PMI SFA Publication Highlight

U.S. DEPARTMENT OF ENERGY | Office of Science

High Impact Publication: A *Populus* receptor-like kinase gene induces fungal symbiosis.

Objective	• Investigate the molecular mechanism underlying fungal mycorrhizal symbiosis in *Populus*.
New science	• Mycorrhizal symbiosis is the most ubiquitous and impactful mutualistic plant-microbial interaction in nature and the *Populus-Laccaria* bicolor system has emerged as the system of choice for studying plant-ectomycorrhizal interactions, aided by the availability of both *Populus* and *Laccaria* reference genomes and genetic tools. • Through genetic mapping and genome re-sequencing, a whole gene deletion event was found to be associated with differential root colonization between *L. bicolor*-compatible and –incompatible hosts, *P. trichocarpa* and *P. deltoides*, respectively. • This genetic locus encodes a member of a large family of receptor-like kinases, designated as PtLecRLK1. • The function of PtLecRLK1 was validated by introducing it to *Arabidopsis*, a non-host plant species of *L. bicolor*, conveying the ability in the transgenic plant to accept interstitial hyphal growth and Hartig net-like structure formation.
Impact	• This finding uncovers an important molecular step in the establishment of symbiotic plant-fungal associations and provides a molecular target for engineering beneficial mycorrhizal relationships.

Mediation of plant-mycorrhizal interaction by a lectin receptor-like kinase.
Labbé, J/Muchero, W., et al. (2019). *Nature Plants,* doi.org/10.1038/s41477-019-0469.

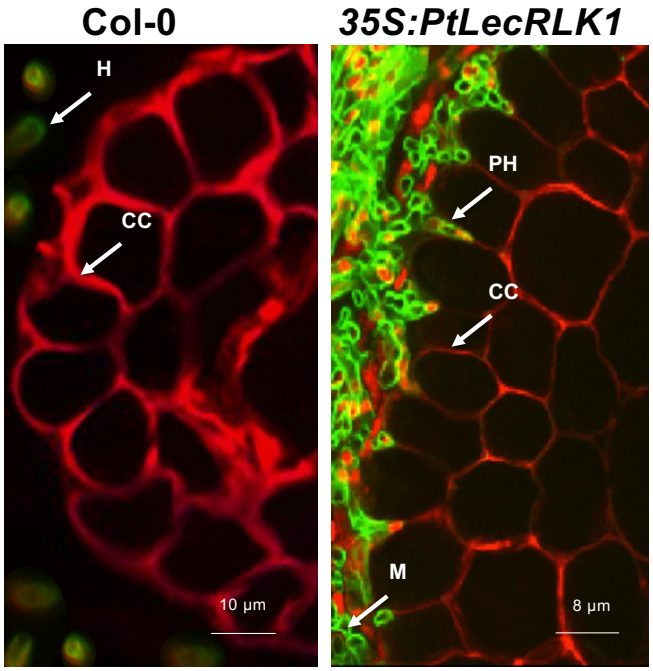

Fig. 1 Micrographs of a transversal section of *Arabidopsis* wild type Col-0 (left) and *35S:PtLecRLK1* transgenic line (right) co-cultivated with *L. bicolor.* Propidium iodide (red stain, root cell walls) and UVitex 2B (green stain, fungal cell walls). H, hyphae. CC, cortical root cell. PH, penetrating hyphae. M, mycelium.

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