

Pest Update (May 27, 2020)

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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, 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 for the growing season



We are receiving our normal spring rains. Much of the state is ahead in average precipitation at this time. We are also a little ahead in plant development. The common lilacs are in full bloom in Brookings along with European and oakleaf mountainashes. Usually these shrubs start flowering in another week.

The growing degree-days for Sioux Falls by Monday (25th) was 390. The normal is 353 for this date. Emerald ash borer should be emerging in Sioux Falls soon, probably next week, so our rough range of its flight period, Memorial Day to Labor Day, the bookends of summer, still appears to hold.

Treatments to do now

Now that the growing season is in full swing there are numerous treatments to be applied. These treatments are necessary to protect the plant from becoming infested or infected by a pest or pathogen. Waiting until you see symptoms of an infestation or infection is usually too late for effective treatments.

Clearwing ash borer (*Podosesia syringae*) treatment with an insecticide containing permethrin as an active ingredient also begin now. The bark must be sprayed to protect the tree as the insecticide will kill the adults as they are walking on the bark to lay their eggs. The insecticide will also kill the newly hatched larvae before they burrow into the wood. Trunk injections or soil treatments with imidacloprid to kill the insect once it burrows into the tree are ineffective. However trunk injections with emamectin benzoate will work, see article under Timely Topics.

The adults are usually out flying about a week or so after Vanhouttee spireas begin to bloom and this shrub is flowering throughout the state. You will know the adults are flying when you see the pupa skins (picture above) sticking out of the emergent holes on infested trees.

Now that buckeyes are blooming, bronze birch borers are emerging from infested trees. **Bronze birch borer** (*Agrilus anxius*) is a native insect that attacks birch. It is a close relative to the emerald ash borer so they both make D-shaped hole as the adult emerges from the tree. The time to treat birch trees is now as the female beetles are finding places on the bark (usually near a branch union) to lay their eggs. The bark can be sprayed with an insecticide containing permethrin as the

active ingredient with a second application in about three weeks. Insecticides containing emamectin benzoate can be injected now to kill newly hatched larvae that will hatch this year. If the canopy has dieback back more than about 40% the tree's vascular system is too disrupted for insecticide distribution through the stem.

Bronze birch borers colonize almost every birch species with their favorites being Asian and European species such as the cutleaf European white birch. The river birch is very, very rarely attacked by bronze birch borer and can be considered a borer-free alternative to other species.



The new shoots are expanding on spruce, so it is time to apply a fungicide to protect against **rhizosphaera** or **stigmina needlecast**. These are the most common foliage diseases of blue spruce. These diseases cause the older foliage to turn yellow by midsummer and then purplish brown. Usually small black fruit bodies can be found in the spring lining the stomata along the needles. Stigmina needlecast fruiting bodies have fuzzy

edges (as pictured above) while rhizosphaera fruiting bodies are smooth (as pictured to the right). The disease results in premature needle drop and a thin and discolored canopy. The disease can be managed by an application of chlorothalonil now and a second application in about two weeks. If the needlecast is due to Stigmina the applications may have to continue every 10-days till August. It is important to treat the entire canopy, not just the lower branches when treating for Stigmina.



Timely Topics

Why are all the evergreens “dying”?

I have been receiving numerous calls and pictures of dying evergreens. Most of the callers (or texters) mention the tree looked fine last year and turned brown this spring. They want to know what to spray to save their trees. Vic, from Warne Chemical in Rapid City, is receiving the same question. As Vic mentioned in our conversation, he could be selling a lot more pesticides but knows there are no treatments for winter injury.

We are seeing many evergreen pest problems this spring and they have all been discussed in the *Update* – Diplodia, Dothistroma, Pine wilt, Spruce needlecast among others. But the most common condition cannot be traced to a pest but the weather.



There are two primary causes for the winter injury, desiccation and freezing. While these are different disorders, the symptoms are similar. Pine foliage turns brown to tan starting at the tips often with distinct bands of discoloration along the needle. Pine foliage may turn shade of brown or even become bleached. Affected spruce needles may turn reddish brown to purple.

Winter desiccation injury has already been discussed in several recent *Updates*. This injury occurs when we have warm spring days, but frozen or cold soils. During the warm days, conifers are transpiring, releasing water vapor to the atmosphere, through their needles but this foliage dries out as the water cannot be replaced quick enough from the cold soils.

