

A TALE OF TWO CEDARS: WESTERN REDCEDAR AND YELLOW-CEDAR

25-28, May 2010

**University of Victoria,
Victoria, British Columbia**



Across species relative generalizations between Pinaceae and Cupressaceae families

	Pinaceae	Cupressaceae
Presence	↑	↓
Habitat	mesic	marginal
Growth	↑ determ	↓ indeterm
Pest resistance	↓	↑
Clonal structure	↓	↑
Adaptive patterns	specialist	generalist
Genetic diversity	↑	↓
Commercial importance	↑	↓
Heartwood durability	↓	↑
Research/genetic improv.	↓	↑

A Tale of Two Cedars: Symposium Schedule

Session AM1	Keynote presentations	Moderator, Paul Hennon
9:00-10:00	Nancy Turner	<i>The cultural roles of western redcedar and yellow-cedar for First peoples of northwestern North America</i>
10:30-11:30	Damon Little	<i>Red (Thuja plicata) and yellow-cedar (Callitropsis nootkatensis): phylogeny, nomenclature, and organismal character evolution</i>
11:30-12:30	Chris Gaston Ivan Eastin	<i>A tale of two markets: Opportunities for western redcedar and yellow-cedar in Japan and the U.S.</i>

Nancy Turner

The cultural roles of western redcedar and yellow-cedar for First peoples of northwestern North America

