Pest Update (July 3, 2019)

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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/

Plant development for the growing season

We are starting our fruit season now that summer is finally here. A forgotten fruit, once a staple on the prairie, is the Nanking cherry (*Prunus tomentosa*). This bush cherry, native to Northeastern China and Korea, is adapted to our cold South Dakota winds and are droughty soils. It does not tolerate poorly drained soils, a trait held in common with all cherries.

This is a true cherry. The small bright red cherries form on a shrub that is usually about 10 feet tall (with an equal width). The plants can be very productive (15 to 25 pounds of cherries per plant) and may produce fruit for 20 to 40 years.

The downside – the reason we do not eat them anymore now that imported fruit is easy to obtain – is that the cherry is sour. It is not very sour, it just does not have a sweet taste, but still great for pies. The fruit is prone to damage at picking as it is easy to separate the seed from the fruit if handled too rough.

Timely Topics

Crabapples losing their leaves

Common apple scab symptoms.

Apple scab (*Venturia inaequalis*) is showing up throughout the state on apples and crabapples, but most concerns are focused on the ornamental crabapples. After all, if most of the leaves have dropped from the tree by June, it's hard to call it an ornament. I receive calls every day now from folks alarmed at all the olive drab leaves falling from their crabapple trees. Fortunately, the disease is usually not a killer. However, the loss of foliage is replaced by new leaves set later in the season and this continual process of losing leaves and adding leaves can stress a tree making it vulnerable to other threats.

Many callers say they have never seen the problem this bad and they may be right. We had the perfect conditions for the disease development this spring. The primary infection in the spring occurs on infected fallen leaves from the previous season.

The fruiting bodies develop on this debris and wet weather results in the release of spores that are carried by wind-driven rain. The secondary infection occurs in the summer and spreads the disease (also on wind-drive rain) from leaves infected in the spring by primary infection.

These infections, primary and secondary, are largely dependent on how long the leaves stay wet. Think of spores as seeds and you can see why a wet surface is a requirement for germination and penetration of the leaf tissue. The leaves must stay wet for about 20 hours (at temperatures between 60 and 70^{o}F) for a severe infection to develop on susceptible trees – a condition we met numerous times this year. Warmer weather, which we are experiencing now, requires few hours of wetting for secondary infection to develop.

Infected fallen leaves.

Most years we see primary infections appearing on susceptible crabapples but usually the rains end in May so there is little to no secondary infections. This year it stayed wet with much of the state receiving abundant rain this week. This means we had excellent conditions for the disease to get started in susceptible hosts and then continue to re-infect the tree into the summer. It's a bad year to be a crabapple.

There are fungicide treatments for this disease, all designed to kill the germinating spore. The standard recommendation is to apply the first treatment as the buds have opened to expose the expanding leaf. A second treatment is applied about 10 days later with a third 10 days afterward. This usually provides enough protection from the primary infection and since the weather usually turns drier by that time, further treatments to prevent secondary infection are rarely needed.

However, the best treatment is not a spray but by planting cultivars that are resistant to the disease. Crabapple cultivars are not equally susceptible to the disease. Some, such as Red Jewel, show far fewer symptoms of the disease than others. However, just as there are many crabapple cultivars, there are many races to the apple scab disease and resistance to one race does not mean resistance to all.

We also have a problem with cultivars being released too quickly and the claim of resistance based on its performance in one area. Cultivars need to be evaluated for at least 10 years, 15 years or longer is even better, and at multiple locations to ensure exposure to a range of environmental conditions (e.g. wet spring, dry spring) and pathogen races.

There are cultivars that were released with great fanfare as to their disease resistance that were later found to be susceptible to the disease. One cultivar that

Spring Snow crabapple in bloom.

has been particularly disappointing is the Spring Snow crabapple (*Malus* x 'Spring Snow'). The original tree was discovered in Parkside, Saskatchewan in 1963. It was covered with dense white blossom each spring but never any fruit set. The tree was considered only slightly susceptible to apple scab at first but by the 2000s was considered highly susceptible and now it is hard to find a tree that isn't completely defoliated by the disease by August.

Few crabapples have stood the test of time and resistance to the different races of the disease. A few of the best are the following:

Beverly - reddish-pink flower buds that open to white petals, glossy red fruit
Dolgo - pink flower buds that open to white petals, purplish-red oval fruit.
White Angel - pine flower buds that open to white petals, bright red fruit.

