**Primary Industries Standing Committee**

**Forestry and Forest Products Committee**

**Research Priorities and Co-ordination Committee**

# RESEARCH WORKING GROUP 7
# FOREST HEALTH

# Annual Pest and Disease Status Report for Australia and New Zealand 2003-2004

**October 2004**

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## INTRODUCTION

This report presents the annual statement of forest pest and disease conditions throughout Australia and New Zealand for the year 2003-2004. It comprises the sixth combined pest and disease report under RWG 7 (Forest Health). Tabular data to assist in reporting health issues for Montreal Process as requested by the Montreal Implementation Group (Agenda Item 3.1.2, Geevston Meeting Minutes, 2000) is supplied.

## PURPOSE

To communicate the annual statement of forest pest and disease conditions and quarantine situation in Australia and New Zealand to the Primary Industries Standing Committee, Forestry and Forest Products Committee, Research Priorities and Co-ordination Committee for its information, consideration and any action deemed necessary.

# AUSTRALIA

## VICTORIA

### PLANTATIONS

#### *Pinus spp.*

##### Insect Pests

***Sirex noctilio (Sirex wood wasp)***

In Victoria, the incidence of Sirex (Figure 1) over summer 2003-2004 again remained very low across the state although a small number of 'hotspots' were identified where Sirex has the potential to increase. Remedial actions including thinning and additional inoculations have been recommended to reduce the risk of outbreaks occurring. No Kamona strain has been recovered, with the 'defective' and 'other' strain predominating in field samples although these defective and other strains vary greatly in their infectivity potential. Emphasis has been placed on ensuring sufficient inoculations are done using the more effective Kamona strain nematode coupled with timely surveillance and thinning of susceptible stands.

Figure 1. Female *Sirex noctilio* ovipositing on *Pinus radiata*.

***Ips grandicollis (Fivespined Bark Beetle) and other bark beetle species***

Apart from isolated minor outbreaks involving individual and small plots of trees in the north-east of the state, *Ips grandicollis* (Figure 2) has remained at trace levels. Outbreaks of another bark beetle species *Hylurgus ligniperda* were recorded in newly established plantations in south west Victoria although seedling mortality remained at low levels.

Figure 2. Adult *Ips grandicollis* with distintive five spines on elytra.

***Essigella californica (Monterey Pine Aphid)***

Monterey Pine Aphid populations have been high again this year, with significant defoliation occurring in localised areas in north-east and central Victoria predominantly within 15 year-old thinned stands of *P. radiata* although some defoliation of individual younger trees has been observed. At the time of this report being compiled, surveillance of aphid population levels and associated damage in the south of the state is being completed.

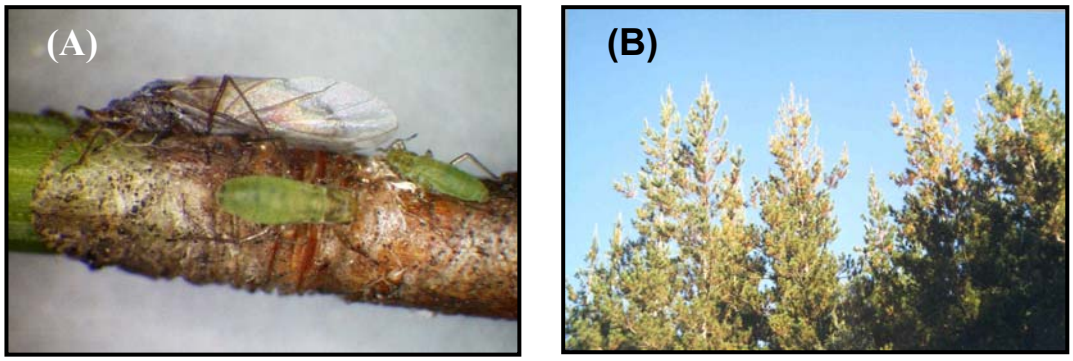



Figure 3. Pine Aphid (A) adults and nymphs and (B) characteristic defoliation of upper crowns in *Pinus radiata* plantations

## Diseases

No major outbreaks of disease were observed during the Forest Health Surveillance program within Hancocks Victorian Plantations during 2003/2004.

***Dothistroma***

Due to the previous dry conditions in Victoria, *Dothistroma septospora* continued to show relatively low levels of disease, and no spray programs were conducted in the State for 2003/2004. Some pockets of disease were recorded in north-east Victoria with the recent autumn rains and will be monitored.

***Cyclaneusma Needle Cast***

Defoliation associated with Cyclaneusma was recorded in most areas of plantations in the State, with some areas exhibiting moderate defoliation levels.

***Other***

Diplodia in association with the previous drought, is continuing to cause dead topping and death of trees in some plantations throughout the State.

***Bursaphelenchus***

In February 2000, *Bursaphelenchus hunanensis* nematodes were isolated from a dying *Pinus halepensis* tree in a botanical garden near the port of Melbourne. This species has previously only been recorded from a dying pine tree in China. However due to the fact that some species of *Bursaphelenchus* (eg. *B. xylophilus*) are significant pathogens of conifers overseas, and its association with a dying tree, a survey and

eradication program was approved as a precautionary approach to their introduction by the then Standing Committee of Forestry (now Forests and Forest Products Committee) under the coordination and support of a National Consultative Committee established for this purpose.

Surveys over the next 4 years resulted in the removal of 39 mature pine trees that contained the nematodes (generally *Pinus radiata* > 40 yrs of age), out of more than 300 dying trees sampled across Victoria. These nematodes were not isolated from any pine trees tested outside of a 60km zone around Melbourne. Other factors (such as drought, *Diplodia, Sirex wasp* and salinity) were also associated with some of the tree deaths, particularly in country Victoria. All trees containing the nematodes were removed and destroyed. No further trees have been identified as being infected with the nematode since January 2003, and no *Monochamus* beetles were detected, however *Arhopalus rusticus* (an exotic longicorn beetle of pine that attacks stressed trees that was also recorded during the initial surveys) has continued to establish itself across Melbourne.

The FWPRDC sponsored project at Adelaide University is progressing with sequencing, morphology and biology studies well underway.

### *Eucaluyptus spp.*
### Insect Pests

***Mnesampela privata (Autumn Gum Moth)***
Low levels of Autumn Gum Moth (Figures 4ab) defoliation have occurred predominantly in *Eucalyptus globulus* plantations throughout Victoria during autumn/winter 2003, with trace levels also being observed in *E. camaldulensis* plantings in the west of the state.

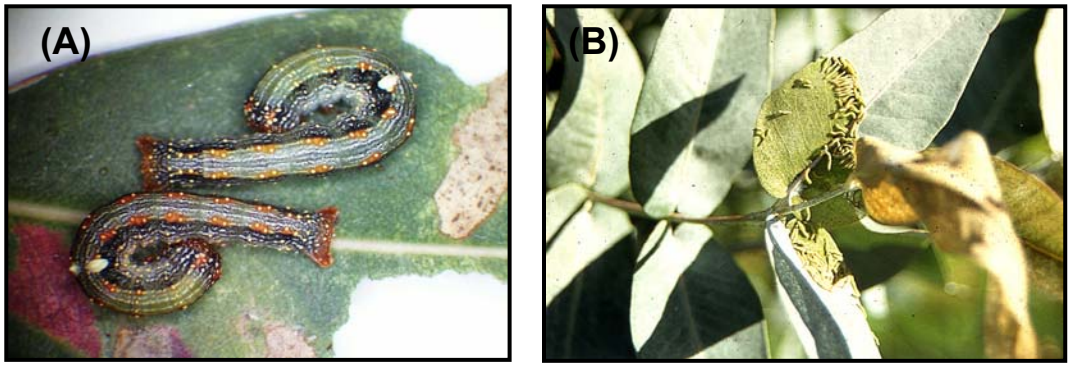



Figure 4. Autumn Gum Moth (A) larvae and, (B) early instar larvae feeding on juvenile *E. globulus* foliage

***Chrysophtharta and Paropsis (Chrysomelid Leaf beetles)***
Leaf beetles of the genus *Chrysophtharta and Paropsis* (Figure 5) have caused low to moderate levels of defoliation (up to 30%) in 15 year-old stands of *E. globulus*, *E. viminalis* and *E. nitens* in north-east Victoria during the 2003-2004 summer with damage generally observed in the upper 50% of the tree canopy. Significant upper

crown defoliation (up to 50%) was also observed in 12 year-old *E. globulus* and *E. nitens* plantations in East Gippsland, while low levels (up to 20%) were observed in the upper crowns of *E. globulus* in the Shepparton irrigation region over the same period.

Figure 5. Leaf beetle larvae cluster consuming eucalypt foliage

***Perga spp. (Sawflies)***

Sawflies were again observed causing trace to low levels of defoliation only in north central and south west Victoria during winter/spring 2003. Damage was generally confined to individual and small clusters of trees (predominantly *E. camaldulensis*) no more than 10-20 in number. Defoliation was predominant in the upper 50% of tree crowns although in severe cases, lower crowns were also affected. No mortality was recorded.

***Phorocantha spp. (Longicorn Borers)***

Following on from observations made over the 2002-03 summer, monitoring was continued for borers of the species *Phorocantha acanthocera* in eucalypt plantations in East Gippsland (Figure 6ab). Observations confirmed that *Eucalyptus saligna* and *E. viminalis* remain the preferred host tree species, with attack confined to individual trees within stands at this time.

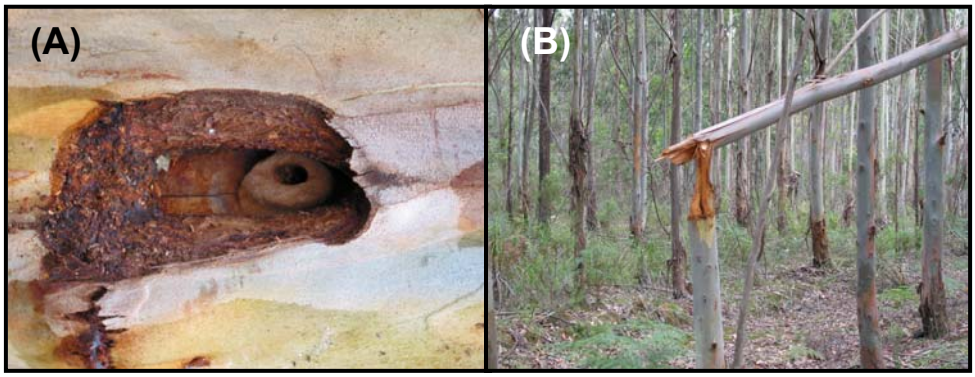



Figure 6. *Phorocantha acanthocera* (A) adult exit hole and, (B) *E. saligna* blown over due to weakening of main stem by borer damage.

***Cardiaspina spp. (Psyllids)***

Psyllids of the genus *Cardiaspina* have been observed causing moderate levels of defoliation to predominantly *Eucalyptus camaldulensis* plantings in northern Victoria during 2003 (Figure 7) with the damage generally confined to localised areas rather than being widespread. Defoliation occurred predominantly in the lower crown of trees with levels up to 50% in some stands being recorded compared to levels ranging up to 20% in the upper crowns.

Figure 7. *Cardiaspina* damage to young lower canopy eucalypt foliage

***Other Pests of Eucalypts***

- Minor damage was observed over summer 2003-2004 to *E. saligna* and *E. grandis* plantations in north central Victoria by the Leaf Blister sawfly (*Phylacteophaga froggatti*). Damage was predominantly confined to young juvenile foliage on two year old trees.
- The Wingless grasshopper *Phaulacridium vittatum* again caused localised damage to newly established eucalypt plantations in south west Victoria over summer 2003-2004 although not on a scale to warrant widespread control measures to be implemented.
- Eucalypt weevils (*Gonipterus* sp.) were observed causing damage to 2-3 year old eucalypts (predominantly *E. viminalis*) in plantations in north east Victoria during late summer/early autumn 2004. Damage was generally confined to foliage in the lower crown of the trees where up to 50% defoliation occurred. However, as the upper crown remained relatively untouched, it is anticipated the trees will make a full recovery.
- Christmas beetles (*Anoplognathus* spp.) have caused low to moderate levels of damage in the upper crowns of 2-3 year old *E. globulus* plantations in Gippsland over early summer 2003-2004.
- The Gum Leaf Skeletoniser *Uraba lugens* caused minor damage to native stands of *E. camaldulensis* along the Murray River from Echuca to Swan Hill over summer 2003-2004.
- Witches broom scale (*Maskellia globosa*) was observed causing significant localised damage to *E. microcarpa* and *E. camaldulensis* along roadside plantings and on farms in north east Victoria during early 2004.
- An isolated outbreak of Emperor gum moth larvae (*Opodiphthera helena*) was reported in a small *E. globulus* plantation on the Bellarine Peninsular outside Geelong.

## Diseases

***Mycosphaerella leaf diseases***

*Mycosphaerella* defoliation in 2 year-old *Eucalyptus globulus* plantations in South Gippsland, is the only significant disease reported within eucalypt plantations during 2003/2004.

## NATIVE FORESTS (*EUCALYPTUS* SPP.)

***Didymuria violescens (Spurlegged Phasmatid)***

Follow up surveys of alpine areas of north-east Victoria over summer 2003-2004 (Figure 8) indicate that as a result of the wildfires in early 2003, a large degree of 'natural' control of phasmatid populations has been achieved by removal of the litter layer necessary for egg survival and subsequent development. Surveys in the central highlands of Victoria over the same period indicate phasmatid populations also remain at trace to low levels in these areas.

***Cardiaspina bilobata (Mountain ash psyllid)***

An inspection was conducted of mountain ash psyllid monitoring plots in March 2004 with plots assessed selected to give as wide a geographic range as possible for examination of psyllid population levels. Based on observation over previous years, the current survey indicated that populations are at trace levels only and as a consequence, unlilely to cause significant defoliation this year (Figure 9). Observations made indicate general tree health to be very good at all three sites and in the surrounding forest with minimal insect/pathogen damage evident. A map showing the area inspected is shown in Figure 8.

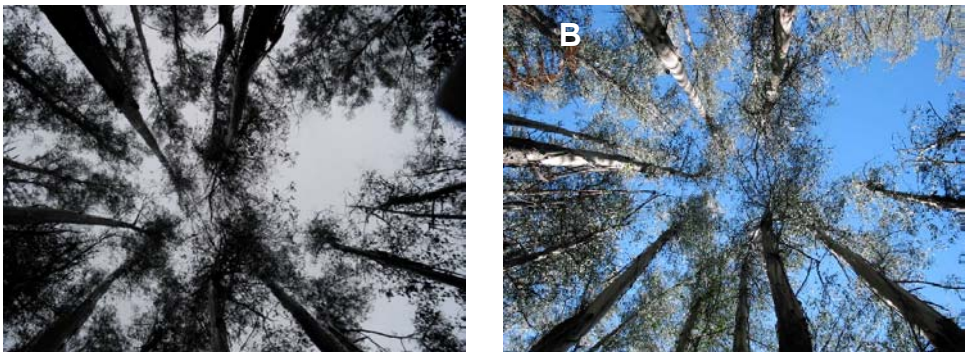



Figure 9. Canopy images from the Victorian Central Highlands taken in a) 2002 and b) 2004 to indicate the general maintenance of canopy foliage over the two-year period.

