Universität Basel

Research Project

Interplay of arbuscular mycorrhizal fungi with transgenic and non-transgenic wheat

Third-party funded project

Project title Interplay of arbuscular mycorrhizal fungi with transgenic and non-transgenic wheat
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Does fungal resistance in transgenic wheat harm beneficials? Some fungi cause devastating diseases; others are beneficial to the plant, facilitating its uptake of nutrients. If plants are genetically engineered to make them resistant to fungal diseases, this resistance could also have a negative impact on so-called beneficials. Background Mildew and other fungal diseases have to be controlled in agriculture with fungicides that harm the environment. To reduce the use of fungicides, plant breeders are attempting to modify the genetic material of crop plants to enhance their resistance to fungi. However, many plants naturally form close relationships (symbioses) with beneficial fungi (mycorrhizas) that play a major role in enabling the plant to absorb minerals such as phosphorus and nitrogen from the soil. Laboratory trials have shown that enhanced resistance to fungi in genetically modified crops can have a negative effect on symbioses with beneficial fungi. Objectives A major field trial with transgenic wheat (cf. Keller project I) will investigate whether these laboratory results can be extrapolated to conditions in the open. The project will study the effect of enhanced resistance to fungi on the colonization, function and diversity of special symbiotic fungi that are found in the roots of wheat plants. Methods The planned trials will use both conventional microscopy and new genetic methods. The colonization of the plants' roots by symbiotic fungi will be determined by identifying the fungal spores under the microscope and by quantifying the fungal DNA. Trials with special nutrient capsules will provide information on the extent to which the function of these fungi changes. The spores will also be studied to determine the diversity of fungi in the plants' roots. Significance In the struggle to achieve sustainable agriculture and promote healthy soils, it is important to accurately assess the extent to which fungal resistance in crop plants can be reconciled with the symbiotic fungi living in their roots. The project will develop a basis for this work.

Keywords Transgenic wheat , arbuscular mycorrhizal fungi, disease resistance
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