

Margaret Dick



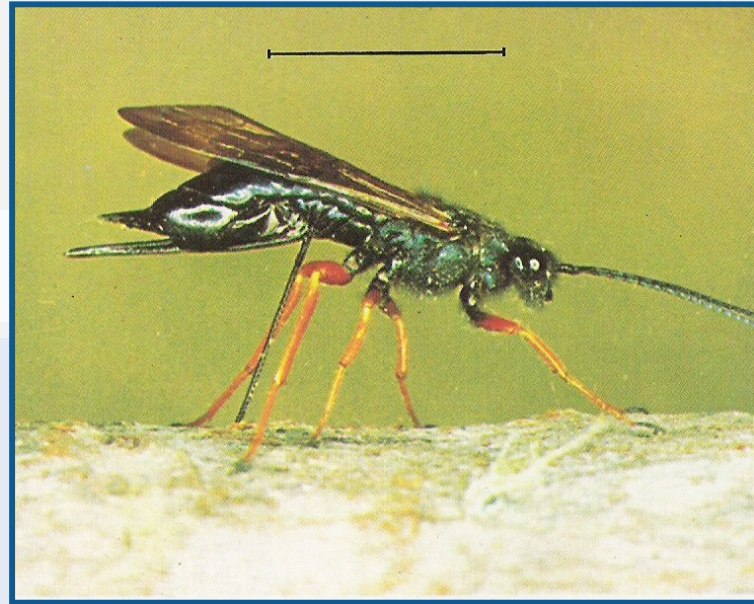
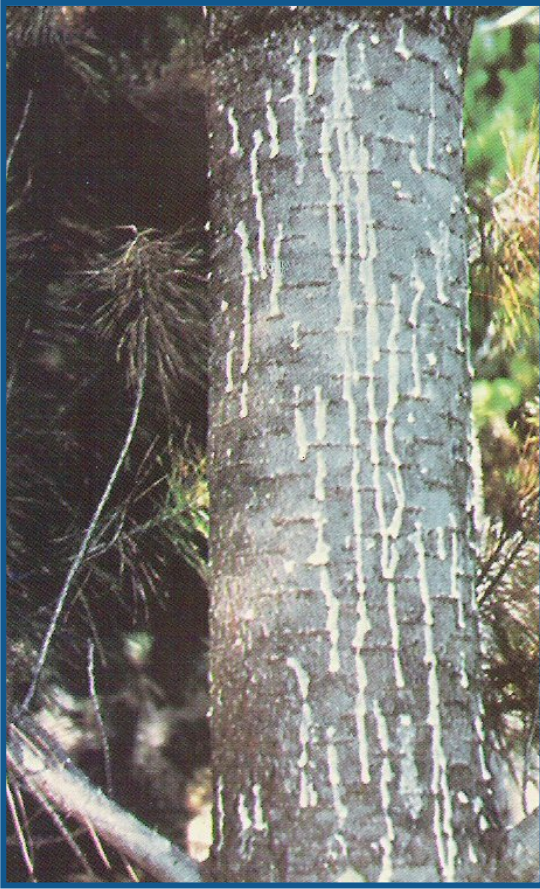
Ensis Forest Biosecurity and Protection

Pests and diseases in NZ: What's been done about them?

Traditional methods

- Silviculture
- Breeding
- Chemical intervention
- Biocontrol
- Site matching
- Maintaining host biodiversity

Sirex noctilio



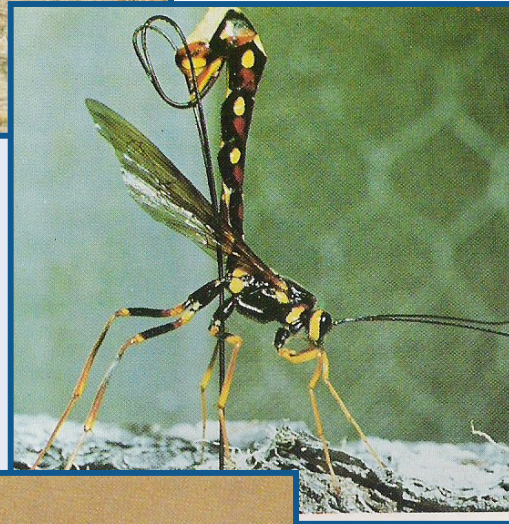
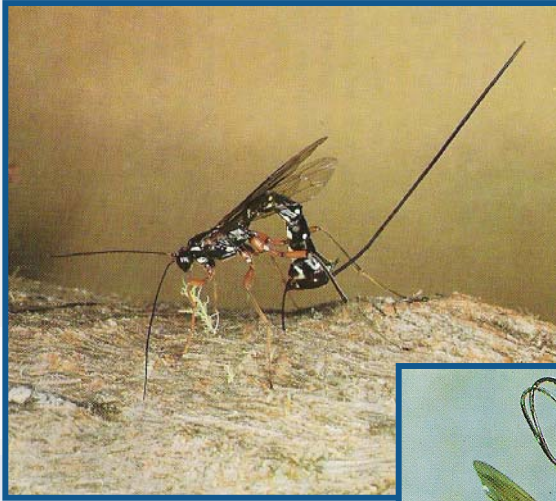
- Oviposits into trunks of living trees
- Injects a toxic mucus and
- *Amylostereum areolatum*