***Eucalyptus Leaf Beetle (Chrysophtharta agricola)***

An inspection was conducted in April 2004 on the Nunniong Plateau in north-east Victoria following up concerns that the defoliation of *E. delegatensis* by *Chrysophtharta agricola* (Chapuis) observed the previous year had continued (Figure 8). Examination of the assessment plots determined that while defoliation had occurred at all sites and throughout the general area, the primary cause of the defoliation observed was due to drought related factors rather than caused by chrysomelid leaf beetles or other biotic factors although these did contribute in part to

the overall levels of defoliation observed. Both foliage present in the tree crowns and freshly fallen leaf litter material revealed little in terms of characteristic feeding patterns/damage to foliage apart from that associated with what would be considered as normal background levels of leaf beetle attack. General observations combined with discussions with field staff indicate that the very dry conditions currently being experienced are contributing substantially to the decline in canopy health observed. Species such as *E.viminalis* and *E.cypellocarpa* which during the 2002/03 surveys displayed generally healthy canopys unaffected by chrysomelids have also been affected by the dry conditions, with thinner than usual crown coverage observed. Defoliation levels observed during the April 2004 visit are comparable to those observed in March 2003 possibly indicating the dry conditions have prevented a full recovery of trees from previous defoliation episodes.

***Cardiaspina retator (Red gum basket lerp)***
Following on from observations made over the 2002-03 summer, infestations of *E. camaldulensis* by the Red gum basket lerp *Cardiaspina retator* have continued over the 2003-04 summer, with significant defoliation again observed in northern Victoria (Figure 8). Defoliation is more widespread than that observed last year, with the recovery of trees much slower than previously noted. Observations will continue throughout the year to observe recovery and whether populations of the psyllid diminish or again increase.

***Doratifera vulnerans (Mottled cup moth)***
In response to reports of significant defoliation occurring in Gippsland native forests, an inspection of the affected areas was conducted in November 2003. While evidence of *Uraba lugens* (Gumleaf skeletoniser) damage was observed, this was at trace to low levels only, with the mottled cup moth (*Doratifera vulnerans*) being the main causal agent of the defoliation observed (Figure 10). The area of defoliation appears to extend over a wide range from Nowa Nowa eastward across the remainder of the Gippsland region (Figure 8) and was most severe in White Stringybark (*E.globoidea*) and River Peppermint (*E.elata*) stands. Silvertop (*E.sieberi*) displayed low to moderate levels of defoliation due in part to 'spill-over' from *E. globoidea* when the moth has exhausted supplies of its preferred foliage. Most other species including *E.globulus* and *E.cypellocarpa* appeared resistant to defoliation.

Based on initial observations, defoliation appears most severe in low elevation areas under 400-500 metres with trees above this elevation suffering minimal defoliation although this may be more a function of the range of *E.globoidea* rather than elevation and climatic/temperature related factors. The cause(s) for the outbreak were not able to be determined although weather, parasites, predators and diseases may all have played a role. It is unknown whether the cause was conditions specifically favouring cup moth development and survival in particular, conditions suppressing its natural control mechanisms or a combination of both.

**Figure 10.** Defoliation of *E.globoidea* (White stringybark) at Buldah north of Cann River, East Gippsland (note new shoot growth in crowns of trees).

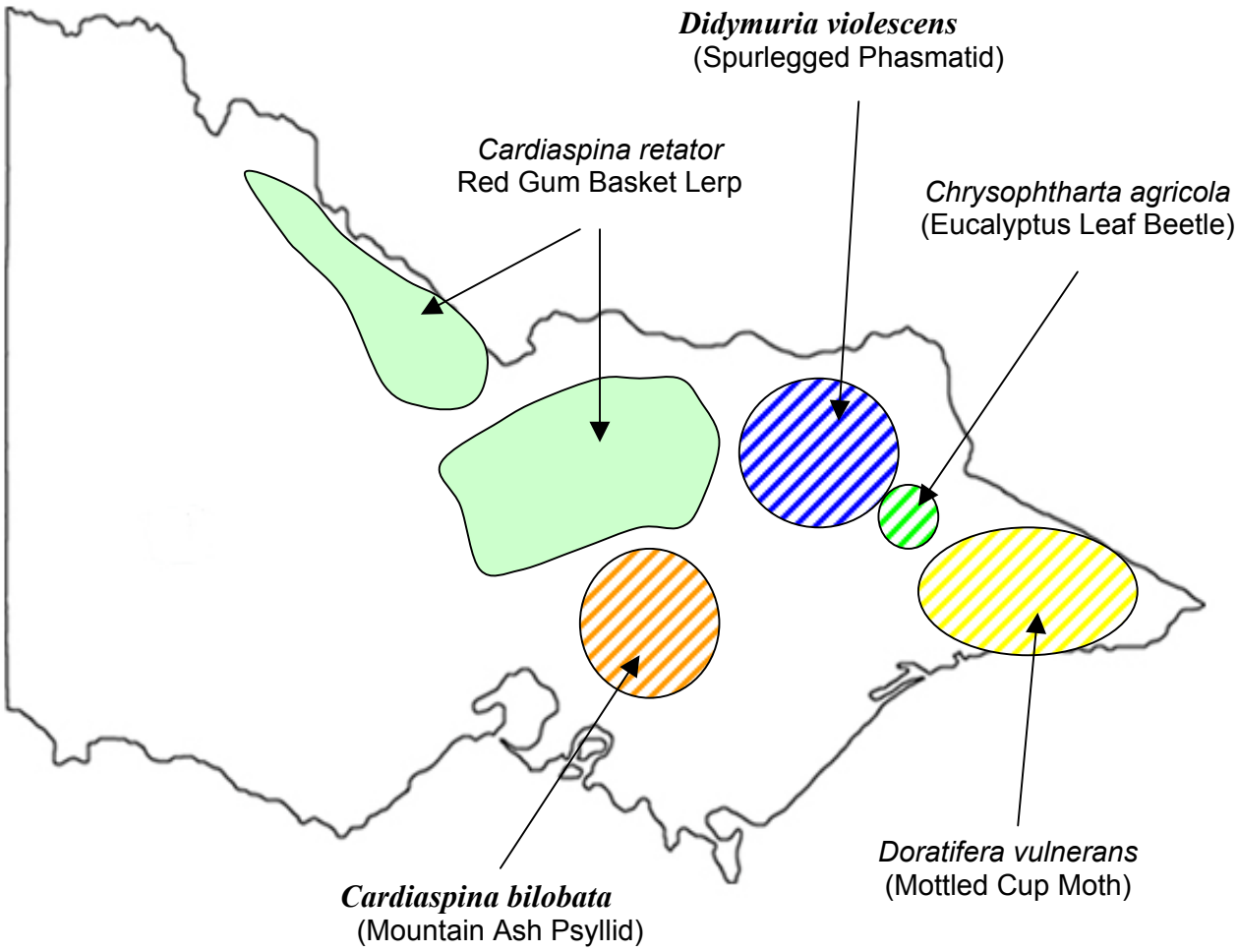



Figure 8. Map showing the approximate locations of various insect pest outbreaks/occurrences/monitoring programs in native forests in Victoria during 2003/04.

### Diseases

Few diseases were reported from native forest during 2003/4.

## NURSERIES

### *Conifer*

*Phytophthora cinnamomi* remains a high priority for monitoring so as to reduce the further spread of disease.

The garden symphilid (*Scutigerella immaculata*) detected for the first time in Victoria in an asparagus crop in South Gippsland in 2003, appears to be widespread in the area. However it has not as yet been recorded from any coniferous nurseries in South Gippsland.

### *Eucalypt*

*Botrytis* has been the main disease reported from eucalypt nurseries in Victoria. No reports of damage due to other pathogens were recorded in 2003/2004.

## NATIVE PLANT COMMUNITIES

A monitoring program for Myrtle Wilt in Myrtle Beech stands has shown only minor changes in disease status over the previous 12 months and few other diseases were reported from native forest communities during 2003/2004. *Phytophthora cinnamomi*, continues to expand in areas such as the Brisbane Ranges.

## URBAN

Pathogenicity trials on a new species of *Phytophthora* recorded from dying *Alnus glutinosa* (Alder) in Melbourne in autumn 2003, continued in 2003/2004. Seedling stem inoculations of *A. glutinosa*, *Pinus radiata*, *Eucalyptus globulus*, *E. nitens*, *E. regnans*, *E. obliqua*, *E. cladocalyx*, *E. viminalis*, *Corymbia maculata*, *Acacia mearnsii*, *Grevillea robusta*, *Citrus limon* and *C. sinensis* showed this pathogen to be selectively aggressive on alder, and only a very weak pathogen of the other tree species when compared to *P. cinnamomi*.

Further reports of Fusarium Wilt were made in 2003/2004 from dying Canary Island Date Palms in Melbourne and Geelong. Surveys within the major plantings of palms in Melbourne have shown symptoms to be expressed across the estate, however only 10 trees have been so far confirmed as infected with the pathogen *Fusarium oxysporum fsp canarensis*. Trees containing the pathogen are currently being removed and destroyed and a local working group established to help contain and manage the disease.

Investigations into the cause of Mundulla Yellows is continuing with a multi-disciplinary team drawn from the Department of Primary Industries and Department of Sustainability and Environment through funding by Environment Australia and South Australia Department of Environment and Heritage. Studies to date suggest that soil factors may play a significant role in the development of the 'disease'.

The City of Melbourne continued to support surveys for Dutch Elm Disease in the main gardens and boulevards under their management. Symptoms resembling DED were attributed to ringbarking of branches by possums and elm bark beetles. The fungus could not be isolated from wood of any trees exhibiting flagging due to beetles.

## MONITORING AND SURVEILLANCE

### *Lymantria dispar (Asian Gypsy Moth)*

Monitoring of the ports of Melbourne, Geelong and Westernport continued for the Asian Gypsy Moth over summer 2003/04 as part of a nationwide monitoring program. As a result of the trapping of a gypsy moth in New Zealand, additional traps and lures were also ordered and placed on standby should the moth also be subsequently located in Australia. Also as a result of the New Zealand interception, additional monitoring points were also established at strategic locations around the ports of Melbourne and Geelong. No gypsy moths were detected during the survey.

### *Plantations and Native Forests Monitoring*

The Forest Health Surveillance Group has been working closely with industry developing formalised, ongoing insect pest and disease surveillance programs in both softwood and hardwood plantations throughout the state to meet their varying operational and stewardship requirements. It is hoped that such a system may also have potential for application in native forests under Departmental management.

## NEW SOUTH WALES

### PLANTATIONS

### Pinus *spp.*

#### Insect Pests

***Sirex noctilio (Sirex wood wasp) (DW)***

The incidence of Sirex was again low in all plantations in NSW, and only observed in suppressed trees:

*Hume Region*

Tree death due to *Sirex* attack was observed in a number of sites across Hume Region although the level of attack was down from last year. Sites proximal to the Red Hill area of Buccleuch SF exhibited symptoms of *Sirex* attack. The Kangaroo Vale area of Buccleuch SF also continues to support *Sirex* but only at low incidence levels. This is mainly due to the rocky aspect of the site and the dry conditions thus increasing the proportion of stressed trees. Hume Region provided billets from 31 trap trees for nematode monitoring, with no naturally struck billets collected. The nematode infection rate was below the desired level of infection (i.e. >90%), and further work is required to address this infection rate (see Table). Hume Region recorded moderate numbers of *Ibalia* (83 male, 95 female) and 1 male and 1 female *Megarhyssa*.

*Macquarie Region*

The susceptible area of *Pinus* sp. plantation, that is the net stocked area with age classes between 10-25 years with greater than 700 stems per ha, is 14902ha. Levels of *Sirex* were down on those observed last year. Trap tree establishment, nematode inoculation and surveillance should continue in those areas where *Sirex* is present. The *Sirex* control program in this Region is providing an acceptable level of control for this potentially damaging pest. Macquarie Region recorded moderate to high numbers of *Ibalia* (205 male, 226 female) and 4 male and 12 female *Megarhyssa*.

*Monaro Region*

Monaro Region has 21198 ha of susceptible *Pinus radiata* plantation (ie. 10-25 year old stands) across the Bombala, Moss Vale and the Tallaganda management areas. The Region utilised 45 million nematodes in the biological control programme. *Sirex* was not a problem in Monaro Region again in 2003 with only old *Sirex* damage observed. It is advised that the *Sirex* biological control program continue in all susceptible age classes within the Region. Recent *Sirex* struck trees were observed in Glen Allen SF. This was observed at <1% incidence levels in an area that had previously been affected by hail. Monaro Region provided *P. radiata* billets from 26 trees for *Sirex* nematode monitoring, and this included 6 naturally struck trees together with billets from 20 trap trees. The nematode infection rates are well below the desired level (ie. >90%), and further work is required to address these levels to ensure the establishment of the Komona strain of the *Sirex* nematode. Monaro Region recorded low to moderate numbers of *Ibalia* (34 male, 15 female) and no *Megarhyssa* emergences.

**Table. *Sirex noctilio* emergence data for 2003/2004 in NSW**

| Region | Trap Tree | Nat. Struck | Total Emerged * | No. +ve | No. -ve | Total Infected % |
|---|---|---|---|---|---|---|
| **HUME** | | | | | | |
| Tumut | 11 | | 15 Male | 12 | 3 | 75 |
| | | | 8 Female | 5 | 3 | 63 |
| Tumbarumba | 20 | | 55 Male | 44 | 11 | 80 |
| | | | 44 Female | 38 | 6 | 86 |
| **MONARO** | | | | | | |
| Bombala | 17 | | 46 Male | 1 | 45 | 2 |
| | | | 3 Female | 0 | 3 | - |
| | | 6 | 0 Male | 0 | 0 | - |
| | | | 0 Female | 0 | 0 | - |
| Moss Vale | 3 | | 25 Male | 17 | 8 | 68 |
| | | | 4 Female | 1 | 3 | 25 |
| **MACQUARIE** | | | | | | |
| Oberon & Bathurst | 16 | | 312 Male | 189 | 123 | 61 |
| | | | 201 Female | 172 | 29 | 86 |
| | | 4 (as part of a TT site) | 3 Male | 2 | 1 | 67 |
| | | | Female | 5 | 1 | 83 |
| **NORTHERN** | | | | | | |
| Walcha | 13 | | 16 Male | 11 | 5 | 69 |
| | | | 47 Female | 24 | 23 | 51 |
| | | 3 | 2 Male | 2 | 0 | 100 |
| | | | 1 Female | 1 | 0 | 100 |
| **Total** | **80** | **27** | **2947** | **2058** | **889** | **70** |

*Northern Region*

The area of susceptible plantation (10-25 year old trees) was 9719ha. Regional staff utilised 70 million nematodes for the inoculation program over the 2003/2004 season. There was no significant damage from *Sirex* observed this year. *Sirex* was detected at Armidale SF via exit holes in a dead naturally struck tree although no recently struck trees were observed. The trap tree program should continue in the Walcha and Casino Operational Areas. *Sirex* susceptibility testing of *Pinus* sp. is planned for 2004/2005 in conjunction with QDPI in the Casino area. Trap trees need to be established in the Casino Operational Area to detect the potential spread of *Sirex* into these plantations. The Region provided trap tree billets from 13 sites and naturally struck billets from 3 sites. The nematode infection rates are below the desired level of infection (ie. >90%), and further work is required to address these levels to ensure the establishment of the Komona strain of the *Sirex* nematode in the Region. Moderate emergence levels of the *Sirex* parasitoid, *Ibalia leucospoides* were recorded (47 male, 28 female). Very low emergences of *Megarhyssa nortoni* were recorded (5 male, 3 female).

