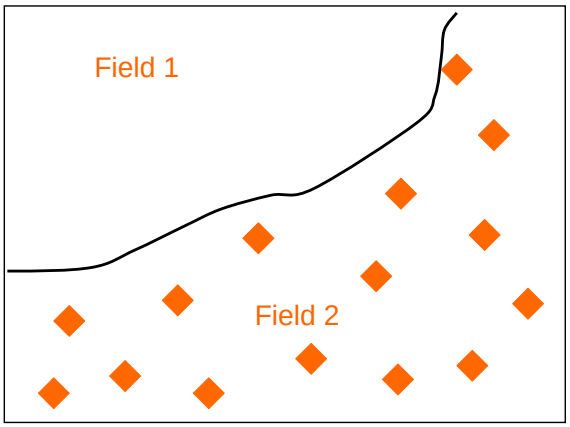
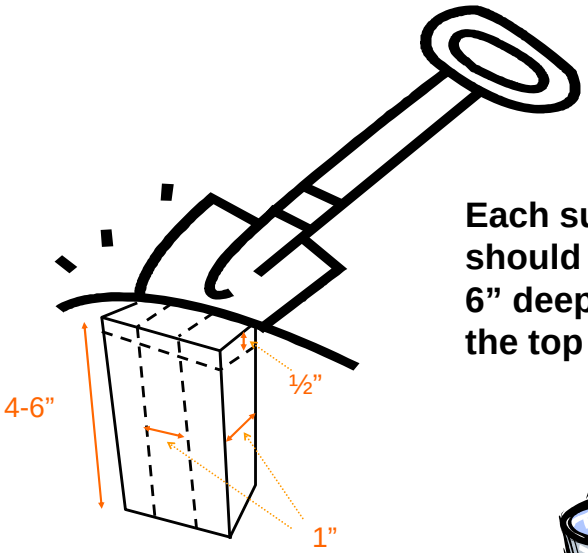
Taking a Soil Sample

Best to sample late summer or early fall, but not after fertilizing or after rain.

Figure out if your plantation is uniform to decide if you need to send in more than one sample. Take 10-20 sub-samples per field.





Each subsample should be about 4-6” deep. Remove the top ½”.

Mix the samples well. Remove stones and plant debris. Air dry about a cup before bagging.

Christmas Tree Diagnosis
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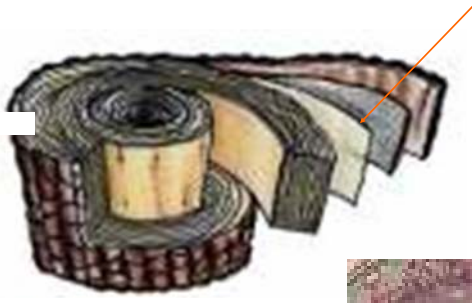
Symptom Evaluation

