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Forest Biosecurity and Protection

Nectria ecology summary March 2007



1. How does the fungus spread and infect the host?
2. How does the host respond to the fungus?

1. Spread and infection: Spore Trapping

- ▶ Is there a correlation between spore release and environmental conditions?

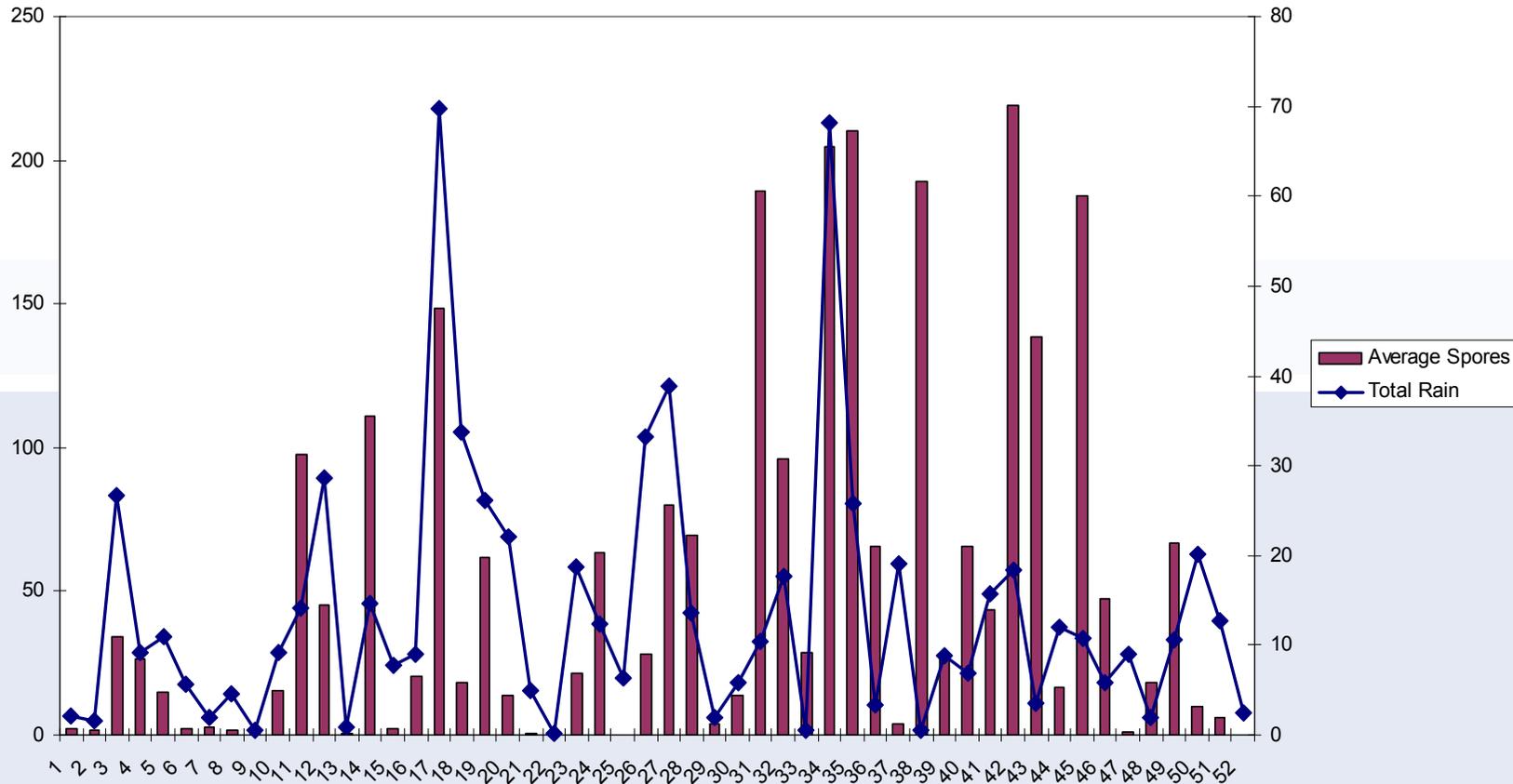


1. Spread and infection: Spore Trapping

- 3 spore traps around each of 2 trees
- Traps changed weekly for one year
- Collected environmental data



