



## Stone Fruit Commodity-Based Pest Survey



# European Stone Fruit Yellows

## *Candidatus Phytoplasma prunorum*

### Introduction

Present primarily in the Mediterranean region, European stone fruit yellows (ESFY) poses a major threat to stone fruit because of the severity of the disease, its ability to spread, and the fact that infected plants may not show visible symptoms. ESFY is an epidemic disease, characterized by rapid and widespread movement when conditions are favorable for host plants and the insects that can spread the disease.

The disease—formerly referred to as apricot chlorotic leaf roll, plum leptonecrosis, peach yellows, and peach decline—is not currently known to be present in the United States.

ESFY can sometimes be challenging to understand because—unlike many diseases—it is caused by a phytoplasma. These are a group of extremely small organisms that can live in the tissue of a plant or be carried by “vectors,” insects that can spread the disease-causing organism without being harmed by it. In the case of ESFY, the disease vector is often a psyllid (also known as a jumping plant louse, primarily the plum psyllid), but it can also be spread via infected planting material or by grafting.

### Vector

The plum psyllid (*Cacopsylla pruni*) is considered the primary vector of the disease. This psyllid is capable of producing one generation each year and overwinters as an adult on shelter plants (conifers). At the end of winter, the plum psyllid moves from shelter plants to stone fruit trees to lay eggs. From May through the beginning of July, the new generation feeds on stone fruit. As soon as adult development is complete, the plum psyllid abandons the stone fruit trees.

Once infected, the psyllid can rapidly transmit the organism that causes ESFY throughout its life. The psyllid can retain ESFY in its system through the winter and into the following spring. This means that when an overwintering insect reaches a stone fruit tree, it is already infected with the organism and is now infective to the tree. The transmission period lasts as long as the infected psyllid is present on *Prunus* species.



**FIGURE 1.** Leaf-rolling symptom of ESFY in apricot. Photo courtesy of G. Morvan, EPPO.

### Symptoms

The symptoms of ESFY may vary by the infected species, cultivar, and environmental factors. Apricot and Japanese plum trees (the most susceptible species) show typical yellows accompanied by leaf roll (Figure 1), followed by leaf reddening (Figure 2). Infected trees may also be more susceptible to frost damage because of reduced or suppressed dormancy. The continued presence of the disease and vector often results in severe and progressive tissue death, overall plant decline, and the eventual death of the infected tree.



**FIGURE 2.** Reddening of Japanese plum leaves affected by ESFY (right) compared to an unaffected leaf (left). Photo courtesy of Dr. B. Schneider, BBA.

Peaches exhibit early leaf reddening; severe upward (lengthwise) rolling of leaves; abnormal thickening of the midribs and primary veins in the leaves; autumnal growth of latent buds, which produce tiny, abnormally yellow leaves and sometimes flowers; and early leaf fall. The leaves also tend to be more brittle than normal.

ESFY affects tree flowers and shoots in winter, which leads to lack of fruit production and chlorosis (abnormal yellowing) of the leaves later in the growing season. As noted earlier, the disease can cause a tree to come out of dormancy too early in the season, which increases the risk that affected trees will be damaged by frost (Figure 3). The disease can start with only a few branches, but as it progresses, the whole tree may be affected. Infected shoots are typically shorter and bear smaller, deformed leaves. Additionally, leaves can drop prematurely and shoots may die back. Overall, trees are likely to produce lower yields. Fruit on affected branches develops poorly and may fall prematurely.

## Hosts

Major hosts for ESFY include: apricot (*Prunus armeniaca*), Japanese plum (*Prunus salicina*), and peach (*Prunus persica*). The phytoplasma that causes ESFY can infect several other cultivated and wild stone fruit (*Prunus* spp.). The hosts, however, can be infected while showing no symptoms and serve as a reservoir of the infectious agent.

## Distribution

This pest is currently present in Albania, Austria, Belgium, Bosnia-Herzegovina, Bulgaria, Czech Republic, England, France, Germany, Greece, Hungary, Italy, Romania, Serbia and Montenegro, Slovenia, Spain, Switzerland, and Turkey.

## Identification

Molecular analysis is used to identify the disease. A “universal” polymerase chain reaction (PCR) assay has been developed for diagnostic testing. It enables amplification of the 16S rRNA genes of phytoplasmas. Digestion of these PCR products with selected restriction enzymes provides a DNA fingerprint that can be used to determine phytoplasma identity.

While species-specific and real-time PCR assays are available, they are not currently approved for regulatory purposes.

## Survey

The most common method used to survey for this pest is visual survey. Survey instructions are provided at: <http://pest.ceris.purdue.edu/services/napisquery/query.php?code=cam2012>. Sensitive stone fruit species (apricot and Japanese plum) can indicate the presence of ESFY in a given area, which means that growers and industry should be particularly attentive to these hosts.

## What Can We Do?

If you suspect that ESFY is present in your area, please contact your local extension office or State Plant Regulatory Official to have the specimen properly identified. For contact information, visit [www.aphis.usda.gov/StateOffices](http://www.aphis.usda.gov/StateOffices), [www.nationalplantboard.org/member/index.html](http://www.nationalplantboard.org/member/index.html), or [www.nifa.usda.gov/Extension/index.html](http://www.nifa.usda.gov/Extension/index.html)

References for the above information can be found on the Cooperative Agricultural Pest Survey (CAPS) Web site at <http://caps.ceris.purdue.edu/stonefruit/references>.

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**FIGURE 3.** Phloem necrosis in a *Prunus* spp. affected by ESFY (right). Photo courtesy of Dr. B. Schneider, BBA.