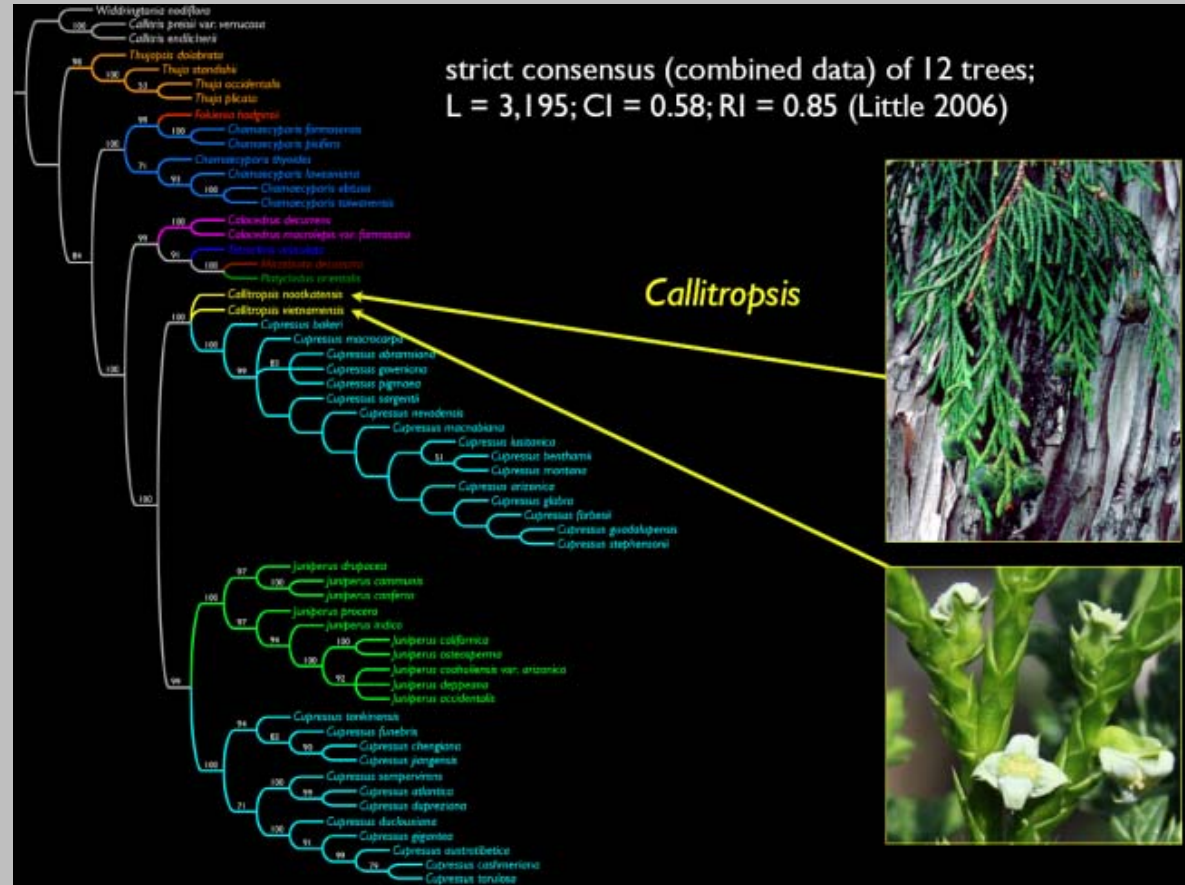


Damon Little

Red (Thuja plicata) and yellow-cedar (Callitropsis nootkatensis): phylogeny, nomenclature, and organismal character evolution



Callitropsis nootkatensis



Chris Gaston and Ivan Eastin

A tale of two markets: Opportunities for western redcedar and yellow-cedar in Japan and the U.S.



Tuesday PM₁	Paeleocology, ecology and habitat preferences
Tuesday PM₂	Soils and nutrient cycling
Tuesday PM₃	Ice breaker and Posters
Wednesday AM₁	Physiology
Wednesday AM	Forest Health
Wednesday PM₁	Climate
Wednesday PM₂	Field trip 1: Victoria watershed: Cwr old-growth/plantation First nations Dance and Salmon BBQ in Duncan
Thursday AM₁	Genetics
Thursday AM₂	Wood
Thursday PM₂	Field trip 2: J.River: Cwr/Cy genetics/silvics/old-growth
Friday AM₁/AM₂	Silviculture and management



United States
Department of
Agriculture

Forest Service

Pacific Northwest
Research Station

General Technical
Report
PNW-GTR-828
October 2010



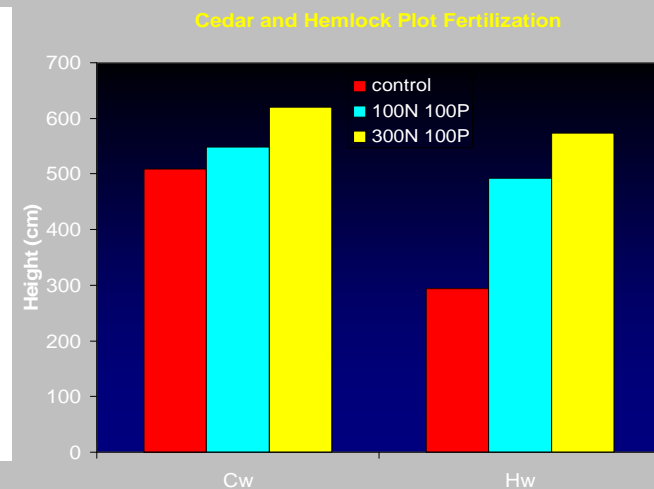
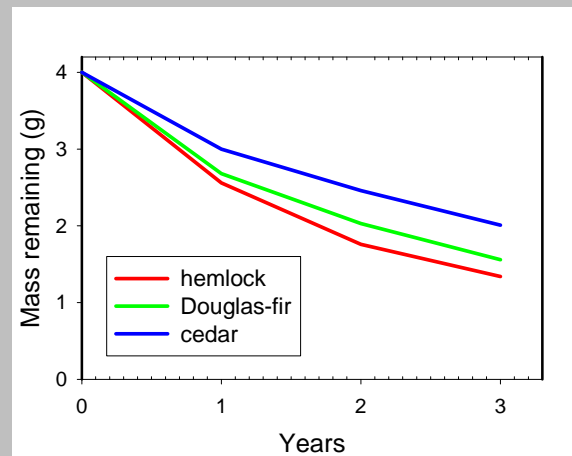
A Tale of Two Cedars: International Symposium on Western Redcedar and Yellow-Cedar