1. Spread and infection: Spore Trapping



•Some relationship between rainfall and spore release

1. Spread and Infection: Spore Trapping



- Further investigations:
 - ▶ Ice melt on stems
 - ▶ Temperature
 - ▶ Consecutive rain days

1. Spread and Infection:

Long-term spore viability



- Aim: determine long-term viability of ascospores within perithecia.
- Preliminary trials: May require an overwintering period.
- Methods:
 - ▶ 4 treatments: room temp, 4°C, -18°C, room temp/- 18 °C alternating
 - ▶ 2 wood blocks/treatment
 - ▶ Assessed after 1, 2, 3, 6 and 12 months

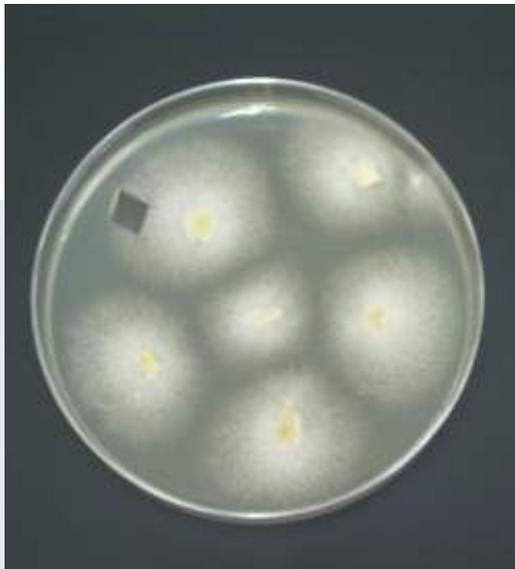
1. Spread and Infection: Development of perithecia



- Aim: determine how long after infection perithecia are produced & how long they remain viable
- Assess inoculation conc. trial monthly - photographs
- Collect data from pruned stub trial, other observations

1. Spread and Infection:

Effect of resin on growth and germination



- Aim: examine the effect of pine resin on mycelium and spores.
- Methods:
 - ▶ Grow *Nectria* on medium containing resin.
 - ▶ Assess spore germination when resin is present.

PROBLEM: Pine resin does not dissolve in water!

1. Spread and Infection: Inoculation Trial



- Pat & Margaret set up in April 2005
- Aim: Determine infection potential of ascospores and conidia
- Methods:
 - ▶ 45 trees
 - ▶ 3 inoculations: water, ascospores, conidia
 - ▶ 3 wound types: shallow, deep, branch

1. Spread and Infection: Inoculation Trial: 2 year results



- Some trees in all treatments showing fluting
- Fluting is usually greater with *Nectria* than water
- Type of wound is most important factor (especially deep wounds)
- Felled 9 trees:
 - ▶ *Nectria* isolated from 2/3 controls.
 - ▶ Will fell rest of the trial to look at infection patterns

1. Spread and Infection: Mating Study



- Two mating types needed to produce fruitbodies in culture
- How many mating types are there?
- Do you need more than one mating type for fruitbody production in the field?



2. Host Response:

Early disease development and effect on host

Pat: Early infection stages, Nov. 2005

- Inoculated 8 trees
- Harvest 2 trees every 2 months
 - Reisolate fungus
 - Study changes in wood and bark



2. Host Response:

Early disease development and effect on host

Inoculated in August
2006

- Inoculated 8 trees
- Harvest 2 trees every
2 months
 - Reisolate fungus
 - Study changes in
wood and bark



2. Host Response:

Early disease development and effect on host

- Very little fungus isolated from trees or seen under microscope
- Fungus often isolated from controls



Nectria: What do we know so far?



- *Nectria* dispersed by water and appears to have some correlation to rainfall patterns
- *Nectria* perithecia are viable all year round



- Ian Simpson, Ensis
- Peter Oliver & Ross Chambers, City Forests
- John Spiers, City Forests
- David Thode, PF Olsen
- Aaron Gunn, Paul Greaves & contractors, Wenita
- David Orlovich, Mary Anne Miller, Otago University