

# Pest Update (May 8, 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/>

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

Magnolias are just past full bloom and usually they are finished by the end of April. Compared to past years, this growing season seems to be off to a very slow start due to the cold weather. While a few days have been cool and wet, it looks like a return to warmer and drier weather next week.

## Treatments to do soon



**Diplodia tip blight** treatments should be started soon in much of the state. This is the most common disease of pines, particularly Austrian and ponderosa pine. Symptoms begin in early summer with the new needles becoming brown and stunted, less than half the length of normal needles. Twigs may be infected and become stunted and deformed. The treatment is a fungicide containing thiophanate-methyl, propiconazole, or chlorothalonil (labeled for management of this disease) applied *just before the bud sheaths have opened*, timing is critical, and the treatment needs to be repeated in 10 to 14 days, as this is the period when the shoot is very susceptible to infection. The bud sheaths will soon begin to open throughout the state so try to get the first application on in the next week or two.

The treatments will not ‘cure’ the disease, but the tree will present fewer symptoms for several years or more before the treatments need to be repeated. It usually takes two years of treatments at the beginning to get the disease under control.



The new shoots will be expanding soon on spruce so it close to 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. 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. Also, for *Stigmina* it is important to treat the entire canopy, not just the lower branches.



**Zimmerman pine moth** is not just a single insect, but a complex of three different species of closely related insects. The three species found in South Dakota are *Dioryctria ponderosae*, *D. tumicolella* and *D. zimmermani*. The first two are generally found West River, while the last is found only East River. All three insects are easily identified by the masses of reddish pitch created in response to the burrowing activity of the larvae. Typically, the pitch masses will be found near the branch whorls and infested trees

will often have broken branches near these pitch masses as well as deformed treetops. While the damage is the same, the treatment window differs among the three from their different life cycles. ***D. ponderosae* and *D. zimmermani* should be treated with a bark spray during the end of April, in another week or two, and again in mid-August.** *D. ponderosa* is treated the first week of June and again in early July. The most common insecticides for managing this insect contain Permethrin as the active ingredient. The application must be made with enough pressure to penetrate the foliage and cover the trunk and branch attachments.

## Timely Topics

### The one-year anniversary of emerald ash borer in Sioux Falls



*An infested ash in Sioux Falls.*

It has been about a year since the discovery and confirmation of emerald ash borer in South Dakota so now is a good time to look back and see what has been done and then where we are going.

**Emerald ash borer** was confirmed in northern Sioux Falls in May 2018. This was the first discovery of this insect in South Dakota and was about 100 miles from the closest confirmed reports in Alta, Iowa and Welcome, Minnesota.

The infestation appeared to be about two to three years old at the time though a few trees showed about four years of repeated attacks (based on our dendrochronology study). The infestation appeared confined to a relatively small area of city. Approximately 250 infested trees were identified by initial delimiting survey by crews from the South Dakota Department of Agriculture.

### **Identification of infested trees**

Trees infested by emerald ash borer present symptoms and signs of the colonization. Typically, it takes four to five years of repeated attacks to kill a tree and only a few trees that were attacked for four years had more than 50% canopy dieback from the infestations.



*Blonding with woodpecker pecks.*

We identified infested trees by inspecting upper tree canopies for blonding – where the woodpeckers have flecked off the bark in the search for the emerald ash borer larvae – and woodpecker pecks within these blond patches. The presence of blonding is not diagnostic as squirrels will also flake off ash bark. Pecks, woodpecker drilling, must be found in the blonding.

Trees that have been infested for one or two years have blonding limited to small patches in the upper canopies of the tree, often on a single leader. Trees that have been infested for three years or more have blonding throughout the canopies and often within 10 feet of the ground.

Thinning canopies is also a common symptom of a tree infested by emerald ash borer. The thinning – fewer, smaller, and lighter green leaves – is usually confined to a portion of the canopy in trees infested for a year or two. This thinning becomes more widespread by the third year. Generally, by the third year of the tree being infested outer portions of the canopy have branches that have died back several feet or more. The few trees in Sioux falls that have been infested for four years have extensive dieback, about half the canopy.



*Canopy thinning in infested tree.*



*Watersprouts along limbs.*

Infested trees have many watersprouts - rapidly growing, upright shoots that arise in clusters along branches and trunks - throughout the canopy. While these occurred on all the trees that had been infested for three years, in themselves they are not diagnostic. The production of watersprouts is a general stress reaction and is not limited to insect attacks. The spring ice storm that occurred in 2013 resulted in extensive canopy damage and many trees responded to this loss of canopy by producing watersprouts.

