

Helpful Information on *Phytophthora ramorum* for Production Nursery Staff and Their Customers

What is the organism? *Phytophthora ramorum* (fi -TOFF- thora ram-OR-um) is a fungus-like organism that can cause leaf spotting, stem canker, or leaf blight on a variety of woody ornamentals. It can also kill several species of oak, such as tanbark oak and live oak very rapidly, hence its common name, sudden oak death. Even though for the vast majority of host plants, it is no more serious a pest than many of the other species of aerial *Phytophthora*, the nursery industry is taking the threat of *P. ramorum* very seriously. The fungus does not harm animals or humans. Rather than call this disease sudden oak death, most experts are now calling this disease ramorum leaf spot, or ramorum die-back. Because it is not recognized as being widely distributed in the U.S., the USDA has established a quarantine against this organism.

P. ramorum prefers cool, damp weather and is suppressed by hot, dry weather, though it still can survive in these conditions. It can be spread by irrigation water, rain-splash and probably by blowing wind. Scientists have discovered two specific forms of this organism, a European form (A1) and a North American form (A2). The North American form has been shown through research to be generally less damaging and less prolific than its European cousin.

The genus *Phytophthora* is made up of many species in addition to *P. ramorum*. Other species, with habits similar to *P. ramorum* are common in the U.S. These are generally referred to as 'aerial' *Phytophthora*.

Which plants are hosts? Currently, there are 28 regulated host species listed by the USDA. An additional 36 species are suspected hosts, but conclusive scientific studies are not yet complete (see <http://www.aphis.usda.gov/ppq/ispm/sod/usdasodlist.html> for the most current list). All the species and crosses of the genus *Rhododendron* and *Camellia* are considered hosts. The following three genera have multiple host species: *Pieris*, *Quercus* and *Viburnum*. New hosts are being found almost monthly, however, most are minimally impacted from a disease standpoint.

How does *P. ramorum* impact plants? Symptoms vary by plant species and often resemble symptoms caused by other species of *Phytophthora*. Laboratory tests are required to make a diagnosis. For most host species, the symptoms range from leaf spots to twig lesions. Some plant species suffer a die-back of stems or branches. A few species of plants can be killed by the fungus, including tanbark oaks and some live oaks. It is generally confined to attacking above-ground parts of plants, and is rarely found in soil or associated with roots. Thus, it is considered an aerial *Phytophthora* (as opposed to being a root-rotting form of

Phytophthora.) It can persist either as an active, vegetative infection, or as a dormant spore. Pictures and description of the fungus and its hosts can be seen at the diagnostic guide link at: <http://www.suddenoakdeath.org>.

On some plants, including camellia, the fungus generally causes few symptoms, and it reproduces at a very low level. This combination of factors makes it difficult to detect on camellia and has thus set the unfortunate conditions that allowed the shipment of infected camellia plants to nurseries across the U.S.

Where is *Phytophthora ramorum* found? *Phytophthora ramorum* was originally detected in Germany in 1993. A few years later, it was found in Marin County, California. It has been detected in the European Union, in Canada and in at least 21 states of the U.S including Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Louisiana, Maryland, New Jersey, New Mexico, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, South Carolina, Texas, Tennessee, Virginia and Washington state.

What is the situation in Oregon nurseries? Oregon has participated in all annual surveys for *Phytophthora ramorum* since the inception of the USDA inspection program in 2001. To date, over 70,000 samples have been collected and processed in Oregon, and the pathogen has been detected to a very limited extent in a few nurseries. In these cases, the Oregon Department of Agriculture (ODA) took immediate action to suspend shipments and to intensively survey the nurseries and surrounding environs for the pathogen. The nurseries fully cooperated with state and federal authorities and provided all shipping documents necessary to conduct trace back and trace forward surveys.

