

August 20, 2007

Re: Insects and diseases affecting willows at the McIntosh Fen of the Black Hills National Forest, RCSC-5-07

To: Forest Supervisor, Black Hills National Forest

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On August 15, 2007 we accompanied botany and wildlife staff from the Supervisors Office and District office at McIntosh Fen to look at damage being caused to willow by assorted insects and diseases. The fen has a number of different willow species, including 2, autumn willow (*Salix serissima*) and hoary willow (*S. candida*), which are locally rare. We inspected a number of willow clumps and found a wide range of insects and diseases. This report documents our findings and conclusions.

The agent causing the most damage was a weevil, the poplar and willow borer, (*Cryptorhynchus lapathi*). The lifecycle of this insect takes 1 year to complete in the Black Hills. The adults do some minor feeding on the green bark of willow shoots. They make holes or slits along the main stem. The larvae begin by feeding on the inner bark. When the larvae are ready to pupate, the tunnel into the sapwood and create a pupal chamber. The feeding of the larvae is what is causing the death of individual stems within the willow clumps. The adults exit the pupal chamber and lay eggs in August. Most of the weevils we found at this time were new adults, although there were still a few pupae.

Branch/stem mortality was observed on several willow clumps, and all species of willow had some evidence of attack by the weevil. This weevil is exotic and was introduced from Europe in the 1880s. It was first reported in the Black Hills in 1953 (Froiland 1962). We did not see the borer completely killing a willow clump. The borer causes more damage at dryer sites than at sites with more moisture.

The willow leaf rust (*Melampsora epita*) was causing rust to orange colored leaf spots on the underside of leaves and some dead patches on the leaves. In most cases the rust was not significantly affecting the willow. However, a few of the autumn willow were likely being significantly stressed by the rust, having 60% or more of their leaf surfaces affected. Only one small autumn willow patch was found that was being killed by this rust. The alternate hosts for this rust disease are *Ribes*, *Saxifraga*, fir, and hemlock. Several *Ribes* plants were observed in the area. This rust is poorly described and is considered by some to be a grouping of species. On willow, a uredinial spore stage exists that can reinfect



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willow, and the rust might overwinter in this life stage on twigs and buds allowing for infection of willow leaves far from the alternate hosts.

Other minor diseases and insects damage observed included:

- *Cytospora* canker (*Cytospora* sp.) was killing a few branches. This results in dead and dying branches with discoloration and small pimple-like dark fruiting bodies (pycnidia) in the bark. This is a weak pathogen on willow that kills the phloem tissues.
- An undetermined longhorned beetle borer (family Cerambycidae) was observed causing tunneling in the wood of a few stems.
- Tar spot (*Rhytisma salicinium*) causing black spots on leaves.
- Leaves with hollow swellings caused by willow gall sawfly (*Euura* sp.) larva.
- Oystershell scale (possibly *Lepidosaphes ulmi*) was found on the lower stem of a few willows.
- Eriophyid mite causing irregular raised red galls on upper surfaces of a few leaves.
- Browsing by deer or elk, and minor damage by rodents were also observed in the fen.

MANAGEMENT CONSIDERATIONS

The weevil, rust, and other diseases and insects were not causing widespread damage to the willow in the area. There were only 2 small areas where there was over 50% mortality of the mature willow stems, and in both cases, there were abundant new sprouts coming from the base of the shrub. This indicates that the root systems are still healthy and able to recover from having the stems killed.

It did appear that there may a species difference in the willows in how susceptible they are to the rust. This may be something that is worth noting in the future as monitoring is done in willow areas. There was not a noticeable species difference in the stems being attacked by the weevil, all the species seemed to have some level of damage.

Probably the biggest reason for the suspected rise in insect and disease activity in willow areas is the relatively dry conditions the willow has been under lately. The metal plates being installed for increased water retention in the fen should help restore environmental conditions more suitable for willow, resulting in reduced host water stresses. This should result in fewer insect and disease problems.

If you have any questions about this survey or other forest health topics please contact Jim Blodgett (605) 716-2783 or Kurt Allen (605) 716-2781, Rapid City Service Center.

Froiland, S. G. 1962. The genus *Salix* (willows) in the Black Hills of South Dakota. USDA For. Serv. Technical Bulletin No. 1269.