The same is true for suckers – rapidly growing, upright shoots that arise in clusters near the base of the tree. While these are common on infested trees, they are also a common occurrence on trees struck by lawnmowers and grass-whips.



*D-shaped emergence hole.*

D-shaped emergence holes created by the adults as it tunnels out of the tree are not generally seen in the lower five or ten feet of the trunk until the tree has been infested for four years. The only emergence holes in trees

infested for two or three years are found in the upper canopy.



*Suckers along base.*

### ***Adults captured in panel traps***



*Purple prism trap in infested ash.*

Purple prism traps were installed in the area around the infestation. These traps have proven to be of limited value in detecting an infestation in the surrounding area. However, there have been a few instances where the first indication of the borer was through trapping.

There were six to eight traps placed within each of the areas defined by the yellow squares for a total of 30 traps. The traps were placed on public ground, generally parks, and on private property with permission. These were checked weekly during the flight period between the end of May and the end of August.

Only the traps near the center of the core, where the infestation appears to have originated, captured any adult beetles. Emerald ash borer adults were not captured in any trap outside of the core. A total of 72 adults were captured in four traps during the summer.

The trap catches started in early June (about when black locust *Robinia pseudoacacia* blooms), with the highest weekly capture during the third week of

June, when lindens (*Tilia*) were blooming. No adults were captured after mid-August. Since the life span of an adult emerald ash borer is about three weeks, most likely no adults were alive after the end of August. The beetle flight period in 2018 was within the Memorial Day and Labor Day period.

**Treatments**

We were fortunate that the infestation was discovered and confirmed at the beginning of the treatment window. Several tree care companies were already prepared to offer emerald ash borer treatments (a few were already treating trees



*Injection system for emerald ash borer treatments.*

through we discourage treatments until the insect has been confirmed in a community). The number of companies offering this service rapidly expanding and about 8,000 street and residential trees were treated during 2018.

Almost all the ash within the core area where the infestation was first found were treated. This action will greatly slow the spread and expansion of the infestation beyond the core.

There was been a tremendous interest by tree owners in Sioux Falls to treat their ash. A review of 228 quotes for treating ash trees in the community yield the follow ranges for removal versus treatment.

Tree diameter <sup>1</sup>	Removal Cost <sup>2</sup>	Treatment Cost <sup>3</sup>
8-15 inches	\$450-\$900	\$100-\$160
15-22 inches	\$750-\$1,500	\$140-\$240
More than 22 inches	\$1,400-\$2,800	\$220-\$350

<sup>1</sup> measured at 4.5 feet above the ground

<sup>2</sup> includes stump grinding

<sup>3</sup> injection

If injections are repeated every two years, the recommended interval during the first decade while the emerald ash borer population is building, the break-even is about five treatments for the small trees (8-15 inches), six for the medium size (15-22 inches), and seven for the larger trees (more than 22 inches). This means that treating a larger tree over the first 14 to 16 years is less expensive than removal, whereas when treating smaller trees this threshold is reached at about year ten.

It makes good sense for ash tree owners, both in costs and the benefits a large tree can provide to a landscape (e.g. shade and beauty), to treat healthy large ash. However, for the small trees, removing the ash and planting another species is probably the better option. The cost of removal is not very high, the loss of shade

can be relatively quickly replaced by the new tree and this replacement will not require decades of treatments.

### ***Parasitoid release***

Another tactic to slow tree mortality is the introduction of natural enemies, insects that feed on emerald ash borer. While the introduction of these insects will not eliminate the threat, nor are they a replacement for removal or treatment of infested trees, they can help to slow the spread.

These insects, known as parasitoid wasps, are from Asia where they feed on emerald ash borer in the native forests. These insects were brought to the United States and are now reared at a special USDA facility in Michigan. They are provided, through the Animal and Plant Health Inspection Service (APHIS) to state cooperators at no charge.



*Oobius agrili* adults being released.

One of these insects, *Oobius agrili*, inserts an egg into an emerald ash borer egg. The wasp develops in the egg and then emerges as an adult. Each *O. agrili* can parasitize up to about 60 emerald ash borer eggs. Since an emerald ash borer adult typically lays about 80 eggs, this wasp can provide significant control and help slow the spread of an infestation.

