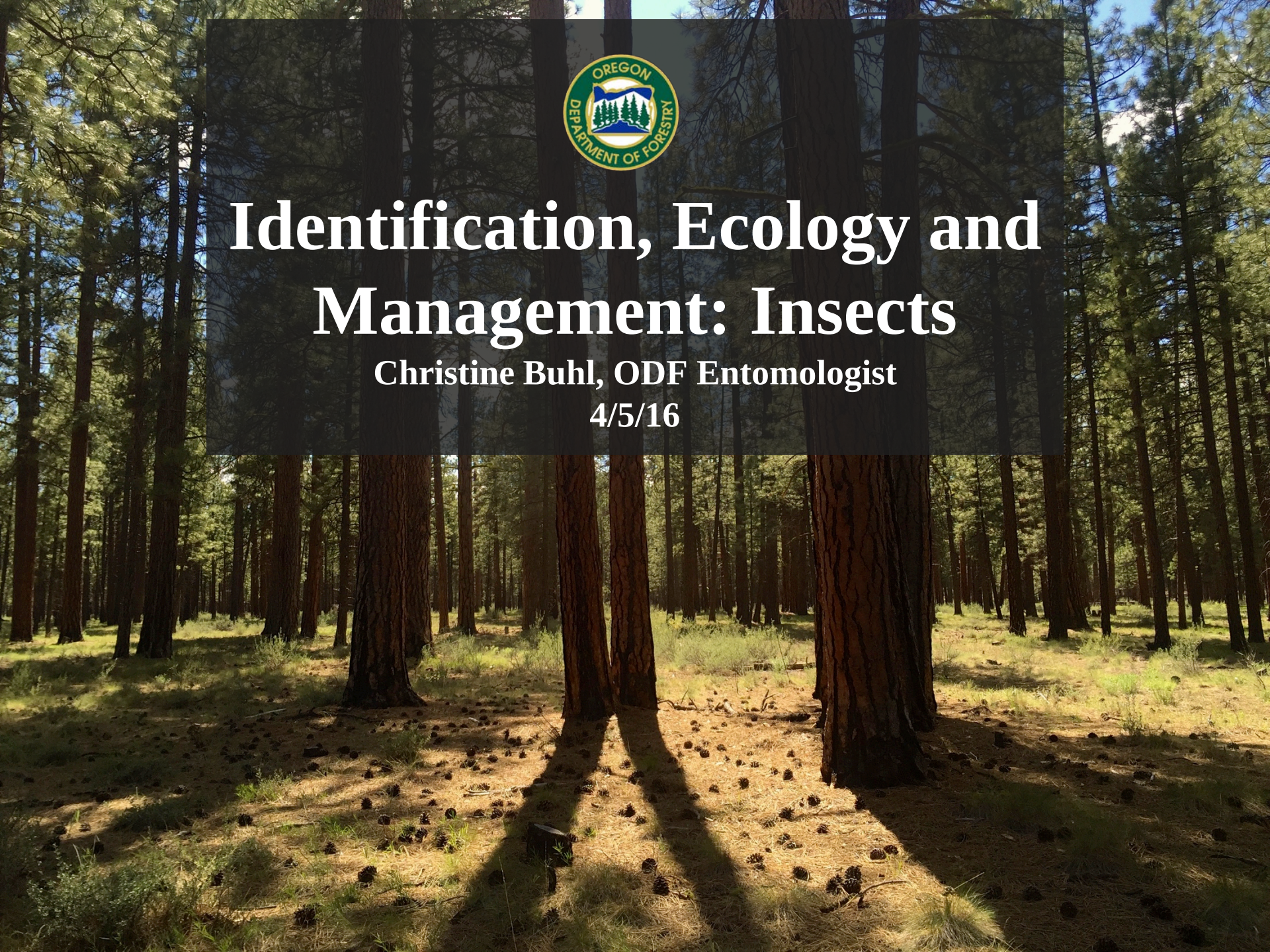


Identification, Ecology and Management: Insects

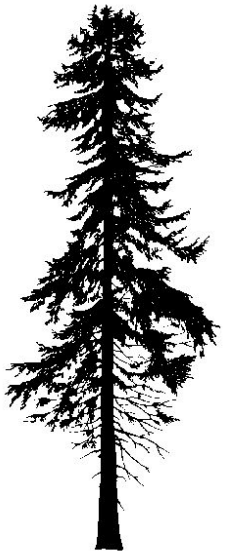
Christine Buhl, ODF Entomologist

4/5/16

MAJOR BARK BEETLES IN OREGON FORESTS

Douglas-fir

- Doug-fir beetle



True fir

- Fir engraver*

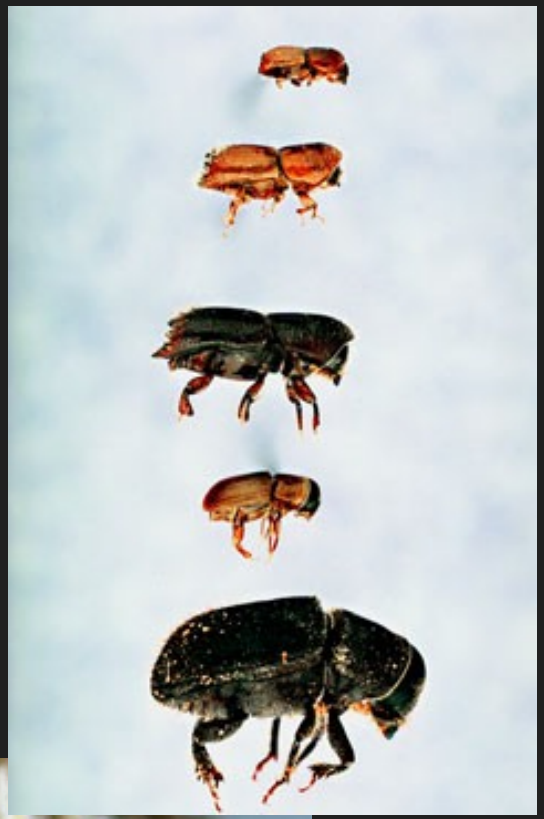
Pine

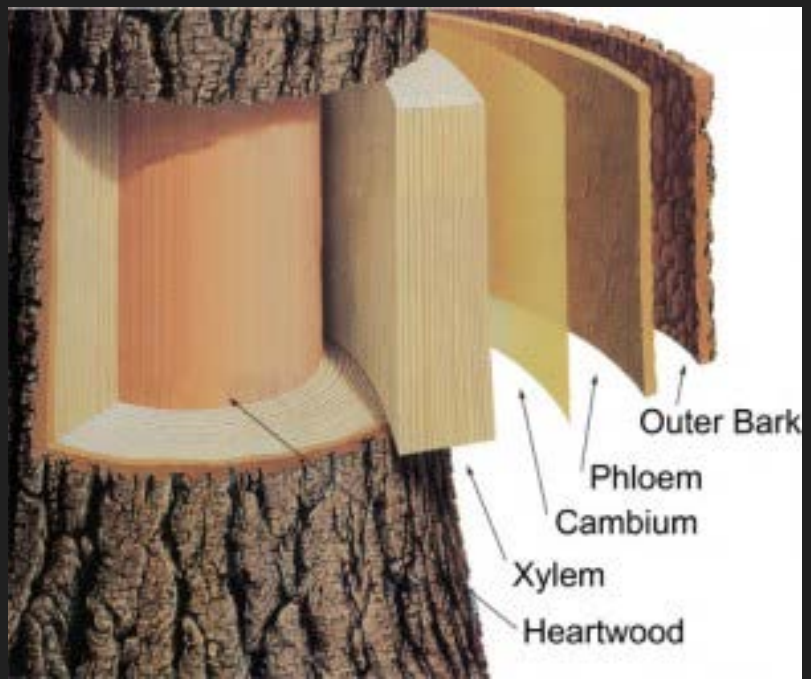
- *Ips* spp. beetles
- Mountain pine beetle
- Western pine beetle (ponderosa only)
- Red turpentine*

*secondary pest

HOW DO BARK BEETLES WORK?

- Most damaging group of forest insects
  - Opportunistic, some eruptive
  - Feed on inner bark
  - Introduce fungi
  - Affect water and nutrient uptake





BEETLE-VECTORED STAINS

- Aesthetic – no structural defect
- Appear weeks after beetle infestation
- Evident in drilled shavings or core samples

Blue stain/Sapstain (various bark beetles)

Black stain (ambrosia beetles)