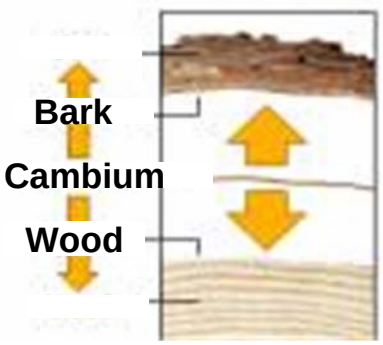
Transition Zone

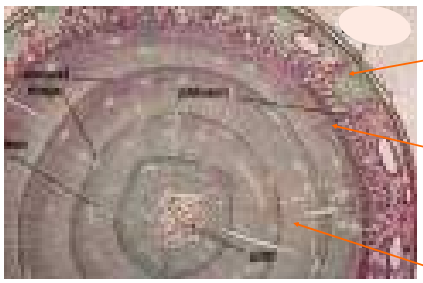
Look for the Transition Zone here

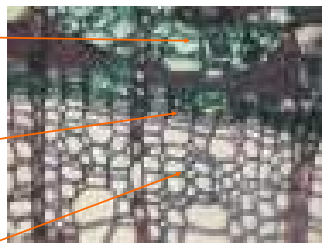
Cambium



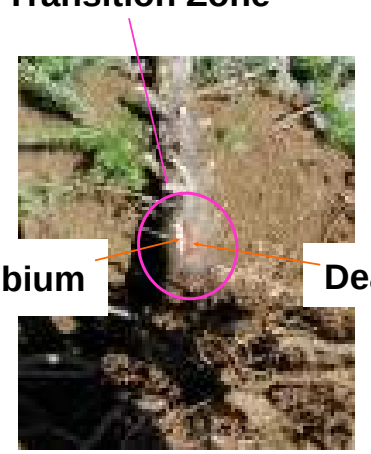
The cambium is a living layer of cells that divides to make new bark and new wood. It's located where the bark peels off in the spring.







When part of the cambium is wounded or dies, new wood ("callus") may grow around the affected area.



You can date the injury by counting the new rings.

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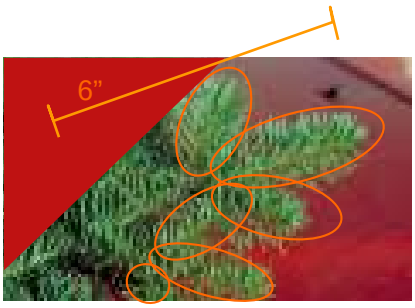
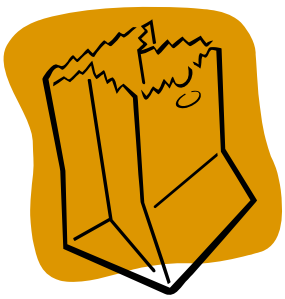
Taking a Foliage Sample

Sample in the fall after the trees are dormant (late October). Select 10-15 trees per field.



From the top of each tree: Collect all of the current year shoots from one 6” branch.

Remove all the needles from the stems. Collect in a paper bag.



Send a fist-sized sample; either fresh the same day, or dry.

INTERPRETIVE NUTRIENT LEVELS FOR PLANT ANALYSIS

CROP	VARIETY
Fir	Any

	Low	Normal	High	Excessive
Nitrogen (% DW)	0.45	0.66	2.22	3.50
Phosphorus (% DW)	0.05	0.07	0.26	0.40
Potassium (% DW)	0.20	0.28	1.84	2.50
Calcium (% DW)	0.09	0.12	1.39	2.00
Magnesium (% DW)	0.04	0.05	0.26	0.40
Sulfur (% DW)	0.07	0.11	0.22	0.40
Manganese (ppm DW)	70	200	1600	2000
Iron (ppm DW)	25	35	120	200
Copper (ppm DW)	1	2	8	25
Boron (ppm DW)	10	15	35	75
Zinc (ppm DW)	10	20	50	100

Plant Tissue Testing Labs

University of New Hampshire
http://extension.unh.edu/Agric/AGPDTS.htm

University of Maine
http://anlab.umesci.maine.edu/price/price0.htm

Penn State
http://www.aasl.psu.edu/manureprgnew.html

University of Massachusetts
http://www.umass.edu/plsoils/soiltest/

Cornell
http://www.css.cornell.edu/soiltest/plant_analysis/index.asp.

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Sending a Sample for Lab Diagnosis

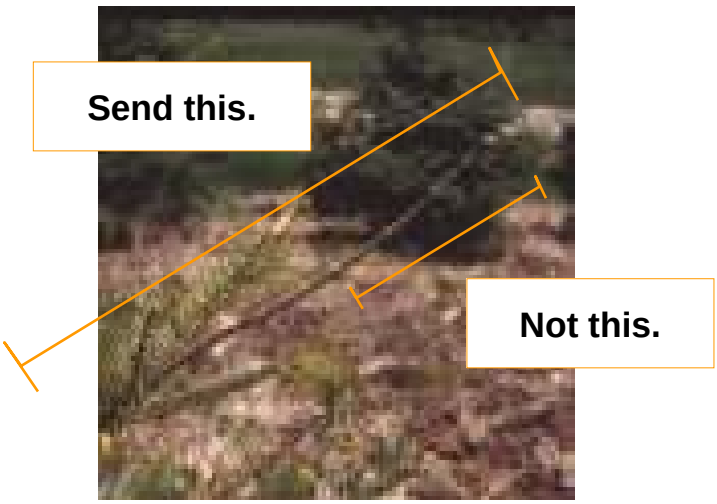
Include the transition zone.

