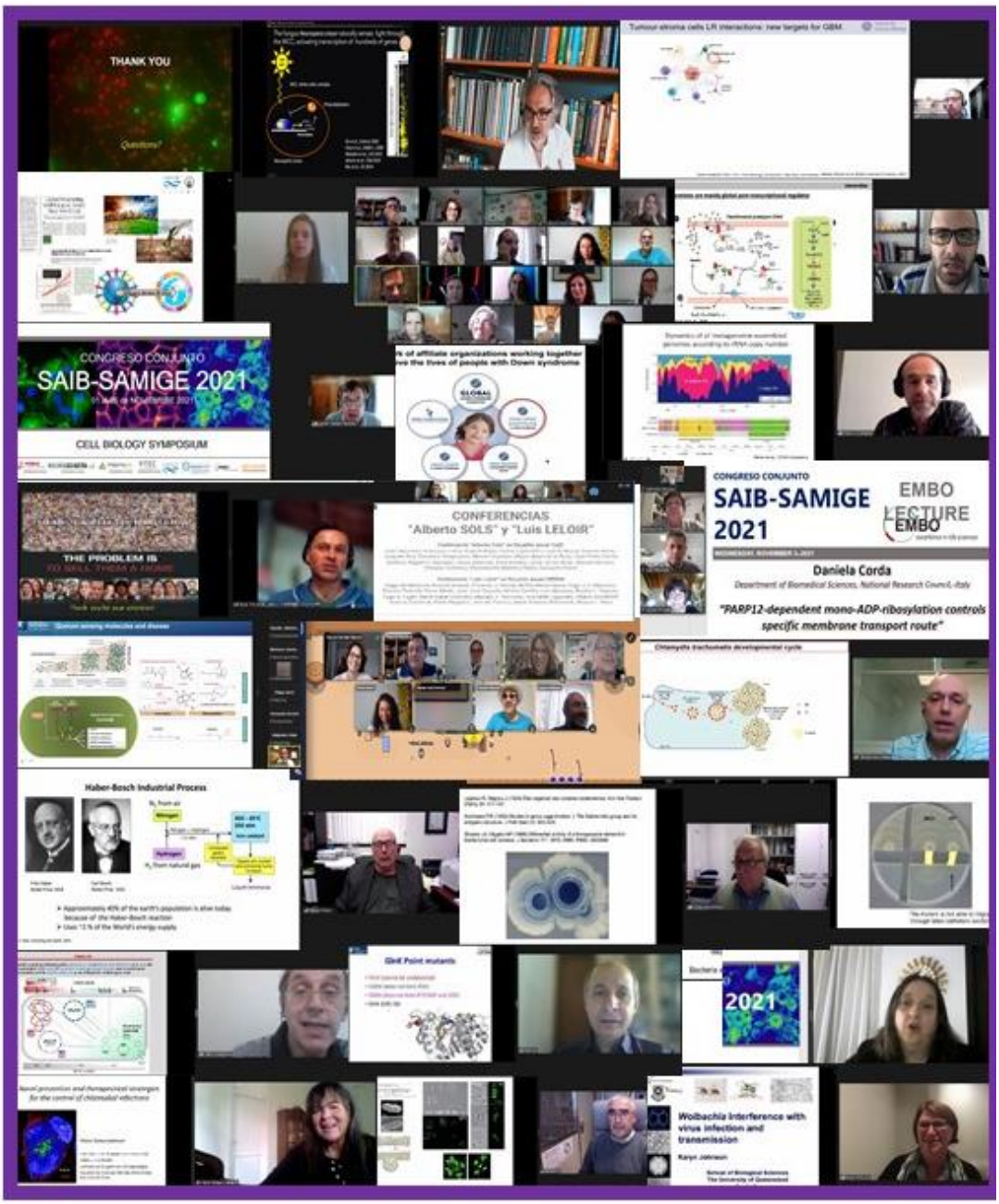

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MI-P091-166
INOCULATION OF *Brachypodium distachyon* WITH THE RECOMBINANT BACTERIA *Pseudomonas fluorescens* MME3-SyNOS INCREASES ROOT DEVELOPMENT

