State of South Dakota

Forest Health Highlights 2016

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General Overview:

The most common tree species from which samples were submitted (either by mail or as pictures sent by email or text) or inspected during site visits was green ash *(Faxinus pennsylvanica)* (23%)
Green ash is one of the most common trees in South Dakota community forests and wind breaks. The discovery of emerald ash borer in the spring of 2016 in Nebraska also increased awareness and concern regarding the insect so more tree owners were looking for symptoms and signs of emerald ash borer infestations in their ash trees.
Colorado spruce (*Picea pungens*) was the second most common tree associated with samples (18%). This is also a very common tree in communities and windbreaks. There are over-mature or planted too close together, and these stresses have resulted in decline of this species across the state.
Other genera; of trees that were seen in samples of pines (*Pinus*) (16%), elms (*Ulnus*) (9%), maples (*Acer*), juniper (*Juniperus*) (6%), and crabapple (*Malus*) (5%).

Declining green ash in Horsehead Campground at Angostura Recreation area near Hot Springs, SD (SDDA. 2009).

Sixth Year of Governor's Black Hills Initiative

(see mountain pine beetle highlight on p.3)

2016 marked the sixth year of the SD Governor's Black Hills Initiative. Through this initiative, the SD Department of Agriculture's Division of Resource Conservation & Forestry (RCF) was tasked with surveying and marking mountain pine beetle (MPB) trees on private lands throughout the Black Hills, and creating a cost share incentive for landowners to treat the MPB infested trees.
The program focused on areas of high MPB infestation, and worked with landowners to reduce local MPB populations.
Through partnerships with other agencies, MPB infestations were targeted across the Black Hills ownerships in the recent years of the program.
With the end of the epidemic insight, this may be the final year of the program. Crews have already surveyed over 35,000 acres of private, state, and federal lands, and found few than 2,000 infested trees as of December. 2016. The efforts pf RCF to reduce impacts to landowners during the epidemic were effective in priority areas where work was focused and followed up with thinning treatments. The program was widely regarded as a success.

HIGHLIGHTED INSECT CONDITIONS

Ash/lilac borer (*Podosesia syringae*)
This is a common borer of stressed ash trees and there has been an increase in reports of this insect during the recent drought and following discovery of emerald ash borer in Nebraska. Ash/ lilac borer infestations rarely result in significant mortality, but two ornamental plantings of Manchurian ash (F. mandshurica) and 'Northern Treasure' ash (black x Manchurian) were attacked and killed by this insect. Manchurian ash is being considered as a possible substitute for our native ash due to its tolerance to emerald ash borer infestations. However, its susceptibility to our native borer, and poor adaptation to dry climates, may limit its future use.

Cedar borer (*Semanotus amplus*)
his cerambycid beetle was discovered in declining eastern redcedar windbreaks in the central part of the state. According to the literature it is not found east of the Continental Divide, so this may be the first record of it in South Dakota. Sometimes it is considered a subspecies of a *Semanotus* that is found throughout the country. Regardless, this borer does infest junipers (cedars) though it typically is found in dead and dying trees rather than healthy trees.

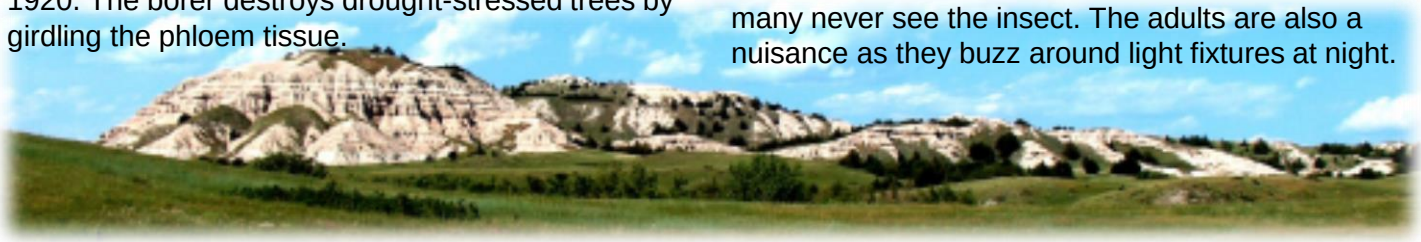
European elm leaf weevil (*Orchestes alni*)
Elm leaf beetles (*Xanthogaleruca luteola*) were once associated with the defoliation of elms, but this weevil, first reported in 2010, has become the primary defoliator of elms the past three years. The weevil is generally found on Siberian elm (*U. pumila*)..