Emerald ash borer update

Peak flight appears to be occurring now for emerald ash borer in northern Sioux Falls. The highest number of catches from the purple panel traps last year was about the time that lindens were in full bloom, an event that started last week. We observed an increase in trap catches up to last week and I expect it will drop off quickly now – not that you catch many in a trap anyway. The panel traps are not the best means of monitoring emerald ash borer flight – most adults seem to avoid the traps – but they still can be useful as a relative measure of the number of beetles flying.

The infestation still seems to mostly confine to the northern portion of Sioux Falls. Infested trees, defined as those with woodpecker blonding and pecks along limbs in the upper canopy, have not be found in surveys north of I-90, either along the Big Sioux or the small housing developments north of town. There have also been few infested trees found south of the core infested area. However, there are probably small pockets of infested trees missed as they are so lightly infested that they have not attracted the attention of the woodpeckers.

Woodpecker pecks and blonding.

This is a normal pattern, rarely are communities completely infested within a year of discovery.

Instead the spread is insipient, slowly building over a few years or more before exploding. Many communities out East were lured into a false sense of success due to this slow expansion after the initial discovery. They assumed it was not going to be as bad in their town so did little active management only to be overwhelms with dead and dying trees once the outbreak accelerated.

Fortunately, Sioux Falls has a very active management program and are removing ash in anticipation of future expansion. While this is causing a little concern – I get a call or two a week why the city is cutting down healthy ash trees – it is best long term plan as you can either work a plan to gradually remove the ash that will not be treated or react to hundreds of dead tree lining the streets.

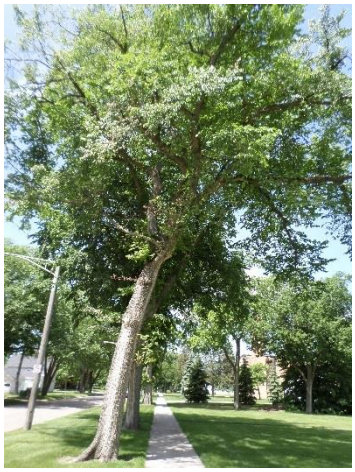
Why you do not want to wait too long to treat your ash (if you are in Sioux Falls).

It can take several years or more for emerald ash borer to kill a tree. The insect generally has a one-year life cycle, adults flying during the early summer, eggs in summer with larvae from summer till spring followed by a short pupa resting stage in mid-spring. Once the adults emerge, they feed on leaves for a bit before laying eggs on a suitable host. Apparently, 'mom' emerald ash borer considers the tree she just emerged from to be the most suitable host and trees are repeatedly infested until declining to the point that the emerging adults must seek a new home – the closest ash will do.

A tree that was infested last year and treated.

Since it takes years to kill a tree and emerald ash borer injections are so effective that they can kill larvae already in the tree, some Sioux Falls residents are thinking of delaying treatments until their tree is showing symptoms of attack. After all, if the treatments can kill larvae in a tree that has been attacked for several year, why not wait?

Ash is tough. Out East you can find trees that had a third or more of their canopy already killed by the borer successfully treated. The problem is nothing will bring back to life the branches already dead which means someone has to prune out the dead, unstable limbs and create a new canopy from the many sprouts that are generated at the base of the dead limb. This can be done and it's amazing to see trees with almost have their canopy killed back by continual emerald ash borer infestations, but it is far cheaper to start treatments sooner and avoid the pruning.

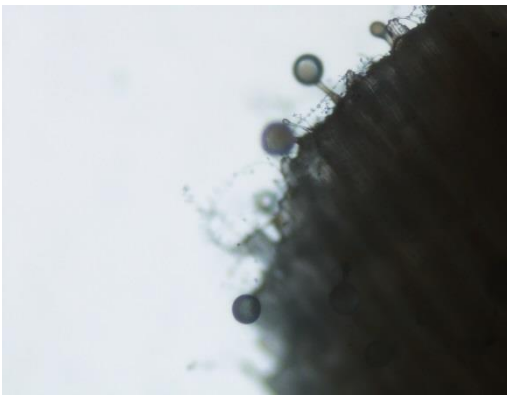


Dutch elm disease (*Ophiostoma novo-ulmi*) reports are starting to come in again as they do every year about now. Unfortunately, South Dakota is struck with managing two exotic threats at the same time, Dutch elm disease and emerald ash borer. Many Eastern communities lost most of their elms back in the 1970s, so they had about a 30-year gap between removing elms and removing ash. We may not be that fortunate as Dutch elm disease was first found in South Dakota in 1967 but did not really become a serious problem until about 10 years later. We still have many American elms in communities across the state and some unfortunate towns may experience elm and ash removals at the same time in the future.

