

INVASIVE SPECIES **Species know no national borders.** The number of unintentionally imported plants, animals and fungi is increasing dramatically due to global trade. Controls at national borders are not always sufficient. WSL is helping to detect introduced species.

International travel and trade are leading to more and more non-native species entering Switzerland, such as beetles in the wood used for packaging or fungal spores in potting soil and on exotic garden plants. If they spread uncontrollably, they are referred to as invasive species. Of the approximately 1300 alien species known in 2022 to have become established, one in six is considered invasive. Combating them is expensive – if not impossible. WSL researchers are working on ways to detect them as early as possible and – where possible – stop them.

The most efficient way is to detect such organisms directly through border controls at the national border, and then eliminate them. This is not, however, always successful. Moreover, many also manage to migrate without human help. Until a few years ago, pests or diseases were therefore often only spotted when they were detected by chance or through targeted surveys in the country. The Asian long-horned beetle, for example, which is dangerous for many native tree species, has been found several times by chance in Swiss gardens. It probably got there from Asia with wood used for packaging.

Many countries are therefore introducing comprehensive and regular pest surveys. WSL tested this approach in Switzerland between 2020 and 2022 as part of a pilot project with the support of the Federal Office for the Environment FOEN. Cantonal forest protection officers regularly monitored test sites near urban areas in six cantons to detect eight harmful organisms that are particularly dangerous – so-called ‘priority quarantine organisms’. The cantonal forest protection officers checked focus trees to see if they had disease symptoms, and collected insects and fungal spores from dedicated traps. The organisms they found were then determined by the WSL researchers.

During the three years of the trial, none of the species they were monitoring were found, but they did discover other introduced organisms, including another longhorned beetle species from Asia. It is still unclear how dangerous it is. “This finding shows that such monitoring sites are useful for detecting harmful new organisms early,” says Valentin Queloz from the Swiss Forest Protection Group at WSL. The Group supports state and cantonal authorities in combating tree diseases and invasive forest pests.

The pilot project was promising, which is why pest surveys will be set up nationwide by 2025. Benno Augustinus, an insect researcher at WSL, estimates that around one hundred such sites will be needed for effective monitoring throughout Switzerland.

First, however, the organisms the authorities need to keep an eye on must be selected. Here so-called ‘sentinel plantings’ can help. At WSL, for example, a site with European plant species that are often exported to the USA has been

For further information on forest protection in Switzerland, see: [wsl.ch/forest-protection](https://wsl.ch/forest-protection)



Tree-of-heaven and paulownia trees (on the left) – as here in Ticino – grow very quickly in open areas. That's why keeping, for example, power lines clear has become more expensive.

set up. The researchers at WSL regularly check these plants to see whether they harbour any local pests that could reach America with the plants and cause problems there.

## Exotics on the move

Plant traders are, of course, obliged to guarantee that their plants are healthy. But even healthy plants can cause problems if they, for example, escape over the garden fence. At the WSL site in Cadenazzo in Ticino, researchers are therefore studying the tree-of-heaven, the paulownia and the Chinese windmill palm, which is sometimes incorrectly called the 'Ticino palm'. All three species have spread over large areas in the local forests.

These exotics grow faster than native tree species and game browse on them less, which means they often become dominant. This can interfere with some of a forest's desirable functions, such as providing protection against natural hazards. Windmill palms, for example, have thin roots and do a poorer job of stabilising steep slopes than native trees. The risk of slopes slipping therefore increases, as WSL researchers demonstrated in one part of the federal government's 'Adaptation to Climate Change' pilot programme.

With further climate change, it is likely that the problems caused by the often heat-loving exotics will get worse. Researchers at WSL are therefore working with the local authorities and foresters to develop strategies for dealing with the unwanted invaders or, if possible, get rid of them altogether. "Our goal is to offer realistic solutions for the particular region," says the WSL researcher Eric Gehring.

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