<http://www.fs.fed.us/pnw/publications/gtrs.shtml>



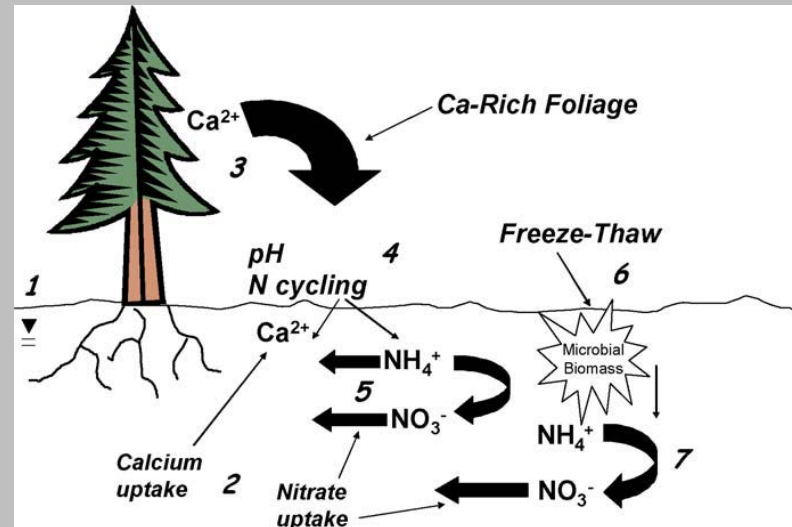
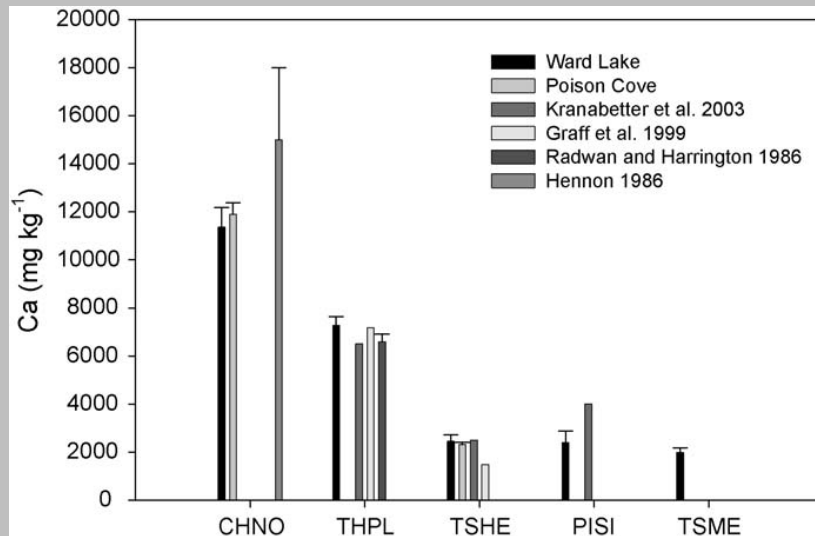
Ecology/nutrient cycling

- Cw past: indicator of nutrient-rich sites; produces N rich forest floors; cedar preferentially takes up nitrate; has arbuscular mycorrhizae (nitrate uptake)
- Cw research shows: grows on N-poor sites, does not respond to N addition, has recalcitrant litter\ low-N forest floors; low preference for nitrate uptake
- Current thinking: produces recalcitrant, low-N litter which decomposes relatively slowly, but has high pH and [Ca] which stimulate nitrification; no preferential nitrate form of nitrogen uptake
- Creates the unusual situation in which the forest floor is N-poor but dominated by nitrate



