



Tree Pest Alert



September 15, 2021

Volume 19, Number 31

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Samples

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

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 as 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.

Reviewed by Master Gardeners: Bess Pallares, Carrie Moore, and Dawnee Lebeau

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This publication made possible through a grant from the USDA Forest Service.

Plant development for the growing season

We are at 3100 growing degree days (GDD- base 50) in Sioux Falls. The growing season is almost done. Woody plants are preparing for winter and ripening their fruit. But they have one more ornamental task to complete – fall color!



The fall color season has started but may be short this year with colors peaking in the next week or two. The drought and warm temperatures have impacted this year's color. Many trees have already dropped leaves and the color of the remaining leaves are a dull yellow.

The yellows, carotenoids, are pigments that are always present in the leaves but are masked by the green chlorophyll. Once chlorophyll production slows and finally stops in the fall, the yellows show through. The reds, anthocyanins, are plant pigments made from the sugars trapped in the leaf.

A little stress can improve fall color, a lot of stress can result in yellow and brown becoming the dominant colors. Our trees have been stressed this year by drought and heat so the fall color season may not be one of the better ones, particularly for the reds.

The yellow pigments are less affected than the red so some trees noted for attractive yellow may still put on a show. Spearfish Canyon is still a good spot for bright yellow display of aspen and it may peak next week. We are beginning to see some reds on the maples in the eastern side of the state, but the colors are not as intense as past years.

Treatments to Begin Now

We are at the time of year that sanitation is the best treatment for many pests. If we remove and destroy infested or infected plants or plant parts, we may reduce the severity of the pest next year.

This is the time to pick up and discard any fallen apples that may be infested with apple maggot (see Timely Topics this issue). Another apple treatment at this time of year is to rake up and dispose of leaves infected with the fungal disease apple scab. Eliminating the overwintering inoculum can reduce the source for the disease next spring.

However, these treatments must be applied over a large area for them to be effective. If you pick up the wormy apples in your yard, but your neighbor doesn't, the insect can easily move back to your tree. Same with raking the falling leaves that are infected with apple scab. Just as effective and easier to do is just mow the lawn low this fall to shred the infected leaves, so they decompose quicker. But if you are the only one doing it, the disease can easily spread from your neighbor's yard.

The sanitation measures are more effective if applied over a larger area so might be best to get the neighbors involved. If everyone on the block picks up and discards the wormy apples or rake/mows the apple scab infected leaves this fall everyone might benefit.

Fall is also an excellent time to remove pines infected with pine wood nematodes. Infected trees should be removed and destroyed before the sawyer beetles emerge next April. This beetle carries the nematodes from dead, infected trees to healthy trees. Once again, as large an area as possible should be included in sanitation effort. Removing infected Scotch pines in your windbreak but the neighbor does not, will provide limited control.

Timely Topics

Emerald ash borer update

We are no longer finding any 2nd instar larvae. Most of the larvae are in the 3rd instar and we are also beginning to see some 4th instar larvae. The 4th instar is the overwinter stage and by next month all the larvae will be in this stage.

Dutch elm disease and emerald ash borer

South Dakota is one of the few (unlucky) states that is dealing with the Dutch elm disease and emerald ash borer. Dutch elm disease was first confirmed in South Dakota in the late 1960s and emerald ash borer in the late 2010s (and both in Sioux Falls!).



Last week I conducted our annual Dutch elm disease survey in Selby and continued our emerald ash borer surveys in Minnehaha and Lincoln counties. Both these surveys are made a little more difficult with the drought. All trees, including ash and elm, are having their leaves turn yellow, wilt, and fall. Common symptoms for water stress as well as pest infestations.

Both pests are managed by sanitation, removing infested trees to reduce the rate of spread. This effort does not stop the pests but does help slow the spread in a community. The biggest difference in management is for emerald ash borer, communities are starting to remove their healthy ash in anticipation of attack. This was not a common tactic for Dutch elm disease management.

The reason is not every American elm will die from Dutch elm disease. There are many American elms that are tolerant of the pathogen. They can become infected but recover and may never even present symptoms of the disease. Since there are American elms that are tolerant of the disease, we still see American elms in communities across the state, even if the disease has been present in the community for decades. Fewer than before the disease entered of course, but still about 15 to 20 percent of the elms may remain.

Some have just been lucky: not attacked by the elm bark beetles that carry the fungus or the fungus did not take, but eventually the luck runs out and the tree becomes infected and dies. We had a line of Augustine elms at SDSU that survived almost a century before becoming infected in 2016 and died.

This will not be the case for emerald ash borer. Once a community has the insect infest their ash trees, the loss of almost all their ash may occur in a decade or so. The reason is the beetle itself kills the tree through its network of tunnels beneath the bark. It does not also carry a fungus that must become established as does Dutch elm disease.

There is also far less tolerance in ash for emerald ash borer than in elms for Dutch elm disease. Only one or two percent of the ash population may have some tolerance of the borer. This means once the insect moves through a community, almost no mature ash remain.