Honeylocust borer (*Agrilus difficilis*) is a close relative to the emerald ash borer. It is native to the United States and is only known found in honeylocust. The insect is not a common pest but we do see it in young, stressed honeylocust across the state. There are samples of this insect in the SDSU insect museum caught in Kadoka back in 1920. The borer destroys drought-stressed trees by girdling the phloem tissue.

May beetle defoliation on ash in an eastern SD campground (Dr. Ball, Pest Update June 8, 2016, Vol. 14, No. 18.

Gall wasp (*Callirhytis flavipes*)
Bur oak serves as a host to a number of gall wasps and most colonization results in no damage or only minor twig dieback. The damage caused by this gall wasp is minor, but the mechanical injury caused by woodpeckers searching for the larvae beneath the bark can result in tree mortality. Woodpeckers shred most of the bark from young trees in their search for the insect, enough that trees are killed by this injury. There were belts of young oaks with mortality as great as 50% from mechanical injury from woodpeckers. The trees that are not killed by woodpecker activity often have tops killed back enough that the trees become misshaped and of little value as a windbreak tree. Injury becomes so extensive that many producers look for another tree species to plant in windbreaks.

May beetles (*Phyllophaga spp.*)
Also known as June bugs caused severe defoliation of ash across eastern South Dakota during June, 2016. The adults are shiny reddish-brown, about an inch long, and stout. This insect spends most of its life underground as 1 – 1.5 inch, C-shaped larvae, feeding on the grass roots, and other plants. The larvae require about three years to complete this soil life stage before pupating and emerging in the May/June as adults. The adults feed on the young leaves of many tree species, but seem to have an attraction to ash and oak. The adults are nocturnal so many never see the insect. The adults are also a nuisance as they buzz around light fixtures at night.



HIGHLIGHTED INSECT CONDITIONS (CONTINUED)

Aerial view of Black Elk Peak looking east into the Black Elk Wilderness. Most mature pine have been killed by MPB, and the remaining green trees are Black Hills spruce and immature ponderosa pine. (Marcus Warnke, 2016)

Mountain pine beetle (*Dendroctonus ponderosae*)
The Forest Service land surrounding the border of the Sylvan Lake area of Custer State Park has been experiencing an epidemic since 2002, particularly within the Black Elk Wilderness Area. The Black Elk Wilderness Area bordering Custer State Park has experienced near 100 percent mortality by 2012. Custer State Park has seen lower pine mortality due to a multitude of management tactics such as thinning stands to reduce susceptibility and sanitation measures including removal of infested trees to cutting the infested trees into short sections and leaving in place. An estimated 1,000 trees were infested during the past flight (2016). As a comparison, there were about 110,000 tree killed from the 2011 flight, then 45,000 (2012), 30,000 (2013), 25,000 (2014), 5,000 (2015). Not only has the number of infested trees declined remarkably, the trees selected for attack differ. Where once the focus trees were large diameter pines, the attacks are now concentrated in smaller diameter, 6 to 9 inch dbh, trees or trees stressed by lightning or other abiotic agents.

Pine engraver beetles *(Ips* spp.)
Pine engraver beetle populations were very low during the past year but we have seen an increase in attacks on live trees in some stands. These localized population increases may be due to chipping slash following thinning operations. We have seen an increase in pine mortality in stands where the fresh slash has been chipped in early spring.

Red turpentine beetle (*Dendroctonus valens*)
Populations of red turpentine beetle have appeared to increase recently. The number of infested trees may not be increasing as much as being reported however, as infested trees are probably being identified more from landowners inspect trees for mountain pine beetle. We are also seeing an increase in turpentine beetles in stands that were chipped in the early spring and in areas with new home construction.

Lilac root weevil (*Otiorhynchus meridionalis*) and black vine weevil (*O. sulcatus*)
These insects were responsible for widespread defoliation of common lilacs throughout eastern South Dakota during the summer of 2016. These root weevils overwinter as mature larvae. The larvae feed in the soil on the roots of a wide range of plants from clover to spruce. The insect pupates in the spring with the adults emerging from the soil in June. The adult beetles are about 1/3 inch long with a long stout. They do not fly, but climb up on the plants at night to feed and lay eggs.
If they are disturbed the adults quickly drop to the ground and hide.
The adults can also be a nuisances in in homes. They prefer moist environments so keeping the foundation of a home wet by watering flowers and shrubs next to the house encourages the insects to enter through broken screens and cracks.