The infected trees have one or more branches with leaves that are curling and turning yellow to brown, symptoms referred to as flagging. While flagging is a common symptom of trees infected by Dutch elm disease, flagging can also be from broken branches, branches girdled by squirrels and sap-sucking insects such as aphids and soft scales. A branch with yellowing leaves must be closely examined to determine if Dutch elm disease is the problem.

If the bark is peeled away from a section of these branches, there may be brown streaks running along the surface of the wood. This streaking is a good indicator of Dutch elm disease and is usually enough to determine the presence of the disease and have the tree removed. However, the only way to be certain the tree is infected with Dutch elm disease is to send a sample to our clinic for isolation and identification to confirm its presences.

The sample should be taken from a branch that is flagging, not dead. The branch should be about 1/2-inch in diameter and the sample piece about 8 inches long. Place the sample in a plastic bag and do NOT add water or moist paper towels. The sample should be mailed on a Monday or Tuesday, so it will arrive before the weekend. If the sample is cut later in the week it may be best to refrigerate it until Monday and mail.



Once they arrive at the SDSU diagnostic lab, a small piece of the streaked sapwood is cut out and placed on a plate for isolating the pathogen. After a short time period the coremia, the asexual fruiting structures, will occur. They look like little lollipops sticking up on the wood. This is positive identification of the pathogen. However, to find the pathogen in the tree, it must be present in the sample so collecting branch samples from recently flagging branches is the key to positive identification of the pathogen.

The disease is spread from tree-to-tree by bark beetles that carry fungal spores from an infected tree to a healthy one or by root grafts between trees. About a week or two ago I started receiving reports of American elms flagging throughout the canopy. Many of these trees had been close (less than 40 feet) from other elms that died last year from the disease. Elms can root graft, and this is a common means for the disease to move from tree to tree. The root grafts are most common with elms that are standing within 35 to 50 feet of one another. If the disease is spread by root grafts the symptom pattern is often the entire tree flagging (branches with yellow, wilting leaves) almost at once, whereas beetle carried infections start with a branch or two near the top of the canopy flagging and the disease spreads out from there, often taking a month or more before the entire tree flags.

Two recently 'X' Dutch elm disease infested elms in Brookings.

A practice to prevent the spread of the disease from an infected tree to a nearby healthy one is to sever the connecting roots by trenching. The trenches are usually cut to 36 to 40 inches depth and between the infected elm and one to be protected. The trench should be made at least 20 feet away from the healthy tree to avoid severing too many roots and father out is even better. The diseased tree should still be promptly removed, and the stump ground out as soon as possible to reduce the survival of the disease in the roots.

The symptoms of new infections started by beetle-carried spores generally occur beginning in July and are often limited, at least initially, to the leaves at the tips of branches turning yellow and wilting. The smaller European bark beetle (*Scolytus multistratus*) is the most common vector of the disease in South Dakota.

If you look closely at the wood in the originally infested tree you can see the galleries made by this insect. There is a long center adult egg-laying gallery that runs with the grain of the wood and the smaller larval galleries that branch off it.

Obviously, wilting and yellowing can be due to other stressors, but bark beetles and root grafts are how the fungus spreads from host to host. The most effective community-wide effort for DED management is to quickly identify and remove infested trees. The sooner infested trees are removed, the less likely the surrounding healthy elms will become infected. Individual healthy trees can be protected from the disease by root-flare injections of either Arbortect or Alamo fungicides though these must be repeated every two to three years. The injections must be done by commercial tree companies.

E-samples

Anthracnose is still showing up but now on sycamore (*Platanus occidentalis*). We do not have many sycamores in South Dakota, but the ones we do have appear to be heavily infected by the anthracnose fungus this summer. There are some nice trees in the Sioux Falls-Yankton region as well as Rapid City (and a very lonely one in Webster) and for the last week or two they all have been dropping their leaves. Now many of the trees only have few tufts of foliage at the branch tips.