***Ips grandicollis (Fivespined bark beetle) and other bark beetles***

There were no significant occurrences of *Ips* in NSW. There is indications from winter surveys in 2004 that levels of *Ips* are increasing in certain areas in Hume Region.

***Essigella californica (Monterey pine aphid)***

*Essigella* was again widespread in Hume Region and again with most damage (chlorosis and needle cast) in the mid- to older age-classes (20-years plus). Damage was higher than in 2001-2002, but still not as high as in 2000. Significantly, moderate damage was observed in younger age classes in Hume, with trees as young as 3-5 years old having moderate severity.

State Forests of NSW is part of a national collaborative project looking at the causality and impact of *Essigella*, which has recently been completed.

Chlorosis associated with *Essigella* in young *P. radiata* in Bago State Forest.

## Diseases

***Dothistroma septosporum (Dothistroma needle blight & cast)***
Lower rainfall across NSW resulted in lower severity of *Dothistroma* needle blight in NSW in 2003. The severity and extent of *Dothistroma* needle blight was lower than previous years in the *P. radiata* plantations around Walcha (Northern Region) with less than 1000 ha requiring control (cf. 1300 ha in 2002). No other Regions had significant levels.

***Cyclaneusma minus***
Again, widespread throughout the state but generally restricted to less than 25% of the crown.

***Sphaeropsis sapinea (=Diplodia)***
Drought-related *Sphaeropsis* damage, dead tops and dead trees, was less significant in NSW in 2003 than previous years. However, infection and damage was the main problem observed in Macquarie Region in 2003. Damage ranged from <1% incidence to hot spots where up to 15-30% of trees had died within a compartment. Plantations with the most significant damage were Canobolas SF (~400 ha), Pennsylvania SF (~500 ha), Roseberg SF (100 ha), Vittoria SF (~350 ha), and Essington SF (~200 ha), where trees had either died or had dead tops. The remaining *Sphaeropsis* affected state forests in Macquarie Region had lower levels of damage (1-5% incidence). There were localised areas of several hundred hectares where damage was up to 5-10% in Hume Region (eg. Kangaroo Vale).

***Armillaria novae-zelandiae***
Scattered mortality associated with *Armillaria* was again observed in the *P. radiata* plantation at Acacia Plateau in Northern Region. Mortality of up to 10% annually for the first three years, then around 1% in following years, has been observed since 1996 in this plantation. *Armillaria*-associated mortality was observed in the 1st rotation crop of *Araucaria* spp.

***Phytophthora cinnamomi***
The root–rot fungus *Phytophthora cinnamomi* was isolated from dead and dying trees in the old clonal trial in Buccleuch SF, Hume Region. Up to 10% of the trees had died. This area has previously been identified as being infected with *Phytophthora*, and also *Armillaria* root rot, and was one of the reasons this nursery was abandoned.

## Environmental (drought, frost, fire, nutrient, weeds, etc.)

Boron deficiency is an ongoing problem in many 1st rotation areas planted on ex-pasture. Remedial fertilisation alleviates the problem. Weeds, mainly *Acacia,* were a problem in several areas of younger age-classes, and control was necessary in several areas.

## Vertebrate pests

***Possum***
Although the area of possum damage has not changed significantly in recent years in Monaro Region, the levels of damage (incidence) has decreased again from those seen in 2002. Still, over 1500 ha were observed with damage.

***Wallaby***
Significant damage was again observed in young age-classes adjacent native bush in Monaro Region. This is of increasing concern to the Region, who have postponed establishment in small blocks adjacent native regeneration. Damage from wallabies was also observed in Macquarie Region.

***Pseudotsuga menziesii (Douglas fir)***

**Diseases**

***Phaecryptogus gaeumannii (Swiss needle cast)***
*Phaecryptogus gaeumannii* was again associated with chlorosis and needle cast in the majority of the Douglas fir plantations in Bago State Forest.

**Insect pests**

***Adelges cooleyi (Cooley spruce gall aphid)***
*Adelges cooleyi* was observed on Douglas fir in Bago State Forest.

***Hoop pine (Araucaria cunninghamii)***
No significant pests or diseases were observed in the *Araucaria* plantations in NSW.

***Eucalyptus species***

**Insect Pests**

***Mnesampela privata (Autumn Gum Moth)***
Again, no significant problems this year, although it was observed in several *E. dunnii* plantations in northern NSW.

***Psyllids (Cardiaspina, Ctenarytaina, Creiis)***
Severe damage from *Creiis lituratus* occurred in up to 500 ha of 3-6 year-old *E. dunnii* in northern NSW in early- to mid-2003 (reported last year). Although severe damage occurred again in autumn-winter 2004, this was only localised areas of less than 10ha, with a total of less than 50 ha severely affected. Spraying was conducted on several blocks.

*Cardiaspina maniformis* and *C. fiscella* caused significant damage in several *E. grandis* plantations. One 8-year-old plantation had greater than 75% CDI of all trees, while another had 50% CDI in the majority of trees.

***Leaf beetles***
There was generally only low to moderate levels of damage from chrysomelids in 2003-2004. However, several *E. cloeziana* plantations around Taree experienced higher levels of damage, similar to previous years.

***Erinose mite (Rhombacus sp.)***
Although recorded in numerous *Corymbia* spp. plantations since 1996, *Rhombacus* sp. has not caused significant damage like that seen in Queensland.

***Christmas Beetles (Anoplognathus spp.)***
Damage not significant this year.

***Stem borers***
Both cossid and longicorns continue to be a major problem in older plantings of *E. grandis*. Several plantations of *E. dunnii* with moderate levels of damage this year, especially those damaged by *Creiis* in 2003. The cossid, *Uzucha humeralis,* was observed in several *E. grandis, E. grandis x camaldulensis, C. variegata* and *E. dunnii* plantations in winter 2003 and winter 2004.

**Diseases**

***Mycosphaerella leaf diseases***
Low levels of damage from *M. cryptica* and *M. marksii* in several *E. pilularis* plantations.

***Phaeophleospora epicoccoides***
Very common again in 2002-2003 on *E. grandis* and *E. grandis* hybrids, associated with lower crown defoliation of up to 25%, but with several plantations of over 50% defoliation.

***Phaeophleospora eucalypti***
This pathogen caused severe damage to a single *E. nitens* plantation in Dorrigo in 2004, where the majority of the plantation had a CDI of 75%.

Severe damage from *P. eucalypti* in *E. nitens*

***Corymbia shoot blight (Quambalaria pitereka)***
*Quambalaria pitereka* was not as severe this year as previous years.

***Canker Fungi***
A new species causing cankers has been identified, and is currently being described

**MANAGED NATURAL FORESTS**
Native forest dieback is a continuing problem in coastal NSW. Aerial surveys in northern NSW were conducted in March 2004.

**NURSERIES**
***Conifer species***
No significant problems reported/observed.

***Eucalyptus species***
No significant problems reported/observed.

**NATIVE PLANT COMMUNITIES**
*Cardiaspina maniformis* and *C. fiscella* were observed causing severe damage in many mature stands of *E. grandis* in central and northern NSW. Significantly, damage was not severe in the large mature *E. grandis* plantations in northern NSW.

**URBAN AND RURAL**
*Thaumastocoris australicus* continues to cause significant damage to street trees (*Eucalyptus nicholii* and *Eucalyptus scoparia*) in Sydney, with greater than 50% foliar damage and dieback. A second undescribed species of *Thaumastocoris* has also been found on *Corymbia maculata* and *Corymbia citriodora* again on Sydney urban trees.

**QUARANTINE**

# TASMANIA

## PLANTATIONS

### *Pinus spp.*

#### Insect Pests.

***Sirex noctilio (Sirex Wood Wasp).***

Trap trees were established in four northern plantations and subsequently nematodes introduced into each plantation. Three other plantations surveyed had isolated *Sirex* struck trees, which at this stage do not warrant control. Nematode control using the Kamona strain has been very successful (93%) in the absence of defective strains. *Megarhyssa*, *Rhyssa*, and *Ibalia* were reared from billets taken from attacked trap trees at all sites. One hundred and ten mated female *Megarhyssa* were sent to Brazil in 2003 to re-establish breeding stocks at EMBRAPA. Other reared parasitoids were released in northern plantations. *Sirex noctilio* females were captured in quarantine static traps placed in one kilometre radius of the port of Bell Bay in northern Tasmania. Subsequent blitz surveys located several *Sirex* stuck trees close to the port area.

***Ips grandicollis (Fivespined bark beetle) and other bark beetles.***

*Ips grandicollis* is not yet present in Tasmania. *Ips* pheromone traps are monitored during the summer months at several sites throughout the softwood estate. Port surveillance static traps at a number of port surround sites, where *Pinus* species were present, captured both *Hylastes ater* and *Hylurgus ligniperda.* Two other unidentified scolytids are currently being examined by ANIC.

***Essigella californica (Monterey pine aphid).***

The Monterey pine aphid is widespread in southern Tasmania but has not yet been detected in the north. Population levels have remained at very low levels and have not caused economic increment losses at any site since the initial establishment.

***Eulachnus thunbergii (pine aphid).***

Not recorded from Tasmania.

***Pineus laevis (pine aphid).***

Remains a minor problem in wildling regenerated plantations in eastern Tasmania. In the rest of the State attacks suppressed trees at the plantation edge along roadsides.

#### Vertebrate pests

Approximately 1000 ha of pine plantations, mostly in northeastern Tasmania currently suffer moderate (25-50% incidence) or severe (>50% incidence) bark stripping by wallabies. Mortality was generally low, although in three stands mortality reached 20-40%.

Top death following bark chewing by brush tailed possum has stabilised in affected stands in northwestern Tasmania. However, the problem has again intensified in the mid-lower Derwent Valley catchment where as much as 40% of trees are affected in localised hot-spots.

Losses from bud and shoot browsing of young transplants by mammals was relatively minor. A total of 26 ha of young plantation was understocked because of past mammal browsing.

**Diseases.**

***Spring Needle Cast / Cyclaneusma needle cast***
Remains the most significant disease affecting *P. radiata* in Tasmania. Current management is through deployment of planting stock selected for greater resistance to SNC onto high-risk sites.

***Dothistroma needle blight***
*Dothistroma* hotspots in the northeast remain active with defoliation of individual trees reaching 75%. However, the problem was too localised to justify control.

***Sphaeropsis shoot blight/crown wilt***
Several small (<1 ha) patches of trees with dead tops due to *Sphaeropsis* infection were detected in the central north of the state and the upper Derwent Valley. Affected areas were concentrated on shallow, rocky soils where the effects of recent droughts were magnified.

*Sphaeropsis* shoot blight was not detected during the past year.

***Root diseases***
*Phytophthora cinnamomi* was implicated for poor survival in two stands (approximately 30 ha) on flat, water-receiving sites in the central north.

Mortality due to undiagnosed root and collar rots were found on two stands in the northwest.

**Environmental and site related problems (Exotic pines / Pinus species especially P. radiata)**

Patch death due to lightning strike continues to be recorded in the central north and northeast.

Two mid-rotation (6-10 year-old) stands in the northeast had a high incidence of resin bleeding. Symptoms were analogous with Summerville's (1980)[1] type II resin pockets. Causal factors have not been identified.

***Eucalyptus species.***

**Insect Pests**

***Mnesampela privata (Autumn Gum Moth).***
Low levels of activity in the eucalypt estate.

[1] Sommerville, A. (1980) Resin pockets and related defects of *Pinus radiata* grown in New Zealand. *New Zealand Journal of Forestry Science*, **10(2)**: 439-444.

'Mimic' (tebufenozide, Group 16A), an insect growth regulator, has been registered for the protection of plantation eucalypts from defoliation by autumn gum moth larvae.

***Psyllids (Cardiaspina, Ctenarytaina, Creiis).***
Blue Gum Psyllid is present in all *E. globulus* juvenile age planting's, often heavily infesting shoot buds, but causing little long-term impact. One *E. nitens* plantation of suffered a severe outbreak of *Cardiaspina squamula* resulting in considerable leaf senescence. Late in the summer very large numbers of parasitoids emerges from samples. Difficult to find any psyllid lerps in the following summer.

***Leaf beetles. (Chrysophtharta spp.)***
Operational control operations were conducted on 950 hectares of *E. nitens* and *E. globulus* plantations. The total area over threshold level was 2612 hectares. Limitations due to weather and equipment availability during the fire season restricted the area sprayed. 'Success' (spinosad, Group 5A), now registered for aerial application against leaf beetles. Spray trials showed little impact on non-target insects.

***Swarming Scarabs.***
No problems this summer.

***Weevils.***
*Gonipterus scutellatus* caused moderate defoliation to several coupes of 2-4 year old *E. globulus* in both the south and northwest regions. Very low egg parasitism levels were detected.

***Gum leaf skeletoniser.***
*Uraba lugens* has not been present at damaging levels in eucalypt plantations during the past two years.

***Sawflies.***
*Perga affinis* is found occasionally within eucalypt plantations usually causing temporary minor defoliation to individual trees.

***Stem borers.***
The longhorned beetle *Phoracantha mastersi* is still a minor pest of eucalypt plantations causing patch death at sites of poor drainage or new road disturbance. In southern *E. globulus* plantations attack by the wood moth *Culama* sp. is frequent on trees six to eighteen months of age. Attack sites are often flooded with resin and most larvae do not establish. On older trees (*E. nitens* and *E. globulus* aged 3-6) cossids attack 2-4% of trees.

***Gum Tree Scale (Eriococcus).***
In a number of plantations and farm wood lots *Eriococcus* scale was present in large numbers on lower branches of 2-5 year old *Eucalyptus nitens*. In plantations the scale disappeared following pruning.

**Vertebrate pests**

Damage from browsing mammals continues to be the most significant biotic treat to young eucalypt plantations in Tasmania. Currently, about 100-150 ha (about 3% of annual area planted) fails or has delayed establishment because of severe browsing pressure. Control by poisoning using compound 1080 has been the normal practice. All plantations being established require monitoring of vertebrate pest populations or seedling damage to trigger control operations when required. In recent years about 75% of plantations have required poisoning operations. However, there is strong public pressure against control of browsing mammals by poisoning using 1080. As a result considerable research effort is currently being devoted to finding suitable alternatives to 1080 for preventing damage from browsing mammals. Reflecting this, and a willingness of field staff to use alternative controls, there has been a 50% reduction in the amount of 1080 used on State Forest over the past four years.

### Diseases

***Mycosphaerella leaf blight***
Mycosphaerella leaf blight (MLB) caused little damage in *E. globulus* plantations again this year. This not only reflects the drier conditions experienced in winter-spring 2003 but also the current embargo on planting *E. globulus* in the high-risk areas around Smithton (northwestern Tasmania) and a program of supplemental N&P fertilisation of young plantations on nutrient-limited sites subject to MLB.

***Shoots***
No shoot diseases were detected during the past year.

***Stems***
No stem diseases were detected during the past year.

***Roots***
No significant root diseases were detected this year. *Armillaria* continues to be detected at low incidence in young plantations. The small patch death associated with *Armillaria*, which was reported last year continues to expand.