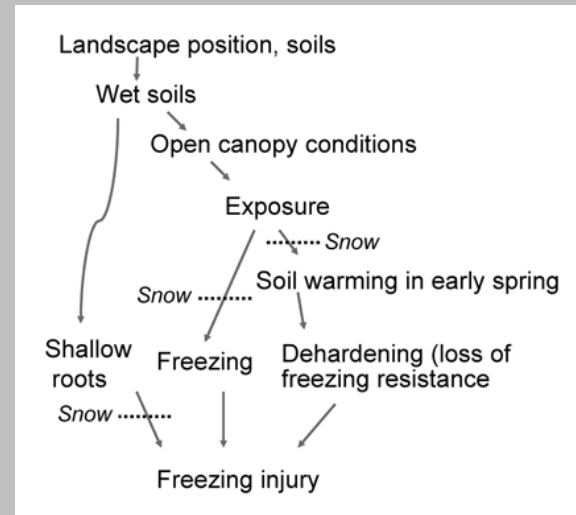
Cedar-nitrate hypothesis

- Yc/Cw competitive on wet, nearly saturated soils
- Assimilate NO_3 and Ca to control their internal cell pH
- higher pH and aerobic soil near surfac; nitrification
- susceptibility to freezing injury: fine-root biomass near the soil surface
- vulnerability to periodic root freezing; Yc decline



Yellow-cedar decline

- First recognized in Alaska; widespread
- >32,000 ha in BC south from Alaska to midcoast



- Dendrochronology, biophysical/landscape attributes to understand/model current/future Yc habitat for conservation and management (salvage/reforestation)
 - Risk of late frost, increased soil depth