Winter freeze injury occurs when water in the cells freezes. This often occurs in the fall. Woody plants go through a process in the fall called acclimation where the free water in cells is reduced and replaced with a natural antifreeze. While decreasing day lengths are the trigger for this process to begin, a gradual drop in temperatures also ensures this process is completed by winter.

But a gradual drop in temperatures is not dependable characteristic in South Dakota, a land defined by extremes in weather. We had a relatively warm fall last year. Rapid City saw an October where the average maximum was 51°F and the minimum a mild 26°F. October 25th the high was 66°F but about 6 am, October 30th, it dropped to -1°F. Eastern and Central South Dakota also experience temperature fluctuation, though not quite the extreme as the western part of the state.

This abrupt change caught many trees, including junipers, pines and spruce, not fully acclimated yet for winter. The freezing temperatures resulted in ice rupturing cells in the needles. These dead cells resulted in needles with brown tips, banding, and green bases – symptoms that present with many conifer diseases. We can find black dots, fungal fruiting bodies, on these damaged needles but the fungus is not a pathogen, but *Cladosporium*, a mold fungus.

Trees affected by winter freeze or winter desiccation injury may lose many of their damaged needles and these trees will appear sparse until new needles expands. These trees will also be more susceptible to pests due to their weakened condition.

Ash anthracnose is beginning to show up

This is a common fungal disease of ash and some years the disease can result in completely defoliated trees by the middle of June if we have wet, warm weather (which fits this year). I am already seeing ash trees with many of their leaves lying on the grass beneath them – early fall.



The common symptoms of ash anthracnose are blotches and distortions to the newly expanding leaves and the leaflets will often become distorted and have a slight curl. The infected leaflets will fall individually rather than as the whole leaf. Usually the tree produces a second crop of leaves by the end of June so the problem is short-lasting though this is a stress on the tree. The disease overwinters on the twigs and spreads to the

leaves as they are expanding so the control time period has already passed and since the disease is such a minor threat to the tree generally no control is recommended.

Hackberries are also creating some alarm from all the premature leaf fall

This is almost an annual event, though not always the same trees each year. The late frost this year seemed to add to the problem and there are trees that have lost most of their leaves by now. This is not a concern. The trees will appear a little sparse right now but they will be producing new leaves very soon. I have seen hackberry go from being completely defoliated by early June to having a full canopy by mid-July.



Treatments for the native clearwing ash borer

I received a great question about using emamectin benzoate as an injection for treating ash-lilac borer. Emamectin benzoate is probably the most common active ingredient used for emerald ash borer treatments and can be found in Boxer, Mectinite, and Tree-Age among other commercial products.

Ash are ring-porous, a sapwood vascular arrangement where the pores that carry water are larger earlier in the season than later. These create discrete growth rings that are easy to see in cross-section. Tree species that are ring-porous pull up almost all their water through the most recent growth ring. Ash trunk injections are made very shallow as the youngest sapwood, the layer just beneath the inner bark, is responsible for carrying about 95% of the insecticide up and throughout the tree.

Emamectin benzoate has translaminar activity, meaning if applied to one side of the leaf it is absorbed into the leaf tissue. But it does not move out of the leaf into surrounding leaves. Emamectin benzoate has very limited plant systemic activity when applied to foliage. It does not move from the leaves to other tissue.

This is why we inject it into the trunk where it is carried up with the sap flow to the branches, twigs and leaves. But many borers, such as the emerald ash borer feed in the phloem (inner bark) tissue where sugars are carried. If the injected insecticide remains in the sapwood, the borer will not be affected.

Emamectin benzoate has a valuable property for borer treatments. It is phloem-mobile, which means it diffuses from the sapwood into the phloem, not a common feat for many insecticides. Once in the phloem it will even move through this tissue to other parts of the tree. Hence, emamectin benzoate injections are very effective against phloem-feeding borers such as the emerald ash borer.

But what about borers such as the ash-lilac borer? These insects feed in both the phloem tissue and the sapwood. Emamectin benzoate injections are also very effective on the larval stage of this insect. Most emamectin benzoate products are labelled for flatheaded borers (bronze birch borer and emerald ash borer) and clearwing borers (ash-lilac borer).



And there is no entomological law that says an ash tree can only have one borer. The recently confirmed emerald ash borer infestation in Canton, South Dakota is a testament to this. The destructive trunk sampling done on young, declining ash trees (trees between 12 and 30 feet tall) yield as many ash-lilac borer larvae as emerald ash borer larvae. The trees were being attacked by both insects.

