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PP-PU-13 Effects of endophytic fungi on host-pathogen interaction in tomato plants

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Serendipitales as root endophytic fungi can colonize the roots of different plant species and thus can lead to enhanced plant growth and also systemic resistance against pathogenic fungi. In previous studies *Serendipita indica* and *Serendipita vermifera* as the most well-studied members of this order promoted plant growth and increased resistance and tolerance to biotic and abiotic stresses. In this study, in order to assess the Biocontrol potential of these endophytic fungi to suppress pathogen activity of *Fusarium oxysporum* f. sp. *lycopersici* (*Fol*) and their impact on tomato plants the following four members of *Serendipitales* (formerly *Sebacinales* group B) were investigated under in vitro and in vivo conditions: *Serendipita williamsii*, *Serendipita herbamans* as European isolates, beside two well-studied members of this order, *S. indica* and *S. vermifera* for comparison. Three-week-old tomato seedlings were inoculated with selected endophytic fungi and/or *Fol*. 8 weeks later, the plants were harvested and assessed for growth parameters and disease development. In addition, to investigate the impact of these selected endophytic fungi on the root morphology of tomato plants in in-vitro experiments, tomato seedlings were placed on Knop medium, inoculated with selected endophytic fungi and were grown under a 10-h light/14-h dark photoperiod at 24°C. After 14 days, the roots were scanned and images were analyzed by using the software Win RHIZO Pro. The obtained results from greenhouse experiments showed positive effects of all selected endophytic fungi on tomato plants. There was not only a significant increase in growth but also a reduction in disease incidence of *Fol* by more than 50% in tomato plants co-inoculated with selected endophytic fungi and *Fol*. In addition, root analysis of inoculated and non-inoculated tomato plants under in vitro conditions showed a significant increase in tomato root length, root surface area of tomato plants inoculated with *S. indica, S. herbamans* and *S. vermifera* compared to the control. Furthermore, root surface area was increased in all *Serendipita* sp. treatments compared to the non-inoculated plants. In contrast, root diameter of tomato plants was affected only by *S. williamsii* and *S. vermifera*. Here, it was found that *S. williamsii* and *S. herbamans* can act as biostimulants and biocontrol agents, respectively, by promoting tomato plant growth and reducing the probability of disease incidence caused by the soil-borne pathogen *Fol*.

PP-PU-14 The effect of bioinoculants on grapevine development

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The impact of abiotic stresses on crops is of great concern worldwide. In recent years several strategies have been designed to mitigate the negative effects caused by high temperatures, excessive salinity and extreme drought. Among these strategies is the application of organic and inorganic chemicals, such as osmoprotectants and plant hormones. However, the application of chemicals raises environmental concerns due to their persistence, fate and harmful effects on the environment and public health. The use of beneficial microorganisms, in particular plant growth promoting bacteria (PGPB) and mycorrhizal arbuscular fungi (AMF) appears as an environmentally friendly biotechnological tool, contributing to sustainable agricultural practices and to reverse the trend of applying large amounts of fertilizers and pesticides.

In the last years, we have used bioinoculation to increase the resilience of different plants to abiotic stresses, especially species of agronomic interest, such as maize. In particular, the strain *Pseudomonas reactans* EDP28 and the AMF *Rhizophagus irregularis* acted as plant growth-promoting inoculants, increasing root and shoot biomass of maize plants grown in degraded soil. Similar outputs were obtained with sunflower exposed to different levels of salinity where the application of bioinoculants enhanced biomass production and accumulation of K+, Mg2+, Ca2+, and reduced Na+ levels in maize tissues. However, the effectiveness of bioinoculants in enhancing grapevine performance is still poorly studied. Under this context, the present work aims to evaluate the effect of the bioinoculants already used in previous experiences on growth and development of grapevines in greenhouse and field experiments. Testing the same bioinoculants as growth promoting agents in different plants and across several climatic conditions may be of utmost importance to increase the success of their application, as the specificity of bioinoculants is seen as a factor to hamper their further use in different agricultural scenarios.