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The use of microorganisms with capacity for phytostimulation, biofertilization or biocontrol allow to decrease the application of agrochemicals in sustainable agriculture practices. The nitric oxide synthase from the cyanobacteria *Synechococcus* PCC7335 (SyNOS) uses L-arginine to sequentially produce nitric oxide (NO) and then much of the NO is converted to NO_3^-. We hypothesized that, if expressed in the rhizosphere, SyNOS may have a dual role: NO could act as a plant growth regulator and NO_3^- could be assimilated in the amino acid biosynthesis pathway. In this work, we explored the effect of inoculation with *Pseudomonas fluorescens* MME3 harbouring SyNOS gene with the aim of improving the development of *Brachypodium distachyon* plants. A SyNOS cassette of constitutive expression was introduced into the genome of *P. fluorescens* MME3 to obtain MME3:SyNOS, while the empty construct was used to obtain MME3c control strain. Recombinant strains were used in inoculation assays with 2 factor design: N availability and inoculation treatment. Seeds of *B. distachyon* were sterilized and germinated, then transferred to pot containing sterile sand and inoculated with 10^8 UFC.plant^{-1} of MME3c or MME3:SyNOS. A set of non-inoculated plants was used as a control treatment. Plants were split into two groups that were irrigated with ATS+N (N sufficiency; 9.5 mM) or ATS-N (N deficiency; 1 mM). After 30 days of growth in chamber at 30°C and 16/8 hs photoperiod, plants were harvested and, fresh and dry weights of the aerial and root parts were measured. Roots were also scanned and analyzed with the software WinRhizo to study their architecture. CFU.g^{-1} of root was determined by the drop plate method. In turn, the leaves were used to measure chlorophyll and NO_3^- content. Non-significant differences in CFU.g^{-1} root were found between inoculation treatments. Non-significant differences in weight, chlorophyll or NO_3^- content were observed in the aerial portion of the plants, although a tendency to a higher NO_3^- content could be observed in plants inoculated with MME3:SyNOS in N deficiency. Regarding the analysis of roots, the plants grown in N sufficiency did not show any difference in root morphology by effect of inoculation. However, the inoculation with MME3:SyNOS produced higher root dry weight than MME3c treatment. Within N deficiency group, plants inoculated with MME3c produced significantly shorter roots than non-inoculated plants and MME3:SyNOS inoculated roots showed higher dry weigh than MME3c-treated ones. Inspection of the roots under magnification (22.5x) showed that MME3:SyNOS inoculation had a tendency to induce longer root hairs. In conclusion, expression of SyNOS in the rhizosphere by *P. fluorescens* MME3 recombinant for SyNOS increased *B. distachyon* root dry weight, independently of N availability. The production of longer root hairs, which is a known effect of the NO molecule, might explain this effect and has to be further explored.

MI-P092-199
APPLICATION OF A PGPR BACTERIAL CONSORTIUM TO IMPROVE SOYBEAN CROP YIELD

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Plant-associated microbiota can enormously influence on plant traits. Manipulation of these microbial communities holds great potential as an effective way to improve crops, while contributing to a more environmentally benign agriculture. The goal of this study was to evaluate the efficiency of a soybean inoculant under field conditions. The inoculant was composed of by two bacterial strains previously characterized in our laboratory as PGPR *(Pseudomonas* sp. and *Bacillus* sp.) and a commercial strain of *Bradyrhizobium japonicum*. Under controlled conditions, inoculation with the consortium favored seed germination and showed increased growth parameters compared with the control. In addition, the study of phenological stages also confirmed the beneficial effect of the bacterial combination. Next, a field evaluation was carried out in an agronomically productive area of the East of Tucuman having salinity problems. Seeds were inoculated following standard practices. Crop progression until plants reached their physiological maturity was followed by registering the number of plants per linear meter, growth parameters and phenological stages. Manual and mechanic harvest evaluations were carried out to estimate yield. Results demonstrated that seeds inoculated with the consortium had higher number of plants per meter, enhanced growth and more advanced phenological stage compared with seeds inoculated with the commercial inoculum. Finally, crop yield was increased for the area seeded with the consortium.