Unless treated, of course. We treat all the remaining American elms on the SDSU campus to protect them from Dutch elm disease. These trees are injected every three years and we have not lost one to the disease (but several to verticillium wilt).

In the counties/communities where emerald ash borer has been confirmed, the ash can be treated to protect them from the insect. These treatments are highly effective and the treated trees that died in Sioux Falls, and there are not that many, either were injected improperly or died of verticillium wilt.

More mushrooms!

Lately we have been receiving rains in eastern South Dakota. Mushrooms love moist weather, so they are popping up all over. I have been receiving more pictures of the sulfur yellow fungus (aka chicken-of-the-woods) and now the Shaggy Mane mushrooms are appearing in lawns.

Shaggy Mane mushrooms (*Coprinus comatus*) seem to appear almost overnight if we have some light rains and that is the case in eastern South Dakota. The mushroom has a shaggy, scaly, white cap about 1 to 2 inches wide and 2 to 6 inches tall. The gills on the underside are white but turn black and inky within a few days.



The mushrooms do not last long and the caps soon turn gooey. The stems last for a few more days after the cap has disintegrated. Then it also falls and all that remains is slightly gooey debris.

Inky cap mushrooms (*Coprinus atrementarius*) look like shaggy mane mushrooms. They both produce a black ink-like substance and have a bullet shape when they are young. The inky caps have a more defined caps while the shaggy mane, as the name implies, are shaggy.

Reminder: do not use these pictures or information to collect mushrooms! There are look-a-likes that can be poisonous! Start your mushroom hunting adventure with an experienced hunter.

Apple maggot

What is worse than biting into an apple and finding a worm? Biting into an apple and finding half a worm! Fortunately, when I bit into this crabapple I found a worm, rather than a half. The crabapple is the Dolgo crabapple. This was introduced by N.E. Hansen, South Dakota's famous plant explorer, around 1897. It is a Siberian crabapple that has a sweet-tart flavor to the flesh with a little tannic hint. I like to eat it off the tree, but others use it in jellies and it is a great addition to a cider blend.

But not this one. It was infested by the apple maggot. This insect and the codling moth are the two major insect pests in apples. The apple maggot adult resembles a fly and the females "stings" that apple skin (which leaves a dimple) with an egg. Once the egg

hatches the larvae tunnels into the flesh. The larvae are maggots, so leg-less and a somewhat pointed end with a small head capsule.



The larvae make as mess of the fruit as they tunnel. They turn the pulp into a discolored, rotted mess. Not too attractive for eating. While you will not want to pick these infested fruits to eat, they should still be picked before they fall. If the infested fruit falls to the ground, the larvae will crawl out and pupate in the soil. This means there will be more apple maggots out next summer.

E-samples

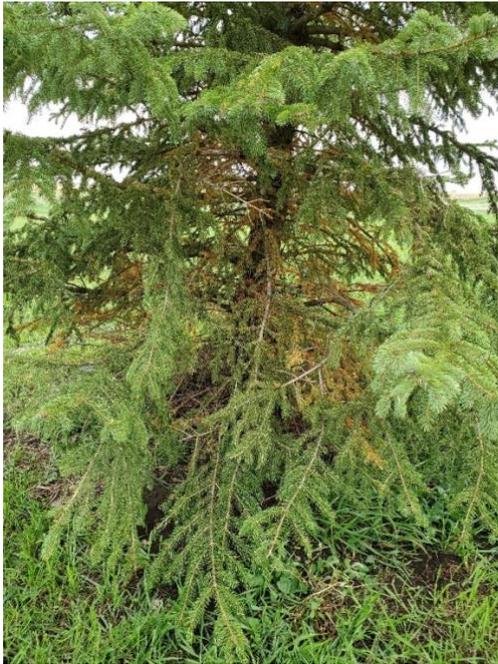
Cottony maple scale

This scale was discussed in the August 25 issue of the *Pest Alert*. While maples are commonly infested by this sucking insect, it was a buckeye that was infested. This e-sample was of an infested Japanese elm. Interestingly, there were two Japanese elms next to each other but only one was infested. I have seen this same situation in Brookings where three lindens are next to each other but only one continues to be infested.



Transplanting stress

This is a picture of a stressed spruce that was moved last spring. The dull color of the new foliage as well as the stunted shoots are common symptoms of water stress. Trees transplanted with a tree spade are more vulnerable to this stress as they lose a significant portion of their roots during the lifting process.



This tree was moved with a 96-inch tree spade so the size was correct. A spade this size will save more roots than the smaller 44s and 66s that are common in the state. Equally important it will sever many roots at the 1/2-inch diameter, a diameter that seems to generate the most new roots. Severing larger roots, which can happen if too small of a tree spade is used, can result in fewer new roots being generated from the cut tips.

But a tree moved with the correct size spade still needs to be watered on a regular basis. Once a tree is moved with a tree spade, it must be watered. The first watering should take place just after it is moved. Not later in the day or the next day. Then watering should continue every two or three days for about six weeks then weekly for the rest of the growing season. If we receive an inch of rain, the watering can be skipped that week, but we had very few rainy weeks this past spring and summer.