This is not a new discovery. When the first emerald ash borer surveys were conducted in Ohio over a decade ago, one surprising find was just how many trees were infested by the ash-lilac borer.

An trunk injection made in the spring (now through June) will pull double duty. It will kill emerald ash borer adults as they feed on the leaves and the young larvae as they feed in the phloem. It will also kill ash-lilac borer young larvae as they feed in the phloem and the young sapwood.

These are not morels

Common lilac is in full bloom across the state, so the morel season is in full swing. As frequent readers of the *Update* know, don't eat any fungus until you have gone out with an experienced mushroom hunter so you can learn the critical, but seemingly minor, difference between what is edible and what can make you sick – or kill you.

Morels are considered one of the “foolproof” four and along with chicken-of-the-woods, puffballs, and chanterelle are considered near impossible to confuse but

don't count on it and get some training on morel identification and harvesting (as well as how to prepare them for eating) before collecting.

One fungus that is occasionally confused with morels is the false morel, sometimes called the deadly false morel (*Gyromitra esculenta*) so that should give you some idea of the caution! The false morel is found at the same time of year and in similar habitats. They are common in western pine forests and this one was found in Custer State Park last week.



False morels have large, reddish-brown, brain-like folds rather than the wrinkled pits found on morels. They also have an irregular, squashed, cap shape, whereas true morels have a more uniform, upright, shape. If you slice them open, true morels are hollow from the top of the cap to the base of the stem. False morels have a more solid cap. The stem is not completely hollow and is filled with a cottony material. Still do not rely on this description to separate the two

– have an experienced mushroom hunter show you!

Morels are delicious with a nutty, meaty flavor. False morels taste like fuel that you sucked into your mouth when siphoning gas out of a tank (note: not a recommended practice). They contain a toxic called monomethylhydrazine (any substance with a name that long has to be toxic) that is used as a rocket fuel (no, we are not launching rockets powered by squeezed false morels). If you google false morels you will find they can be eaten if boiled and prepared properly but again not a process for amateurs

E-samples

Black knot



Black knot (*Apiosporina morbosa*) is a disease that really stands out in the spring. The cylindrical, black, rough textured galls on the branches are hard to miss and go by many descriptive names from “dead man’s finger” to “dog poop on a stick.” The disease is not only unsightly; it eventually girdles the attached branch through this often takes years. The disease is common on many cherries, particularly the ‘Schubert’ chokecherries and some plums.

Spores are released from these knots in the spring and infection can occur from the time the buds are just beginning to expand (April) until shoot growth is completed (early June). Infections can start during this

time period whenever the tissue is wet (after a rain) and the air temperature is above 60°F – sounds like this year.

The disease is not easy to manage, and I tend to lean towards killing infected plants – basal pruning – rather than attempt to cut out the knots. First, once susceptible, always susceptible. There is some resistance to this disease among cherries and plums and some trees will never get the disease and others will always have it (or become infected again after pruning). However, if you have a lot of time on your hands or the tree is important to you, prune out and destroy all the knots now. Prune away infected branches back to a healthy branch or limb. If the disease has progressed to the trunk, just cut down the whole tree. And if you have enough time on your hands to cut the knots out of one tree, remove all the knots on any other cherry or plum within a couple of hundred feet of this tree as the spores can spread that far.

Second, even after you prune, you'll see new knots the following year. The shoots infected last year only have a slight swelling to them at this time and are easily missed while pruning. The larger, blacken galls will not form from these swollen areas until this summer.

After all the knots are removed, fungicides can be applied to reduce future infections. Fungicides containing chlorothanil that are labelled for stone fruits such as cherries and plums (the trees with the most problem with black knot) can be used to help manage this disease. The first application should be made just before bud-break (about a week ago so probably too late for this year) and then on a 10-day interval until shoot growth has stopped (early June).

The treatments prevent the tender new shoots from becoming infected by the spores being released from the knots. Fungicides containing Chlorothanil or Captan should not be tank mixed with oils or applied within two weeks before or after an oil spray as plant injury may occur. Chlorothanil application must stop at blooming for any tree you intend to harvest fruit for human consumption. The first applications are the most important so if flowering occurs before shoot growth ends (and expect this on cherries and plum) forgoing the later sprays will probably be okay.

