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Press release

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Are gone-wild grapevines a danger to viticulture?

Flavescence dorée, a dreaded grapevine disease among winegrowers, is spreading beyond cultivated vineyards. A joint study by the federal research institute WSL and Agroscope shows that gone-wild grapevines and related vector insects contribute to the spread of the disease in the forest.

A glass of Merlot from Ticino is a treat appreciated by many. However, a grapevine disease called Flavescence dorée is causing worry among winegrowers in Ticino. Flavescence dorée is caused by a phytoplasma, a bacterium without a cell wall, which is transmitted to grapevines by an insect called the American grapevine leafhopper Scaphoideus titanus. There are no treatments available for infected plants, so they inevitably die over time (see box).

The forest is also a source of infection

For a long time, the disease and its management were considered a purely agricultural matter and were investigated by Agroscope, the Swiss centre of excellence for agricultural research. Researchers later discovered that the neighbouring forest also plays a role. Grapevines frequently survive in vineyards that get abandoned, for instance due to a lack of succession in the winegrower's family. Over time, such abandoned vineyards can turn into forests. The surviving grapevines then climb up the forest trees and become a potential reservoir for the disease, a situation about which little was known until recently.

This is why WSL and Agroscope started a research collaboration in 2016. The researchers collected grapevine leaves and insects from 13 different test sites where gone-wild grapevines were present in the forest. In the laboratory, they tested the samples for the relevant phytoplasma and compared the genetic characteristics of the pathogens in gone-wild grapevines to those of cultivated grapevines.

Control measures in the vineyards are not enough

The study found that gone-wild grapevines are affected by similar infections as cultivated vines. In addition, the pathogens on gone-wild and cultivated vines were genetically identical. "This reinforces the concern that the forest is also a reservoir for infection because the American grapevine leafhoppers carry the pathogen back and forth between vineyards and forests", says WSL project manager Marco Conedera. This also explains why previous efforts to control the disease by applying insecticides, removing infected grapevines and using certified pathogen-free grapevines in vineyards have not been enough to stop the disease from spreading in vineyards that are in the immediate vicinity of forests.

Another result of the research was that, in addition to the American grapevine leafhopper, other insects – such as the non-native oriental leafhopper Orientus ishidae – can also carry the phytoplasma and could potentially transmit the disease between forests and vineyards. This makes the distribution pathways of the disease even more complex.

‘It is important to act now,’ emphasizes Conedera. The gone-wild grapevines could contribute to the diffusion of the disease into previously unaffected regions. “Prevention and early detection measures are urgently needed in the other wine-growing regions in Switzerland,” according to Conedera. Insecticides are not necessarily required for this. Certain forms of landscape management, such as the complete removal of gone-wild grapevines, could be highly effective in preventing a further spread of the disease.

In the next phase of the project, the researchers want to find out more about other insects with a potential role in pathogen transmission and investigate whether Swiss winegrowers are ready for such preventive control measures.

Box: Characteristics of the Flavescence dorée

The phytoplasma (Candidatus Phytoplasma vitis) is involved in causing flavescence dorée (FD) in grapevines. Therefore, the phytoplasma is classified as a quarantine organism in Switzerland and the European Union. This means that suspected cases of FD must be reported to the responsible authorities and there is an obligation to control the disease. FD was first observed in France in the 1950s. In Switzerland, the first infected grapevines were found in Ticino in 2004. Since then, the disease has spread to almost all the viticulture areas south of the Alps as well as to the cantons of Valais, Vaud and Geneva. The rest of Switzerland is still FD-free.

The American grapevine leafhopper transmits the disease by sucking the sap from infected vines, thereby picking up the pathogen and passing it on to other vines. In vineyards, individual diseased grapevines can quickly lead to epidemics. Current control measures include the use of insecticides and the removal of infected vines.

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When infected with flavescence dorée, the grapes on the vine often shrivel up and wither.
(Photo: Agroscope)

Alan Oggier (WSL) replaces an insect trap on a gone-wild grapevine.
(Photo: Attilio Rizzoli, Agroscope)