The amount of water applied each watering depends on the size of the tree. Trees that are about three inches in diameter (at six inches above the ground) should receive about three or four gallons each watering.

Samples received/Site visits

Corson County, Dying Siberian elms

Siberian elms are considered tough trees. It is not because they have few pests – Siberian elm has lots of pests – but the tree is hard to kill. It can just live half-dead forever!

There are three common canker diseases of Siberian elm – botryodiplodia, cytospora, and tubercularia – that result in half-dead trees. These canker diseases are responsible for the dieback of Siberian elms across the Great Plains. The canker diseases rarely kill a tree, instead the cankers cause the tree to die back but it quickly sprouts and forms new stems. This means the

tree becomes more of a large shrub than a tree, but it does survive.



The pathogen in this windbreak appears to be *Tubercularia*. The trees had numerous oval cankers. The infected bark was discolored and was covered with small tan to black fruiting bodies. There were also numerous sprouts arising from below the cankers. *Botryodiplodia* are similar in appearance and only culturing can determine which pathogen is responsible for the cankers.



Botryodiplodia is the more serious of the two pathogens and can kill otherwise healthy trees. *Tubercularia* requires a stressed host. The stress that has impacted trees throughout the state, but more severely in the area along the Missouri River is two years of wet weather followed by two years of drought. This sequence of events left many trees suffering from a declining root system at a time when a drought required an expanding root system.

The best treatment is to prune out the dead and try to shape the “bush” back to a one or two main stems. Since these are windbreak trees, bushy is not a bad thing – better to slow the wind – so the pruning will not be extensive.

Harding County, Apple scab

We did not see a lot of apple scab this season. Most fungal leaf pathogens require a cool, moist leaf surface to germinate and penetrate the leaf. We seemed to have

gone from winter to summer and skipped spring so did not have conditions favorable to leaf diseases.

Still, I have seen a few trees showing the characteristic foliage symptoms of an apple scab infections – yellowing leaves covered with olive-drab blotches. Many of these infected leaves are already beginning to drop.



While the spring weather is a major factor in determining the severity of the disease, the tree also plays a role. There is a wide range of resistance to apple scab among apple and crabapple cultivars. Cortland apples and Hopa crabapples are almost always infected while Honeycrisp apples and Red Jewel crabapples rarely have an infection even during years with cool, wet springs.

Minnehaha County, Honeylocust plant bug

This was a stop to look at two honeylocusts that were already partially defoliated and the remaining leaves were turning yellow a little prematurely.



The reason for the yellowing was feeding by the honeylocust plant bug (*Diaphnocorus chlorionis*). This insect sucks the sap from the piercing-sucking mouth parts. The feeding results in stippling, flecks of yellow around the feeding wound, and eventually the entire leaflet turns yellow. Plant bug feeding may also result in the death of buds and newly expanding foliage so an infested tree may appear to leaf out later than the surrounding honeylocust.

The plant bug nymphs are about 5/32-inch long and resemble an aphid. Egg hatch occurs at about 230 GDD, the time the leaves start to expand. There is only one generation per year but when we have a long, hot

summer – as with this year – we can find some adults into September. Usually the adults are gone by August.

There is another insect that feeds on honeylocust by sucking sap. It is the honeylocust leaf hopper (*Macropsis fumipennis*). The easiest way to separate the two nymphs is by their motion when disturbed. The leafhopper can move sideways – crab-like - when prodded, a locomotion not common with other insects.

Walworth County, Lecanium scale on American elm

At this time of year, it becomes more difficult to separate the early symptoms of Dutch elm disease, yellowing and wilting leaves, with those caused by sap-sucking insects such as lecanium scale.

Scales have appeared in the *Pest Update* almost every week this summer (including the September 8th issue). It seems that hot, dry weather causes an increase in their population. Lecanium scale is a complex of a dozen different species so they are easy to find on many different trees. They are commonly found on elms, lindens, and maples.

The adult female scales are about 1/5-inch long and are a dark brown with a shiny coating. Lecanium scales are soft scales, so they produce honeydew, a sticky substance that covers the tree and any surfaces below the tree. The scales can suck a tremendous amount of sap from twigs and branches. The loss of this sap can cause the leaves to turn yellow, wilt and fall prematurely.



This American elm was covered with the scale and there were many branches that had already dropped many of their leaves. Fortunately, the scale problem may be over for a while. If you looked closely at the scales, most had a tiny hole near the top of the shell. This is not where the young scales emerged, but where the young parasitoid emerged – the insect that ate the scale.

There are several tiny wasps that feed on scales and these provide most of the control. Foliage sprays of insecticides can sometimes kill more of the wasps than the scale. This is why soil treatments where the insecticide is absorbed by the roots and carried up the tree to the twigs are popular means of managing scales. However, in this instance most of the scales were parasitized this summer so no treatment is necessary.