

Pest Update (March 27, 2019)

Vol. 17, no. 7

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Note: samples containing living tissue may only be accepted from South Dakota. Please do not send samples of dying plants or insects from other states. If you live outside of South Dakota and have a question, instead please send a digital picture of the pest or problem.

Available on the net at:

<http://sdda.sd.gov/conservation-forestry/forest-health/tree-pest-alerts/>

Any treatment recommendations, including those identifying specific pesticides, are for the convenience of the reader. Pesticides mentioned in this publication are generally those that are most commonly available to the public in South Dakota and the inclusion of a product shall not be taken as an endorsement or the exclusion a criticism regarding effectiveness. Please read and follow all label instructions and the label is the final authority for a product's use on a pest or plant. Products requiring a commercial pesticide license are occasionally mentioned if there are limited options available. These products will be identified as such, but it is the reader's responsibility to determine if they can legally apply any products identified in this publication.

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Plant Development

The weather has turned warm throughout the state with sunny skies and temperatures in the 50°Fs or higher. While the warmer temperatures are welcomed, the melting is not. The raising rivers have left roads washed out and flooded basements throughout the state.

Timely Topics

Flooding and trees



The flood is dominating the news. While our downstream neighbors are experiencing most of the impact, as our snows continue to melt, we may also see more flooding in the coming weeks. Fortunately, some of the forecasts are calling for nights below freezing and little precipitation so we may not see the widespread flooding the state experienced in past years.

First, this is not a bad time for most tree species to have their roots, or even their lower trunks, covered with water. Our trees are still dormant. They have not started to leaf out though some are beginning to have their buds expand. If our flood waters recede before the trees leaf out, we will probably see few problems. It is longer....all bets are off.

Most people are aware of photosynthesis, the process where trees take in the bad air (CO₂) and give back the good air (O₂), but many are unaware that living tree tissue is respiring, essentially taking in the good air (O₂) and giving off the bad air (CO₂). This applies to roots and they have a surprisingly high oxygen demand as the tree begin to leaf out in the spring.

If trees are still standing in water during the early growing season, the reduced soil oxygen concentration can limit nutrient uptake and even water absorption. Paradoxically, trees die from the lack of water because they are *standing* in water, a phenomenon referred to as physiological drought.

While long-term flooding is harmful to all trees, there are some tree species that have a very low tolerance to this condition while others can withstand weeks or even months standing in flood waters.

The following trees may be able to withstand months of flooding. They survived the summer-long flooding during the 2011 with little decline or dieback.

Boxelder (*Acer negundo*)
Green ash (*Fraxinus pennsylvanica*)
Cottonwood (*Populus deltoides*)
Willows (*Salix*)

There were tree species that had mixed survival results in the 2011 flood. Many started declining after a month of flooding, though some survived the entire growing season with water flowing around their trunks. While the literature said that hackberry was flood-tolerant, apparently someone forgot to ask them as these trees often started to decline after a month of standing in water. Oddly, junipers (cedars) seems to hold up better and many survived more than two months of standing water that year.

Silver maple (*Acer saccharinum*)
Hackberry (*Celtis occidentalis*)
Eastern redcedar (*Juniperus virginiana*)
Bur oak (*Quercus macrocarpa*)
American elm (*Ulmus americana*)

Finally, there were tree species that did not fare well during the 2011 flooding. These will be the first trees to decline if our flood water in 2019 persist into the growing season.

Crabapples and apples (*Malus*)
Stone fruits, cherries, peaches and plums (*Prunus*)
Pines (*Pinus*)
Spruce (*Picea*)

The tree species is a factor in determining the impact of flooding but so is the timing. The *longer* the water remains this spring, the greater the impact. If the flood water recedes within the next few weeks, the injury to most trees will be minimal. If the flooding continues for another month or two, many trees may experience some decline.

However, one of the biggest variables for the extent of injury, almost regardless of the length of the flood, is the *water temperature and movement*. These two factors have considerable influence on the amount of oxygen carried in the water. The warmer the water and the less movement, the lower the oxygen and the increased potential for injury.



During the summer flooding of 2011, we had junipers underwater for two months that survived because the water was cold and fast moving. We had cottonwoods that died because they were standing in warm, stagnant water left behind the levees as the flood waters receded.

Right now, we have cold, fast moving water flowing around dormant trees, almost the best combination of factors for surviving a flood. However, if the receding flood waters leave pockets of warm, stagnant water, fruit trees and most evergreens will start to be impacted. It is critical that these areas be drained before trees begin to leaf out this spring.

When to start spraying apple trees?

Insecticide sprays for apple pests will not begin for a while. Our most common insect pest, the apple maggot, is not flying until late June and the second most common insect pest, codling moth, does not need to be treated until after the flower petals begin to fall.

It will be time soon to begin treatments for apple diseases. While the symptoms of an infection do not appear until summer, the time to manage apple diseases will be just as the buds begin to expand. Two major foliage and fruit diseases of apples in our area are apple scab and cedar-apple rust.