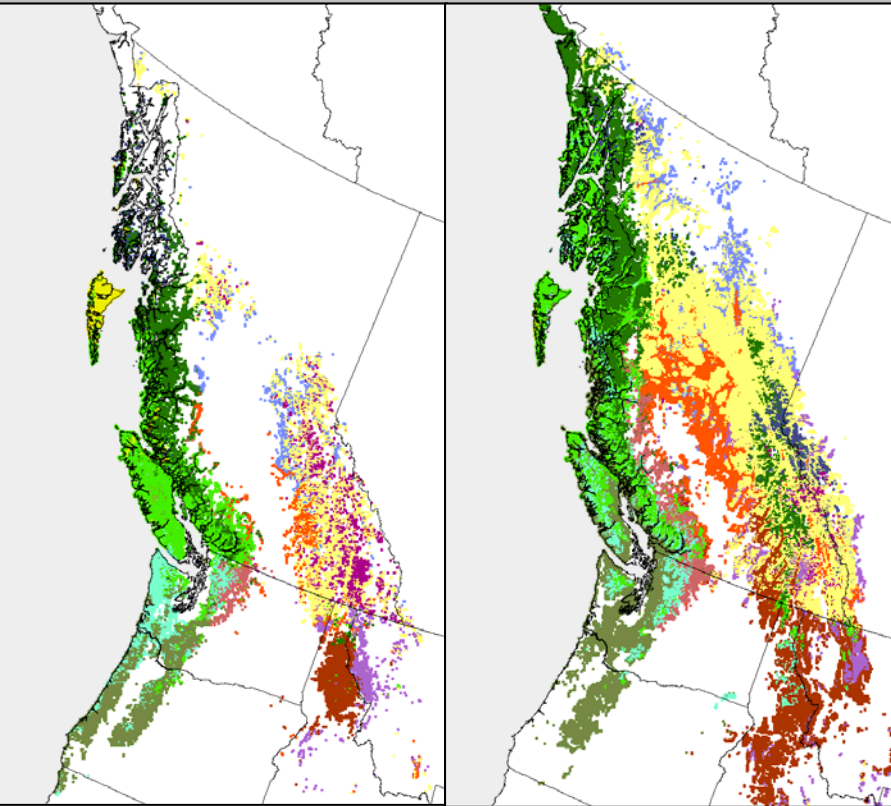
Climate and adaptation

- Climate envelopes: Seedzone projections

Western redcedar

Present

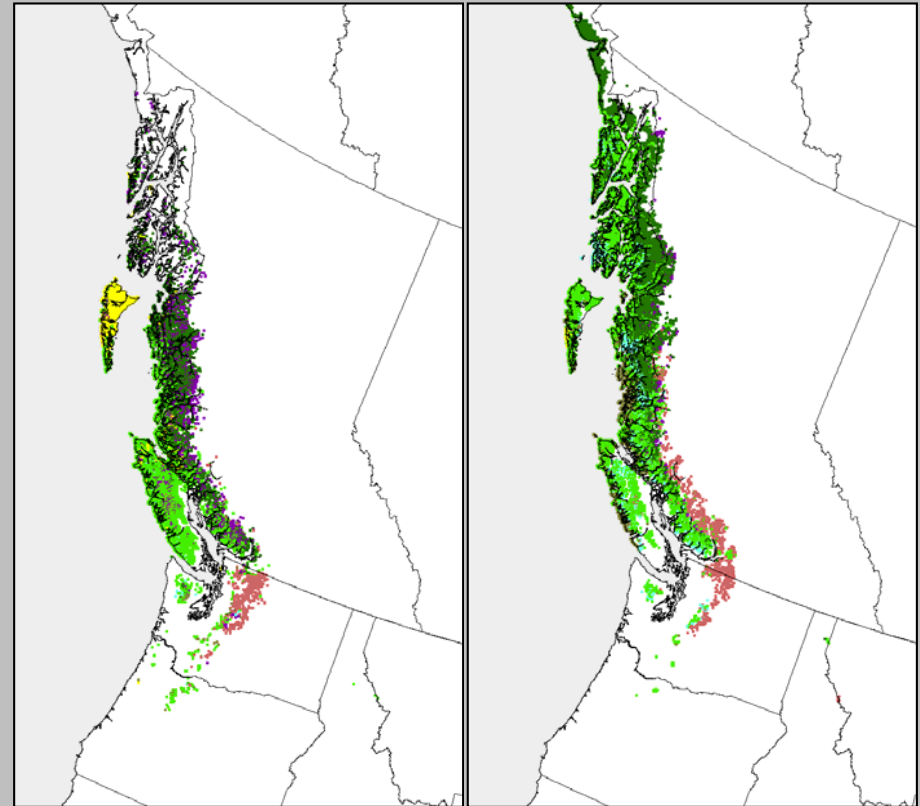
2080



Yellow cypress

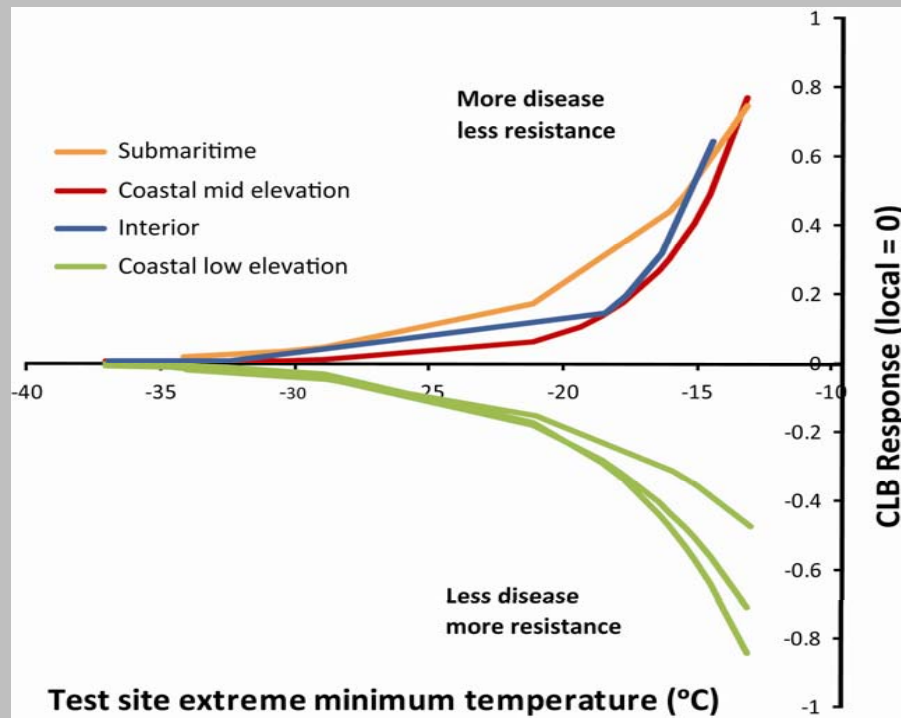
Present

2080



Climate and adaptation

- Climate envelopes
- Adaptation to future climates
 - Yellow cypress: broad transfer OK but snowpack and drought limit productivity, form & survival
 - Western redcedar: wetter spring, milder winter may increase CLB risk; higher productivity on warmer, summer-wet sites