Collect samples when foliage is dry.

Send generous amounts

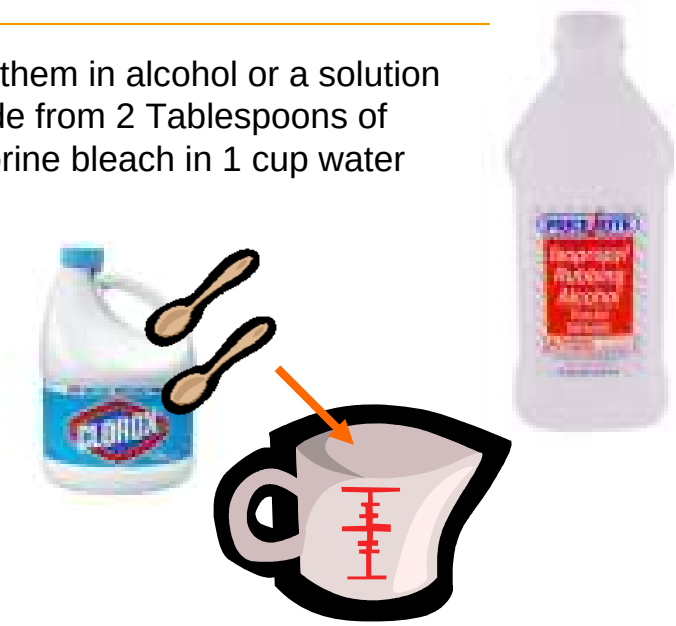
Don't add water..

Send immediately, early in the week.



To Disinfect Hand Pruners

Dip them in alcohol or a solution made from 2 Tablespoons of chlorine bleach in 1 cup water



For whole trees, remove extra soil and wrap roots in a plastic bag.

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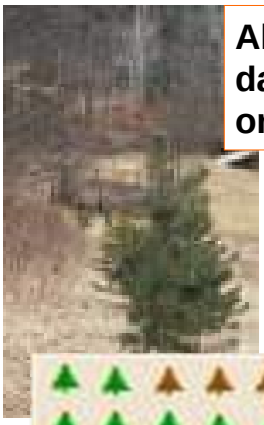
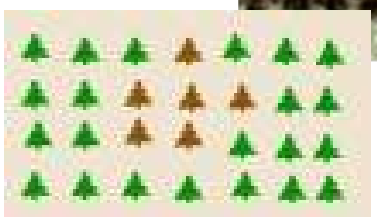
Patterns on the Landscape

Spreads from a center, like root rot.



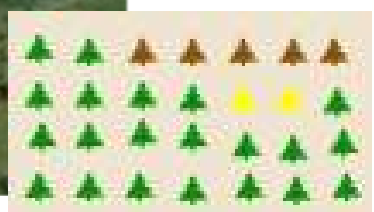
Along the edge, like damage from shading, or fungus disease

Shows up all at once, in part of the plantation, like lightening or winterburn.

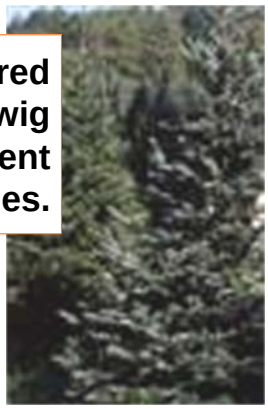


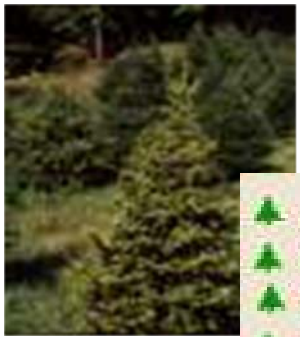
Down a row, like pesticide injury.

