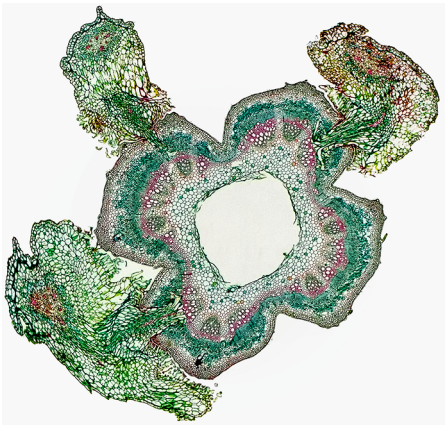
PARASITIC PLANTS

Intimate grandeur

Mol. Plant http://doi.org/dg8k (2019).



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Many species of plant are parasitic, including the iconic mistletoes and the highly destructive *Striga*, commonly known as 'Witchweed'. These parasites generally attach themselves to their hosts using a specialized structure called a haustorium, through which they extract nutrients and water. Jianqiang Wu of the Kunming Institute of Botany, Chinese Academy of Sciences, and colleagues have found that the haustorial connections also allow exchange of hundreds, if not thousands, of proteins between parasitic plants and their hosts.

As their experimental model, the Chinese team used a dodder, *Cuscuta australis*. Dodders are obligate parasites which have dispensed with leaves and roots, instead relying on their hosts to supply all their material needs. After three weeks of infestation, more than 600 and 1,500 proteins from *Arabidopsis* and soybean, respectively, could be identified in *Cuscuta* tissue, while well over 1,000 dodder proteins were present in the hosts — a substantial fraction of the plants' total proteome. Messenger RNAs (mRNAs) also moved between the plants, but there was little overlap between foreign proteins and mobile mRNAs that could have directed their synthesis, showing that most of the proteins had been synthesized in their native plant before translocation.

Using plants engineered to contain marker genes, the researchers showed that the transferred proteins retained their activity in these new locations. More dramatically, when two different host plants were parasitized by a single dodder, more than 700 proteins from one host were found in the second, having been transferred through the parasite like a kind of bridge.

It is not yet certain what role is being played by the parasite proteins in host plants, but it seems likely that at least some of the translocated proteins will be affecting, or even controlling, the host plants' metabolisms. Also, the proteins transferred from one host to another through a 'dodder bridge' may convey novel traits, such as stress resistance or altered growth phenotypes.

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