Sirex noctilio

- **No serious damage until late 1920s**
- **Serious outbreaks 1946-51**
- **33% of trees killed over 120 000 ha**
- **heavily stocked stands stressed
thetrees**

Management of *Sirex*

A suite of parasitoids introduced over a period of time

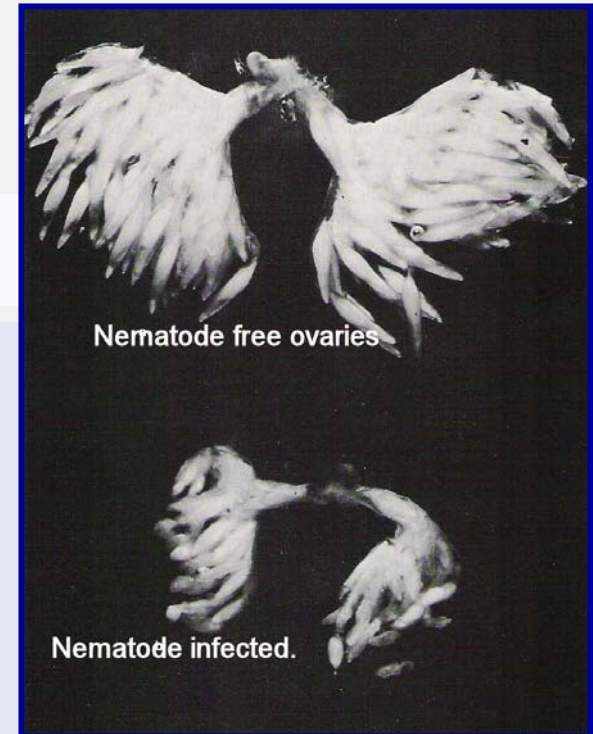


Rhyssa persuasoria
Rhyssa lineolata
Megarhyssa nortoni
Ibalia leucospoides



Management of *Sirex*

- The sterilising nematode *Deladenus siricidicola* was found in New Zealand and introduced into plantations during 1960's
- *Sirex* no longer a problem due to suite of biocontrol agents, and attention to stocking rates
- This system has held for 50 years



Dothistroma needle blight



- Severe growth loss when infection levels high
- Tree death
- Some countries ceased growing *Pinus radiata*

Studies on the biology

Dothistroma infection depends on:

- Leaf wetness period
- Temperature
- Inoculum density

Management of Dothistroma

Silviculture

Pruning and thinning reduce disease by removing inoculum and reducing the needle wetness period

Chemical intervention

Copper spray provides excellent control by:

- killing fruiting bodies and stopping the release of spores
- killing spores landing on needle surfaces
- protecting new foliage from infection

