

## **Multi-omics approaches provide insights into fungal-plant interactions in the model system *Serapias vomeracea* - *Tulasnella calospora***

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Orchids are highly dependent on their mycorrhizal fungal partners for supply of organic carbon and other nutrients, especially during seed germination and early development. We have used genomics as well as untargeted transcriptomics and metabolomics to investigate plant-fungus interactions in the symbiotic association formed between the terrestrial orchid *Serapias vomeracea* and *Tulasnella calospora* (Basidiomycota, Cantharellales). Transcriptomic profiling was instrumental to get insights on the symbiosis-upregulated plant and fungal genes that may play a role in the orchid mycorrhizal interaction. Among them, we could identify genes involved in nitrogen uptake, which allowed us to reconstruct the possible pathways of nitrogen transfer from the fungus to the mycorrhizal protocorms.

Metabolomic profiling was used for the first time in orchid mycorrhiza to investigate metabolic changes that occur in *S. vomeracea* and *T. calospora* during interactions. Even though data are preliminary, the availability of the *T. calospora* genome (Kohler *et al.*, 2015), and the possibility to compare metabolomic and transcriptomic data for both plant and fungus, open new perspectives for a comprehensive understanding of the pathways modulated by the symbiosis.

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