How has Oregon responded to this issue? The Oregon Association of Nurseries asked the ODA to immediately implement a *Phytophthora ramorum*-free nursery stock certification program. This is a mandatory program for all Oregon nurseries that produce host material and requires annual testing and inspection of the facility. In addition, all host and associated host materials shipped into Oregon must either have been produced in a nursery with an ODA-approved *Phytophthora ramorum*-free nursery stock certification program, or the material must be safeguarded, segregated, held, inspected and tested prior to release. This is a state-of-the-art program using the most current sampling and testing procedures and will set the benchmark for *Phytophthora ramorum* host stock production in the industry.

In Oregon, the nursery industry members, their association and the state regulators have taken an aggressive stand with respect to *Phytophthora ramorum*. The industry has continually urged the USDA to add more resources for survey efforts and to take a strong position with respect to international and interstate shipments of high-risk stock. Oregon believes its aggressive response is directly related to the negligible level of *Phytophthora ramorum* present in the state. However, Oregon growers are prepared to go further to assure customers

and regulators that Oregon offers high quality, *Phytophthora ramorum*-free nursery stock.

How can *P. ramorum* be controlled and eliminated? Once a plant is infected, there is no treatment for *P. ramorum*. Plants may be protected from the infection with labeled fungicides (watch for a growing list of chemical recommendations and announcements from manufacturers). The best way to protect plants from *P. ramorum* is to utilize specific best management practices (BMPs) that lower the risk of receiving infected material. (The OAN is working with ODA to provide recommended BMPs. In the meantime, refer to the Confirmed Nursery Protocol available at www.aphis.usda.gov/ppq/ispm/sod/, Appendix C on page 9). Because it is a regulated disease, all infected plants must be incinerated to ash or subjected to deep burial (to a depth of at least 6 feet) and double plastic bagged.

What do Oregon growers do if they find plants with what appear to be symptoms of *P. ramorum*? Growers are instructed to contact their ODA nursery inspector and request a sample be taken. The only way to determine if a plant is infected is to have it tested by an experienced laboratory. In Oregon, labs at the Oregon Department of Agriculture and the Oregon State University Plant Clinic perform testing, sometimes for a nominal fee. If you are a grower in another state, please contact your state department of agriculture for the correct procedure to follow.

If growers have a shipment coming from out-of-state or internationally, what do they do? In Oregon, shipments from non-certified sources must be held for inspection. Oregon growers are instructed to contact their ODA nursery inspector at least 48 hours prior to the arrival of the plant material. Pre-notification gives ODA an opportunity to respond more quickly and speeds release of the plant material. Again, if you are a grower in another state, please contact your state department of agriculture for the correct procedure to follow.

Is there a list of certified growers in Oregon? The Oregon Department of Agriculture has a list of certified growers on its Web site: http://egov.oregon.gov/ODA/PLANT/sod_free.shtml. In the meantime, ask the grower if they are certified and request a copy of the certification when purchasing host or associated host plants. Currently, California and Washington are the only other states to offer an ODA-recognized certification program for Oregon growers buying in from out of state.

What if Oregon growers are shipping plants out of state? Oregon growers must be certified to ship host and associated host plants out of state. Again, see the ODA list on the ODA Web site: http://egov.oregon.gov/ODA/PLANT/sod_free.shtml.

What is the difference between being certified and being under a compliance agreement? Most Oregon growers have been inspected, tested and declared free of *P. ramorum*. Those nurseries are then declared “certified” disease-free by the ODA. After being notified of certification, the grower must enter into compliance agreement with the ODA. To remain certified, growers will undergo annual testing and inspection for *P. ramorum*. Growers, retailers and other dealers of nursery stock also will enter into compliance agreements with the ODA. Unlike other states, the new Oregon rule includes retail garden centers as well as wholesale nurseries under the compliance agreement rules; however, only growers can be certified.

These agreements are designed to further reduce the risk of introduction of *P. ramorum* by requiring participants to report all introductions of woody ornamental stock, by purchasing only certified *P. ramorum*-free plants or by holding any uncertified shipment in a safe, isolated location and having the ODA inspect and test those plants. In addition, participants must keep shipping and receiving records for a minimum of two years to allow trace-back investigation if necessary. Growers in other states will need to follow the protocols of their state ag departments.