There are also two other parasitoids, *Tetrastichus planipennisi* and *Spathius galinae*, that attack emerald ash borer larvae. These wasps can find the larvae as it feeds beneath the bark. Once the adult wasp locates a larva, it threads the ovipositor down into the emerald ash borer and deposit their eggs inside this host insect. After the eggs hatch, the wasp larvae devour their host then emerge as adults.

These insects were released on trees infested by emerald ash borer but are not being treated with insecticides. There were multiple releases on the same trees beginning in August. Some of these wasps, *Tetrastichus*, were released by attaching small logs containing the insects onto trees. Another larval wasp, *Spathius*, was released by cups attached to the tree. The egg wasp, *Oobius*, was released by shaking them out of small cup.



A log attached to a tree containing *Tetrastichus planipennisi*.

The releases were made by APHIS beginning in mid-summer and continued over a five-week period utilizing the same trees. More releases are planned for 2019.

## **Removal of ash trees**



*Grapple-boom saw removing an ash.*

Many of the infested trees within the core were treated rather than removed. Many of these treated infested trees were presenting 20 to 30% canopy decline by mid-summer. This is generally considered the limits for successfully injecting trees and having a recovery. There were a few trees that were presenting 40 to 50% canopy and these may not recover. The vascular disruption from the galleries may prevent an even uptake and distribution of the insecticide. These trees may die by this summer (2019).

The city has already started their removal of ash trees along streets and in parks. They are working in the southern half of the community rather than on the boundary of the infestation. This strategy can slow the spread by using the buffer to absorb the migrating beetle population. The emerald

ash borer does not fly far if there are available hosts nearby.

Ash pruning and removal were prohibited within the city of Sioux Falls during the adult flight period (Memorial Day to Labor Day), except for public safety and line-clearance. This prevented the movement of infested wood during the time of adult emergence. Since the pupa and adults can survive most wood chipping and can be found in wood chips larger than 1-inch, banning the movement of any raw ash wood – brush, clippings, chips, and logs – prevents the accidental transportation of beetles through the community. This ban will continue into 2019 and may be continued until the infestation become widespread in the community.

## **Street tree survey**

The Master Gardeners, with assistance by the South Dakota Department of Agriculture, began a survey of the street tree population in Sioux Falls. The inventory collected information on tree location, species, height, diameter and general condition. The Master Gardeners collected information on more than 5,200 street trees. The data they collected showed that about 36% of the street trees are ash (e.g. black, green, white), 31% maple (e.g. Norway, red, silver, or sugar), 5% lindens (e.g. American or littleleaf), 5% hackberry, and 3% honeylocust. The remainder are other genera (e.g. elms *Ulmus*, oaks *Quercus*) or unknowns.

This means that a significant proportion of the street tree population is at risk to a known lethal threat (ash- emerald ash borer) or to a possible threat (maple – Asian longhorned beetle).

The inventory efforts will continue in 2019 by a consulting firm which should have the street tree inventory completed by the end of the summer.

### ***Now what?***

The core infestation should continue to expand out at a rate of 0.5 to 1-mile a year and I expect it to be closer to the former than the latter based on our surveys. However, if the experience of other communities is any gauge for the future, I also expect a few small satellite infestations to be discovered within 5 to 8 miles of the core. A unique characteristic of the infestation detected in 2018 was that it was spreading south into Sioux Falls rather than north so most likely these satellites will be found in the heart of the city. Most will be small but are harbingers of things to come as these pockets coalesce and expand over the years.

The unfortunate part of all this is you almost need newly discovered infestations to keep the public's interest. If nothing new is discovered and only existing infestations continue their slow expansion, the public loses interest (at least until their tree dies).

I had an opportunity to visit an eastern community where emerald ash borer has been established for about eight years. The community experienced the usual flurry of attention when the insect was first confirmed but then as the population of beetles and associated tree mortality expanded, the public lose interest.

However, in five years trees started dying at an alarming rate and everyone took notice again but there were not enough resources to quickly remove the rapidly expanding population of dead trees. The trees in the pictures have been standing dead for two years now.



*Two yards in an Eastern community with ash killed by emerald ash borer.*

The problem with leaving these trees for very long is they fail in predictable ways but at unpredictable times. An infested tree once dead can stand for weeks or years, its hard to know which so a tree owner is taking a risk.



*A tree killed by emerald ash borer that split.*

How they fail is somewhat easier to predict – the trees tend to fail at the roots, so the entire tree falls, or they snap and split at about one-third or one-fourth their height. Since the branches tend to remain attached to the dead tree until it falls there is usually quite an explosion of debris once the tree hits the ground.