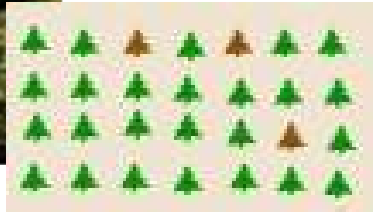
Progresses from the edge, like some wet site problems.



Shows up on scattered trees, like balsam twig aphid or some nutrient deficiencies.







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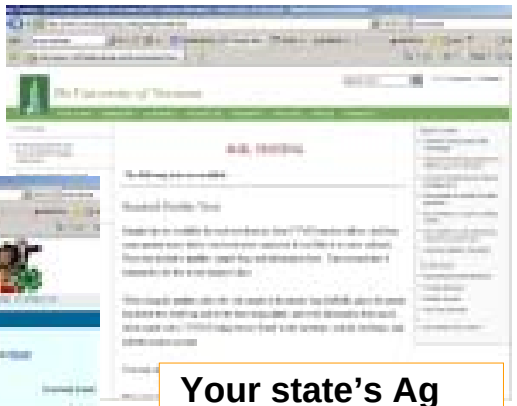
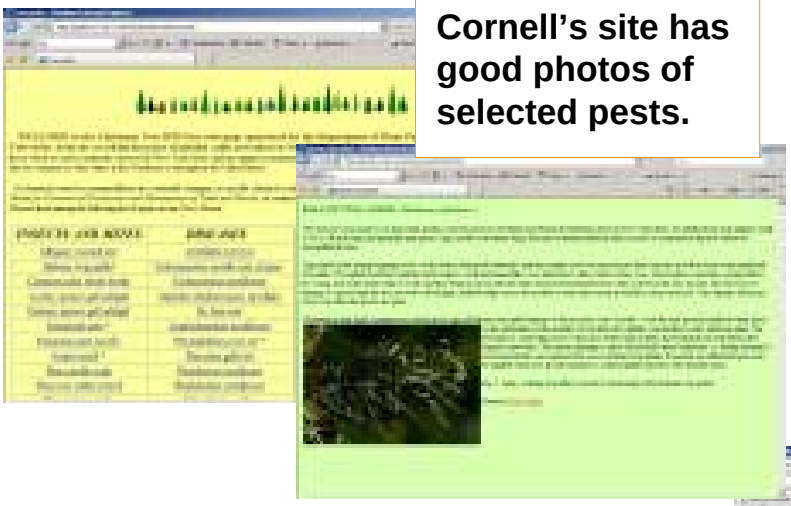
Christmas Tree Health Information on the Web

