







Planning for Plant Disease Diagnostics

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Some highly damaging pathogens of common deciduous trees in New York State are most easily diagnosed when the organism is sporulating, when symptoms have recently developed, or when the level of the organism in the tissue is high enough to be detected using an ELISA test. For the most reliable results, please try to submit living tissue at the best diagnostic times. For New York State, the table below may be a helpful reminder of when to look for symptoms and when to submit tissue. *Continued on back...*

Submitting Specific Tree Disease Samples to the Cornell Plant Disease Diagnostic Lab		
<p>Verticillium Wilt</p> 	<p>Hosts</p> <p>Maples are the most common host, but many trees and shrubs are susceptible.</p> <p>Symptoms</p> <p>Small leaves may be observed by the time leaf size is fully developed, but premature discoloration may not develop until later.</p> <p>Tissue to Submit</p> <p>Small living branch segments ¼ to 2 inches in diameter and 4–12 inches long.</p> <p>Timing</p> <p>Collect from symptomatic branches as soon as symptoms are noted.</p>	<p>Hosts</p> <p>Maples are the most common host, but many trees and shrubs are susceptible.</p> <p>Symptoms</p> <p>Small leaves may be observed by the time leaf size is fully developed, but premature discoloration may not develop until later.</p> <p>Tissue to Submit</p> <p>Small living branch segments ¼ to 2 inches in diameter and 4–12 inches long.</p> <p>Timing</p> <p>Collect from symptomatic branches as soon as symptoms are noted.</p>
<p>Dutch Elm Disease</p>  <p><i>Dutch Elm Disease flagging © Joseph O'Brien, USDA Forest Service, Bugwood.org</i></p>	<p>Hosts</p> <p>Elms</p> <p>Symptoms</p> <p>Off-color foliage may be noted mid-summer and will eventually wilt and die.</p> <p>Tissue to Submit</p> <p>Small living branch segments ¼ to 2 inches in diameter and 4–12 inches long.</p> <p>Timing</p> <p>Collect tissue when symptoms first observed and before foliage on affected branches is fully dead.</p>	<p>Hosts</p> <p>Elms</p> <p>Symptoms</p> <p>Off-color foliage may be noted mid-summer and will eventually wilt and die.</p> <p>Tissue to Submit</p> <p>Small living branch segments ¼ to 2 inches in diameter and 4–12 inches long.</p> <p>Timing</p> <p>Collect tissue when symptoms first observed and before foliage on affected branches is fully dead.</p>
<p>Oak Wilt</p>  <p style="text-align: center; font-size: small;">vascular discoloration</p>	<p>Hosts</p> <p>Oak: The red oak group may be more susceptible than the white oak group.</p> <p>Symptoms</p> <p>Usually scorching of leaves develops after the leaves are fully mature and when temperatures get hot in July and August.</p> <p>Tissue to Submit</p> <p>Small living branch segments ¼ to 2 inches in diameter and 4–12 inches long.</p> <p>Timing</p> <p>Infected trees may die in the same season symptoms develop so be certain to get fresh tissue submitted as quickly as possible after symptoms are observed.</p>	<p>Hosts</p> <p>Oak: The red oak group may be more susceptible than the white oak group.</p> <p>Symptoms</p> <p>Usually scorching of leaves develops after the leaves are fully mature and when temperatures get hot in July and August.</p> <p>Tissue to Submit</p> <p>Small living branch segments ¼ to 2 inches in diameter and 4–12 inches long.</p> <p>Timing</p> <p>Infected trees may die in the same season symptoms develop so be certain to get fresh tissue submitted as quickly as possible after symptoms are observed.</p>
<p>Bacterial Leaf Scorch</p> 	<p>Hosts</p> <p>Various: Maple, oak, sycamore, elm, and potentially many others may be infected.</p> <p>Symptoms</p> <p>On oak, symptoms may be similar to oak wilt making lab analysis important for identification. For other hosts look for leaf scorch with a bright yellow band between green and scorched leaf tissue.</p> <p>Tissue to Submit</p> <p>Leaf petioles are used for analysis so be certain to collect sufficient symptomatic leaves for testing. Larger petioles: about 25 leaves Small petioles: about 40–50 leaves. Very thin and/or very short petioles: 50–100 leaves.</p> <p>Timing</p> <p>In the Northeastern U.S. wait until September-to early November to collect tissue as the titer of the organism may be high enough for detection via ELISA at that time.</p>	<p>Hosts</p> <p>Various: Maple, oak, sycamore, elm, and potentially many others may be infected.</p> <p>Symptoms</p> <p>On oak, symptoms may be similar to oak wilt making lab analysis important for identification. For other hosts look for leaf scorch with a bright yellow band between green and scorched leaf tissue.</p> <p>Tissue to Submit</p> <p>Leaf petioles are used for analysis so be certain to collect sufficient symptomatic leaves for testing. Larger petioles: about 25 leaves Small petioles: about 40–50 leaves. Very thin and/or very short petioles: 50–100 leaves.</p> <p>Timing</p> <p>In the Northeastern U.S. wait until September-to early November to collect tissue as the titer of the organism may be high enough for detection via ELISA at that time.</p>

Please keep in mind that for all of these pathogens, freshly collected tissue and overnight shipment is best, but for oak wilt, overnight shipment may be imperative. During hot weather, it is best to submit tissue in a cooler along with an ice pack.