Heartwood durability

- Rhona Sturrock...incredible wood fungal spp diversity



Pathogen Disease Name	Synonyms	Decay Type	Western Redcedar	Yellow- cedar
<i>Armillaria</i> spp. Armillaria root rot	<i>Armillaria solidipes</i> , <i>A. ostoyae</i> , <i>A. obscura</i> , <i>A. mellea</i>	Root, White	✓	✓
<i>Phellinus weirii</i> laminated root rot	<i>Poria weirii</i> , <i>Fomitiporia weirii</i> , <i>Fuscoporia weirii</i> , <i>Inonotus weirii</i> , <i>Phellinidium weirii</i>	Root, White	✓	✓
<i>Heterobasidion occidentale</i> annosus root rot	<i>Heterobasidion annosum</i> , <i>Fomes annosus</i> , <i>Fomitopsis annosa</i> , <i>Polyporus annosus</i>	Root, White	✓	
<i>Onnia tomentosa</i> Tomentosus root rot	<i>Inonotus tomentosus</i> , <i>Polyporus tomentosus</i> , <i>Coltrichia tomentosa</i>	Root, White	✓	
<i>Phaeolus schweinitzii</i> schweinitzii butt rot	<i>Polyporus schweinitzii</i>	Root, Brown	✓	
<i>Physiporinus rivulosus</i> white butt rot – white laminated rot	<i>Ceriporiopsis rivulosa</i> , <i>Polyporus rivulosus</i> , <i>Poria albipellucida</i> , <i>Poria rivulosa</i> , <i>Rigidoporus rivulosus</i>	Heart, White	✓	
<i>Perenniporia subacida</i> stringy butt rot	<i>Poria subacida</i> , <i>Polyporus subacida</i> , <i>Poria fuscomarginata</i>	Heart, White	✓	
<i>Phellinidium ferrugineofuscum</i>	<i>Phellinus ferrugineofuscus</i> , <i>Polyporus ferrugineofuscus</i>	Heart, White	✓	
<i>Porodaedalea pini</i> red ring rot	<i>Phellinus pini</i> , <i>Fomes pini</i> , <i>Trametes pini</i>	Heart, White	✓	✓
<i>Canoderma applanatum</i> white mottled rot	<i>Fomes applanatus</i> , <i>Polyporus applanatus</i>	Heart, White	✓	
<i>Fomitopsis pinicola</i> brown crumbly rot	<i>Fomes pinicola</i>	Heart, Brown	✓	✓
<i>Laetiporus conifericola</i> brown cubical rot	<i>Polyporus sulphureus</i>	Heart, Brown	✓	
<i>Postia sericeomollis</i> brown cubical & pocket rot	<i>Oligoporus sericeomollis</i> , <i>Polyporus sericeomollis</i> , <i>Poria asiatica</i> , <i>Poria sericeomollis</i> , <i>Tyromyces sericeomollis</i>	Heart, Brown	✓	✓