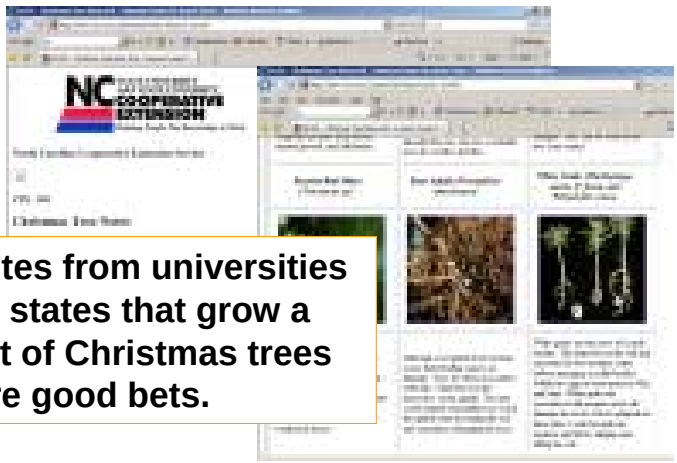
This entire manual is on-line



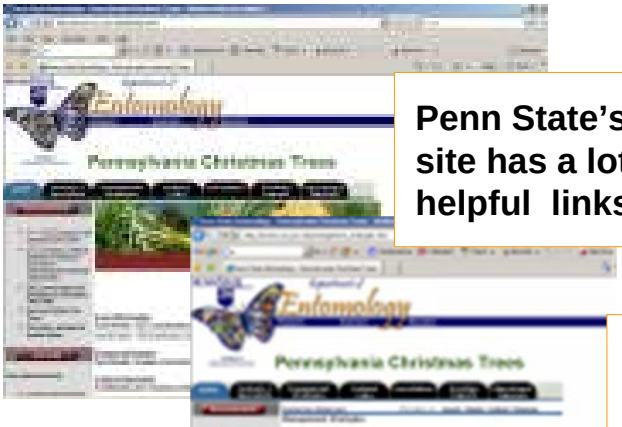
Your state's Ag Testing Lab will have information about how to send in samples.

Cornell's site has good photos of selected pests.

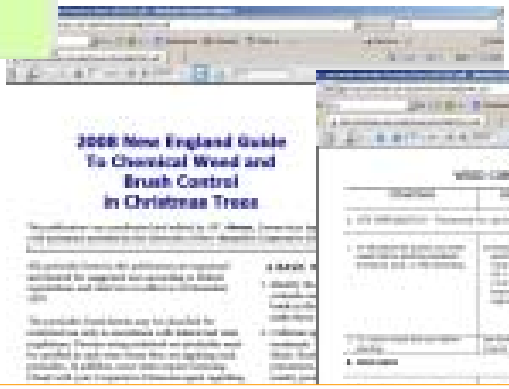


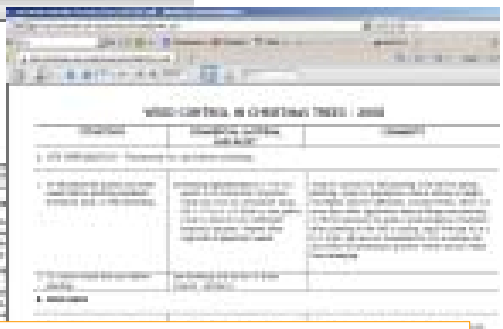


Sites from universities in states that grow a lot of Christmas trees are good bets.



Penn State's site has a lot of helpful links.





When the weed control recommendations are updated, you can find changes on the UNH website.

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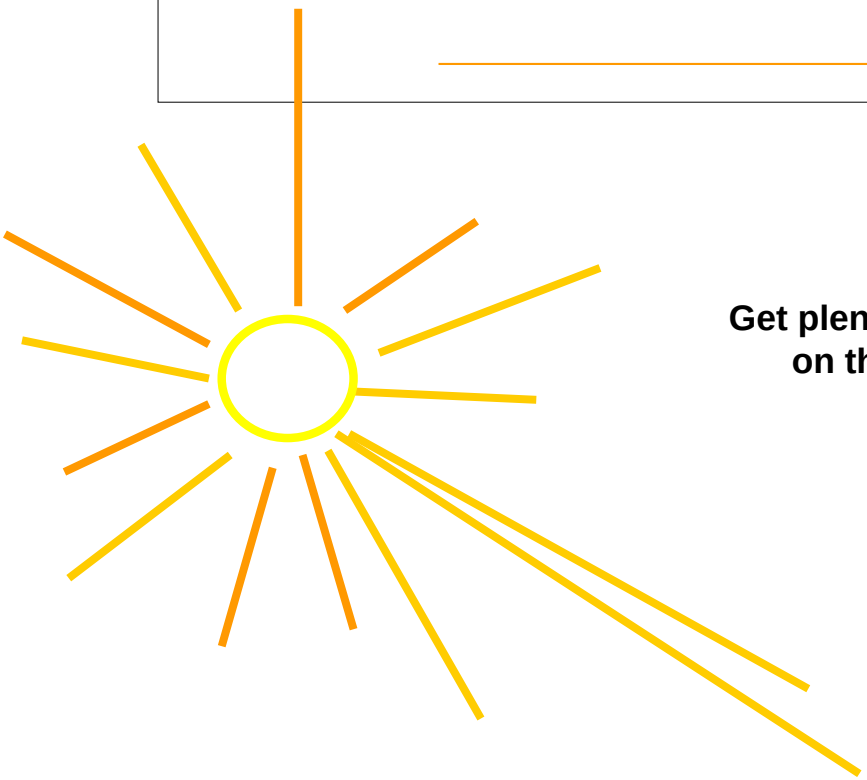
To Use a Hand Lens