Any tissue sent at any time of the year can overheat or dry out in transit

Packages tend to sit in hot vehicles for extended periods of time. Using a cooler whenever you submit samples will ensure the tissue does not overheat and become

useless in transit. For verticillium or Dutch elm disease timing is a little less critical, but any shipment, and any tissue sent at any time of the year can overheat or dry out in transit, especially if it takes more than 2–3 days to arrive at the Clinic. Leaf tissue for bacterial leaf scorch testing is hardier but please keep foliage dry for shipping.

Because oak wilt was found for the first time in New York State in 2008 and a second identification was made in 2013, some additional information is included here regarding this disease. The Plant Disease Diagnostic Clinic at Cornell University provides testing for all of the pathogens described above. In an effort to reduce the length of time required to grow the oak wilt pathogen in culture for diagnosis using fungal morphology, clinic staff members have been developing a molecular analysis technique to detect the causal fungus in infected tissue. While we hope that eradication efforts have been effective, we recognize that early detection may aid in any future eradication efforts or help to minimize the spread of potentially devastating tree diseases such as oak wilt, so we continue to strive to provide rapid, accurate diagnoses.

Another pathogen of concern is Sudden Oak Death caused by *Phytophthora ramorum*. Currently only established on the west coast, occasionally nursery crop shipments to the east have included plants that were exposed or may have been infected so regulatory officials and nurserymen remain on high alert and keep a watchful eye for the development of symptoms. The Clinic is also prepared for this testing and thanks to a specialty crop block grant, has incorporated some additional testing of techniques, identification procedures for identifying those not *P. ramorum* and testing for the harmful *P. kernoviae*, which causes more devastating damage and is not in the US to date. We will provide an update of this project in a *Branching Out* article scheduled for July.

For more information on these diseases, you may find many, many on-line fact sheets. Below we have included links to some of the Cornell University, Plant Disease Diagnostic Clinic and US Forest Service fact sheets on these diseases.

Dutch Elm Disease

plantclinic.cornell.edu/factsheets/dutchelmdisease.pdf
www.na.fs.fed.us/spfo/pubs/howtos/ht_ded/ht_ded.htm

Oak Wilt

www.ccealbany.com/Oak%20Wilt%20announcementWebsiteEdition.pdf
www.na.fs.fed.us/spfo/pubs/fidls/oakwilt/oakwilt.htm

Bacterial Leaf Scorch

plantclinic.cornell.edu/features/2013/august2013.pdf
www.na.fs.fed.us/fhp/bls/

Verticillium Wilt

www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5347330.pdf

Miscellany

We had a recent question from one of our readers about where to get the 2014 edition of *Pest Management Guide for Commercial Production and Maintenance of Trees and Shrubs*. You can purchase this guide either from the Cornell Cooperative Extension office or the Cornell Store at Cornell University at 800-624-4080 or <http://store.cornell.edu/c-875-guidelines.aspx>. The 2014 Cornell Guidelines will NOT be available online this year as it had been the last several of years. Our recommendations listing chemicals registered for control of specific pests discussed in the Scouting Reports in *Branching Out* are taken from this pest management guide.

Growing Degree Days

As of May 13, 2014



Station	GDD ₅₀	Station	GDD ₅₀
Albany.....	170	Ithaca.....	118
Binghamton.....	140	New Brunswick,NJ.....	254
Boston, MA.....	181	Riverhead (5/11).....	149
Bridgeport, CT.....	180	Rochester.....	163
Buffalo.....	141	Syracuse.....	157
Central Park.....	310	Watertown.....	117
Farmingdale (5/11).....	149	Westchester.....	174
Hartford, CT.....	183	Worcester, MA.....	112

Phenology

Rockland County: **Flowering**—Crabapple, flowering, daphne, dogwood, hawthorn, hemlock, horsechestnut, *Ilex meserve*, Kwanzan cherry, lilac, pin oak, redbud, red oak, Sassafras, *Viburnum carlesii*, white oak, wisteria

Tompkins County: **Flowering**—Amelanchier, Callery pear, flowering quince, PJM rhododendron, redbud, red oak, sugar maple, *Viburnum carlesii*

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