State of South Dakota

2020 Forest Health Highlights

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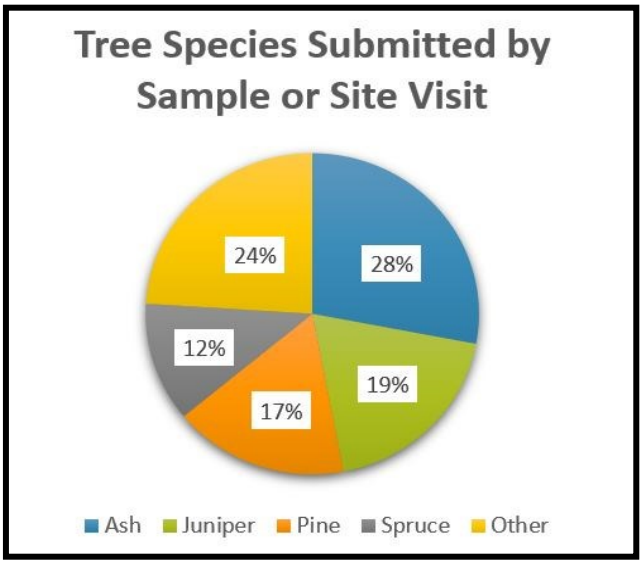
General Overview:

The most common tree genera from which samples were submitted (either by mail or as pictures sent by email or text) or inspected during site visits was ash, *Fraxinus* (28%). The majority were green ash (*Fraxinus pennsylvanica*). Green ash is one of the most common trees in South Dakota community forests and windbreaks, making up 60% of some communities' urban forests. The confirmation of emerald ash borer (EAB) in Sioux Falls in 2018 increased awareness and con-cern regarding the insect, consequently more tree owners are looking for the symptoms associated with EAB infested ash trees. Many of the ash trees inspected during site visits were just over-mature, declining ash trees. Most of these trees were infested with the ash bark beetle, ash-lilac borer, banded ash borer or the redheaded ash borer.

Juniper (*Juniperus*) was the second most common genera from which samples were submitted (either physical samples or e-samples) (19%). Most of these samples were from windbreaks in the north central part of the state consisting of eastern redcedar (J. virginiana) and Rocky Mountain juniper (J. scopulorum). The windbreak trees were infected with either Cerco-spora blight, Kabatina blight or Phomosis blight. Cercospora blight was found on more site visits than we have typically seen during past years. The disease caused widespread interior needle discoloration and defoliation with many infected trees only presenting foliage at their tips. This disease was most noticeable on Rocky Mountain junipers. Rocky Mountain junipers in these same windbreaks were also infected with botryosphaeria canker. We recommend Rocky Mountain junipers not be planted in windbreaks on the east side of the Missouri River. The higher humidity may be the reason for the infections being more common on this side of the state.

Pine, *Pinus*, was the third most common genera for samples or site visits (17%). Austrian (*P. nigra*), ponderosa (*P. ponderosa*), and Scotch (*P. sylvestris*) were all common pine samples. Austrian and Scotch pine are common trees in windbreaks throughout the southern half of the South Dakota and are planted in communities through the state. Ponderosa pine is native to the Black Hills and adjacent regions to the north and east. It is also a common windbreak and commu-nity tree through the state. The most common pests associated with these trees was pine wilt disease on the Austrian and Scotch pines, and Diplodia tip blight and pine engraver beetle on ponderosa pines. Pine engraver populations increased in the Black Hills. This year, pines that fell during storms or were damaged by fire were quickly colonized by the pine engraver beetle and the six-spine engraver beetle. Slash piles with green wood were also colonized by these insects.

Another common tree genera submitted as samples was spruce, *Picea* (12%). Colorado spruce (*P. pungens*) samples usually were showing, needlecast, either Rhizosphaera or Stigmina needlecasts. The remaining samples and site visits were of numerous genera including maples (*Acer*), elms (*Ulmus*), catalpa (*Catalpa*), hackberry (*Celtis*), honeylocust (*Gleditsia*), crabapple (*Malus*) and walnut (*Juglans*) among others.