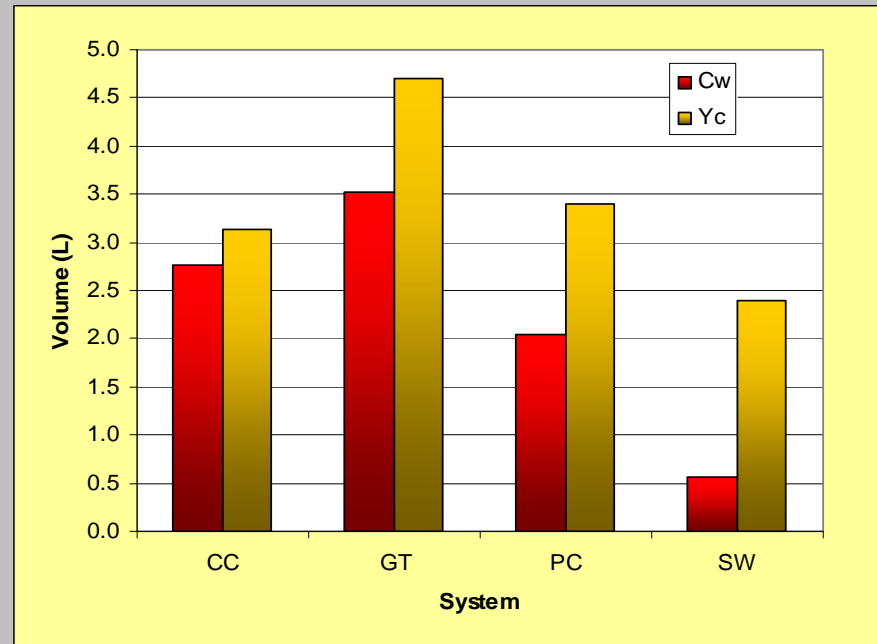
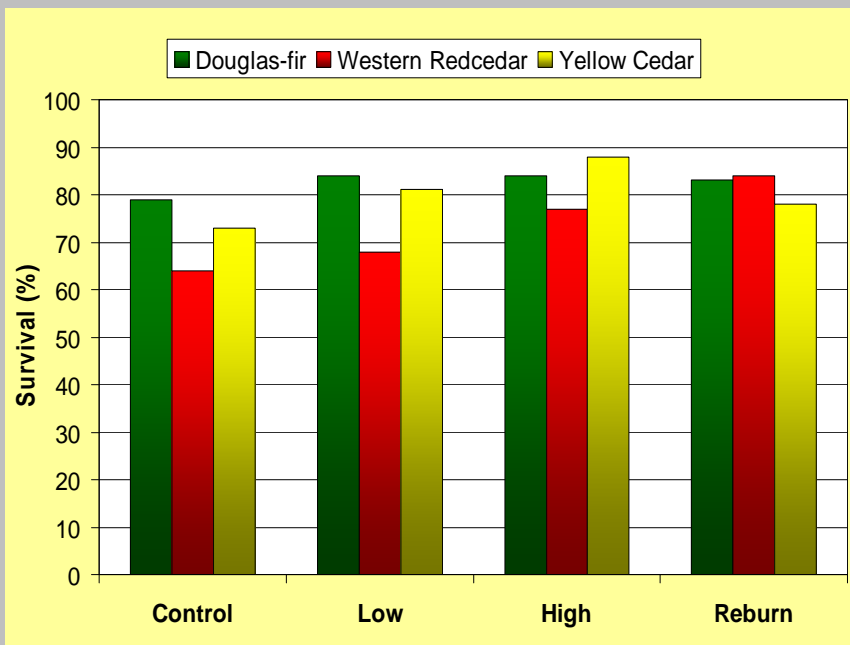
Heartwood durability

- Breeding for heartwood durability (BCFS/FPI):
 - living heartwood extractives (tropolones): antimicrobial
 - Wood in service (lignans): high concentration



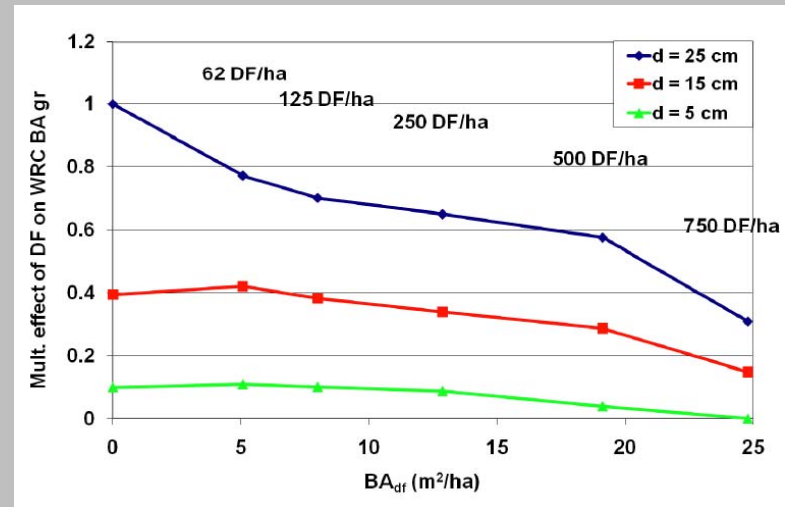
Management and silviculture

- **Beese and Chrimes:** Cw/Yc comparative studies (15-20 year results): .
 - Both Yc and Cw perform well with prescribed burning
 - Patch cuts & low levels of retention do not affect Cw & Yc growth
 - $Yc > Cw$ under partial canopies
 - Beware of species mixtures with Douglas-fir



