Fungus could help increase crop yields

A new study by Swiss researchers suggests that certain types of fungi could be bred that increase the growth of the crops. Rice plants injected with a specially bred mycorrhizal fungus grew two to five times larger than normal in the study’s experiments, which may have important implications in the future for food security.

Certain fungi that live on crop plants are known to deliver important nutrients to the plant. The study focuses on ‘mycorrhizal’ fungi – fungi that live in symbiotic relationships with plants, meaning that both benefit from the association. The fungus absorbs sugars from the plant, while transferring minerals to the plant. Previously, all mycorrhizal fungi were thought to grow asexually by cloning themselves, but it now appears that they can exchange genetic information, as sperm and egg cells do in animals. This means that simple breeding techniques could potentially manipulate the genetic make-up of the fungi so that they are better at delivering nutrients to their plant hosts.

The researchers tested this theory by crossing several different lines of the fungus *Glomus intraradices*, a common mycorrhizal fungus, to see whether they could produce a fungus that would enhance rice growth. This particular species usually has no positive effect on rice growth. However, after crossing the lines, the researchers were able to show that different genes were present in the offspring. When they inserted some of these lines into the rice plants, the plants grew between two to five times larger than control plants.

One of the rice species tested was *Oryza sativa*, a species cultivated throughout the tropics. This species is used to produce hundreds of millions of tonnes of rice every year, with the vast majority grown in Asia.

Investigating further, the researchers tried to work out how the fungus led to faster growth. They looked specifically at genes in the rice plants known to be associated with symbiosis, including PT11, a gene thought to be involved in transferring phosphorus – an important plant nutrient – from the fungus. In plants with the fungi, these genes were more active compared to other genes responsible for basic cell processes.

Although the researchers say they do not yet fully understand the exact processes involved when the fungi increases plant growth, the study provides an important starting point for future research. Also, the plants in the study were grown in special greenhouses in Switzerland, so it remains to be seen whether the fungi will have the same effect in real paddy fields.


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