

# Forest Health Newsletter for DNR Central Region Forestry Staff

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## Contents

Some oaks on the decline from variability in growing season precipitation.....	1
Fall webworm made many webs this summer .....	2
Striped oak webworm associated with some branch flagging on the Anoka Sand Plain .....	3
Botryosphaeria-associated shoot blight associated with some branch flagging on the Anoka Sand Plain.....	4
Avoid planting ponderosa pines in Minnesota .....	4
Bark cracking on northern white cedars in southern Minnesota .....	5
Severe bur oak blight likely taking the blame for other problems .....	6

## Some oaks on the decline from variability in growing season precipitation

By Rachael Nicoll and Brian Schwingle, Regional forest health specialists

*(Suggestion for declining yard oaks in blue, italics below)*

DNR foresters and the forest health team have fielded many calls this summer from concerned landowners in northwestern, central, and southern Minnesota reporting dieback and mortality of their oaks. This is not new, as we have been investigating areas experiencing abundant mortality or dieback of bur and red oak for several years. We refer to all of this death as “decline.”

What is oak decline, exactly? We use the phrase to describe progressive dieback and eventual death of oak trees from multiple factors over several years. Twolined chestnut borer and Armillaria root disease usually deal the final blow to these stressed oaks, but the damage was done in the preceding year or years by other factors.

To illustrate, we documented large areas of bur and red oak death in central and south-central Minnesota starting around 2015. Much of this was due to

1. drought late in the 2011 growing season, one of the top 10 driest on record for central and south-central Minnesota,
2. flooding early in the 2012 growing season, one of the top 10 wettest on record for east-central and central Minnesota,
3. drought late in the 2012 growing season, one of the top 10 driest on record for east-central, central, north-central, and south-central Minnesota, and
4. Armillaria and twolined chestnut borer attack on extremely stressed oaks.

Drastic swings in precipitation damage roots, which can kill an oak outright or make it susceptible to diseases and pests over the following decade while it attempts to regrow its roots. Oak mortality in 2020 in north-central Minnesota is likely a result of the extremely dry growing season in early 2017, the seventh driest on record. In contrast, mortality in 2020 in south-central Minnesota is partly due to extremely wet growing seasons since 2016, three of the wettest six on record from May through October.

Decline usually is seen first as stunted leaves or dieback in the outer canopy. Epicormic sprouts grow out of the trunk or upper limbs. Decline is often slow, and the dieback or epicormics often go unnoticed. When Armillaria starts causing root disease or twolined chestnut borer infests the tree, death can happen quickly, as we have seen in some areas this summer.

Unfortunately, the damage is difficult to reverse once decline has progressed. Further, decline is difficult to prevent as extreme weather events are unpredictable and vary by location. [If you see declining oaks in your yard, the best course of](#)

action is to water them only during droughts and properly mulch them. Otherwise, leave them alone: avoid watering, fertilizing, compacting the soil, and applying herbicides under their canopies.

In forested settings, avoid harvesting for several years after a drought. During the growing season on wetter sites, operate heavy equipment only during frozen ground conditions to avoid stressing healthy trees, and remove oaks with dieback and epicormic sprouts during thinning operations.



Figure 1. (Left) Declining bur oak in Kandiyohi County from soil compaction, drought, excess rainfall, and old age. (Right) Northern red oaks in decline in northern Pine County from a harvest after extremely high precipitation and later drought in 2012.

## Fall webworm made many webs this summer

If you observed a disheveled web the size of a bowling ball or larger in your tree's outer canopy late this summer, it almost certainly was spun by the fall webworm.

Besides walnuts in the woods, fall webworm likes to make webs in cherries and alders. In urban areas, we've noted it in ash, lindens, birches, and crabapples

This pest is not a problem for tree health, because in most trees it only removes a tiny portion of leaves.

*In the woods, just ignore these pests. In your yard, if you don't like the webs, just take a rake, pull the nests down, and squash the caterpillars under foot.* If you don't like to squish soft-bodied insects, then just toss in the compost or leave on the ground for a bird to feast on.

Many types of caterpillars make webs in trees, but the timing of web-making and the shape of the web allow for easy identification. Of course, the characteristics of the caterpillars are unique, too. Webs you may see formed by other caterpillars in mid- or late summer: [uglynest caterpillar](#), [cherry scallop shell moth](#), [oak webworm](#), [striped oak webworm](#). None of these were abundant this year except striped oak webworm in Chisago County.



Figure 2. Webs in a cherry tree in southeast Minnesota made by fall webworm.



Figure 3. Fall webworms in a web.

### Striped oak webworm associated with some branch flagging on the Anoka Sand Plain

In 2019 and 2020, I noted quite a few webbed shoots on northern pin oaks (and/or northern red oaks) in the Carlos Avery Wildlife Management Area. These were associated with striped oak webworm. *This pest is not a tree health concern.* Another similar pest is the oak webworm, which makes nests slightly earlier in the growing season but overlaps with the striped oak webworm. The webbed branches did not seem to be the primary cause of branch flagging though. A fungal shoot blight seemed more common (see next article).