Get plenty of light on the sample

Move your head and hand toward the sample (or move the sample towards the lens) until it comes into focus

Hold the lens close to your eye (about 1” away)

It may help to steady the lens by putting your finger through the opening in the lens holder,

…and bracing your hand against your face

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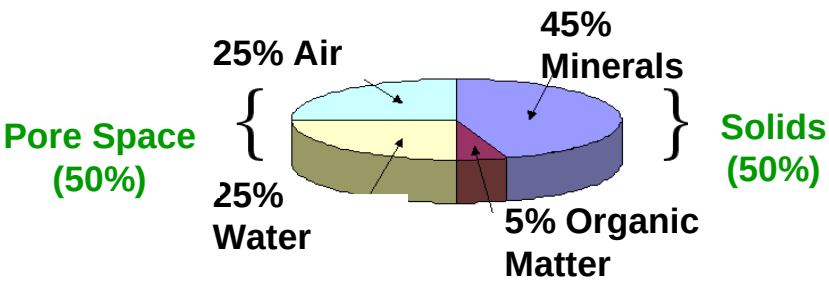
Site Evaluation

Wet Sites

All soil has pore space, which can be filled with air or water: ideally, half air, half water.



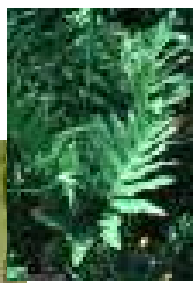
When all the pore space is filled with water, tree roots can't get the oxygen they need.

Wet Site Indicator Plants

Sedges: Triangular at the base in cross section.

You can't roll them between your fingers like grasses.

Sensitive Fern: Flat fronds; not at all lacy ("once-cut").



Separate fruiting structure.

…Also Spagnum Moss.

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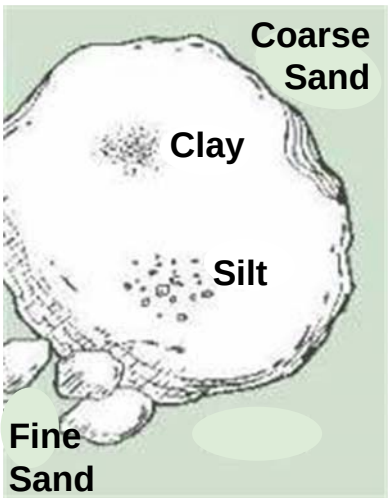
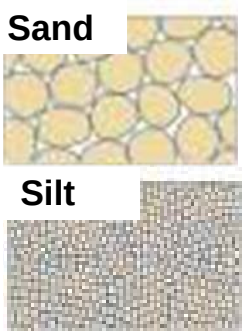
Site Evaluation

Dry Sites

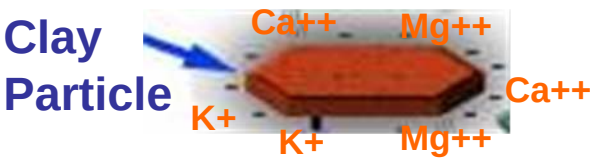


Sandy soils have more large particles, than fine particles like silt and clay.

Sand can't hold water as well as finer particles can. You may have a sandy soil if you can't make your soil into a ball when it's wet.



Because fine particles, like clay, are the ones that store soil nutrients, *and* because water is what carries nutrients to the plant, trees on sandy sites may show symptoms of nutrient deficiencies.