Pie graph showing the percentage of tree species submitted by species during FY2020

Confirmed Insects & Mites

By samples submitted or pictures sent via phone or email

- Apple maggot (*Rhagoletis pomonella*)
- Ash-lilac borer (*Podosesia syringae*)
- Ash bark beetle (*Hylesinus* spp)
- Ash grey blister beetle (*Epicauta fabricii*)
- Ash plant bug (*Tropidosteptes amoenus*)
- Ash seed weevils (*Lignyodes bischoffi*)
- Banded elm bark beetle (*Scolytus chevyrewi*)
- Banded ash borer (*Neoclytus caprea*)
- Basswood leaf miner (*Baliosus nervosus*)
- Boxelder bug (*Boisea trivittata*)
- Bronze birch borer (*Agrilus anxius*)
- Carpenterworm (*Prionoxystus robiniae*)
- Codling moth (*Cydia pomonella*)
- Cotoneaster leaf crumpler (*Acrobasis indigenella)*
- Cottonwood borer (*Plectrodera scalator*)
- Cottonwood leaf beetle (*Chrysomela scripta*)
- Dogwood sawfly (*Macremphytus tarsatus*)
- Eastern tent caterpillar (*Malacosoma americanum*), the western tent caterpillar (*M. californicum*) and the forest tent caterpillar (*M. disstria*)
- Elm leaf beetle (*Xanthogaleruca luteola*)
- Emerald ash borer (*Agrilus planipennis*)
- European elm flea weevil (*Orchestes alni*)
- Fall webworm (*Hyphantria cunea)*
- Fall cankerworm (*Alsophila pometaria)*
- Fruittree leaf roller (*Archips argyospila*)
- Gall wasp (*Callirhytis flavipes*)
- Hackberry nipple gall maker (*Pachypsylla celtidismamma*)
- Honeylocust pod midge (*Dasineura gleditschiae*)
- Japanese beetle (*Popillia japonica*)
- Juniper spittlebug (*Clastoptera junperina*)
- Lecanium soft scales (*Parthenolecanium*)
- Maple bladder gall mite (*Vasates quadripedes*)
- Metallic woodborer (*Buprestis confluenta*)
- Pear slug (*Caliroa cerasi*)
- Pigeon tremex (*Tremex columba*)
- Pine engraver beetle (*Ips pini*)*
- Pine leaf adelgid (*Pineus pinifoliae*)
- Plum curculio (*Conotrachelus nenuphar*)
- Poplar borer (*Sapera calcarata*)
- Poplar vagabond aphid (*Mordvilkoja vagabunda*)
- Six-spined engraver beetle (*Ips calligraphus*)
- Spotted wing drosophila (*Drosophila suzukii*)
- Spruce bud scale (*Physokermes piceae*)
- Spruce needleminer (*Endothenia albolineana*)
- Turpentine beetle (*Dendroctonus valens*)
- Twolined chestnut borer (*Agrilus bilneatus*)
- Velvet erineum gall mite (*Aceria aceris*)
- Willow sawfly (*Nematus ventralis*)
- Zimmerman pine moth (*Dioryctria* spp)

*Although calls were responded to regarding mountain pine beetle (Dendroctonus ponderosae), this insect was nearly undetectable this year. Calls were typically for pine engraver or tur-pentine beetles.

Ash-lilac Borer Pupal Case
(Anthony Seidl, SDDA RC&F)

Confirmed Diseases

By samples submitted or pictures sent via phone or email

- Apple scab (*Venturia inaequalis*)
- Ash anthracnose (*Plagiostoma fraxini*)
- Ash rust (*Puccinia sparganioides*)
- Bacterial blight of lilac (*Pseudomonas syringae* pv. *syringae*)
- Black knot (*Apiosporina morbosa)*
- Cedar-apple rust (*Gymnosporangium juniperivirginianae*)
- cedar-hawthorn rust (*G. globosum*)
- cedar-quince rust (*G. clavipes*)
- Cercospora blight (*Pseudocercospora juniperi*)
- Cereal rust fungus (*Puccinia coronata*)
- Diplodia tip blight **(***Diplodia pinea*)
- Dothistroma needle blight (*Dothistroma pini*)
- Dutch elm disease (*Ophiostoma novo-ulmi*)
- Fireblight (*Erwinia amylovora*)
- Kabatina twig blight (*Kabatina juniperi)*
- Marssonina blight (*Marssonina brunnea*)
- Phomopsis twig blight (*Phomopsis juniperovora*)
- Plum pockets (*Taphrina communis*)
- Tar spot (*Rhytisma acerinum*)
- Spruce needlecast (*Stigmina lautii and Rhizosphaera kalkhoffii)*
- Sycamore anthracnose (*Apiognomonia veneta*)
- Valsa (cytospora) canker (*Valsa kunzei*)
- Walnut anthracnose (*Ophignomonia leptostyla*)
- Willow scab (*Venturia saliciperda*)
- Verticillium wilt (*Verticillium dahliae*)

Chlorosis on maple

(Dr. John Ball Pest Update November 20 , 2019, Volume 17 #38)