Figure 4. (Left) Webbed oak leaves. (Right) Striped oak webworm was found in the webbed leaves.

Botryosphaeria-associated shoot blight associated with some branch flagging on the Anoka Sand Plain Sand country north of the Twin Cities, once again, has quite a few red oaks with flagging branches. Most of these appear to be caused by a fungal shoot blight. The University of Minnesota Plant Disease Clinic made an initial judgement that the causal organism was Botryosphaeria. *Almost always, Botryosphaeria by itself isn't a major tree health concern.*

Other organisms that can cause shoot blight on oaks: [Tubakia](#) species, [Diplodia](#), [cicadas](#), [twig pruner](#), [twig borer](#).



Figure 5. (Left) A northern pin oak with scattered blighted shoots. (Right) A close-up from the image on the left, showing fungal shoot blight.

## Avoid planting ponderosa pines in Minnesota

For many years, various landowners have planted ponderosa pines in central and southern Minnesota. Two reasons for planting ponderosas must have been that Minnesota's native white, red, and jack pines did not originally grow in most of the prairie and savanna regions of our state, and scientists were predicting a drier climate in the future. Ponderosa pine is rated as having high drought tolerance.

Over the last couple of decades, climate in central and southern Minnesota has not gotten drier in the growing season (roughly April to October), but wetter — a lot wetter. Precipitation and humidity favor fungal tree diseases. Two types of fungal disease that affect ponderosa and red pine are needle blights and shoot blights. In one setting in southeast Minnesota, we were recently able to compare how ponderosa and red pine were handling these diseases.

As you can see in the background in Figure 7 (left photograph), ponderosa pines had brown lower canopies, while red pines in the foreground did not. The brown canopies in the ponderosa were due to blighted needles and shoots (Figure 7, right photograph). [Dothistroma](#), or brown spot needle blight, was affecting the needles, and [Diplodia](#)



Figure 6. A ponderosa pine in Carver County with blighted shoots and needles, in contrast to the healthy white pine in the background.

[shoot blight](#) was killing entire shoots. The ponderosa were full of these diseases but the red pine were minimally impacted.

Around the Twin Cities, we have also seen ponderosa pines severely blighted by *Diplodia* and needle blight fungi (Figure 3).

Red pine seems to have fewer disease problems than ponderosa pine in many Minnesota settings, but white pine is the most disease-free of all our pines. The only significant tree-killing pest or disease you have to worry about with white pine is [white pine blister rust](#), a disease that can be managed in the forest and avoided on yard trees. We recommend planting white pine, red pine, and jack pine over ponderosa pine anywhere in Minnesota.



Figure 7. (Left) Ponderosa pines (left row) in Winona County with brown canopies compared to healthy red pines (on the right). (Right) Blighted ponderosa needles and shoots.

## Bark cracking on northern white cedars in southern Minnesota

Recently I investigated multiple reports of dying windrow white cedars in southern Minnesota. These cedars had callusing physical wounds (bark splits) on their main trunks under lateral branch axils. The wounds occurred in either 2018 or 2019. According to a [bark splitting publication from Cornell](#), there are a couple southern Minnesota scenarios that could have caused these bark splits:

1. Severe cold in late winter followed by rapid warming (happened in 2018 and 2019)
2. Late growth in fall, promoted by unusually warm weather or a fall fertilizer application

I suspect the damage occurred in the early growing season of 2018. March and April 2018 were drier and substantially colder than normal (especially April). That colder April was followed by a May that was warmer and wetter than average (and there were no frosts in May). A very drastic warmup occurred from late April to early May 2018.

I believe only native Minnesota seed source white cedars were impacted (not the arborvitae cultivar 'Techny'). It usually is not wise to move seed source too far latitudinally, so that may be an underlying issue too.



Figure 8. Bark split on white cedar, probably from extreme weather in 2018.

## Severe bur oak blight likely taking the blame for other problems

Annually, we receive many concerns about bur oak in August and September. The visible problem in most cases is bur oak blight. For the second year in a row, I have been on sites where the only bur oaks sustaining 90% leaf loss were those that had severe root stress in the last 10 years. I do not think this is a coincidence. Like many native pathogens, the cause of bur oak blight (*Tubakia iowensis*) could be an endophyte that only causes severe disease when its host is stressed.

Despite ample concerns of bur oak blight in central and southern Minnesota, I have found only 3% of bur oaks severely defoliated (5 plots, 240 total bur oak surveyed), and only the plots in city parks had defoliated bur oaks.

General suggestions for bur oak blight can be found in our [bur oak blight webpage](#). From what I've seen and what I've heard from arborists, I am steering homeowners away from considering propiconazole injections, as results are highly variable. Quality tree care might be the best approach: *water stressed bur oaks only during droughts and properly mulch them. Otherwise, leave them alone: avoid watering, fertilizing, compacting the soil, and applying herbicides under their canopies.*



*Figure 9. When a bur oak sustains extreme defoliation by bur oak blight (right-most tree), something else is usually wrong with the tree. Often, heavy root damage is the culprit.*