Management and silviculture

- **Mainwaring and Maguire:** Mixed Cw/Dfc in W. Oregon (19-24 year results)
 - individual tree basal area growth was reduced 30% for Cw growing with 125 Douglas-fir per ha:40-80% with 500
 - height growth reductions only 8% with 125 Douglas-fir/ha

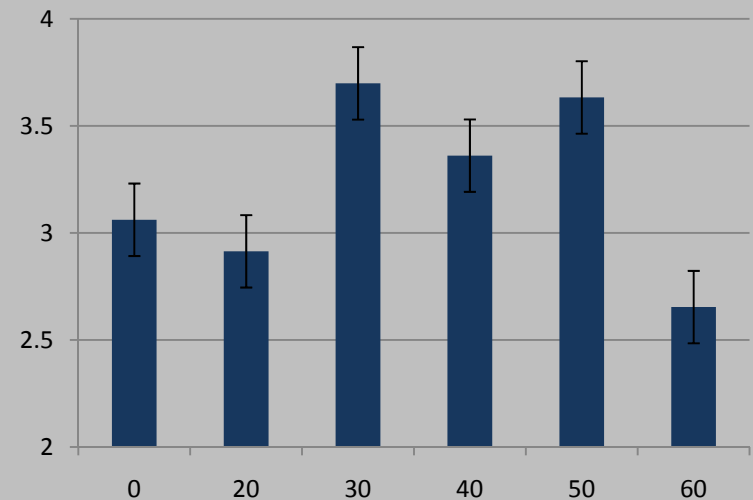


Management and silviculture

- **De Montigny, Negrave, Ott: Pruning Cw (12 year results)**
 - Pruning up to 50% of tree height in young cedar did not affect total height or DBH.
 - No excessive epicormic branching with pruning <50% tree height



Height Increment After 12 Years



Management and silviculture

- Rod Negrave: Cw/Hw comparison (15 years)
 - Cw will tend to produce more structurally diverse stands than Hw on sites with medium, but not poor, nutrient supply;
 - fertilization reduces stand diversity
 - increased soil resource availability does not promote structure



Management and silviculture

- Rudi van Zwaaij: 20 years growing cedars



- Claire Kooistra: Yellow-cedar in the interior







THE BALLAD OF TWO CEDARS

Come listen to a story 'bout a cedar that is red
The native folk say that it kept their family fed
Even though they didn't use the cedar tree for food
They used the bark for baskets, and made houses from the wood
Long houses, sturdy walls, totem poles

Well the next thing you know those burly loggers came
The locals said, "Weyerhaeuser is to blame!"
They said "California is the place you ought'a be"
But they cut a lot of cedar and they left woody debris
Coarse woody, rotten logs, habitat

Well red cedar has a cousin and its wood is kind' a yellow
Most folks say he's a mighty handsome fellow
They say *Callitropsis* is the name we ought'a use
Don't say *Chamaecyparis* or folks will be confused
Alaska cedar, Nootka cypress, Cupressaceae

Now folks did some retention and they left some scattered trees
Franklin and Bunnell said it's good for birds and bees
Along came the wind and it blew some cedars down
But they'll still have a life just lying on the ground
[If the salvagers don't get 'em!] **Shake** cutters, chainsaws

So now you've heard the story of the yellow and the red
Yellow is declining and a lot of trees are dead
They're worth a lot of money making houses in Japan
And we want them in the future so we're doin' what we can
Research, management, conservation

Yes, we love both of these cedars
So we're doin' all we can.

<Da dada da da, da da>