



Technical updates from the Forest Health Program of the Missouri Department of Conservation

New Forest Pathologist

We in the Missouri Department of Conservation (MDC) are very pleased to have welcomed **Simeon Wright** as the new Forest Pathologist for our Forest Health Program. He began the position in March 2010 and has already accomplished a great deal in his first year here providing forest health expertise and leadership on the issue of thousand cankers disease of walnut.

Simeon holds a Master's degree in Plant Pathology from The Ohio State University and a Bachelors degree in Entomology from Iowa State University. He served as the Director of the University of Missouri Plant Diagnostic Clinic from 2004 to 2010. During that time, he worked closely with our Forest Health staff, consulting on tree disease diagnoses. Simeon has authored numerous extension publications, developed plant disease and pest management information, and given many plant disease presentations to university classes, Master

Gardeners, Extension specialists, and the green industry. Welcome, Simeon!

- (RL, Entomologist)



Simeon Wright
MDC Forest Pathologist

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Forest Entomologist's Notes

Spring Phenology Report

As spring unfolds each year, many of us wonder: Are we warming up earlier this year? Are we behind? Based on my records of plant phenology (timing of budbreak, blooming, etc.) in central Missouri, we are only about 2 to 3 days ahead of average as of April 18. We had several days of above normal temperatures in late March and early April, but we have also had below normal temperatures in between. The roller coaster ride has averaged out to somewhere only slightly ahead of "normal." The average dates of the last spring frost range from about April 5 in the Bootheel area to April 20 in northern Missouri. <http://agebb.missouri.edu/weather/frost.htm>

Periodical Cicadas Return

We are about to hear many amazing displays of “singing” by throngs of millions. Those millions happen to be periodical cicadas. The periodical types of cicadas (*Magicicada* genus) occur in broods, or “year-classes”, that emerge in spring at either 13 or 17-year intervals, and are different from the “dog-day” or annual cicadas that appear every year in late summer. For more background on periodical cicadas and the brood emerging this year, please refer to our web page and links here:

<http://mdc.mo.gov/landwater-care/forest-management/forest-health/periodical-cicadas>



Periodical cicada adult
(Photo: Jim Rathert)

The particular type emerging in 2011 is Brood XIX of 13-year cicadas. This brood is geographically the largest of all broods, extending from Missouri to North Carolina. In Missouri, it covers most of the state except the Bootheel, the western edge of the state, and much of northwestern Missouri. Range map:

<http://hydrodictyon.eeb.uconn.edu/projects/cicada/NA/Magicicada/BroodXIX.html>

Based on temperature data as of April 18, cicada emergence can be expected to begin near the end of the first week of May in southern Missouri and about a week later in northern Missouri. But that could change if we get unusually warm or cold temperatures over the next couple weeks.

There are a few indicators that cicada emergence is near. Prior to emerging from their underground burrows, cicada nymphs open up half-inch holes in the soil surface. In some cases, they may build mud chimneys or towers that stand 2 to 7 inches tall above the surface.

When actual emergence begins, brown wingless cicada nymphs crawl up onto tree trunks and other objects and shed their exoskeleton, leaving the shell-like “skins” behind. Most cicadas in a local area will emerge in just a few days. Adult males will begin their noisy “singing” a few days after shedding their exoskeleton and expanding their new wings. Males congregate in “choruses” and sing to attract females. The abundance of cicadas and the noise level can be expected to peak in mid to late May and taper off later in June.



Mud chimneys created by periodical cicadas during the 1998 emergence

After mating, females cut slits with their ovipositors into the underside of 1/8 to 1/2-inch diameter tree twigs and deposit their eggs there. Eggs hatch in six to ten weeks, and the tiny offspring drop to the soil to reside there feeding on roots until the next mass emergence in 2024.

Branch damage due to egg deposition causes leaves to turn brown and branches to droop. Where cicada populations are high, this can cause visible “flagging” of branches throughout the tree canopy. Twig death and dieback can occur. For large, healthy trees, the impact is minor, and no insecticide use is recommended.

Young trees in fruit orchards, nurseries, or growing in the landscape are most at risk for significant damage, because most of their branches are the susceptible size.

Emerald Ash Borer

The emerald ash borer (EAB) infestation in Wayne County is still the only known EAB infestation in Missouri. But we all need to be alert for symptoms of other infestations. Refer to the Missouri EAB web site for more details: <http://eab.missouri.edu>

If you find suspect beetles or suspect trees, compare them first with information available on the web site. Suspect infestations may be reported at that site, or by e-mailing your report to Forest.Health@mdc.mo.gov. Photos are very helpful, including a view of the whole tree, close-ups of symptoms or insects (include a coin or ruler in close-ups for size reference), and close-ups of leaves to confirm tree species.