The fallen leaves, which are littering yards beneath the trees, are covered with large blotches that are associated with the veins, particularly near the base of the leaves. The disease can also infect the twigs resulting in a proliferation of stunted shoots appearing along the branch. There is not much a tree owner can do to

protect their tree other than rake up and dispose of the fallen leaves to reduce the amount of overwintering fungi.

This provides only limited control and usually fungicide treatments are necessary to control the disease to any degree. The trees can be injected with a fungicide; some of the same ones used to treat for Dutch elm disease control, but these must be done by a certified pesticide applicator and are not available to the general homeowner market.

The **ash leaf curl aphid** also known as the woolly ash aphid (*Prociphilus fraxinifolii*) is just showing up across the state again this year as it frequently does each summer. The symptoms are curled leaves forming rosettes at the ends of ash shoots; particularly the rapid growing terminal shoots. If you unfolded the leaves, you'll find these little "fuzzballs" that are aphids. You might also find lady beetle larvae that are feeding on the insects. Treatment is usually either letting it be – since any treatment will not uncurl the leaves and the lady beetles do a pretty good job of killing the aphids – or an insecticide containing acephate since this is a systemic and will kill the aphids as they feed on the leaves. Most insecticides are contact poisons and will not reach the aphids living inside the curls.

Linden leaf gall mite (*Eriophyes tiliae*) is causing bumps to form on linden leaves. Josh, a South Dakota Department of Agriculture forester in Rapid City, sent this picture to me. I saw the same problem in Huron a week ago. Eriophyid mites are almost microscopic, and they are usually identified by their host and the shape of the galls.

These mites become very specialized feeders, generally limited to feed on trees within the same genus, but sometimes are confined to a single species. The linden leaf gall mite feeds mostly on basswood (*Tilia americana*) but can also be found on littleleaf linden (*T. cordata*). The galls the mite causes the plant tissue to form in response to their feeding are tube-shaped, 3/16-inch long, they taper at the top to a pointed tip, hence the other name – nail gall.

The adult mite overwinters in bark crevices on the tree, emerging in the spring about the time the leaves open. They move to the leaves and as they feed inject a toxin into the foliage that causes the gall to form. There are no effective treatments, but none are needed as the galls are not harmful to the tree.

Samples received/site visits

Haakon County **Declining spruce**

This was a stop made about 25 miles north of Philip to look at a spruce. Considering the location, out on the prairie though protected by the home from the northwest winter winds, it's not too surprising the tree was becoming more open. However, the past year was been kind to the tree, and it has put on more growth then the previous years so is recovering from previous stress, mostly liking the past drought. This year the tree is receiving abundant moisture (it was even raining when I stopped) so I expect the recovery to continue. Watering during a dry summer is the key to maintaining this tree.

Lawrence County **Declining spruce**

The sample did not show any signs or symptoms of needlecast disease. Fortunately, we rarely see needlecast with Black Hills spruce but occasionally see Lirula needle blight (*Lirula macrospora*). It's called a needle blight, rather than a needle cast, as the brown infected needles remain attached for several years. We did not find this pathogen but noticed that the shoot and needle expansion was less in recent years and this often speaks to site problems, e.g. drought, changes in drainage, etc.

The only pests noted on the Black Hills spruce sample was the eastern spruce gall adelgid (*Adelges abietis*), and many were the failed attacks that merely result in terminal distortion, and spruce bud scale (*Physokermes piceae*). There may be other reasons for the decline of these trees but these that are probably site related.

Minnehaha County **Why did these crabapples dieback?**

This was an interesting stop. There were a couple of crabapples with severe dieback while an adjacent tree was fine (though infected with apple scab). The declining trees had few leaves and these leaves were distorted, a common symptom of herbicide injury. Some foliage was collected and analyzed for PGR (Plant Growth Regulator) herbicides. The results showed high levels of 2,4-D and dicamba, two common lawn care herbicides.

Minnehaha County **Pine wilt disease**

We are looking for the nematode in the samples and will report back next week. Scotch pine in this area have been greatly impacted by the nematode in recent years and pine wilt is becoming a common problem on Scotch pine in South Dakota. However, one sample is from a tree with only three dead branches and since the entire canopy of an infested tree is usually impacted quickly, the branch dieback may not be due to pine wilt. The second tree may have died of pine wilt but because it died in 2018, a year ago, we may not be able to find any nematodes.

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