Cedar-apple rust



Cedar-apple rust galls on the junipers have expanded during the past week and this is an indicator to begin treatments to protect susceptible apples and crabapples from cedar-apple rust. The galls have developed their gelatinous, orange telial horns that will be releasing teliospores that infect the apples and crabapples. The horns expand during wet weather and

then shrink down during dry spells. They can expand and contract several times.

The teliospores can be carried as far as six miles, though most apple and crabapple infections occurring within 300 feet of the cedar. The infection on apples and crabapples results in discolored foliage and fruit and premature drop of the leaves. Fungicides containing Myclobutanil as the active ingredients can be applied beginning now and repeat three more times at 7 to 10-day intervals. Captan, a common fungicide for apple scab is NOT effective against cedar-apple rust.

Eastern tent caterpillar



I received this picture of eastern tent caterpillars are leaving their tents to feed on the foliage. As the caterpillars continue to grow, the amount insecticide required to kill them increases. Ideally the treatment is applied before the caterpillars are more than 1/2-inch long but we are beyond that stage now. It is still worth treating as they still have a lot of feeding ahead of them. Waiting until the caterpillars are about 2-inches long is merely revenge spraying. They will have already eaten about everything they can by that time.

The most common available insecticides for managing this insect are ones that contain Carbaryl or Malathion as the active ingredient. Carbaryl is commonly sold as Sevin while malathion is sold as Malathion. *Remember spraying any tree during flowering will have the undesired effect of also killing any pollinators so avoid this time period.*

Homeowners have another option for managing tent caterpillars and other moth and beetle larvae, Captain Jack's Deadbug Brew™ from Bonide (you have to love the name). This product contains Spinosad. This is a natural insecticide derived from an actinomycete bacterium. Spinosad has been available to commercial applicators for years but now products can be found in the market for homeowners. Spinosad exhibits low toxicity to mammals and while toxic to pollinators at the time of the application, once the residue has dried on the foliage (about 2 or 3 hours) there is little risk to honeybees (*Rev Environ Contam Toxicol* 2003: 179: 37-71). However, I still recommend avoid spraying trees in bloom with any insecticide.

Lichens

I received a picture with the question what is it and will it kill the tree? These are lichens, an example of the perfect symbiotic relation between a fungus and algae (or cyanobacterium). The fungus is about 80% of the structure and its filament strands provide support, protection from the elements, and a reservoir for water



and minerals, all to the benefit of the algae. In turn, the algae produces food through photosynthesis and some of this food is utilized by the fungus.

So where does the tree come in to this arrangement? It doesn't. It is just support for the lichen, much like rocks that also serve as support. They are more common on dying trees, since more light reaches the trunk, but they are not the cause for the decline.

They are also indicators of good air quality. Lichens are fussy about their air and do not proliferate in areas with high air pollution. If you find lichens on your trees, don't panic – breath deep, the air is good!

Sapsucker on pine



I also received a picture of parallel rows of holes in the trunk of a tree. These are the work of a sapsucker, which is not an insect, but a bird. These woodpeckers are not even after insects, but the sap the runs from the wounds, hence the common name sapsuckers. The damage is easy to spot from the bands of round drill holes that encircle the trunk. The holes are usually very shallow and may weep sap. The damage to the tree is minimal and most people once they find it's not a borer attacking their tree do not worry about them further.

However, if rows of holes in a tree trunk are an aesthetic concern, the birds can be discouraged from returning (they do favor some trees more than others) by smearing a sticky material such as Tanglefoot[®] in a band above and below the holes. Since sapsuckers are protected, shooting them is not an option and may even create more holes in the tree if you are a bad shot.

Samples received/site visits

Codington County

Leaf rollers in dogwoods



Dogwoods (*Cornus*) are common ornamental shrubs. These shrubs have colorful stems in the winter and white flowers in late spring. However, it does seem to have a few defoliators that can leave the leaves distorted and tattered. I opened one distorted leaf and found this obliquebanded leaf roller (*Choristoneura rosaceana*).

The obliquebanded leaf roller infests a wide range of hosts but its favorite is apple (and there were a few apple trees nearby). The insect gets its name from the habit of the larvae to feed inside a protective shelter of rolled up leaves that are webbed together. If you peel the webbing open now you can find this small, about 1/2-inch yellow-green larva with a dark head.