The City of Sioux Falls will continue to remove ash trees ahead of their decline and hopefully residents will be making similar decisions on their ash – treat or remove. Since 8,000 trees were treated last summer by residents, we are hoping that another 5,000 or so will be treated this year. These two managements tactic can help spread the cost of the epidemic over a longer time periods and avoid the situation of streets lined with standing dead trees

that are hazards to the community.

### **The problem with pollen.**

Every spring some unlucky people greet the warm weather with a sneeze rather than a sign of relief that the winter is over. The spring pollen problems are not the same as the summer when ‘hay fever’ becomes the issue. Hay fever is not related to hay, but ragweed, a common weed that flowers during late summer. This plant and many grasses are responsible for most of the plant pollen problems for people living on the Northern Plains.

What do grasses and ragweed have in common? First, they are wind pollinated. The pollen is light enough that it is easily carried by the wind.

Plans that have colorful flowers that are attractive to bees and other pollinators are rarely a pollen source for allergies. The pollen is too sticky to be carried by the wind; it’s designed to be carried by an insect. So, unless you are sticking your nose into these flowers, you are not likely to pick up much pollen.



*A flowering bur oak.*

There are lots of plants that are blamed for itchy noses and running eyes that are not a problem. The best-known example is lilac (*Syringa*). The flowers on common lilac are very fragrant, but there is a low frequency of sensitive to the pollen. Lilac, along with privet (*Ligustrum*), are insect-pollinated but not especially attractive to most insect so there is some transfer via wind. The pollen is relative heavy so can

only travel a short distance. If a person is sensitive to lilacs, they almost need to be standing in the grove, rather than viewing from a distance.

The most common trees and shrubs that produce pollen that results in an allergic reaction for sensitive people are the wind pollinated plants:

- Ash (*Fraxinus*)
- Birch (*Betula*)
- Boxelder (*Acer negundo*)
- Cottonwood (*Populus deltoides*)
- Juniper (*Juniperus*)
- Oak (*Quercus*)
- Pine (*Pinus*)
- Poplar (*Populus*)
- Silver maple (*Acer saccharinum*)
- Walnut (*Juglans*)

And not all members of these genera or species are a problem. Many of these trees are dioecious, meaning they have either male or female flowers on a tree. Only the males produce pollen so it's the guys that are the problem.

## E-samples

### ***Powdery mildew on purple-leaf ninebarks***



I received a picture of these brooms in a Little Devil™ ninebark (*Physocarpus opulifolius* 'Donna May'). The brooms are from a powdery mildew (*Podosphaera physocarpi*) infection of the foliage and shoots. The infection results in white powdery leaves that become stunted and are clustered in thickened short shoots we call brooms. The disease is most noticeable on the purple-leaf cultivars.

Many of the purple-leaf cultivars are sold as resistant but I have seen heavy infections of Diablo<sup>R</sup> (*P. opulifolius* 'Monlo') and Summerwine<sup>R</sup> (*P. opulifolius* 'Seward'), two of the most popular ninebarks and now am seeing the disease on the smaller cultivar, Little Devil. The disease can also

be found on the yellow leaf cultivars. The disease is much less prevalent on the green leafed species.

The season is less of a problem when we have dry springs and summers. Last May and June were wet in many areas of eastern South Dakota and this is where

the problems are mostly seen. The best solution is to plant these shrubs in areas with full sun, so the wet foliage dries quickly. The spores need a wet surface to germinate.

## Samples received/Site visits

Pennington County FL1900008

**What is wrong with my apple tree?**



This looks like Black rot (*Botryosphaeria obtuse*) a fungal disease we find on old declining apple trees or those suffering winter dieback. The disease causes leaf spotting, fruit rot, and stem cankers.

Infected fruit is probably the easiest to identify and these will have black concentric rings covering large areas of the apple. The infected fruit mummifies and will remain hanging from the tree until late autumn or even into the next spring. Infected leaves will have circular lesions with a purplish border and tan interior. Infected leaves generally do not fall much earlier than healthy foliage.

The branch cankers begin as sunken reddish-brown areas on the bark, usually surrounding an old pruning wound or a branch stub. The cankers expand and may become several feet long, often girdling stems which results in dieback.

Prune out any cankers and dispose of mummified fruit during the winter months. All pruning should be completed by mid-March as the fungus does not come active until the weather begins to warm into the 40°F's. It may be a little late this year, but I still recommend pruning out the canker-ridden branches at this time.

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