Research has been conducted to develop advanced phytosanitary technologies

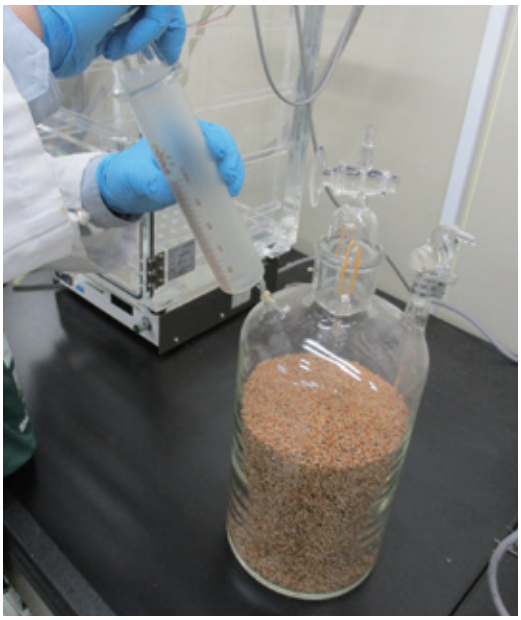
Development of phytosanitary treatment

In order to accurately and safely disinfest/disinfect plants in which pests have been detected, development of chemical and physical disinfection techniques is underway.

Examples of research

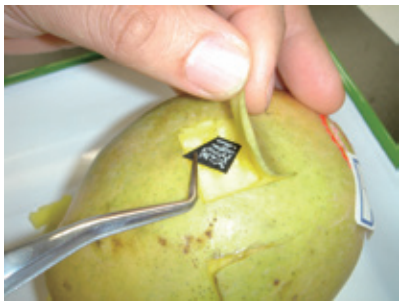
Tests to establish disinfestation/disinfection standards using fumigants to replace methyl bromide, a substance that depletes the ozone layer, are ongoing.

Measurement of the gas concentration of fumigants using gas chromatograph



Administration of fumigants

Research has been conducted to determine the temperature treatment conditions that can reliably kill fruit flies.



Inoculation of fruits with fruit fly eggs before insecticidal treatment

Eggs and larvae of the citrus fruit fly parasite inside the fruit

Assessment of survival or death of the fruit fly inside the fruit after insecticidal treatment

Research on insect pests

Information on pests and nematodes which is required at the plant quarantine sites is collected and analyzed to conduct various surveys on their physiology, ecology, and control and to develop technology for identification methods based on genetic analysis and estimation methods for the origins of invasions.

Examples of research

Since nematodes can have different parasitism depending on the host plant variety, even within the same species, we are checking growth rates on various varieties to determine pathotypes and appropriate control methods.

Surveys of proliferation rates of cyst nematodes using potatoes

Base sequence data on pests are collected and compared with existing information in databases to establish identification technology based on genetic information and to estimate the origin of their invasion into Japan.

Development of identification technology for larvae of weevils

Research on phytopathogens

Various information is collected and analyzed regarding plant diseases that have not yet occurred in Japan. Pathogens may be brought in and studied for their properties in morphology, biochemistry, serology, and molecular biology in order to develop technology for inspection and identification methods.

Examples of research

In efforts to work on a method using an AI to identify spores with high accuracy, an AI that can simultaneously identify beet pollen and the urediniospores and teliospores of beet rust fungi, which are difficult to identify due to their similar shapes, was successfully developed.

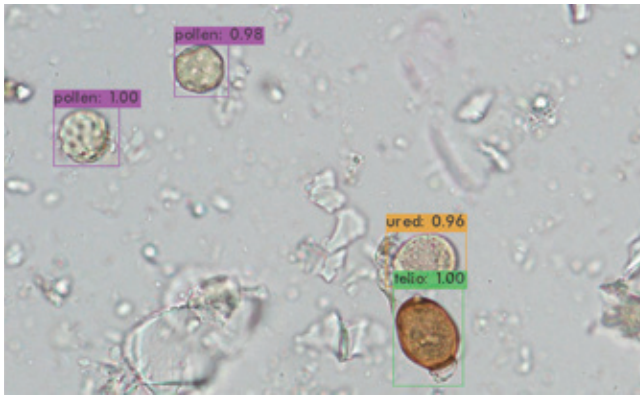
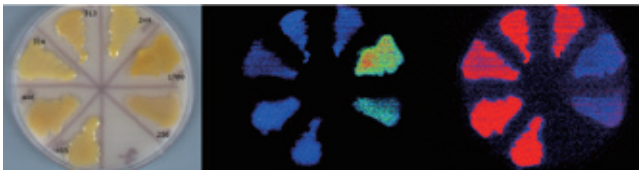


Image of AI detecting rust fungus spores

Plants are infected with plant diseases that have not yet occurred in Japan in isolated greenhouses to develop different testing methods.

Collection of samples for virus assay

Research is actively conducted to establish a method to identify bacterial leaf streak from isolated colonies of similar colors using a hyperspectral camera that can visualize differences in physical properties that are difficult to distinguish with human eyes.



Images of identifying colonies of bacterial leaf streak in YDC medium (from left: images of RGB, slope analysis, and SAM analysis)