**Investigating the streptomycetes interaction with plants using omics approaches: from the efficacy to the mode of action.**

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In our lab, we explore the role of streptomycetes as biocontrol agents and plant growth-promoting agents.

Our laboratory tests and greenhouse and field studies showed the efficacy of streptomycetes in helping the plant cope with biotic and abiotic stresses.

Here, we present two experiments aimed at characterizing two streptomycetes with effective positive interaction with wheat and tomato plants using proteomics and metabolomics, respectively.

In the first experiment, an *in-vitro* system coupled to a 1D GeLC-MS/MS approach led to the identification of over 300 proteins (90% from wheat) involved in the wheat response to *F. graminearum* infection in the presence or absence of a streptomycete on the seed and drought stress. The fungal infection produced the major shift in protein abundance involving primary and redox metabolism, transport, and defence-related proteins. Interestingly, the seed inoculation also influenced the plant responses, suggesting that *Streptomyces sp.* modulates the plant defence mechanisms against different stresses and provides insight into its mode of action.

In the second experiment a new candidate species of streptomycetes was investigated for its ability to increase iron accumulation in tomato plants. When applied to tomato seeds, it modulates roots exudates, decreasing the attractiveness of roots to germinating conidia of *Fusarium oxysporum f.sp. lycopersici*. A metabolomic study identified possible molecular players.

These works show how omics techniques can help decipher or discover novel modes of action of streptomycetes.

Acknowledgments:

Seed Project UNIMI, COST Action ROOT BENEFIT, PNRR AGRITECH