

Tree Pests and Disease

Outline for Health Management Plan: Loblolly Pine

Readings:

- Loblolly Pine Biology (http://www.na.fs.fed.us/spfo/pubs/silvics_manual/Volume_1/pinus/taeda.htm)
Southern Pine Beetle (http://www.na.fs.fed.us/spfo/pubs/fidls/so_pine_beetle/so_pine.htm)
(http://whizlab.isis.vt.edu/servlet/sf/spbiccc/page.html?name=spb_IPM)
Fusiform Rust (<http://www.na.fs.fed.us/spfo/pubs/fidls/fusiform/fidl-fusi.htm>)
Edmonds p. 327-331, 491-502,

- I. Consider forest management objectives: **Plantations and Natural Regeneration.**
- II. Understand biology for tree species (how adapted).

A. Site.

1. Soils -

2. Soils -

3. Seedling establishment.

4. Competitors.

B. Climate.

III. Disease complex: Fusiform rust.

A. Components.

1. Diseased tree, plant(s):

a) Susceptible species:

b) Symptom(s):

c) Tissue functions initially affected:

d) Potential impact on whole tree functioning:

e) Potential impact on forest.

2. Primary stress(es) [pathogen(s)]:

a) Abiotic factor(s) &/or Latin name(s):

***Cronartium quercuum* form species *fusiforme*.**

b) Signs:

3. Environment: Geographic range where complex is found

B. Development - Interaction of disease triangle over time.

1. Predisposing factors: What makes disease possible.

a) Tree adaptations - resistance:

b) Degree of stress:

i) Life cycle and mechanisms:

ii) Why fusiform rust has become a problem due to land use history

2. Inciting conditions:

3. Contributing factors:

C. Control options: (Silvicultural, biological, breeding, legal, chemical, mech., none)

1. Preemptive:

a) What can increase tree resistance:

i) Genetic breeding.

ii) Seed sources.

iii) Protective fungicides in nurseries (June).

b) What else can decrease stress(es) (pathogen(s)):

2. Reactive:

a) What else can decrease stress(es) (pathogen(s)):

3. Feasibility of option(s):

a) Economic: cost vs. value.

b) Ecological: Influence on other species in forest.

c) Political: Laws and regulations.

IV. Complex: **Southern Pine Beetle.**

A. Components.

1. Tree species attacked:

a) Symptoms:

- i) Needles turning yellow, red, then brown in 1-2 months
- ii) Dying trees in pockets.

b) Diseased functions:

- i) Tissues affected:
- ii) Impact on tree

iii) Impact on forest:

2. Primary stress agent

- a) Species: **Southern Pine Beetle** (*Dendroctonus frontalis* = “tree killer”)
- b) Signs:

3. Environment: Geographic range where complex is found

B. Disease development

1. Predisposing factors:

a) Tree adaptations - needs vigorous water transport

b) Degree of stress - Life cycle

i) **Blue stain fungi**

ii) **Primary Attacks**

iii) **Secondary attack**

iv) Switching

v) Female constructs S-shaped brood gallery

vi) Larvae

vii) Pupae

viii) Fall dispersal

ix) Overwinters

x) Generations per year:

c) Degree of stress - Natural mortality factors:

2. Inciting conditions

a) Weakened tree

3. Contributing factors:

C. Control options

1. Pre-emptive:

2. Reactive

3. Feasibility

a) Economic considerations

b) Ecological considerations

c) Political

V. HMP Recommendations for Loblolly Pine

A. Pre-emptive:

B. Monitor and survey

1. Where are surveys needed:

2. Signs and symptoms.

3. How often should surveys be done?

 4. What time of year should the observations be made?

 5. Be aware of surrounding landscape
- C. Reactive