### Environmental and site-related problems (Eucalyptus spp.)

Several stands in the northeast suffered severe windthrow following commercial thinning. A review of windthrow risk is currently being undertaken, which will be augmented by research evaluating whether the risk can be managed by modifying the current silvicultural regime for solid wood products.

Scattered mortality in mid-rotation plantations at, or soon after, commercial thinning was reported from two stands in the northeast. Stem attack by both bupresids and cerambycids was present as was *Armillaria* collar rot. However, each appeared to be acting in a secondary role. Drought stress is likely to have been the trigger for secondary attack, but this diagnosis has not been demonstrated conclusively.

## NURSERIES

***Conifer species.***
No insect problems in Tasmania.

***Eucalypt species.***
No insect problems in Tasmania.

## NATIVE FORESTS

### Insect pests
There were no significant insect pest problems reported in native forests over the past year.

### Vertebrate pests
Mammal browsing is a significant threat to the successful regeneration of native forests in Tasmania, particularly in wet forests harvested using clearfall, burn and sow silviculture. All native forest coupes are monitored for browsing until seedlings have grown beyond susceptible height (about 1 metre). For the 2001-2 age class on State Forest, 57% and 13% of clearfall burn and sow coupes and variable retention coupes, respectively, required control measures for browsing.

### Diseases

***Myrtle wilt***
The very high amenity value of *Nothofagus* within a major ecotourism development (Dismal Swamp) has required the use of intensive therapy (stem injection with propiconazole) in an attempt to prevent the development of myrtle wilt in wounded trees.

***Phytophthora cinnamomi root rot***
Priority management areas for *P. cinnamomi* have been reviewed and expanded to include some highly susceptible plant communities.

### Environmental and site-relate problems

There are extensive areas of eucalypt forests with severe crown dieback on the Central Plateau and along the northern slopes of the Great Western Tiers. *E. gunnii, E. coccifera* and *E. delegatensis* are the main species affected. The causal factors have not been isolated with any degree of certainty although it is known that over-grazing by brush-tailed possum, chrysomelid defoliation and drought stress are implicated in some of the affected areas. Remnant populations of *E. gunnii* have been virtually eliminated from some sites, existing only as ex-situ populations in seed orchards.

## URBAN AND RURAL

### Insect pests

Gum tree scale (*Eriococcus* spp.) was commonly reported on garden and wood lot eucalypts during the 2003-04 summer.

*Uraba lugens* is a common tree pest of eucalypts in gardens and dry forest areas. Sawflies, mainly, caused considerable damage to roadside planting's in the central midlands of Tasmania.

*Phoracantha mastersi* caused many eucalypt deaths in drought effected areas especially in remedial planting's.

The Elm Leaf Beetle (*Pyrrhalta luteola*) has spread to most elm trees in the City of Launceston Parks and Gardens. Population numbers are low. To date control measures have not been introduced. ELB not been detected out of the City boundary and has not yet been detected in Hobart. Council officers in Hobart conduct several surveys a year.

**Diseases**

*Armillaria luteobubalina* is particularly active in public reserves in the Cataract Gorge and Trevallyn areas of Launceston.

An aggressive stem decay (causing a white straw rot) is affecting several mature *Sequoiadendron* specimens in the Launceston area. To date, attempts to isolate the fungus responsible have been unsuccessful, although an unidentified ascomycete and a mitosporic fungus have been isolated from decay fronts.

Fructifications suspected to be *Phaeolus sweitzieii* were found at the base of two mature *Pinus radiata* specimens at Breadalbane (near Launceston). The trees have been recommended for removal.

**QUARANTINE.**

The delta trap-monitoring program for the detection of Asian Gypsy Moth continues to be conducted at Tasmanian seaports. The iron ore facility at Port Latta in NW Tasmania is now included in the program. A total of 130 traps were established for the six month trapping period.

Funding has been obtained to establish a demonstration site, at Bell Bay in northern Tasmania, to show the effectiveness of sentinel tree plots and static trapping techniques for the detection and monitoring of exotic insect pests and diseases. Sentinel plots consisting of 20 trees of paired species placed within one hundred metres of port and airport cargo facilities. Static trap sites, consisting of paired funnel and vane traps placed within a 1-2 kilometre radius of the cargo facility in urban areas. Static trap sites consisting of 3 funnel traps, one panel trap and fresh billets are established in plantation sites nearest to the cargo facility. The trapping system utilises the established fruit fly and Asian Gypsy Moth monitoring sites as the basis of an integrated system for agriculture, forestry, horticulture, and urban tree protection.
The Queensland Forest Service is currently operationally testing the plantation section of the system in three Districts.

## FOREST HEALTH SURVEILLANCE AND DIAGNOSIS.

All *Pinus radiata* and *Eucalyptus* plantations on State Forest receive annual detection surveys involving aerial inspection (low altitude inspection from a helicopter) and roadside cruises. These surveys are primarily to detect and map areas suffering moderate or severe damage (based on National damage reporting thresholds). These surveys provide two outputs: (i) initiate remedial actions; (ii) provide data for tabular reporting (operational quality standards, AFS, RFA and RPCC).

This year considerable effort has been devoted to improving the development and implementation of remedial and other responses to detected health problems. A refined system of rapid notification has been developed to ensure field staff receive timely advice for dealing with detected problems. In addition, all recommendations are reviewed with the Districts at the end of the surveillance season.

A trial was commenced this year to quantify the efficiency of aerial, roadside and ground inspections in detecting a range of different damage symptoms in eucalypt plantations.

## RESEARCH AND DEVELOPMENT.

### *European wasp. (*Vespula *spp.)*

The European wasp, *Vespula germanica* and the common wasp, *Vespula vulgaris* are causing severe problems at many Tasmanian forestry operations and visitor facility sites. Forestry Tasmania has a developing tourist infrastructure which includes the Tahune Airwalk (200,000 visitors in 2002/2003), Dismal Swamp Slide and numerous picnic and camping parks. The populations of vespulid wasps during the late summer months has a detrimental impact on visitors and also impacts on forestry gangs performing operational activities such as roading, pruning etc. Forestry Tasmania has had research permits for the use of experimental insecticides, provided by Bayer, for the development of bait traps (fibronil) which have proved very effective in reducing wasp populations on a seasonal and limited area basis. We can reduce worker populations by 90% using a grid baiting system. Prior to thinning crews going into a coupe with a high wasp population a grid system of baits is set out several days in advance. At non- baited site the thinning crews are frequently forced to move to other sites. The process of patents and registration of commercial bait is frustratingly slow and lack of control is having an economic impact on forestry companies.

### *Autumn Gum Moth (Mnesampela privata)*

A cooperative research project with CRC for Sustainable Production Forestry was conducted in northern Tasmania looking at the effectiveness of AGM female pheromones. Unitraps were established at 4 sites with 3 traps per site. A maximum catch of 6 moths per night resulted in an egg count of 96 eggs per tree with 13% egg parasitism. Catches of 2.5 moths per night averaged 7 eggs per tree with egg parasitism of 26%. Highest egg parasitism level site was 56%.

***Leaf beetles (Chrysophtharta spp.)***
Trials with 'Confidor' (imidacloprid, Group 4A), injections showed some leaf beetle larval mortality after 4-6 weeks but no activity against adults. Formulations still need improving.

***Mycosphaerella leaf diseases***
A embargo on planting *E. globulus* in far northwestern Tasmania has been made in response to severe defoliation and resultant chronic injury from MLB. This embargo will remain in place until cost-effective management prescriptions can be developed to mitigate disease impacts.

Permanent growth plots established in adjacent *E. globulus* stands have measured a 1 and 1 ½ year retardation of height and diameter growth respectively following a severe epidemic of MLB (CDI 88%). Losses of this magnitude can probably be tolerated provided chronic injury does not develop in response to the MLB epidemic.

A trial has been established to evaluate whether N&P fertilisation before or after MLB outbreaks can ameliorate growth impacts in *E. globulus* plantations and in particular to prevent chronic injury.

## WESTERN AUSTRALIA

### PLANTATIONS

#### *Pinus radiata*

##### Insect Pests

***Sirex***

From July 2003- July 2004 no evidence of Sirex infestation was found in Western Australian pine plantations. However, although the establishment of more trap tree plots were planned for Dec 2003, this has not been completed due to salvage logging in plantations affected by the December 2003 fires near Bridgetown. (JF, FPC)

***Ips grandicollis***

No reports on high numbers have been received for this past year. (JF, FPC)

***Monterey Pine Aphid (Essigella californica)***

The aphid is a common occurrence and widespread in pine growing areas. Damage is minimal with no tree deaths or loss of tree vigour being observed as a result of infestation. Monitoring of this species has ceased, as it is not significant enough a pest to justify the expense of monitoring and or control. All field officers are aware of this pest and any plant deaths or loss in vigour caused will be reported as an EMS incident.

***Wingless Grasshopper (Phaulacridium.sp):***

This is a common pest during the first year of plantation establishment. Control involves weekly monitoring and occasional control by misting with alpha cypermethrin and or baiting with Malathion infused chick starter crumble. Such control was required throughout the entire 2003 plantation area for the northern west coast region (approximately 635 ha)

***Rutherglen Bug (Nysius vinitor):***

It is a pest of during first year plantation establishment. Control involves weekly monitoring during the end of spring and start of summer. Misting with alpha cypermethrin is used to eradicate infestations. Such control was required throughout the entire 2002 and 2003 establishment area (approximately 1379 ha)

##### Diseases

No major problems reported.

#### *Eucalyptus spp*

##### Insect Pests

***Psyllids***

The blue gum psyllid is common across the plantation estate but has not been a significant pest during 2003-04. (FPC, GSP, APFL, WAPRes, Timbercorp)

***Autumn gum moth***

Autumn gum moth has not been a significant pest during 2003-04. This species occurs mostly around Albany, especially east of Albany. Adults are observed mostly in March and April. A plantation east of Albany received severe damage in 2002, and

a high density of late instar larvae were found in the same plantation in July 2003. In other plantation, most late instar larvae were killed by a virus. Diversity of parasitoid wasps of AGM seems to be limited in SW WA. (FPC, GSP, APFL, WAPRes, Timbercorp)

***Leaf beetles***
Very minor damage from *Cadmus* and Chrysomelids was noted. (FPC, GSP, APFL, WAPRes, Timbercorp)

***Eucalyptus weevil***
Weevil control was carried out on approximately 12,000 with the ages varying from 2 to 4 years old. Significant damage would have resulted if this preventative spraying hadn't occurred. Defoliation appeared less severe in 2003 than in previous years. This is because (1) weevil densities are gradually decreasing in areas around Albany and (2) trees have kept producing new leaves because of a wet winter-spring season. The area of high weevil densities have been gradually moving northwest, and the current high risk area is around Manjimup. The weevil distribution is also expanding north. (FPC, GSP, APFL, WAPRes, Timbercorp)

***Heteronyx spp***
*Heteronyx* have caused light defoliation to the growing tips of older aged plantations, particularly in the North Bannister area (~20 Ha) & east of Albany (~750 Ha). The distribution and density has significantly increased in the last 24 months. Using 12 light traps in seven plantations, 41 (morpho-)species of *Heteronyx* and related scarab beetles (*Liparetrus*, ABB and allies) have been collected from December 2003 to May 2004, although some of these species may not cause damage on blue gums. Different species and the same species in different plantations show different phenology. But as a general rule, high activity levels are observed on hot nights in the coastal areas. Coastal areas east of Albany are more at risk, but *Heteronyx* beetles are found throughout the region. Damage levels due to Heteronyx beetles were much lower in 2003-04 than 2002-03, possibly due to fewer hot evenings in 2003-04. (FPC, GSP, APFL, WAPRes, Timbercorp)

***African Black Beetle (Heteronychus arator)***
The introduction of "socks" to seedlings prior to planting in known african black beetle areas continues to be effective. The impact of this insect has now been reduced to nil. (FPC, GSP, APFL, WAPRes, Timbercorp)

***Leaf Blister Sawfly***
LBS predominantly cause damage to juvenile leaves of blue gums. A high risk area is around Albany. Damage was generally limited in 2004. However, some plantations (area not available) received severe damage (>50% of canopy damaged on >25% of trees). Damage became suddenly apparent in late March/early April. (FPC, GSP, APFL, WAPRes, Timbercorp)

***Spring Beetle (Liparetrus spp)***
Increased knowledge of the life cycle has significantly reduced the threat of this insect. (FPC, GSP, APFL, WAPRes, Timbercorp)

### Vertebrate pests

***Port Lincoln (28) Parrot***

Throughout the West coast region(midwest and southwest) both trapping and shooting of the Port Lincoln Ringneck had been occurring. The success between control techniques vary greatly with shooting found to be the most cost effective and easiest method. Shooting of the parrots has occurred via both contractor and FPC personnel where from the Collie region alone (inclusive of the southern west coast region) 3753 birds have been destroyed throughout 21 properties over the past 12 months. Such numbers have been reflected in the midwest region with approximately 1214 birds destroyed in the past 4 months throughout 11 properties.

### Diseases

No major problems reported. Research continues on *Mycosphaerella* leaf blights and *Endothia gyrosa* and other cankers in *Eucalyptus globulus* plantations (see Research and Development).

***Mycosphaerella***

*Mycosphaerella* predominantly causes damage to the juvenile leaves of blue gums. Plantations east of Albany affected by AGM and LBS are often also affected by *Mycosphaerella*. Another high risk area is near Northcliff. *Mycosphaerella* is also found throughout the region at low levels. Also, one year old coppice growth near Albany was severely damage by *Mycosphaerella* in 2003. Coppice growth before thinning may retard air flow and create moist environments which may encourage growth of *Mycosphaerella*. (FPC, GSP, APFL, WAPRes, Timbercorp)

### Weeds

***Blackberry control***

Following on from work that was started in the 1990's CSIRO have obtained approval for the release of 8 additional strains of blackberry rust fungus to be trialled in the SW of WA. The release of the new strains has created a unique opportunity for integrated weed management for blackberry. Effective control strategies have been developed for agricultural properties but riverbank, forest edge and plantations provide a unique challenge where infestations have been considered too difficult to tackle due to access and the sensitive environment. This project is designed to intensively study blackberry ecology and management in WA and to develop appropriate control strategies. The project will be led by CSIRO in conjunction with FPC, CALM, Ag Dept, UWA and others.

***Sandalwood***

Due to the difficulty and expense of controlling Kangaroo populations within Sandalwood plantations it has become standard practice not to establish Sandalwood plantations adjacent to or in close proximity to native bush reserves. This was demonstrated recently with a sharefarm north east of Brunswick Junction losing its entire Sandalwood host planting (*Acacia acuminata)* to kangaroo grazing. The area affected was 25 hectares. Some plant culling was carried out in order to reduce seedling damage but this was unsuccessful as the site adjoins State Forest and private

property. The area has since been planted with *Eucalyptus saligna* rather than re-planted to *acacia acuminata.*

## MANAGED NATURAL FORESTS

### Insect Pests

***Jarrah leaf miner***

Jarrah leaf miner is still in outbreak in some areas of the northern Jarrah forest. A small outbreak area of Jarrah leaf miner was observed on the Water Commission block east of Manjimup near Tone River last November. Janet Farr, Tom Burbidge and Allan Wills inspected this area and it was decided to inspect it again this coming November to see whether it has worsened or not. Cutout boundary surveys were not conducted over this past season. It is anticipated that the next survey will be conducted in October 2004. Maintenance of a project investigating the control of Jarrah leaf miner through selective retention of resistant trees continues. (A. Wills, T Burbidge).