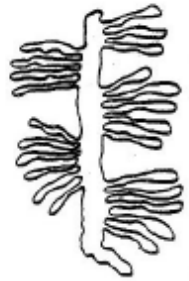
BARK BEETLE SIGNS

Pitch / boring dust

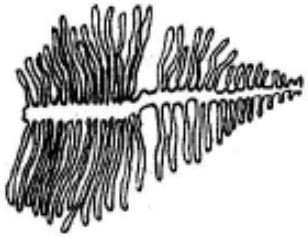
Egg and larval galleries

Staining

GALLERIES VARY BY BEETLE SPECIES



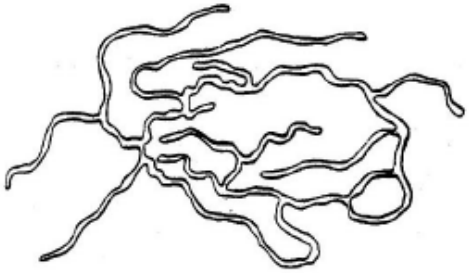
f. Douglas-fir beetle



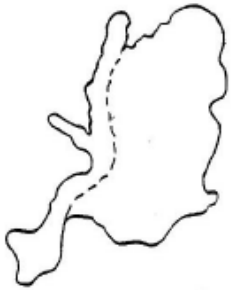
a. Fir engraver

California 5-spined *Ips*

d. Mountain pine beetle,
Jeffrey pine beetle



b. Western pine beetle



h. Red turpentine beetle

BARK BEETLE-CAUSED MORTALITY

Color change on a portion or whole tree depending on beetle species

Occurs the same year of attack at the end of summer or next year at the start of spring

BARK BEETLE OUTBREAK DYNAMICS

- Eruptive bark beetle events are linked to many factors
  - Stand conditions (density, structure, tree species)
  - Climate and weather conditions (drought, temp.)
  - Damaging events (storms, fire, diseases, defoliation)

Douglas-fir blowdown, OR Coast

Whitebark pine, Central OR

Endemic MPB, Southwest OR

MPB outbreak begins

MPB outbreak intensifies

MPB outbreak declines

DOUGLAS FIR BEETLE

Most at risk:

- Pole-sized and larger Doug-fir
- Outbreaks associated with blowdown, root disease, drought, defoliation, fire injury

DOUGLAS-FIR BEETLE

Infestation/Outbreak Cycle

1. Endemic populations attack scattered blowdown & root disease pockets

2. Population build-up following large storm events (1-2 year duration)

3. Outbreak populations attack standing >8” trees (2-3 year duration)

MCH: ANTI-AGGREGATE PHEROMONE

(for Doug-fir beetle)

- Apply annually in March
  (reapply 1-2 more years if necessary)
- 1 blister pack per tree at a rate of 30/acre
- $80-100/acre
- Make also apply aerially as flake formulation
- Efficacious, pair with silvicultural management

FIR ENGRAVER

Most at risk:

- Slash then drought stressed true fir (grand and noble)
- Also associated with root diseases and defoliation

Ips spp.

Pine engraver and California 5-spined

Most at risk:

- Slash then drought or fire-stressed pines

(small-diameter pines, top-kill in larger trees)

MOUNTAIN PINE BEETLE

Most at risk:

- Older, dense lodgepole (and other pines)

>60 yr | >6” dbh | BA >100 ft^2

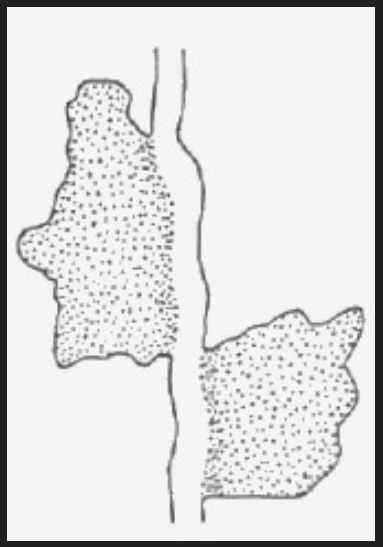
WESTERN PINE BEETLE

Most at risk:

- Drought and fire-stressed or injured ponderosa

RED TURPENTINE BEETLE

Good indicator that *Ips*, mountain or western pine beetles have already infested



VERBENONE: ANTI-AGGREGATE PHEROMONE

(for pine-infesting beetles)

- Apply annually in May

  (reapply mid-summer if necessary)
- 1 pouch or 4 dollops per tree at a rate of 30 or 20 treated trees/acre, respectively
- $250/acre
- Variable efficacy

TREE STRESS = BARK BEETLE INFESTATIONS

Trees are stressed by:

- Drought
- Stand density
- Competition
- Old age
- Mechanical injury
- Lightning
- Fire
- Disease
- Defoliation
- Poor or inappropriate site quality