Sample Photos Submitted

with Follow-Up Site Visits

- Chlorosis (*Acer rubrum*, *A.* x *freemanii*, and *Betula nigra*)
- Drought (*Acer and Picea)*
- Fall needle drop (*Pinus, Picea*)
- Winter- burn (*Abies*, *Taxus* and *Thuja*)

Woody Plant Identification

- Common buckthorn (*Rhamnus cathartica*)
- Tatarian honeysuckle (*Lonicera tatarica*)
- White mulberry (*Morus alba*)

Highlighted Insect Conditions: Emerald Ash Borer

Emerald ash borer (EAB) was confirmed in two more communities in 2020; Canton and Worthing. An ash tree possibly in-fested with emerald ash borer was reported in Canton SD by a local arborist. Canton is approximately 20 miles to the south-east of Sioux Falls, where EAB was first confirmed in South Dakota in 2018. The dead tree presented extensive woodpecker drills and blonding. Adjacent to this tree was an abandon nursey that had numerous sapling green ash trees that also had woodpecker drills and blonding. EAB larvae were collected from these trees along with ash-lilac borer and banded ash borer larvae. Adult ash bark beetles were collected from beneath the bark. The ash trees appear to have been infested by the EAB for at least three years based on examination of the galleries in the cross-section of the wood. There were many other trees found throughout the community presenting symptoms of an EAB infestation – epicormic sprouting, blonding and woodpecker drills.

A third EAB infestation was identified in Worthing, a town between Sioux Falls and Canton. This was discovered as part of a driving survey of the community. This is an on-going effort to survey the smaller communities in Lincoln, Minnehaha, and Turner Counties. A grouping of ash trees located along a railroad track were presenting with woodpecker drills and blonding. An emerald ash borer adult was collected from an ash tree branch, confirming the infestation.

The identification of EAB in a community between Sioux Falls and Canton is not too surprising. The interesting connection is that all three finds are in the industrial area of the communities where pallet wood or raw wood is stored. There are also railroad yards and tracks near the finds. None of these infestations appear to have originated from the movement of infested firewood.

Emerald Ash Borer Larva

(Dr. John Ball Pest Update, May 6, 2020,

Volume 18 #13)

The EAB infestation is slowly moving south in Sioux Falls from the industrial park where it was first discovered in 2018. Many of the ash trees that were infested in 2018 were treated for EAB by commercial tree companies and are recovering. Howev-er, here are numerous properties where nothing has been done and now dead or dying ash trees can be found in the landscape.

Infested trees can be found throughout the northern half of Sioux Falls and there are undoubtedly satellite infestations throughout the community. These are small enough that they currently escape detection, but as they expand and coalesce, the pockets of infested trees will be more noticeable.

It is estimated that the Sioux Falls area is two years away from a significant in-crease in ash tree mortality, about when experts predicted the problem to become noticeable to many community members. Fortunately, the City of Sioux Falls is being very proactive and has been removing ash trees from parks and boulevards in antici-pation of the spread. This will be a great help in avoiding a steep death curve when the sheer number of dead and dying ash trees overwhelms community resources required to remove them.

Dr. Ball also conducted foliage analysis of emamectin benzoate residue in ash trees injected by commercial companies. The trees were randomly selected and presented canopy decline of less than 5%. However, some of these trees had defects such as cavities or stem-girdling roots.

Overall, it appears that companies are following the proper protocol in performing the injections and the recommended rates. Testing will continue this summer to track foliage residue from trees treated in 2019.

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There is considerable interest in the time of year to complete trunk injections for EAB treatments. There is a question whether this treatment will provide two complete growing seasons of control or only through the growing season following treatment based on the timing of the injection. We are investigating this by treating trees at several times during the season and collecting foliage samples to analyze for emamectin benzoate residue. The insecticide was provided by Rainbow Treecare Scientific Advancement and the injections were performed by Aspen Arboricultural Solutions. Initial results indicate that treating in the spring at a medium rate will pro-vide two growing seasons of control. Injections made in August and October have enough residue to be effective for at least throughout the following growing season as there is enough residue during the following spring to kill adults feeding on the leaves and any immature larvae the following year.

Annual Insect and Disease Training

The Division of Resource Conservation and Forestry's strategic plan requires one insect and disease training be held each year for division personnel to improve diagnoses of common problems of trees in South Dakota. These training are also open to other agencies and individuals looking to expand their knowledge of tree insects and diseases. The 2020 training was held virtually due to the Covid-19 pandemic. This training took place on July 1st. The training included identification of common South Dakota trees and pests, a tree and pest identification quiz, and an update on EAB in South Dakota.