Apple scab infections result in irregular brown to olive-drab blotches in the leaves by mid-summer and these leaves begin to fall shortly thereafter. I have seen trees completely defoliated by apple scab by Labor Day. The fruit may also be affected with hard, scabby lesions being the most common symptom of apple scab infection. Late winter-early spring management of apple scab begins with raking up and burning or otherwise destroying all the fallen apple leaves within a few hundred feet of the trees. Apple scab overwinters on the fallen leaves and during the wet spring weather the spores are released from these fallen leaves to infect the newly developing leaves on the tree. The raking and burning has limited value, and is not a substitute for fungicide applications, but may be helpful in reducing the severity of the disease particularly for isolated trees.



Cedar-apple rust infection results in orange spots on the apple or crabapple leaf by mid-summer and with severe infections the tree may be defoliated before the end of August. The fruit may also develop similar spots. Cedar-apple rust received its name from the fact that the disease must alternate between two hosts, the “cedar” two juniper species, eastern redcedar and Rocky Mountain juniper and the apple, either apple or crabapple. The



disease will not occur if either the cedar or apple host is missing.

Cedar-apple rust management begins with the removal of infected junipers near the apple trees. Look for Rocky Mountain junipers and eastern redcedars with the small hard “apples” encompassing the twigs. These are the indicator that the tree is infected and will be producing spores to infect the apple trees this spring. The galls open and produce these colorful horns that release spores. Ideally all the redcedars and Rocky Mountain junipers within several hundred yards of the apple trees should be removed. This action will reduce the severity of the disease but not eliminate infection, as spores may come from more distant trees. You need to remove all the junipers within *five* miles to completely control the disease, an impossible task. Fungicide applications will still be needed.



Fungicide treatments for apple scab start with a spray applied just as the buds are beginning to expand, less than a 1/4-inch of leaf showing. Cedar-apple rust fungicide applications on apple trees start when the new leaf is about a week or two old, though treating the leaf as it is expanding may also be beneficial.

These first apple scab or cedar-apple rust sprays are critical to the successful reduction of these diseases and, if missed, will significantly reduce the effective of the treatments even if the remaining sprays are properly timed. After the first spray, fungicide sprays are continued about every 7 to 10 days until after petal fall. At that time the weather usually turns a little drier and a 10-14 day interval can be used until the end of June when applications generally stop.

The most common fungicides used for treating apple scab have Captan or mycolubutanil listed as the active ingredient. Captan is also the most common fungicide included in multi-purpose fruit tree sprays and is effective on apple scab, but not cedar-apple rust. Fungicides containing myclobutanil, such as Immunox, can be used for either apple scab or cedar-apple rust.



E-samples

This is a Colorado spruce trees in a Spearfish yard. One tree is presenting brown needles on the lower half to two-thirds of the tree while the other tree, not in the picture, is just looking a little sparse. The question was could these trees be saved? They had sprayed the trees for *Rhizosphaera* needle cast disease (*Rhizosphaera kalkoffii*) last year.

The pattern of browning is a little unusual for a disease. While the lower branches are generally the first affected by Rhizosphaera (Stigmina, *Stigmina lautii*, the other needle cast disease may affect the entire crown), you typically do not see such an abrupt line between healthy and browning needles. The problem may be more related to a soil issue, road de-icing salts perhaps, rather than a disease problem. This will require a site visit...which is the lead in for the next sample.

Samples received/Site visits

Minnehaha County

What is wrong with my spruce?

Ah, the start of the 2019 field samples and our first one is a bag of spruce needles and a bare twig – go figure! As frequent readers of the *Update* have probably already surmised a sample with a few needles clustered at the tips of otherwise bare twigs does not tell us a lot.

We eliminated the usual suspects - bud scale, needle cast diseases, needle miner, and spider mites – in the lab so all we could tell was the trees were stressed since only the current (2018) foliage was present. Spruce typically retain four to seven years of needles but will shed these older needles if affected by stress or canker diseases. The only way to investigate these agents was through a site visit.



When I got to the site the problem became very apparent, 20-year old spruce planted so close they were crowding and shading one another. A check of the interior branches revealed the tell-tale signs of cytospora canker, bluish-white resin blisters. Many of the lower branches were already in serious decline.

The best, though not the easiest, solution is to remove some of the trees, almost every other one, to improve the air circulation and reduce the competition. Pruning out the declining lower branches during dry weather will also help to slow the decline of these trees.

However, the spruce were not the only trees to have a problem. Far more serious was the decline of the adjacent Scotch pines. Many of these trees were standing dead with only a few hanging brown needles remaining from last year.

These are the classic symptoms of pine wilt disease. This is a disease caused by a nematode (and possibility a fungus, bacteria and even a mite associated with the nematode). The best means of saving the remaining



few healthy Scotch pines is to remove these dead pines by early April and burn the wood. Sawyer beetles carry the nematode from the dead Scotch pines to nearby healthy ones in the Spring, so it is critical to remove these dead trees – cut them flush with the ground – and destroy, not just cut and pile, the wood down to at least 2-inch branches.

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