

ask? us

About Diseases



**By
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Diseases

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Q Would you recommend periodically sending water samples to a diagnostic lab to test for various pathogens?

A Contaminated irrigation water is a primary source of inoculum for certain nursery- and greenhouse-crop diseases, especially for operations with irrigation reuse systems. Because producers depend increasingly on the use of recycled water, plant pathogens are one of the most serious threats to production. So while the concept of water testing is a good idea from a disease-management perspective, I would not recommend random testing of irrigation water for plant pathogens.

When a diagnostic lab receives a bottle of water along with a request to check for pathogens, the first question the lab should be asking is, "Which pathogens?" Sampling and laboratory testing of irrigation water for pathogens is anything but straightforward. In a compilation of published research reports, 17 species of *Phytophthora*, 26 species of *Pythium*, 27 genera of fungi, eight species of bacteria, 10 viruses and 13 species of plant parasitic nematodes have been found in irrigation water by various researchers throughout the world. Needless to say, there is no single laboratory test that can detect all of the potential pathogens that could be present.

Before running any assay, the diagnostician must know what pathogen is of interest in order to choose the appropriate detection assay. Irrigation water is rarely monitored for viruses due to the lack of efficient and sensitive detection methods. Most diagnostic labs are equipped to detect only *Phytophthora*, *Pythium* and maybe a few bacterial species in irrigation water, but those are probably the most economically important pathogens in irrigation water. Check with the lab prior to sampling and submission to learn whether the lab has the capability to assay for the pathogen in question. Knowing what to look for always improves the chances of finding it.

The most common detection method for fungi and bacteria involves passing the water through a filter that traps the microorganism. Keep in mind is that laboratory results are only as good as the water sample submitted. Pathogens do not distribute uniformly in water, and contamination may be intermittent throughout the year. Therefore, a negative test does not guarantee the absence of a pathogen — only that it was not detected in the submitted sample.

Q How can I improve my chances of detecting *Phytophthora* in irrigation water?

A Using a baiting technique is generally more sensitive than collecting a small, often unrepresentative water sample when attempting to detect *Phytophthora* species. Baits placed directly into a retention pond are exposed to whatever fungi or bacteria may be lurking in the water. The premise is that the swimming zoospores of *Phytophthora* will find their way to the bait, resulting in infection and the development of lesions.

Hard pears and apples have historically been used as bait, but certain plant leaves, such as *Rhododendron*, Japanese holly and lemon, are also effective. Directions for baiting with pears can be found on the following website: www.cals.ncsu.edu/plantpath/extension/clinic/submit/pear.htm.

If using leaf baits, the leaves can be placed in a nylon mesh bag and weighted with a rock. Tie the bag shut, fasten it to a capped, empty plastic bottle (such as a milk jug) with a 3-foot line and float the apparatus in the water for 24 hours. Position the milk jug near the intake pump, allowing the bag of leaves to sink in front of the intake. Collected leaf and/or fruit baits can then be submitted to a diagnostic lab for testing rather than submitting a water sample.

Microfiltration is also effective in trapping *Phytophthora* zoospores directly from irrigation water. If this can be done on site, large volumes of water can be pumped through the filter. However, most operations do not have the capability to perform microfiltration on site. **GPN**

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