HIGHLIGHTED DISEASE CONDITIONS

Bur oak blight (*Tubakia iowensisi*)

Bur oak blight, otherwise known as BOB, is showing up more along the woody draws in Sioux Falls. The most common symptoms associated with this disease are discolored leaves in late summer with purple-brown lesions appearing along the middle vein, yellow wedge shaped blotches on the leaf blade, and black pustules at the base of the petiole. The infected leaves tend to persist on the tree throughout much of the winter. The symptoms generally occur on the lower branches but during successive years intensify and eventually cover the entire canopy.

The disease is a leaf disease and infected trees will produce new leaves the following spring. However, infected trees are more susceptible to secondary stress agents such as two-lined chestnut borer and often begin showing extensive dieback after a few years of the initial symptoms and may die if the disease and the secondary stresses are left unmanaged. The disease is common in eastern South Dakota.

Bur oak leaf with symptoms of bur oak blight (Dr. John Ball, 2015).

Pine wilt nematode (*Bursaphelenchus xylophilus*)

Pine wilt disease was first confirmed in South Dakota in 1989 along the Yankton-Lake Andes. The disease is vectored by sawyer beetles that carry the nematode from infected to healthy pines. The disease is most common in Scotch (*Pinus sylvestris*) and Austrian pine (*P. nigra*), but mugo pine (*P. mugo*) may also be killed by the disease. Our native ponderosa pine (*P. ponderosa*) appears not to be affected by the disease. ease advance farther north in the past decade.

Scotch pine in Rapid City, SD suspected of pine wilt mortality. (Marcus Warnke 2016).

White pine blister rust (Cronartium ribicola)

This disease was discovered in the relic stands of limber pine in the Cathedral Spires area of Custer State Park in the early 2000s. White pine blister rust is continuing to be a threat to the limber pines. While we have been conducting sanitation pruning on the lower infected branches, some infections still continue to appear in later years. Unfortunately, some of the infection has moved into the trunks of the trees and while we were able to prune out infected tops of some of the smaller trees and excise some cankers in the larger, the infection in some was impossible to remove.

We are also performing preventative pruning on some of the limber pines where all the branches are removed to a height of 7 feet or 40% of live crown. A novel approach we are considering is eliminating the Ribes from the Spires. The spores from pine can travel hundreds of miles, but the spore flight from the Ribes is measure in hundreds of feet. If we pull/spray enough Ribes from the Spires we may be able to slow the spread for a while.

The drought is also taking its toll on limber pines and white spruce, it has become a hotter, drier site.

White pine blister rust on limber pine in Custer State Park. (Dr. John Ball, 2016)

EAB emerging from an ash log. (Brian Garbisch, 2014, Boulder, CO)

Nicole Pyser, Forest Health forester, demonstrates how to hang an EAB trap (SDDA, 2016)

Team inspects symptom card placed on ash tree during field exercise (SDDA, 2016)

EMERALD ASH BORER (EAB) READINESS

Although the emerald ash borer has not yet been detected in South Dakota, RCF, partnering with numerous other state, federal and local agencies, is committed to preparedness and providing a timely response when EAB does show up. Every year RCF forest health staff reviews, and revises when necessary, the *South Dakota Emerald Ash Borer Readiness Plan.* This plan identifies all the partners and their roles in EAB response, including who will act on the technical team vs the communications team, as well as how the State will respond, manage, and monitor the infestation.

In April of 2016, Dr. John Ball coordinated and facilitated a workshop for representatives from agencies responsible for EAB response in Sioux Falls, SD. This workshop included classroom training sessions as well as

an exercise on identifying infested trees in the field. These sessions included:

- Identifying common signs and symptoms of EAB;
- Available preventative treatments for susceptible ash trees and when to treat;
- Proper disposal of trees confirmed with EAB infestation;
- Techniques for trapping EAB and branch sampling suspect trees;
- Protocol for submitting suspect samples of EAB;
- How and when to initiate a delimiting survey;
- Protocol for reporting an EAB confirmed find.

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