***Uraba lugens***

Populations of gum leaf skeletonizer (U. lugens) remain low in the southern Jarrah forest. A paper on *U. lugens* spatial distribution during the outbreak period has been published in Australian Forestry. (JF)

***Defoliation Trial at Holmes Block near Dwellingup***

The annual defoliation of the jarrah coppice at Holmes Block near Dwellingup was carried out last December. The project has been terminated after 15 complete annual defoliations. (T Burbidge)

***Biodiversity study (Forestcheck)***

The biodiversity study FORESTCHECK, has now completed its 3rd sampling season with over 900 morpho-species collected. (JF)

### Diseases

***Jarrah forest (Eucalyptus marginata)***

No new major pathological problems reported. Management and survey of *Phytopthora* root disease in jarrah (*Eucalyptus marginata*) forests continues to command attention (see Forest Health Surveillance and Diagnosis, and Research and Development).

***Karri forest (Eucalyptus diversicolor)***

No new major pathological problems reported. Management of *Armillaria* root disease in karri (*Eucalyptus diversicolor*) continues to command attention.

## NURSERIES

No major problems have been reported in either hardwood or conifer seedlings in nurseries.

## NATIVE PLANT COMMUNITIES

### Insect Pests

***Eucalyptus wandoo***
The Wandoo Response Group continues to coordinate research into the wandoo decline. University of Western Australia honours student Ryan Hooper completed a study of the role of disease factors in the decline of wandoo. Research by UWA on disease, entomological and environmental factors is ongoing. (A. Wills)

***Eucalyptus gomphocephala***
Research and policy development regarding the conservation of Tuarts continues under the direction of the Tuart Response Group. Cooperative scientific research involving The Department of Conservation and Land Management, Murdoch University, Edith Cowan University and Alcoa World Alumina Australia and funding by Australian Research Council's Competitive Linkage Grants Program. Edith Cowan University Masters student Todd Edwards completed a study into the distribution and severity of Tuart decline and factors associated with the decline. The study showed that the decline was largely confined to sites in Yalgorup National Park. (A. Wills).

**Diseases**

Thirty three sites covering a total of 195 ha were aerially sprayed with phosphite in 2004, comprising 168 ha in Stirling Range National Park and on coastal reserves near Albany (South Coast region) and 27 ha on nature reserves and in State forest south of Busselton (South West Region). Ten critically endangered, three endangered and one vulnerable species susceptible to *Phytophthora* root rot disease were treated with phosphite in the South Coast Region and one critically endangered and two endangered, susceptible, taxa near Busselton. Some sites in the Stirling Range and near Albany only received a single spray this autumn because of inclement weather during the second spraying period and these will be treated again at a later date. All sites in the Stirling range burnt in the 2000 wildfires were sprayed at only half the normal rate because the target species were still very small. The effects of the October 2000 wildfires continue to be evident in populations of several endangered plant species in the Stirling Range National Park with little regeneration of several threatened and common obligate re-seeder species. (R. Smith - CALM).

**URBAN AND RURAL**

***Mundulla Yellows***
Monitoring of the occurrence of Mundulla Yellows (MY) has continued. Symptomatic eucalypts (both planted trees and remnant native trees) have been observed in several additional locations. The observed distribution of MY symptoms in the south of the state is from north of Geraldton to Esperance. Tests of foliar samples from symptomatic trees for "MY-RNAs" (by D.Hanold, The University of Adelaide) all gave positive results. As in South Australia, MY is only seen in vegetation in disturbed sites or modified landscapes such as road verges and medians, parks and gardens, and in parkland or paddock remnant stands. Symptoms have not been observed within undisturbed native forest or woodland stands in WA. Contributions were made to the final report of the national Mundulla Yellows Task Group (2004). CALM is an Industry Partner in a three-year ARC Linkage project at The University of Adelaide, "A comparative study of the distribution and spread of potential molecular markers for Mundulla Yellows disease." (M.Stukely - CALM).

### *Tuart decline*

In recent years, tuart (*Eucalyptus gomphocephala*) woodland between Mandurah and Preston Beach has suffered a decline in health. Infestation by wood boring insects is associated with the decline. Reasons for the decline are not yet clear but may include climate variability, hydrological and salinity factors, altered fire regimes, competition with understorey species and impacts by plant pathogens. An initial project intensively sampled whole trees of varying size and health, at a range of sites in Yalgorup National Park. No root pathogens were isolated, but a number of fungi were isolated from significant butt rots and stem decays. Further work is being carried out on the role of butt and root rots in the decline of tuart in yalgorup National park and Ludlow State Forest (D. Hasswell - CALM).

### *Foliar pathogens*

A number of foliar pathogens were isolated and recorded for the first time on *Eucalyptus gomphocephala* in Western Australia. They included *Mycosphaerella cryptica, M. grandis*, *Pachysacca samuelii*, and *Fairmaniella leprosa.* With the exception of *M. cryptica* they are causing minor damage to foliage. Post-fire regenerating tuart has been severely defoliated by *M. cryptica* in Yalgorup National Park, Ludlow State Forest and Yanchep National Park and has contributed to tree deaths in Yalgorup National Park. Trials are currently underway to monitor levels of *M. cryptica* on *E. gomphocephala* pre and post-fire (P. Barber – Murdoch University).

### *Cape Lilac (White Cedar)*

The White Cedar Moth (*Leptocneria reducta*) outbreak has not appeared this year, as there have been no reports from concerned members of the general public. This may be due to it not being observed as much, or it not being as much a nuisance, as it was in previous years (T Burbidge).

## FOREST HEALTH SURVEILLANCE AND DIAGNOSIS

### *Dieback mapping and management*

In the period July 2003 to June 2004, CALM Forest Management Branch mapped the presence of *Phytophthora cinnamomi* disease symptoms and defined protectable areas on almost 16,900 ha of native forest. Approximately 17,300 ha of previously mapped forest was rechecked. Numerous development projects on CALM managed land were assessed for dieback hygiene planning. A variety of disease mapping and inspections were carried out for other government agencies and private companies or individuals. Prescriptions for planning of silvicultural operations were modified based on considerations of *P. cinnamomi* impact on vegetation complexes. These complexes were mapped out in proposed harvest areas and harvesting activities were modified where dieback impact was expected to be high. Training programs were delivered for both Disease Detection and Hygiene Management (G. Strelein - CALM).

Between July 2003 and April 2004, a total of 1,251 samples were processed for *Phytophthora* identification by CALM's Vegetation Health Service (VHS). A small number of other tree health and nursery problems were investigated. (M.Stukely - CALM).

## DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT FOREST INSECT COLLECTION

The databasing of the CALM Terrestrial Invertebrate Collection (BugBase) has been completed and is now available via CALM's website at www.naturebase.net/bugbase and is linked to the WAISS, Department of Agriculture's website and also the main State and Commonwealth insect collection websites. It contains over 17, 000 specimens collected from not only the WA forests, and the plantations of blue gums and oil mallees but also from the Stirling Range and various nature reserves in the wheatbelt (T Burbidge).

## INSECT INCURSIONS

### *European House Borer*

A single female European House Borer was found on 19 January 2004 emerging from a 200 mm x 240 mm beam of *P. pinaster* timber in a house in the Perth suburb of Parkerville. Since then an incursion has been confirmed and the Generic Incursion Management Plan has been initiated.

## RESEARCH AND DEVELOPMENT

Plantations

*Eucalyptus globulus*

Forest health surveillance

Several projects at Murdoch University are focusing on eucalypt plantation health and risks to biodiversity of native forests in Australia. In the past 12 months surveys have been conducted in collaboration with State departments and private forestry companies in eucalypt plantations in NSW and QLD. The surveys will provide a framework for a database on disease already present in Australia. Preliminary surveys of eucalypt plantations in Indonesia (Northern Sumatra and West Papua), Thailand, China and Vietnam have also been undertaken. This was made possible through local collaboration and through Murdoch's association with FABI (Forestry and Agricultural Biotechnology Institute) in South Africa. A database of exotic eucalypt diseases and their proximity to Australia and the risk they pose to Australia's forests and industry is being compiled. A number of diseases are of particular interest, *Phaeophleospora destructans*, *Coniothyrium zuluense* and *Cryphonectria cubensis*. Molecular markers are currently being developed for *P. destructans* and (courtesy of FABI) are already in existence for *C. zuluense* and *C. cubensis*. These markers will be used to determine the origin, diversity and movement of potentially destructive eucalypt diseases (T. Burgess – Murdoch University).

Work under the following grants is in progress at Murdoch University.

SPIRT Large. 2000-2003 at $200, 000 (Industry Partner-Integrated Treecropping). *Mycosphaerella* leaf blights and other pathogens in *Eucalyptus globulus* plantations and interactions with tree nutrient status. (A/Prof. Bernie Dell, MU, Dr. Giles Hardy, MU and Postdoctoral Fellow Dr. Heike Neumister-Kemp).

Collaborative Project - Murdoch University and the Tree Pathology Cooperative Program (Sth Africa)

'New and emerging pathogens threatening the biodiversity of Australia's eucalypts'. This project is concentrating on some of the major eucalypt pathogens worldwide,

(*Phaeophleospora* spp. *Mycosphaerella* spp., *Botryosphaeria* spp. *Cryphonectria* spp.) with the aim of determining their origin, movement and the risk they pose to Australia's eucalypts. (T. Burgess, MU, M. Wingfield, TPCP).

PhD Theses in progress at Murdoch University
Canker diseases in *Eucalyptus globulus*. (Tania Jackson; Supervisors, G. Hardy and B. Dell, MU).

Taxonomy and biology of *Mycosphaerella* species found on *E. globulus*. (Sarah Jackson; supervisors, G. Hardy and B. Dell, MU)

Paulownia Plantations
ARC Linkage. Diseases of *Pawlonia.* (Kirsty Bayliss, Postdoc MU)

Honours Theses
Infection processes of *Alternaria* leaf blights in Paulownia plantations in Western Australia. (Catherin Pleysier, Supervisors T. Burgess and G. Hardy, MU)

Managed natural forests
Corymbia calophylla
Diseases
Canker fungi associated with deaths of *Corymbia calophylla* (marri) (Trudy Paap; Supervisors: G. Hardy, MU, Bryan Shearer, CALM and Jen McComb, MU). Part funded by Forest and Wood Products Scholarship.

Honours
Biology of *Quambalaria* on *C. calophylla* and *C. ficifolia.* (Julie Ellery, Supervisors; G. Hardy, J. McComb and T. Papp, MU)

Jarrah forest (Eucalyptus marginata)
Diseases
Dieback-resistant jarrah (*Eucalyptus marginata*): Planting of a production seed orchard of dieback resistant jarrah clones continued at the Forests Products Commission's Plant Propagation Centre near Manjimup. Field trials of jarrah clones selected for resistance to *Phytophthora cinnamomi* have continued. Trials of site preparation procedures for re-establishment of jarrah in dieback "graveyard" sites commenced in 2003 and further trials are being established in 2004. (M.Stukely - CALM).

Work under the following grants is in progress at Murdoch University.
SPIRT Large. 2000-2003 at $300,000 (Industry partners CALM, Alcoa, Worsley Alumina, CSIRO). Will *Phytophthora cinnamomi* become resistant to the fungicide phosphite? Its implications. (This study examines plant and fungal interactions at a genetic level). (Investigators: Giles Hardy-MU, Inez Tommerup-CSIRO, Phil O'Brien,-MU, Bryan Shearer-CALM, Ian Colquhoun-Alcoa World Alumina, Postdoctoral Fellow Mark Dobrowolski).

Linkage ARC Large. Industry Partners Alcoa World Alumina, Worsley Alumina and Department of Conservation and Land Management. The ability of the fungicide phosphite to stop the autonomous spread of *Phytophthora cinnamomi* in the

*Eucalyptus marginata* forest. Post-doctoral fellow: Bill Dunstan (Investigators: G. Hardy, B. Dell, M. Calver, J. McComb, MU I. Colquhoun, Alcoa World Alumina and B. Shearer, CALM)

PhD Theses in progress at Murdoch University

Long term survival of *Phytophthora cinnamomi* in rehabilitated bauxite mines and adjacent *Eucalyptus marginata* forest. This project is looking at chlamydospore dormancy and saprophytic growth. (Sarah Collins; Supervisors, G.Hardy, MU and B Shearer, CALM). Funded by ARC LINKAGE

Saprophytic ability and long-term survival of *Phytophthora cinnamomi* in rehabilitated bauxite mines and adjacent jarrah forest. (Kathryn Smith; Supervisors G. Hardy, Jen McComb, MU and I. Colquhoun, Alcoa World Alumina). Funded by ARC LINKAGE

The impact of *Phytophthora cinnamomi* on different mammal guilds in the Darling Range of Western Australia. (Rodney Armistead; Supervisors M. Garkaklis and G. Hardy, MU).

Mechanisms of suppression of Acacia species on Pc Arunodini Jayasekera BS JMcC GH

Karri forest (*Eucalyptus diversicolor*)

Diseases

Stump pulling for the control of Armillaria root disease in regrowth karri was initiated in 2003/4. Following first thinning in karri regrowth, stumps were pulled in approx. 300 ha of karri regrowth on high quality sites. The total area of thinning was 800 ha (A. Seymour, FPC).

Native plant communities

Diseases

Work under the following grants is in progress at Murdoch University.

PhD Theses in progress

The biology, ecology, pathology and genetics of *Puccinia boroniae* (Boronia rust) of in *Boronia megastigma, B. heterophylla, B. clavata* and hybrids. (Susanna Driessen APAI; Supervisors Giles Hardy and Phil O'Brien, MU) Funded by ARC LINKAGE

Interactions between potential fungal and insect pathogens associated with the decline of Tuart (*E. gomphacephala*) in Western Australia. (Martin Landolt; Supervisors M. Calver and G. Hardy, MU).

## QUEENSLAND

### PLANTATIONS

#### *Pinus spp.*

##### Insect Pests

***Sirex noctilio (Sirex wood wasp)***

Status unchanged – not yet detected in Queensland. Joint studies by Queensland DPI and State Forests NSW have shown that billets of the F1 and F2 hybrids of *P. caribaea* are susceptible to attack by Sirex. Further studies on standing trees are taking place at Whiporie in New South Wales. The monitoring program continues.

***Essigella californica (Monterey pine aphid)***

Distribution unchanged – occurs throughout the exotic pine estate. A small growth trial on young *P. taeda* that is severely infested by *Essigella* will be carried out at Passchendaele.

##### Diseases

No significant diseases.

#### *Eucalyptus species*

##### Insect Pests

***Psyllids***

The psyllid *Creiis* sp. (species yet to be confirmed, but likely to be *C. lituratus*) was detected on *Eucalyptus dunnii* in three DPIF plantations in the Beaudesert area in September 2003. Populations of the psyllid were monitored monthly after the first detection at one plantation where localised damage was severe. Plots to assess levels of damage and effects on growth over time established. (see research and development)

***Leaf Beetles***

*Paropsis atomaria* caused severe damage in at least three plantations of *E. cloeziana* in southeast Queensland in late summer. CDI assessments and population levels of *P. atomaria* were monitored weekly over a two-month period at one of these sites. CDI assessments were also carried out at one other severely affected plantation.