Emerald ash borer adults start emerging from ash near the time of black locust bloom (late April to early May). Peak emergence occurs near the time of catalpa bloom (mid-May).

The Missouri Dept. of Agriculture and the U.S. Dept. of Agriculture (APHIS-PPQ) are once again placing large purple EAB traps in ash trees around the state to continue surveying for EAB populations in 2011. Last year, 923 traps were placed within an 8-mile radius surrounding the Wayne County infestation. Several EAB adults

Cicada Management Tactics

- Delay planting trees until fall of cicada emergence years or the following spring.
- Enclose all branches less than half-inch diameter on small trees with small mesh (<1/4-inch) netting and tie closed on the trunk.
- Prune out and destroy damaged twigs within 4 to 6 weeks after eggs are deposited to reduce the number of cicada nymphs feeding on tree roots for the next 13 years.
- Chemical controls are not needed or recommended for most trees, but may be necessary in orchards and nurseries at 7 to 10-day intervals during the egg laying period. Several insecticides (Sevin and several pyrethroids) are labeled for control of cicadas. But care should be taken: 1) Avoid insecticide overuse that kills beneficial mites and causes increased problems with spider mites. 2) Avoid spraying on blooming plants to reduce impacts on honey bees and other pollinators.
- See these examples of branch netting and other cicada management tactics:

<http://bugs.osu.edu/~bugdoc/PerioCicada/PeriCicadaControl.htm>

<http://www.wvu.edu/~agexten/orchardmon/om051704.htm>

<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G7259>

were caught within that area. One captured 6 miles north of the infestation center represents the greatest known spread of the infestation. A total of 437 traps were placed at high-risk sites in 66 counties around the state. No EABs were caught in any of those traps.

Insects to Watch For in April and May

- **Pine sawflies** feed in colonies stripping needles from branches. European pine sawflies (Scots & mugo pines) and loblolly pine sawflies (shortleaf pine) have only one generation per year and feed only on old needles. Redheaded pine sawflies (shortleaf and other pines), with their two generations per year, are more damaging.
- Adult **ash/lilac borers** (clearwing moths) emerge in mid-April, leaving empty exoskeletons (brown pupal “skins”) protruding from holes in bark, and begin depositing eggs on stressed ash trees.
- First generation crawlers of the **pine needle scale** hatch in mid-April. To monitor crawler activity, clip infested pine shoot and put in plastic bag in shade.
- **“Looper complex” defoliators** begin feeding on hardwoods in late April & early May.
- **Aphids** feed on young foliage causing curled, deformed leaves. Dripping honeydew and black sooty mold are signs of heavy populations.
- Many kinds of leaf and petiole **galls** become visible.

A similar survey approach is being used in 2011, with many new sites being trapped outside Wayne County. For more details on surveys and EAB management activities at the Wayne County infestation, please refer to the Missouri EAB web site above.

New EAB Publications

- **“Managing Missouri’s Ash Trees for EAB: Treat, Cut, or Leave Alone & Wait?”** See this article about EAB management for homeowners and communities in the March 2011 issue of the “Borer Bite” newsletter.

http://extension.missouri.edu/emeraldashborer/pdf/EABNews_March2011.pdf

- **“Common problems of ash trees”** from Iowa State University. Lots of photos. And check out the very handy chart on page 7, a comparison of symptoms between EAB and other problems.

<http://www.extension.iastate.edu/Publications/SUL21.pdf>

- **“FAQs regarding potential side effects of systemic insecticides used to control EAB”**. A good summary of the issues related to the use of systemic insecticides for EAB control, as well as systemics use in general.

http://www.emeraldashborer.info/files/Potential_Side_Effects_of_EAB_Insecticides_FAQ.pdf

Forest Pathologist's Notes

Diagnosing Tree Diseases

As the trees begin to grow, the diseases are not far behind. The warm weather also brings homeowners and landowners outside where tree problems begin to be noticed.