Treating this insect on dogwood is difficult as the larvae are protected by the folded foliage. Systemic insecticides can be used as a soil drench, but these chemicals are also taken up by the flowers and can kill pollinators. Since the defoliation rarely is severe enough to harm the plant, probably best just to accept a few folded leaves.

Custer County

Pine engraver beetles

Many Update readers will remember the continuous articles on mountain pine beetle during the 2000s and early 2010s. The epidemic, which ran from 1996 to 2016, resulted in the loss of millions of pines throughout the Black Hills. While this epidemic has ended - as they always do, it was the 5th since 1895 - the little sibling to the mountain pine beetle, the pine engraver beetle is always with us. It does not attack healthy trees, but stressed trees are vulnerable. There are some home associations and individual homeowners, especially those in or near burned areas that are having their trees sprayed to protect them against new attacks.



Unlike the mountain pine beetle which does not emerge from its host as an adult until late July, the pine engraver beetle is an adult right now. It can be found either beneath the bark of declining trees and logging slash or even in the duff on the forest floor. They roughly resemble a small mountain pine beetle and I used to receive calls in the spring of “mountain pine beetles” flying earlier that were just pine engraver beetles

The pine engraver beetle generally begins flying in mid-April depending on the location. It usually appears first at lower elevations in the southern Black Hills and later in the higher elevations of the northern Hills. The cold weather the Black Hills experienced the last week (along with the rest of the state) slowed their flight a little. They generally begin their flight when we have day temperatures staying in the 60° and 70°F. That sounds like the weather later this week and next.

The adults are flying now to new hosts and stressed (fire-damaged) high-value pines may need to be treated to prevent successful attacks by this insect. If a property has a few trees that were attacked by this insect last year, it may be worthwhile to treat them and the surrounding trees this spring. One application of an insecticide labeled for bark beetle control, applied at the proper rate, will be

sufficient to protect pine trees from pine engraver beetles for the entire growing season.

A difference between mountain pine beetle and the pine engraver beetle is engraver beetles have several complete generations per year so we tend to see adults out flying (and attacking new hosts) throughout the season, from April to September. The second generation, which usually appears in June, is most commonly the one that goes after stressed trees.

Finally, since pine engraver beetles infest branches as well as trunks, the entire tree must be sprayed, not just the trunk. This means a sprayer with enough pressure to reach high into the canopy.

Pennington County

Declining spruce – planting depth



This was a young Colorado spruce that was declining. The needles were discolored and shedding. The first clue to the problem was that I was able to pull branches out of soil. Yes, this was planted too deep last year. Planting too deep is a common killer of young trees. Too often a person plants a container plant at the same depth it was in the container which is too deep! The trees are placed too deep in the container to keep the young

plant from falling out. This works in the container as the media used in the pot is light and well-drained. Once the tree is placed in the soil (which is often a poorly drained clay), it slowly declines.

Sully County

Zimmerman pine moth



This is worse Zimmerman pine moth damage I have ever seen in a windbreak! Almost every ponderosa pine had a distorted stem or broken branches. This is the work of the Zimmerman pine moth (*Dioryctria*) larvae. Zimmerman pine moth will attack Austrian (*Pinus nigra*), ponderosa (*P. ponderosa*) and Scots (*P. sylvestris*) pine trees. The smaller trees, those between 6 and 20 feet tall, seem to be the size most often attacked. The insect usually does not kill these trees but there can be enough branch breakage that the mature tree shape becomes distorted forming multiple stems rather than just one.

The adult moth is just your typical gray (with zigzag banding) moth fluttering about during the late summer. The larvae that hatch in early fall and feed through the next spring and summer are responsible for the tree damage.

The larvae do little harm during the fall as they have just enough time after egg hatch to form silky cocoons to survive the winter. When the larvae begin feeding the following spring, the array of tunnels they create where the branches attach to the trunk can cause the branches to break off at their bases. The signs that the breakage is due to the pine moth is the presence of frass and pitch masses near the detached branch.



Treatment is an insecticide application made in early spring (mid-April to early May) to kill the larvae before they burrow into the tree and again in late summer (September) to kill newly hatched larvae as they crawl along the bark to find a spot to form their overwintering cocoon.

Insecticides labelled for treatment of Zimmerman pine moth and containing permethrin as the active ingredient are the most common ones used against this insect. The application must be applied with enough pressure to reach the trunk where the insect lays its eggs. I have landowners wanting to spray their infested windbreaks by helicopter. Using a bug ship might be fun, but it is ineffective for treating tree trunks

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