

Douglas-fir Beetle - Detection

- 
1. Aerial Surveys
 2. Ground Surveys
 3. Monitoring

Aerial Surveys



- Overview survey
- Detailed surveys
- Map estimated current attack
- based on colour change
- Map in late July to end of August

After aerial mapping must ground check

- Foliage colour change

- Green → Yellow → Red

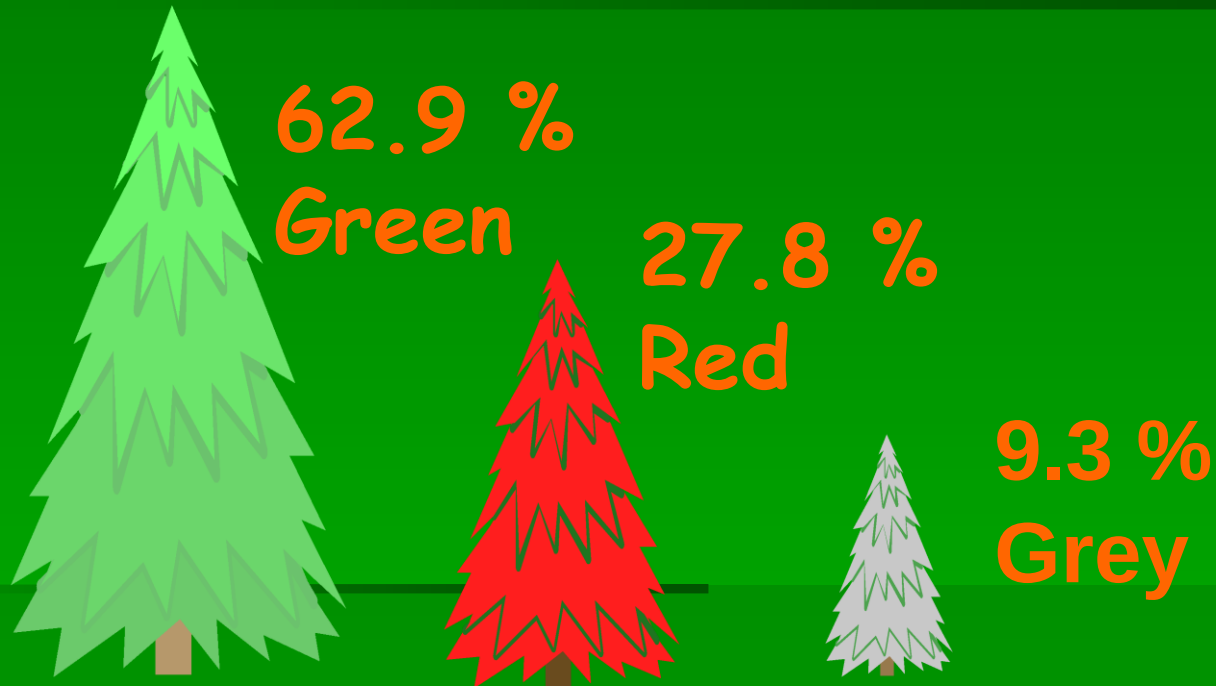
Variable colour change

- Gradual or rapid colour change

- Never assume red & grey have no beetles. You must check under the bark!



Colour Change During Aerial Survey Period



72.2 % of current attack
undetected



- Frass is boring dust plus beetle poop
- Frass on trunk is the best external sign
- fluffy fresh frass