Shallow Sites

Roots are concentrated close to the surface on sites which are shallow because of bedrock, a hard "pan" soil layer, or a high water table. These roots are at risk of drying out during dry periods.

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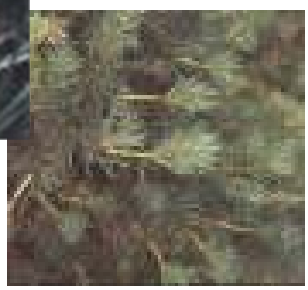
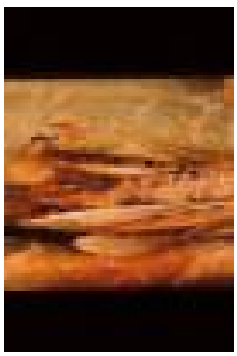
Some Things Aren't Problems



Male cones can cause bare spots.

All trees lose interior needles in the fall…some years more than others.

Lots of living things hang out on trees…….



Fungi that survive on needles that are already dead.

Natural enemies, like immature ladybugs, become common when the insects they feed on are common.

Bark lice feed on fungi and algae growing on the bark surface.

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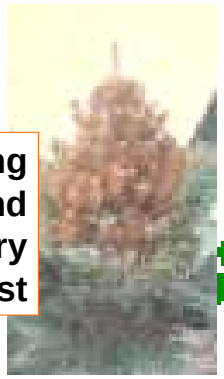
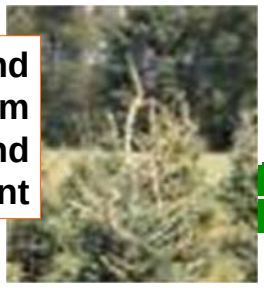
Patterns on the Tree

Abiotic

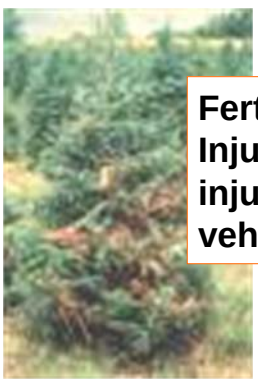


Winterburn.. showing the snow line… and other agents that dry out upper foliage first

Drought and wet sites can both accelerate interior needle loss.



Hail damage..and injuries from shearing and other equipment



Fertilizer Injury……and injuries from vehicles .

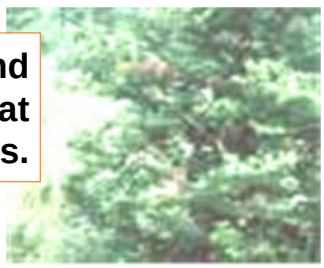
Wet sites….or any problem once it's really severe.

Insects & Diseases

White Pine Blister Rust… or any stem or root problem that stops water movement.

Spider Mites..that thrive on sheltered foliage.

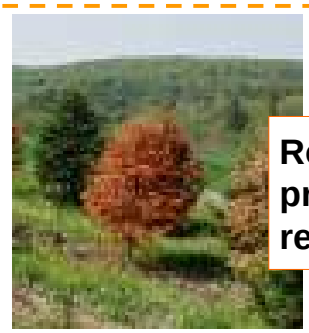
Needlecasts that infected last year's needles.



Sawyer Beetles,, and other pests that affect branches.

Root rot fungi growing up into the stem.

Needlecasts… & other foliage or branch diseases.



Root rots….or any problem once it's really severe.

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Symptom Evaluation

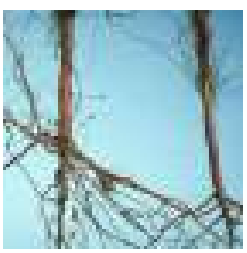
Asymmetrical Symptoms

Symmetrical Symptoms

Fine Feeder Roots

Fine roots grow whenever the soil is above freezing. Trees shed their fine roots like they shed their needles.

Unhealthy fine roots are brown. The bark slides off easily. Dead fine roots break off easily when the dirt is removed.



Healthy roots have pearly white tips.

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