***Swarming Scarabs***

Widespread severe shoot and young foliage damage was caused by two swarming scarab beetle species: *Liparetrus* sp. and *Automolus vulgaris* on two-year old *E. globulus* x *E. camaldulensis* hybrids in the central Burnett. *A. vulgaris* although smaller, was in higher numbers and causing greater damage.

***Erinose mite***

Erinose mite (*Rhombacus* sp.) damage was severe in many spotted gum (*Corymbia citriodora* ssp. *variegata*) plantations across SEQ. Surveys were carried out over the estate for incidence and severity as part of a research program being initiated for this species. Initial surveys of taxa trials to identify tolerance were also commenced. An

undescribed eriophyoid mite (similar to that on spotted gum) was found causing severe localised damage to *E. cloeziana* in the central Burnett area.

Leaf distortion caused by eriophyoid mite affecting immature foliage of *E. cloeziana*.

***Plate galler***

*Ophelimus* sp. was recorded causing moderate damage to *E. argophloia* at a single plantation in SEQ.

***Weevils***

*Oxyops* sp weevils were recorded causing minor damage, mainly to *E. dunnii.*

***Gum leaf skeletoniser***

Gum leaf skeletoniser (*Uraba lugens*) was found causing minor damage to *E. argophloia* at a single plantation in the Boonah-Beaudesert area. This is a first record for this species in plantations in Queensland. It has been recorded outbreaking in native forest in southeast Queensland, principally on narrow leaved ironbark, *E. crebra*.

***Sawflies***

Widespread damage caused by sawfly larvae, mostly on the lower to mid-crown was recorded in February 2004 in a five-year old coastal planting of *E. cloeziana* in SEQ. Assessments were conducted for presence/absence of sawfly larval groups, trees being too large to allow for accurate CDI assessments. Sawfly larval groups were present on 56% of trees across the plantation. This was the most extensive damage caused by sawflies yet seen in a plantation in SEQ Queensland. A subsequent survey a month later showed that most sawfly larvae had completed feeding, left the trees and pupated.

"Broomtopping" caused by chrysomelid leaf beetles and mid-crown defoliation by sawflies to 5 year old *E. cloeziana*

High populations of sawfly larvae on *E. cloeziana* branch

***Leaf blister sawfly***

*Phylacteophaga* spp. were found causing minor to moderate damage to a number of plantations, including *E. argophloia, E. globulus x E. camaldulensis, E. cloeziana* and *E. dunnii*.

Leaf blister sawfly damage to *E. globulus* x *E. camladulensis*

***Wingless grasshopper***

Wingless grasshoppers (*Phaulacridium vittatum*) caused severe damage to newly planted seedlings of *E. argophloia* and *C. c.* ssp. *variegata* at two plantations in the South Burnett region of SEQ.

***Christmas Beetles***

No significant damage noted

***Stem Borers***

Remain a problem mainly of private plantings of *E. grandis* and its hybrids and *E. dunnii*. *Phoracantha solida* damage to about 5% of five –year old *E. cloeziana* was recorded in one plantation.

***Thaumastocoris sp. bugs***

This small bug was found causing widespread minor damage (necrotic patches) to lower foliage of *C. c. ssp. citriodora* in November 2003 in the Beaudesert area and again in June 2004 causing up to 60% defoliation to 15 ha of *C. c.* ssp. *citriodora* plantation in the south Burnett. The observations are a first record for plantations in Queensland. These bugs are capable of causing significant damage ("bronzing") to trees, and have been outbreaking on a number of *Eucalyptus* species in the Sydney region in recent years, including Corymbia species. (For further information see: http://www.thaumastocoridae.org/index.html).

***Flea beetles***

Minor but widespread damage by *Chaetocnema beata* and *Chaetocnema* sp. flea beetles was recorded on *E. argophloia* and *E. grandis* x *E. camaldulensis*, respectively.

## Diseases

A joint SF-NSW/FR survey of *Eucalyptus* plantations in northern NSW and SE Queensland was conducted in February 2004. A number of known foliage pathogens were identified some occurring on new hosts, along with a possible new species detected on *Corymbia* hybrids. The following pathogens were identified during the survey

Fungal pathogens of hardwood plantations in SE Queensland

| **Fungal Pathogen** | **Host species** |
|---|---|
| *Phaeophleospora eucalypti* | *E. grandis, E. grandis x E. camaldulensis, E. tereticornis x E. grandis* |
| *Coniella sp* | *E. tereticornis, E. cloeziana* |
| *Coniella fragariae* | *E. tereticornis, E. dunnii* |
| *Mycosphaerella swartii* | *E. dunnii* |
| *Mycosphaerella sp. (New)* | *C. torelliana x C. citriodora subsp variegata* |
| *Phaeophleospora epicoccoides* | *E. grandis x E. camaldulensis* |
| *Quambalaria pitereka* | *Corymbia spp. and hybrids* |

Fungal pathogens of hardwood plantations in N NSW.

| **Fungal Pathogen** | **Host species** |
|---|---|
| *Fusicoccum sp.* | *Corymbia spp., E. grandis x E. camaldulensis* |
| *Quambalaria pitereka* | *Corymbia spp.* |
| *Phaeophleospora epicoccoides* | *E. grandis and hybrids* |
| *Phaeophleospora eucalypti* | *E. grandis and hybrids* |
| *Phaeophleospora corymbia sp. Nova* | *C. citriodora subsp. variegata* |
| *Mycosphaerella spp.* | *E. dunnii, E. grandis* |
| *Phaeothyriolum microthyroides* | *C. citriodora subsp variegata* |

***Pheaophleospora eucalypti***

*Pheaophleospora eucalypti* was detected during a joint SFNSW/Forestry Research survey causing significant foliage blight and premature death of young leaves on *E. grandis, E. grandis x E. tereticornis* and *E. grandis x E. camaldulensis* hybrids. Hot and humid conditions, ideal for disease development, may have played a role in the significant damage associated with this pathogen observed at the Dor Joint Venture in the Boonah district. The symptoms noted were very similar to damage that is often associated with the exotic pathogen *Phaeophleospora destructans*.

Future surveys of *P. eucalypti* will involve the identification of all host species and the collection of a broad range of isolates for genetic studies. The level of impact under various environmental conditions will also be noted.

*Phaeophleospora eucalypti* on *E. grandis* hybrids in SEW Qld.

***Mycosphaerella sp. nov.***

Trials of the *Corymbia* hybrids inspected at a site near Kingaroy, Coolabunia, exhibited symptoms of a foliage pathogen that had not been previously identified. Characteristic symptoms included leaf spots circular to irregular and discrete, occurring on both the upper and lower sides of the leaf. However the spots are more prominent on the lower side of the leaf and have a slightly raised border. Psuedothecia are produced on the upper and lower surface of the spots.

The impact of this disease is yet to be determined and its incidence and severity in plantings will have to be assessed. The level of defoliation associated with this fungus appeared to vary within the hybrids. There was no evidence of this pathogen occurring on adjacent *C. citriodora* subsp. *variegata* plantings.

New Mycosphaerella species on *Corymbia* hybrids in SE Qld.

***Quambalaria pitereka***

*Quambalaria pitereka* was detected throughout the spotted gum plantation estate following an extended wet period in January/February this year. Collections of isolates from various regions have been made and sequencing data initiated. However, further research has been delayed due to funding issues despite a detailed research proposal being submitted.

***Hoop Pine – Araucaria cunninghamii***

**Diseases**

Health surveys were conducted within Imbil, Jimna and Yarraman regions. No significant health issues aside from root rot (*Phellinus noxius* and *Rigidoporus vinctus*) were recorded. Historical root rot data has been extracted from the FHS database and recorded onto digital maps. This information will be used to assist in determining factors influencing disease occurrence and severity in future survey work.

A root rot assessment system is being developed to determine the incidence and severity of disease within individual hoop pine compartments. This method of assessment could be used for both managerial (application of treatments) and scientific purposes.

Biological control studies have resulted in the development of a gel bead formulation incorporating the biocontrol agent *Tyromyces* sp. with similar decay properties to the mycelial slurry used by Bolland. The new formulation is however more tolerant to environmental variables. Initial field trials have been established to determine the optimum concentration of mycelium required to rapidly colonise the hoop pine stumps and accelerate the rate of decay.

Field trials have been initiated to trial the effectiveness of a Propiconazole chemical (Alamo$^{R}$) in controlling *Phellinus noxius* in established plantations. The use of Pentra-Bark$^{R}$ in combination with Alamo$^{R}$ is being assessed to allow for a more manageable application process to be developed. New chemical additives and a defence promoter are also being tested.

***Wollemi Pine – Wollemia nobilis***

**Insect pests**

Two scale insects have recently been detected in the Wollemi pine nurseries in Queensland. These scales have been identified as California red scale, *Aonidiella aurantii* (Maskell) and Spanish red scale, *Chrysomphalus dictyospermi* (Morgan). Looper caterpillars, such as Sinister moth *Pholodes sinistraria* (Guenee), also known as "Brown looper", have been detected during health surveys but control programs have maintained numbers at a low level. Aphids have been detected on foliage of a few hedge trees but a comprehensive chemical spray program has resulted in minimal impact to the nursery. The aphids were unidentified (Gen. et sp. indet., Aphididae). Scarab beetles, possibly *Ancylonyx sobrinus* (Family Scarabaeidae), were identified

from around Wollemi pine trees. A number of adults were found around the base of the Wollemi trees suggesting that they were emerging from the soil. As no other weeds were proximal, it would suggest that the larvae have been feeding on the root systems. These beetles have previously only been officially recorded in the Cairns area. However AFFS Forestry Research records show that this beetle has been recorded flying around the *Pinus* seedlings at Toolara in September 1993 without causing any noted damage.

**Diseases**

*Fusicoccum* spp. is associated with a range of different dieback symptoms on Wollemi Pine within nurseries in Queensland. Symptom development is generally associated with a form of stress event (hedging, sun or chemical burn or cutting establishment). Symptoms associated with *Fusicoccum* spp. include foliage wilt with internal tissue discolouration extending from the root collar a short way up the stem, crown dieback, shoot tip dieback on young foliage with necrosis extending to the main petiole and death of trees as a result of stem cankers. *Fusicoccum* spp have also been isolated from apparently healthy Wollemi pine foliage and stems.

Observations of fungal morphology would suggest that there might be three different species of *Fusicoccum* within the nurseries. One of these species has also been associated with foliage and stem dieback of hoop pine seedlings.

Invitro studies have been conducted to determine the effectiveness of a range of fungicides against isolates of *Fusicoccum*. Marvel$^{R}$ and Folicur$^{R}$ were most effective in reducing growth rates of all isolates. However Marvel$^{R}$ has now been taken off the market.

Other fungal pathogens identified have included *Nectria* sp. and *Mycosphaerella wollemia*.

## URBAN AND RURAL

***Aconophora compressa (Lantana bug)***
This membracid was introduced from Mexico into Queensland and New South Wales in 1995 as a biological control agent for lantana. Within three years of its release the insect was found to have established on lantana, but was also located on a number of non-target species. The insect causes extensive damage to Fiddlewood trees (*Citharexylum spinosum)*, and has also been recorded on other garden and native species including Duranta (*Duranta erector*), Jacaranda (*Jacaranda mimosifolia*), Blue butterfly *(Clerodendrum ugandse)* and grey mangrove (*Avicennia marina*). In Queensland the insect has been recorded in the southeast corner from Currumbin in the south to Caboolture in the north, and is concentrated around the Logan and surrounding shires. The insect has also been reported from Malanda and Mt Fox in north Queensland, and around Grafton, Terrigal and Iluka in New South Wales. Extreme temperatures during February effectively removed the insects from much of the greater Brisbane area, with populations surviving only in the higher, cooler areas of Springbrook. Recently the insect has been relocated in Brisbane suburbs.

## OTHER HARDWOODS

***Hypsipyla robusta (Cedar shoot borer)***
*Hypsipyla robusta* has recently been collected from African mahogany *Khaya senegalensis* trees in the Darwin area, Northern Territory. These represent the first confirmed record of *H. robusta* in the Northern Territory, although their presence there has been long suspected. The incidence of *H. robusta* in *K. senegalensis* is low to date.

## QUARANTINE

***Red Imported Fire Ant (*Solenopsis invicta*)***
The third year of the eradication program for this exotic pest has just been completed. Extensive active and passive surveillance in Queensland and elsewhere in Australia indicates that RIFA is still confined to the Brisbane- Ipswich area of southeast Queensland. Progress towards eradication has been very promising - monitoring results from the second year of treatment showed that more than 97% of previously infested properties no longer have viable nests. Large areas of the original infested area now appear to be free of RIFA. Approximately 136,000 surveillance inspections have been completed in the surveillance buffers and over 10000 hectares have been surveyed beyond these zones. The rate of discovery of outlying infestations has been dropping. Of greatest concern has been the finding of infestations in rural areas to the south west of the existing core, and proactive treatment in this zone has been carried out in an attempt to get ahead of the pest. A Habitat Model is now being used that directs surveillance efforts to target areas with a high probability of being infested. This allows increased efficiency with only 50% of the area needing to be surveyed with no substantial reduction in efficacy.

An international workshop on RIFA will be held in Brisbane in August 2004. A review of the eradication program in Australia to date will commence at the end of that month.

***West Indian Drywood Termite (*Cryptotermes brevis*)***
Six houses and five stacks of infested furniture were fumigated in Brisbane in 2003. These infestations were in (mostly) known areas of infestation and treatment cost $113K.

***Powder Post Beetle (Lyctus africanus)***
Active infestations of this exotic pest were found in furniture in two houses in Goondiwindi, south-west of Brisbane in May 2004. The furniture had been brought in from Africa as personal effects. The items have been fumigated and arrangements made for further inspections and the placement of trap blocks around the area.

## RESEARCH AND DEVELOPMENT

### Creiis *psyllids*
Four, twenty-tree plots were established in September 2003 at a severely infested plantation near Beaudesert to monitor damage and the effect of the psyllid on growth. Assessments of CDI and height were carried out in September 2003 and June 2004. Populations of the psyllid were also monitored monthly. Six trees were selected at random across the plantation and the terminal 30 cm of a single shoot removed and brought back to the laboratory to assess numbers of the various stages of the psyllid and associated natural enemies.

CDI at the first assessment averaged 41.0 % ± 2.7 (SE). At the second assessment in June 2004, damage by the psyllid had reduced to a mean CDI of 9%. Although damage had reduced substantially since September 2003, both height and DBH increment of trees was reduced significantly in relation to mean CDI over the two assessments. Regressions indicate that at a mean CDI of 40% trees suffered a 55% loss of height increment and a 47% loss of diameter increment over the 9-month period.

Populations of the psyllid were assessed monthly from September to June. Very large numbers of early instar nymphs were present in September with smaller peaks observed in November and February. As predicted from experience with this insect in northern NSW, the population crashed over the hot summer months and remained at low numbers through early autumn. There was a significant increase in numbers in May with an observable increase in damage symptoms. More intensive monitoring of psyllid populations will be undertaken during the winter of 2004, when populations can be expected to increase rapidly.

