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Leibniz Centre for Agricultural Landscape Research (ZALF)

New bacterium described:

Hope in the fight against ash dieback

In a study recently published in the journal "Systematic and Applied Microbiology", researchers from the Leibniz Centre for Agricultural Landscape Research (ZALF) report on the isolation and investigation of a bacterium that could be an effective means of combating ash dieback. Since the early 1990s, ash trees have been severely affected by a fungus that causes the death of branches and shoots. Despite intensive efforts, no effective control measures have yet been found.

The research group of Dr. Andreas Ulrich at ZALF has isolated a bacterial strain from the leaves of healthy ash trees, analyzed it genetically and described it as a new bacterial genus. In an experiment, they were able to show that these bacteria, called *Schauerella fraxinea*, are able to inhibit the growth of the fungus *Hymenoscyphus fraxineus*, which causes ash dieback. Using genome analysis, the researchers also found genes involved in the production of substances that inhibit fungal growth.

Ash trees (*Fraxinus excelsior*) are deciduous trees native in large parts of Europe. Their wood is often used for furniture, parquet flooring or musical instruments because of its good properties. Ash dieback was first detected in Europe in the early 1990s and has since spread rapidly. The disease causes branches and top shoots to die. This weakens the trees and has led to a sharp decline in native ash populations, with both ecological and economic consequences.

Conventional control methods, such as chemical treatments or breeding for resistance, have had little success. Alternative approaches are being sought, including the use of the natural microbiome of uninfected ash trees. The bacterium could play a critical role in controlling this devastating disease. Field studies have shown that *S. fraxinea* is more abundant on the leaves of healthy ash trees than on the leaves of infected ash trees. This suggests that the bacterium contributes to the resistance of the trees.

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The next step will be to investigate whether the bacterium is able to establish in ash trees over longer period which is a prerequisite for applying it in biological control. To this end, the researchers have developed a method to detect the presence of *S. fraxinea* using genetic markers. "Our next steps are to understand the mechanisms by which *Schauerella fraxinea* protects ash trees against ash dieback. To this end, we are planning further laboratory and field studies to investigate the interactions between the bacterium and the fungus," says Dr. Andreas Ulrich. The research team will also investigate how the bacterium can be used in practice.

By utilizing the natural microbiome of healthy ash trees, this approach offers hope for the conservation of this important forest species and its ecosystems. The bacterium could make a significant contribution to further research to combat ash dieback.

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Further information:

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Since the 1990s, ash trees (*Fraxinus excelsior*) have been massively infested by a fungus that causes ash dieback. The bacterium *Schauerella fraxinea* may be a promising candidate for the biological control of the tree disease. | The picture can be used for editorial purposes by stating the source: © WikimediaImages on Pixabay | Picture in color and print quality: http://www.zalf.de/de/aktuelles

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About the Leibniz Centre for Agricultural Landscape Research (ZALF) in Muencheberg, member of the Leibniz Association:

Mission of ZALF is to deliver solutions for an economically, environmentally and socially sustainable agriculture –together with society.

As a contribution to overcoming global challenges such as climate change, food security, biodiversity conservation and resource scarcity, we develop and design crop systems, integrated in their landscape contexts that combine food security with sustainability. Therefore we process complex landscape data with a unique set of experimental methods, new technologies and models as well as socio-economic approaches.

ZALF research is integrated systems research: starting from processes in soils and plants to causal relationships on the field and landscape level up to global impacts and complex interactions between landscapes, society and economy. www.zalf.de