Frass in Bark

- Moderately fine
- Reddish brown
- Accumulates in crevices
- No pitch tubes





Trees Pitch
out Douglas-
fir beetle

the tree
frequently
produces
great
amounts of
flowing resin

Internal Gallery Signs

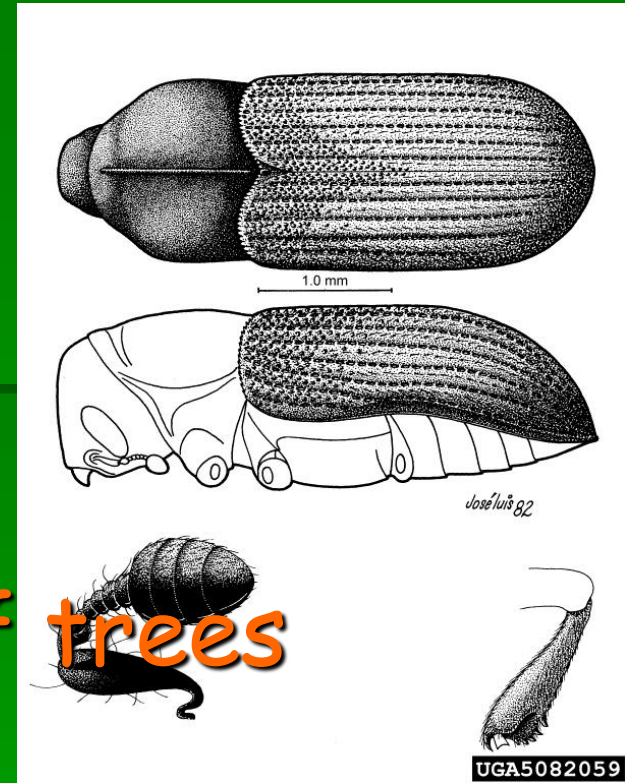


- hook on gallery
- 20 - 25 cm long galleries
- alternate fan-shaped groups
- Packed with boring dust

Look
under or
inside the
bark for
beetles

Secondary Beetles

- Douglas-fir pole beetle
- Infests tops & branches of trees attacked by IBD
- small trees may be killed by pole beetle
- Adult about 3 mm long (small)
- May kill trees but very infrequently
- May interfere & fill up IBD trap trees.



Secondary Beetles

Douglas-fir pole engraver

Secondary Bark Beetle Frass

- fine
- reddish brown



Ambrosia Beetles

- Fine white frass at base of tree
- Burrows into the wood causing shot holes
- Trypodendron &
- Gnathotrichus



UGA1258204



Carpenter Ants



- Coarse frass
- Oval entrance
- small particles of white wood mixed with brown

Woodborers

- roundheaded &/or flatheaded
- Coarse frass
- mixture of white & brown particles.

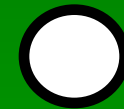


Emergence Holes



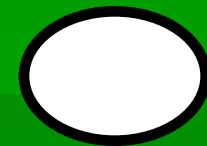
Douglas-fir Beetle

3 mm



Woodborer/Ants

4.5 - 21 mm



Fungal fruiting bodies

- Conks of pouch fungus
- *Cryptoporus volvatus*
- Often on old attack
- Grow out of emergence holes



Beetle Squish Test

- Difficult to determine if red trees are current attack
- Important to assess adult beetles for life status in these trees
- Old beetles dry and crumbly
- New adult beetles soft and squishy

Ground Surveys/Probes

- Star probe
- Grid Probes
- Trap Tree spill-over
- Post-harvest mop-up

Star Probes

- Search at least 50 m beyond last current attacked tree
- GPS POC
- Generally start at mapped infestation centre (red, green and old attack)
- Work around centre looking for current attack
- beetle attacked trees on probe sheet

Star Probes

- Record trees by category on probe card or in digital device
- for example current attack = G or X

Attack Codes

Use these codes to record the attacked trees you find.

Douglas fir beetle & mountain pine beetle

P = Partial

X = Current

⊖ = 1 yr old

⊕ = ≥ 2 yrs. old

W = Windthrow

T = Trap Tree

spruce beetle

P = Partial

X = Current 1 yr.

⊖ = Current 2 yrs., yr. 1

⊗ = Current 2 yrs., yr. 2

⊖ = Old

W = Windthrow

T = Trap Tree

SAMPLE TREE DETAILS

No.	HT	Spec	D.B.H.

MAP LEGEND

S = Strip

G = Green

R = Red (IBD only)

2 YR. = (IBS only)

⊖ = 1yr. old

X = ≥ 2 yrs.

W = Windthrow

- Probe Card

A blank sheet of graph paper with a grid pattern. The vertical axis is labeled with 0 at the top, 400, 300, and 200 from top to bottom. The horizontal axis is represented by a single vertical line running down the center of the page. The grid consists of small squares, with major lines every 100 units on the vertical axis and minor lines every 20 units. There are no markings or data plotted on the grid.

Ground Surveys

- Mark tree location on card or in your device
- Number & mark trees
- Stripe at base

Estimate diameter?

- Mark all current attack trees
- "When in Doubt, Take It Out"



Ground Surveys

- **PO** indicates pitch out
- Paint on tree to alert probe checkers



Ground Surveys

- No beetles in old attack
- paint an X on stem
- Place a dot of paint on all non-attacked trees



Ground Surveys

- Strip attack or partial attack occurs when one side of a tree is successfully attacked
- Partial attack is coded as PA or S
- Mark partial attack as current attack
- Walk completely around trees to make sure partial attacks are detected

Ground Surveys

- Chop!
- Chop!
- Chop!
- Until you understand what is going on under the bark of the tree



LOOK UP!

- Always look up the tree trunk

- Look high up on the trunk for:

Frass

Pitch streams

Woodpecker action

- Ignore all frass or insect activity below breast height, especially on old vets