# SOUTH AUSTRALIA

## PLANTATIONS

### *Pinus radiata*

**InsectPests**

***Sirex noctilio***

**In the Green Triangle Region:**

- Sirex remains at a very low level in this region.
- A total of 108,000 ha has been inspected with just over 2 ha showing moderate damage (0.1% trees affected).
- Surveillance flights are being conducted over July/August (slightly later this year due to problems with the weather and the plane). More trap tree plots were put in this year and the inoculation program is continuing.
- The major forest owners in the region (ForestrySA, Auspine and Green Triangle Forest Products) liaise to determine where trap tree plots will be established to ensure they are spread over the whole plantation estate.
- Each company conducts separate surveillance and inoculation programs.
- Parasites: Ibalia is well established and this year. Schlettererius has been found on several occasions.

**In the Ranges Region:**

- Sirex is well established throughout the Ranges region being recorded in all Forests.
- There has been an increase in the Sirex population at Kuitpo Forest.
- There have also been reports of Sirex at Mt. Crawford Forest.
- The Sirex population at Second Valley Forest has decreased.
- It is suspected that the trap tree monitoring has not been as effective in the Northern Forests this year due to the large number of naturally stressed trees in the area.
- Nematodes are well established in the wild at Kuitpo Forest, Second Valley Forest, Bundaleer Nth in the Northern Forests and at Mt. Crawford Forest.
- There have been no recordings of nematode positive Sirex at Wirrabara Forest (the most northerly forest) since 2001.
- There has been a decline in Megarhyssa numbers throughout the region this year
- The majority of Megarhyssa emerged from one site at Kuitpo Forest. Only 2 emerged from Second Valley and 1 from Mt.Crawford and none from the Northern Forests.
- Most Megarhyssa, which emerged from billets, were released at Kuitpo Forest. Some were sent to Queensland for research purposes.
- Ibalia is well established at Mt. Crawford, Wirrabara, Second Valley and Kuitpo Forests**.**
- Ibalia, which emerged from billets, were released at various localities at Mt. Crawford, Wirrabara, Second Valley and Kuitpo Forests.

- Following last years discovery, Schlettererius was again collected at Kuitpo Forest.

***Ips grandicolis***

**In the Green Triangle Region:**

- Again there has been little activity in this region this year. Of 200ha inspected less than 10ha was found to have evidence of *Ips* activity.

**In the Ranges Region:**

- *Ips* continues to be a significant problem in the northern forests of Bundaleer and Wirrabara. *Ips* attacked trees are present throughout these forests with high numbers of *Ips* present in some areas. It is thought that drought conditions have caused many more trees to be stressed this year than normal and this has contributed to the high incidence of *Ips* attack.
- At Mt Crawford, *Ips* is present throughout the forest but only causes damage around logging areas. Management of logging activities to avoid the warmer months reduces the risk of major damage.
- At Kuitpo and Second Valley, *Ips* is present but is rarely a problem.

***Essigella californica***

- Essigella is present throughout all South Australian pine forests.
- In the Green Triangle Region it's effect varies from year to year and from plantation to plantation and its importance varies depending on the forest owner. *Essigella* is causing defoliation, however often large numbers are seen with little corresponding yellowing or subsequent needle loss.
- Ladybirds have also been present in large numbers again this year.
- In the Ranges Region *Essigella* has not been reported as causeing significant damage.

***Hylastes ater***

- These beetles have been responsible for killing large numbers of seedlings in one plantation in the Green Triangle Region. This outbreak is thought to have occurred because the site was replanted within 4 months of being clearfelled and because of the large volume of slash that remained on the site.

***Wingless Grasshoppers***

- Wingless grasshoppers have caused problems in several *Pinus radiata* plantation in the Green Triangle Region this year. Several hundred hectares were affected.

**Diseases**

***Sphaeropsis***

- No reports of significant damage this year.

***Cyclaneusma minus***

- Significant damage occurred in the Green Triangle Region this year. Over 1000ha have been reported as having moderate damage (25% defoliation) and 100-500ha have been reported as having severe damage (50% defoliation).

- The question has again been raised as to the relationship between *Cyclaneusma* and *Essigella*.

***Dothistroma***

- This disease has not been recorded in South Australia.

***Eucalypts***

**Insect Pests**

***Autumn Gum Moth***

- Autumn Gum Moth continues to be a major pest of 1-3 year old bluegums in plantations. They are present in virtually all bluegum plantations and cause varying amounts of damage. Control is occasionally carried out but as most plantations are privately owned or owned by investment companies, damage levels and control measures taken are rarely reported.
- On Kangaroo Island, in a *Eucalyptus nitens* plantation, 95% of trees had larvae present. Early treatment kept damage to a minimum.
- On Kangaroo Island, Autumn Gum Moth was also found on *E. cladocalyx* and *E. occidentalis*.

***Chrysomelid beetles***

- Chrysomelid beetles are becoming increasingly important pests in eucalypts plantations in the green Triangle region. They are present in almost every plantation and cause varying amounts of damage. As with Autumn Gum moth, damge levels and control measures are rarely reported.
- On Kangaroo Island, Chrysomelid beetles are found in most plantations. *E. cladocalyx* and *E. occidentalis* plantations had most damage.

***Scale***

- Large numbers of scale insects (*Eriococcus coreacious*) have occurred in a few plantations in the Green Triangle Region. In these plantations almost every tree had scale present with sooty mould also on many trees.

***Sawflies***

- Sawflies (*Perga* sp.) are present in some plantations each year. Occasionally they occur in large numbers and cause severe damage.
- Small populations of Leaf blister sawflies were present in most plantations on Kangaroo Island but caused little damage

***Longicorn beetles***

- These are present in many plantations but are not causing significant damage. A study on the incidence and distribution of longicorn beetles in eucalypt plantations is being conducted by ForestrySA in the drier areas of the Green Triangle Region.

***Scarab beetles***

- Various species have caused damage in the Green Triangle Region and on Kangaroo Island this year. However damage levels were below reporting thresholds.

***Wingless grasshoppers***

- Wingless grasshoppers were found in all plantations on Kangaroo Island. Damage varied from minor to very severe (stems being attacked). The severe attack was on *Eucalyptus cladocalyx*.

**Diseases**

There have been no reports of diseases in eucalypts this year.

**NURSERY**

- There have been no reports of pest or disease problems in nurseries this year.

**ENVIRONMENTAL**

- Several hundred hectares of pine forest in the Green triangle Region was damaged by hail and wind in a storm in November 2003. The affected areas have now been salvaged but will continue to be monitored for insects and disease.
- No significant fire events occurred this year.

**DIEBACK**

- A new book on Dieback in the Mount Lofty Ranges is in press. This documents symptoms of dieback and discusses the many causes
- Note: Mundulla Yellows is only one of many causes of dieback. Symptoms are not a reliable indicator of this disease and until a diagnostic test is developed it cannot be positively identified as being present.
- Phytophthora**:** This is present in the mount lofty ranges and on Kangaroo Island. Areas where positive identifications have been made are in a database maintained by the Department of Environment and Heritage. ForestrySA, Local Councils and other organisations have procedures in place to minimise the risk of spreading the disease.

**FOREST HEALTH SURVEILLANCE**

- Flights to detect Sirex (and other pine deaths) continue to be carried out each year in the Green Triangle Region. Surveillance of pine forests in the Ranges Region is carried out by staff of ForestrySA on the ground.
- The Regional Forest Health Group in the Green triangle Region, consisting of representatives from ForestrySA, Auspine, Green Triangle Forest Products (GTFP) and Hancocks, meet twice a year to discuss forest health issues and to coordinate Sirex activities. A similar group may be set up for Eucalypt growers in this region.

**RESEARCH & DEVELOPMENT**

- ForestrySA, Auspine, GTFP, Hancocks, State Forests NSW, Bayer and Sidewinder are collaborating with CSIRO, on a project to assess the causality of *Essigella* ascribed defoliation of mid-rotation radiata pine and its national impact in terms of cost of lost wood production. After preliminary investigations, the main trial began in February 2004.
- A student at the Waite Institute, (University of Adelaide), Zengqi Zhao, from China, is working on a research project on the "Taxonomy, biology and pathogenicity of nematodes associated with pine trees and other conifers in

Australia". The project will survey the above ground nematode fauna of pines and related conifers in SE Australia. It will describe and characterise Bursaphelenchus spp. and any other morphologically similar taxa found and will examine the biology and pathology of the Bursaphelenchus spp detected. Zengqi has collected samples from the Mount Lofty Ranges and the Green Triangle Region and has found several nematode species.

- ForestrySA is conducting a survey of the incidence and distribution of longicorn beetles in eucalypt plantations in the Upper South East area.
- ForestrySA has produced two new manuals this year:
    - *Green Triangle Forest Soil Profiles* – this describes forest soils in the Green Triangle Region and is available for sale from ForestrySA
    - *Forest Weed Identification Vols 1 and 2*. These volumes describe weeds of the Green Triangle Region (with an emphasis on forestry weeds). Both volumes will be available on the ForestrySA website.

## NEW ZEALAND

Collated and summarised by J. Bain, L. Bulman and M. Dick (Forest Research) from data and information from the Forest Research Forest Health Database, *Forest Health News* (Forest Research), the Forest Research Forest Health Reference Laboratories Diagnostic Services, and other Forest Health staff (I. Hood, K. Dobbie, J.Gardner, D. Jones, D.Kriticos, S. Mansfield and T. Ramsfield).

### PLANTATIONS

### *Pinus radiata*

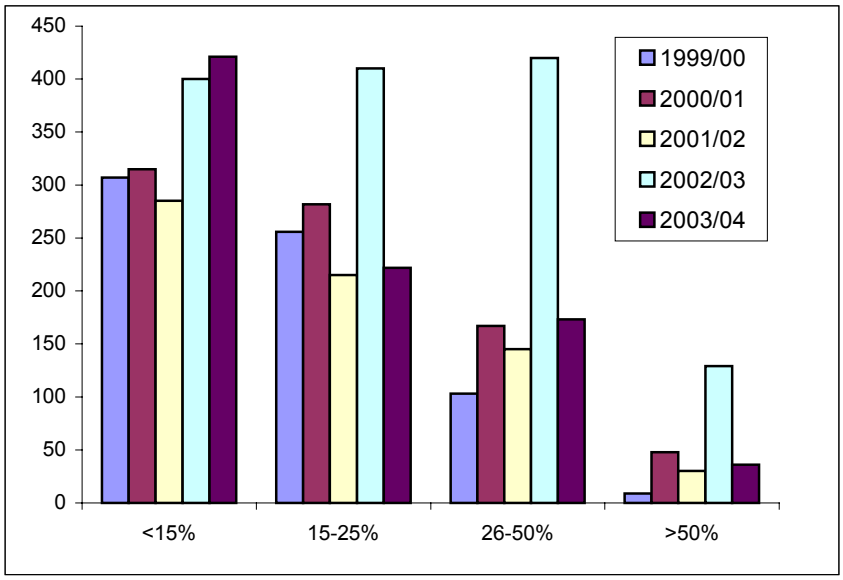
#### Insect Pests

No insect problems of any note were recorded in *P. radiata* plantations. The status of *Essigella californica* is still being monitored but it is not considered to be a serious pest.

#### Diseases

***Dothistroma needle blight***

Records of Dothistroma needle blight confirmed a significant reduction in disease severity in 2003-04, compared with the level reported for 2002-03, which was higher than that in the three previous years. The number of records where severity was greater than 25% decreased significantly in the 2003-2004 year (figure). Above average rainfall was experienced in the central North Island (where most of the susceptible *P. radiata* is grown) during the summers of 2000-2001 and 2001-2002. These consecutive wetter than normal summers and difficulties experienced during the 2001-2002 spray programme contributed to the high infection levels in 2002-2003. Over the summer of 2002/03 dry conditions generally prevailed and infection levels dropped.

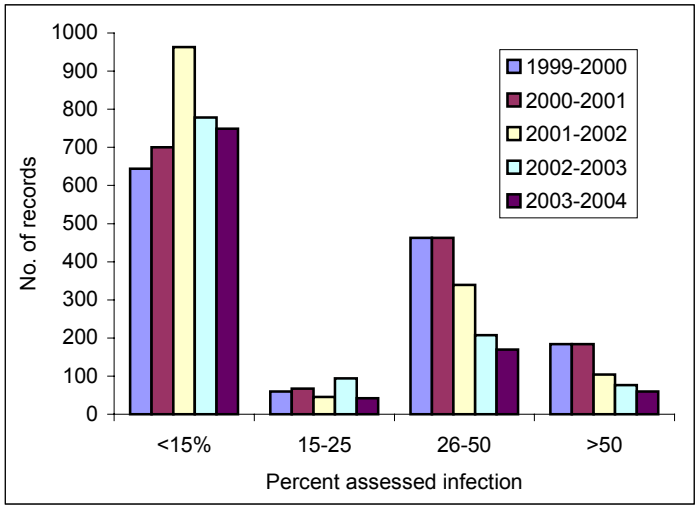



**Forest Health Database records of *Dothistroma pini* during the period 1999-2004**

The aerial spray programme for 2003-2004 at 80,488 ha was considerably smaller than the previous season when an area of 207,549 ha was sprayed. (figures provided by the Dothistroma Control Committee). The 2002-2003 spray programme was the largest ever undertaken, and easily surpassed the 106,451 ha treated in the previous season (cf. 68,000 ha in 2000-2001 and 47,000 ha in 1999-2000). The area sprayed is a separate, but less refined indicator of the annual impact and extent of Dothistroma needle blight throughout the whole country, since it may be influenced by other forces driving company activities (for example: budget constraints, changes in silvicultural practices, increasing area of at-risk age classes due to greater planting in the 1990s).

***Cyclaneusma needle cast***

The severity of Cyclaneusma needle-cast was again low, as it was in the two previous seasons (figure). Disease severity was less than 15% for almost 70% of the Cyclaneusma needle-cast records for the last three years, compared with almost 50% of the records for the two years before that. These lower disease levels are attributed to the dry conditions experienced over much of the country during the autumn period of 2001 (see last year's status report), 2002, and 2003. The main infection period is summer for *Dothistroma* and autumn for *Cyclaneusma*.




**Forest Health Database records of *Cyclaneusma minus* during 1999-2004**

***Physiological needle blight***

Throughout the country outbreaks of the physiological needle blight (in the past often referred to as 'Strasseria-associated needle cast') were rare, and relatively low in severity, in the spring of 2003. To test the hypothesis that outbreaks are related to very high June/July rainfall and number of raindays, forests in the two regions where the disorder has been most prevalent were assessed in 2003 and compared with data collected in 2002.

| | Northland 2002 | Northland 2003 | East Cape 2002 | East Cape 2003 |
|---|---|---|---|---|
| June/July rainfall (mm) | 516 | 210 | 520 | 399 |
| June/July raindays | 46 | 41 | 30 | 24 |
| [1]Disease severity | 56 | 0 | 0 | 0 |
| [2]Disease incidence | 23 | 0 | 0 | 0 |

[1] Severity is the average percentage of affected foliage for all assessed trees.
[2] Incidence is the percentage of trees affected by the disorder

Needle disease was not present in the forests surveyed in 2003 although remnant effects (thin crowns) from the Northland 2002 outbreak were seen in a few stands. The data indicate that the combination of total rainfall and number of raindays may be important. There was an outbreak in Northland after rainfall exceeded 500 mm in June/July 2002, but no such outbreak was seen in the East Cape after a similar amount of rain fell. However, at the East Cape there were fewer raindays, and 44% of the total June/July rainfall fell on three days. Prolonged periods of needle wetness, experimentally applied, resulted in needle death in the absence of the fungi that have been suggested as causal agents. Applications of broad-spectrum fungicide reduced the incidence of needle death although all fungi found associated with (in or on) the needles were known saprophytes.