Drought damage in Doug-fir

BARK BEETLE MANAGEMENT

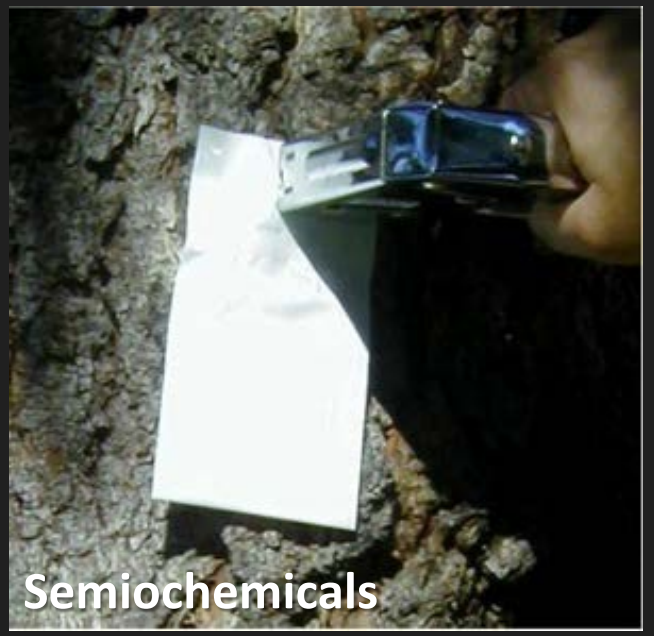
Silvicultural strategies:

- Remove infested trees
- Thin before outbreaks
- Source seed locally
- Diversify species and structure
- Salvage blowdown
- Slash management
- Follow root disease management guidelines

BARK BEETLE MANAGEMENT

Chemical treatments (high value or individual trees):

- Bark cover sprays (effective but expensive and intensive)
- Systemic applications (promising, still under development)
- Semiochemicals (only MCH recommended)



WOOD-BORING BEETLES

- Flatheads
- Roundheads
- Ambrosia beetles

FLATHEADS (Metallic wood-borers)

- Horseshoe nail-shaped larvae
- Bullet-shaped adults, often metallic, with short antennae
- Packed, concentric frass
- D-shaped exit holes

Many flatheads are harmless

Major flathead pest: Flatheaded fir borer

Most at risk:

- DF on poor sites (at <3,500'), drought and fire stress

Signs:

- Woodpecker damage, larval mines, D-shaped exit holes

INVASIVE! Emerald ash borer

SIGNS: D-shaped holes or dead branches in ash

Report find:

1-866-INVADER

https://oregoninvasiveshotline.org/

More info:

http://pestdetector.forestry.oregonstate.edu/

ROUNDHEADS (Longhorned beetles)

- Cylindrical larvae
- Long antennae on adults
- Loose and course, or splinter-like frass
- Round exit holes

Many roundheads are harmless

INVASIVE! Asian longhorned beetle

Round holes and chewed niches in various hardwoods

Report find:

1-866-INVADER

https://oregoninvasiveshotline.org/

More info:

http://pestdetector.forestry.oregonstate.edu/

AMBROSIA BEETLES (many species)

Most at risk:

- Various hard and softwood species; wet or coastal regions and timber lots

Signs:

- Fine white frass, pinholes, black staining

*Feeds on fungal ‘ambrosia’ gardens – not wood

Sap-sucking insects:
BLACK PINELEAF SCALE

Most at risk:

Pine and DF in agricultural areas

Damage

Chlorotic spots, needle loss (lion's tail), dieback/reduced growth/mortality if chronic

BLACK PINELEAF SCALE: MANAGEMENT

- Thin stand
- Alter non-target impacts to natural enemies – reduce broad-spectrum pesticides, alter treatment timing, reduce drift
- Oils and soaps – timing important, requires frequent reapplication, may also impact natural enemies
- Acephate or imidacloprid injections – timing important, uptake and translocation dependent on moisture levels

PESTS OF OAK

Leaf miners
Reduced photosynthetic capacity if chronic

Galls (leaves, twigs)
Mostly damaging for small oaks (girdling)
Can trigger debarking by squirrels

Pit scales
Slowed growth, tip dieback, mortality
Strongly associated with drought

RESOURCES

ODF Forest Health Factsheets

USFS Forest Insect and Disease Leaflets (FIDLs)

Forest Health Highlights

OSU & WSU extension: stand and slash management guides

Photo credits:
Forestry Images, USFS, ODF, WDNR Archives