Breeding

Dothistroma-resistant breeds reduce infection levels

Diplodia whorl canker



Infection of pruned stubs can cause stem cankers, wilt and top death

Malformation of the log and sapstain

Predisposing conditions for whorl canker

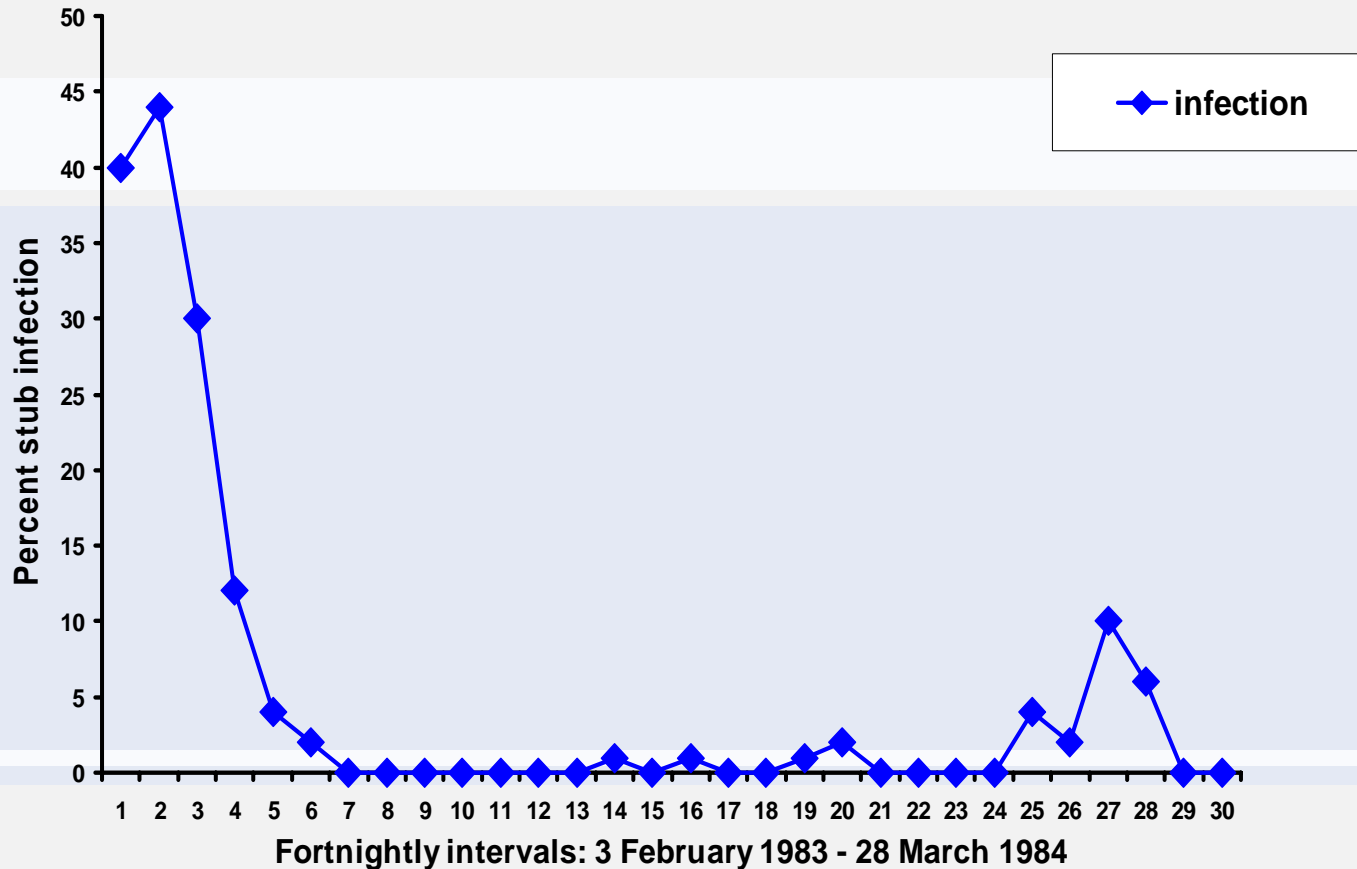
Percent crown removal

- At 25% crown removal; little infection established
- At 40% crown removal; 50% infection

Temperature (season)

- Trees pruned fortnightly for 13 months (February 1983 - March 1984)
- Infection peaked during summer
- During the rest of year very low
- Correlated with drought stress

Percentage infection of trees pruned and inoculated fortnightly



Paropsis charybdis



Defoliator of
Eucalyptus
globulus and
E. nitens

Biocontrol of *Paropsis*



Enoggera

- parasitoid of *Paropsis*

Baeonusia

- hyperparasitoid of *Enoggera*

Neopolycystus

- parasitoid of *Paropsis*

Cleobora

- larval parasite of *Enoggera*



Summary

Sirex - pine wood wasp

- biological control
- silviculture

Dothistroma needle blight

- silviculture
- chemical intervention
- breeding
- site matching

Diplodia whorl canker

- silviculture

Tortoise beetle

- biocontrol