When diagnosing tree disease problems, the smallest clues and background information can make all the difference in obtaining a quality diagnosis. The following website has some useful pointers and great photos:

<http://www.extension.iastate.edu/Publications/SUL3.pdf>

When a decision is made to submit a sample to a plant diagnostic lab, it is critical that the lab receive the proper sample fully representing the problem. An old dead branch tells no stories! Remember to:

- Completely fill out lab submission forms with detailed background information.
- When possible, take some digital photos showing the tree, surrounding landscape and close-up photos of the symptoms observed.
- When you are unsure about what sample to send, you can call or email photos to the diagnostic lab and staff can provide more specific submission instructions.
- Keep your sample cool and send early in the week to ensure your sample arrives at the lab in good condition.



Salt spray injury caused pines to turn brown along Missouri highways

In addition to the tree health assistance provided by the Missouri Department of Conservation, the University of Missouri Plant Diagnostic Clinic is a resource providing a wide variety of services anyone can use. Services provided by the MU lab include tree health diagnosis, diagnosis of issues affecting other plant species, as well as identification of insects, arachnids, and plants. Additional information about the MU lab including fees, submission instructions and forms can be obtained at <http://plantclinic.missouri.edu/>, by contacting the lab at plantclinic@missouri.edu or by calling (573) 882-3019.

Pine problems

Once again, we are receiving reports of pine problems, especially from SW Missouri. The issues seem to include both abiotic and biotic diseases.

Abiotic problems: After deep snow events across much of the state last winter, pines along roadways are displaying evidence of **salt spray injury**. Damage is usually most visible on the side

facing the road. Other pines may be damaged as a result of **winter desiccation**. See:

<http://pubs.ext.vt.edu/426/426-500/426-500.html>

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/agdex4144](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex4144)

Some pines that are declining or have died recently were present in the landscape for many years and do not appear to have the common biotic diseases, salt or winter desiccation injury. As we have experienced this spring, Missouri is a land of weather extremes, and these problems are occurring on species that are not native to Missouri and are not adapted to our climate and soils. Finding a single agent responsible for the mortality is often not possible. However, it may be helpful to identify some of the players in the decline and mortality. Carefully examine the trees looking for evidence of insect injury, cankers (damaged areas with rough, crack or missing bark and oozing sap) or root rot (fungal fruiting bodies, loose bark, cracks and oozing sap at the base, discoloration or decay under bark on tree base and roots).

Biotic diseases: **Dothistroma needle blight** is being reported on Austrian pine. Wet weather in some areas of the state in recent years may have favored a buildup of inoculum and severe infection. Some trees look completely brown from a distance, however when examined closely, the brown bands on needles and a green needle base of remaining needles indicate Dothistroma is present. **Diplodia tip blight** is also being reported on Austrian and Scotch pine. Severe symptom development is more likely on stressed trees. We have also observed many dead Scotch pine in landscapes, as **pine wilt** continues to spread to maturing trees. For more information see:

<http://www.plantpath.ksu.edu/DesktopModules/ViewDocument.aspx?DocumentID=943>

<http://soilplantlab.missouri.edu/plant/diseases/pine.aspx>

Oak wilt

Oak wilt fungal mats are active under the bark on oaks that died of the disease last year. At this time of year sap beetles pick up spores of the fungus from these mats and carry them to wounds on healthy trees. In Missouri, research suggests April may be the highest risk month for spreading oak wilt through wounds on healthy trees. Remember the saying about oaks “Don’t prune in April, May, and June”. Wounds created during the spring can be treated with tree wound dressings to reduce the risk of oak wilt infection. For more information see

http://www.texasoakwilt.org/NOWS/conference_assets/conferencepapers/HayslettJuzwikMoltzanAppelandCamilli.pdf

For general information on oak wilt see http://www.na.fs.fed.us/spfo/pubs/howtos/ht_oakwilt/toc.htm

A recent firewood sample had an oak wilt fungal mat under the bark. Oak wilt is a good example of a tree disease that can be spread with firewood movement.



Firewood sample with bark removed to show oak wilt fungal mat

Diseases to Watch For in April and May

- **Cedar-apple rust** galls with orange tentacles on *Juniperus spp.* and foliar lesions on susceptible crabapple, apple and hawthorn.
- **Apple scab** lesions appear on susceptible crabapple as olive-brown lesions.
- **Anthracnose** on a variety of shade trees.
- Spray for **Diplodia tip blight** when buds begin to elongate, just before new needles emerge from the sheath, and 10-14 days later.
- Spray for **Dothistroma needle blight** on Austrian pine just before buds begin to elongate.
- Spray for **brown spot** on Scotch pine when needles are ½ elongated, and when needles are fully elongated.