

# Discovery of the interactions between plants and arbuscular mycorrhizal fungi

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The arbuscular mycorrhizal symbiosis (AMS) is one of the most ancient and broadly occurring mutualistic associations between plants and arbuscular mycorrhizal fungi (AMF). This intimate relationship

improves plant mineral nutrient acquisition, which potentially enhances crop yield. In addition, AMS can increase plant tolerance to biotic and abiotic stresses. AMS also contributes to many ecosystem functions, improving soil aggregation, lowering fertilizer requirements, and reducing nutrient losses.

Over the past two decades, several genes involved in AMS have been identified based on changes in symbiosis [phenotypes](#) in gene knockout or knockdown mutants. However, the relationship between plant SSPs and AMS remains largely unknown.

Recently, scientists from the University of Tennessee established a computational pipeline for genome-wide prediction of SSPs in [plants](#) and identified a number of plant SSP candidates that are potentially involved in AMS. Published in *Horticulture Research*, their [comparative analysis](#) revealed convergent changes in SSP gene expression and gene regulatory elements between monocot and eudicot species, as well as diversification of protein structure between AMF-inducible SSPs and their closely related homologs, suggesting that SSPs may have played an important role in the evolution of AMS in plants.

"Our results indicate that convergence in SSP sequences and [gene expression](#) induced by fungi is related to convergent emergence of AMS in diverse plant species, and this is also the first plant kingdom-wide analysis on SSP," said Dr. Xiaohan Yang, Senior Scientist in the Synthetic Biology Group in the Biosciences Division at Oak Ridge National Laboratory.

In summary, the SSP candidates identified in this study lay the foundation for the experimental characterization of AMS-related genes to gain a deeper understanding of the molecular mechanisms that underlie the interactions between plants and AMF.

**More information:** Xiao-Li Hu et al, Diversity and conservation of plant small secreted proteins associated with arbuscular mycorrhizal symbiosis, *Horticulture Research* (2022). [DOI: 10.1093/hr/uhac043](https://doi.org/10.1093/hr/uhac043)

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