***Cylindrocladium acicola***

The species of *Cylindrocladium* isolated from discoloured *Pinus radiata* needles in 2003 has been confirmed as a new species after DNA testing carried out at the CBS (CentraalBureau voor Schimmelcultures) in Holland. The new taxon has been named *Calonectria acicola* with the anamorph *Cylindrocladium acicola*. It is not known to be pathogenic.

***Nectria fuckeliana***

Stem malformation of *Pinus radiata* resulting from infection through pruned stubs continues to be a major issue for forest companies in the southern part of the country. Symptoms are very similar to those typical of Diplodia whorl canker, particularly in the early stages. Symptoms have been seen on unpruned trees in the absence of visible injury. A small proportion of stem cankers are initiated at (or below) ground level. A survey of the incidence of the disease, and the relationship with site and silvicultural factors has been undertaken but results are not yet analysed. Internally the sapwood is stained blue-grey or brown. Cankering results from cambial death and often there is subsequent invasion by decay fungi such as *Stereum sanguinolentum.* The native cerambycid *Prionoplus reticularis* (huhu) may then lay eggs in the decayed wood resulting in rapid breakdown of tissue. Typically crowns remain green and healthy even when stems are extensively infected though some stem breakage occurs. The fungus has recently been found in mid-Canterbury, 130 kilometres north of the boundary recognised at this time in 2003. Trials in place are investigating the influence of season, wound size, stub treatment etc on the infection incidence with the aim of finding useful management strategies.

***Sphaeropsis sapinea***
*Sphaeropsis sapinea* was frequently associated with shoot, branch and leader dieback of *P. radiata* of a wide age range. Physical injury caused by environmental agents (wind, hail, snow and frost) and by birds and animals often provided an entry point for the fungus and contributed to these disorders. There have been regular reports of low levels of these disorders but no significant outbreaks. Some Diplodia whorl canker occurred in Hawk's Bay with subsequent tree mortality.

***Bacterial stem canker***
Some incidences of bacterial stem canker (caused by *Pseudomonas syringae* pv. *syringae*) occurred in central North Island forests in autumn. This disease occurs episodically, when a period of mild weather is followed by a sudden drop in temperature with frosts. It is generally confined to plants that have been established for less than one year, and is more common on plants growing in hollows and on flats where cold air ponds.

***Armillaria root disease***
Armillaria root disease, caused by *Armillaria limonea* and *A. novae-zelandiae*, remains widespread in many pine plantations through much of the country. Losses have traditionally been associated with first rotation stands planted on sites cleared of native forest. Economic loss from past infection on such sites remains substantial in current harvests. Mortality of young trees is now less common and, where it does occur, minor. However, chronic, non-lethal infection of older trees can still lead to significant increment loss. This has been estimated at 4% in one long term study recently published.

There are indirect grounds for believing that infection may be spreading into new areas of pine plantation by means of spore dispersal. Firstly, the disease occurs in pine stands on sites where there has been no history of indigenous forest. Then, numerous studies have established that *Armillaria* populations are composed of densely distributed colonies, implying that spore dispersal of the New Zealand species is prevalent in this country. This is in stark contrast to the distribution pattern of *Armillaria* species in many regions overseas, where colony densities are often much lower. In general, only *A. novae-zelandiae* has been found in pine stands on non-native forest sites, suggesting that this species may disperse to a greater extent than *A. limonea*

***Ophiostoma spp.***
*Ophiostoma huntii* and *Pesotum pini* contributed to mortality of 7-year-old *P. radiata* in patches of up to 70 trees in a Hawke's Bay forest. Soil movement on the steep slopes that had led to some root damage had allowed these fungi, regarded as weak pathogens or saprophytes, entry into the root systems.

## NURSERIES

Some incidences of severe *Dothistroma* infection of *P. radiata* were recorded in nurseries that had not maintained a good spray programme. *Phytophthora cinnamomi* root rot associated mortality occurred in a nursery that has had similar problems in the past. Marked differences in the incidence of root rot between clones were observed.

***Douglas fir (Pseudotsuga menziesii):***

**Diseases**

***Phaeocryptopus gaeumannii (Swiss needle cast disease)***

Swiss needle cast disease (*Phaeocryptopus gaeumannii*) was again recorded throughout New Zealand and remains the most significant disease of Douglas fir.

***Eucalyptus spp.***

**Insect Pests**

***Creiis lituratus***

There has been no change in the status of *Creiis lituratus.* This species was first found in New Zealand in June 2002 and is still confined to urban Auckland on *Eucalyptus botryoides*, *E. grandis* and *E. saligna.*

***Acrocercops laciniella***

*Acrocercops laciniella* (Gracillariidae) was first recorded in New Zealand in January 1999. It is a significant pest in coastal New South Wales, where it causes outbreaks of damage from time to time on blackbutt (*Eucalyptus pilularis*). *A. laciniella* has a wide host range, which also extends to species within the eucalypt sub-genus *Symphyomyrtus.* It has spread quite rapidly throughout the North Island and in June of this year was found in the South Island (Nelson) for the first time.

***Nambouria xanthops***

Until recently *Nambouria xanthops* which was first found in New Zealand in October 1999 had only been found in Auckland and Coromandel. It has moved further south and is now found in Waikato. It has also been found on a far wider range of *Eucalyptus* spp. Although the distinctive looking galls can be extremely abundant on some hosts they are not associated with any signs of ill-health of the host.

***Paropsis charybdis***

Between December 2003 and April 2004 monitoring of *Eucalyptus nitens* plantations at three sites in the central North Island of New Zealand revealed that 30% of *Paropsis charybdis* eggs were parasitised by *Enoggera nassaui* during early summer. However, later in the season there was a reduction to 7% parasitism by *E. nassaui*, the remaining 60% of parasitised eggs being hyperparasitised by *Baeoanusia albifunicle. Neopolycystus insectifurax* parasitised an additional 3% of eggs in late summer, which is a much lower rate of parasitism than the previous season (2002-03). One of the three sites monitored had received mass releases of *N. insectifurax* in the previous season but no *N. insectifurax* were detected at that site over the summer. Field monitoring in 2004-05 will focus on a comparison of sites where *N. insectifurax* has been deliberately released and sites that have not had such releases, to determine whether future releases of *N. insectifurax* are likely to improve control of *P. charybdis*.

A comparative analysis of the longevity, fecundity and attack behaviour of the two primary egg parasitoids began in 2004. Under controlled conditions, the lifespan of

adult *N. insectifurax* and *E. nassaui* is greatly increased when pure honey is given as a food source compared with no food or water, water only or honey-water solution. Initial results suggest *N. insectifurax* is synovigenic and that females require some time in the presence of hosts and food before commencing oviposition. In contrast, from previous research and direct observation, *E. nassaui* appears to be a pro-ovigenic species. However this needs to be confirmed experimentally. Further experiments to examine the effect of temperature and host age on parasitism by *N. insectifurax* and *E. nassaui* are underway.

***Uraba lugens***

*Uraba lugens*, which was first found in New Zealand in 1997 at Mount Maunganui and then in Auckland in 2001, is now very widespread in the latter locality and some sites have very large populations. It is now considered to have been eradicated from Mt Maunganui as it has not been found there since early 2001. *U. lugens* is now the subject of a containment strategy in Auckland and its spread is being monitored using pheromone traps, the pheromone having been identified by HortResearch. Forest Research has lodged an application with the Environmental Risk Management Authority (ERMA) for approval to import four parasitoids from Australia into containment. If the application is approved, the earliest date that parasitoids could be imported into New Zealand containment is November, 2004. Forest Research has also conducted efficacy trials on various insecticidal spray formulations. This information could be used to gain registration against *U. lugens* for the Btk (*Bacillus thuringiensis* var. *kurstaki*) and spinosad formulations tested. Combined with previous research on synthetic pyrethroids, this research provides a range of insecticide options suitable for control of *U. lugens* in urban areas and commercial forestry plantations.

Climate modeling has determined that, subject to host availability, the potential distribution of *U. lugens* in New Zealand extends throughout most of the North Island, and in the South Island over much of the Canterbury Plains and Marlborough as well as portions of Southland, Otago, Nelson and Tasman. This encompasses most of the eucalypt plantations in New Zealand. There is some uncertainty as to the effect of excessive rainfall and prolonged waterlogging on *U. lugens*, so more fieldwork is required to clarify this aspect of population spread.

Impact assessment studies have been carried out on 19 *Eucalyptus* and *Corymbia* species considered economically and culturally important to New Zealand. All of the commercial, shelter and ornamental *Eucalyptus* species tested were susceptible to *U. lugens* larval attack to some degree, including a number of key commercial species (*E. nitens*, *E. regnans* and *E. fastigata*). Field tests also found that *Metrosideros excelsa* was somewhat susceptible to attack, but only when plants were in close proximity to infested Australian hosts. It has also been found on *Lopjostemom confertus, Angophora costata, Quercus coccinea, Q. palustris* and *Fraxinus excelsior.*

## Diseases

***Phaeophleospora and Mycosphaerella leaf disease***

*Phaeophleospora eucalypti* was consistently the most common foliage disease in the *Eucalyptus nitens* plantations in the central North Island. Many of the trees are also infected with *Mycosphaerella cryptica* but disease levels tend to be lower than those of *P. eucalypti*.

***Aulographina eucalypti***
Leaf spotting of *E. delegatensis* and *E. fastigata* by *Aulographina eucalypti* was less severe than that seen in some years.

***Cypresses***

**Diseases**

***Cypress canker (*Seiridium *spp.)***
Cypress canker, caused by two species of *Seiridium* continued to cause damage in many cypress stands throughout the country, particularly *Cupressus macrocarpa.* An inoculation programme is underway in an attempt to identify and eventually utilise genetic resistance in commercial stock. *Seiridium cardinale* was responsible for substantial mortality in a stand of the supposedly resistant *Cupressus lusitanica* in the Bay of Plenty. Entry to the stem was often through possum inflicted injury (*C. lusitanica* is very palatable to *Trichosaurus vulpecula*, the brush-tailed possum) and through pruned stubs. Infection of the 'resistant' *Cupressocyparis ovensii* by *S. unicorne* was also recorded.

## NATIVE FORESTS

The new species of *Elsinoe* found on the indigenous *Pittosporum tenuifolium* in a Wellington gully has now been recorded in other locations in Wellington and has been named *Elsinoe takoropuku*. The etymology is from Maori, tà = stem, koropuku = swelling, and refers to the typical host symptom.

## BIOSECURITY

***Post-border (eradication)***

***Pitch canker***
The pitch canker fungus, *Fusarium circinatum*, was intercepted in New Zealand in November 2003. Early in 2003 Douglas fir (*Pseudotsuga menziesii*) scions were imported into the South Island from California and Oregon, from locations some distance from known pitch canker infection sites. The scions were grafted onto New Zealand grown root stock and held in a Ministry of Agriculture and Forestry supervised quarantine facility. As part of the import requirements random samples of healthy-appearing material are collected at intervals during the quarantine period and examined for pests. In November 2003 Forest Research pathologists tested these samples and found *F. circinatum.* The identification was based on both cultural characteristics and a molecular technique developed at Forest Research, and was later independently confirmed by researchers in California.

Subsequently US forest pathologists surveyed the stand from which the scions were collected and have now confirmed the presence of *F. circinatum* in symptomless trees. This raises a number of important questions about its ecology, host interactions and distribution. How widespread is *F. circinatum*? As Douglas fir seems to be acting as a symptomless host, how can countries known to harbour the pitch canker disease

confirm that areas growing Douglas fir are free of *F. circinatum*? What other plant species are acting as symptomless hosts of *F. circinatum*? In response to the find the New Zealand Ministry of Agriculture and Forestry has restricted the importation of Douglas fir material from the USA to seed, which still must be grown in high security quarantine facilities until declared disease free.

***Dutch elm disease***

The eradication campaign for Dutch elm disease continues in Auckland, and is being coordinated and funded by MAF supported by the local city councils. The 2003/04 season was notable for a greatly increased effort in the latter half of the season and an expansion of disease. Three disease detection surveys were carried out. The third survey was not a full survey, instead high risk areas were targeted, and effort was placed on a special survey in five areas where infected trees of infective beetles had been found. Unfortunately, as has happened in previous years, some elms had died before they were reported to be sick and beetles had emerged from elms before they were felled and disposed of. Surveyor audits were carried out.

During the 2003/2004 season infected trees were found at eleven locations: two in Pakuranga in the eastern suburbs, one in Papatoetoe in South Auckland, one in Western springs in central Auckland, and seven in West Auckland. At all locations infected trees were found as a result of the disease detection surveys. In the previous season diseased elms were found at four locations resulting in an expansion of the known infected area to West Auckland and South Auckland. In 2003/04, infected trees were again found at West Auckland and South Auckland. *Ophiostoma novo-ulmi* was isolated from fourteen samples.

A full pheromone trapping programme was carried out this season. Initially, 102 traps were deployed in high risk areas. In mid-February, MAF initiated, and funded, a greatly increased trapping array and by 16 February a total of 206 traps were being checked weekly. As at 12 May 8,677 beetles had been caught, of which 29 (0.33%) on 13 traps were contaminated with *O. novo-ulmi*. Infective beetles were trapped at Northcote in the North Shore, central Auckland, East Tamaki, Howick and Pakuranga. The percentage of infective beetles was significantly lower than last season, when 2.2% of the beetles trapped were infective. For further information see: http://www.maf.govt.nz/biosecurity/pests-diseases/forests/dutch-elm-disease/index.htm

***Fall webworm***

A fall webworm "web" (*Hyphantria cunea*) containing 15 caterpillars was found in Mt Wellington, Auckland in March 2003. Four large scale ground surveys have found no more insects and pheromone traps have drawn a blank as well. Another ground search for caterpillars is scheduled for December 2004 and pheromone traps will be maintained in the field until April 2005. If no further activity is detected by April 2005 will declare a successful eradication. For further information see http://www.maf.govt.nz/biosecurity/pests-diseases/forests/fall-webworm/index.htm.

***Painted apple moth***

The painted apple moth (*Teia anartoides*) which was first found in Auckland in May 1999 is still the subject of an eradication campaign. Aerial spraying with Btk was initiated in January 2002 and the last spray was carried out in May 2004. Pheromone

traps have been deployed in the infested area since 2002. The last male moth trapped (one only) was in January 2004. Pheromone trapping and vegetation controls will probably remain in place for a further two years. For further details see:
http://www.maf.govt.nz/biosecurity/pests-diseases/forests/painted-apple-moth/index.htm

***Asian gypsy moth***
Last year we reported that in March 2003 a single male gypsy moth (*Lymantria dispar praetrea*) had bee trapped in Hamilton. MAF formed a Technical Advisory Group and it was decided to spray the area with Btk. There were eight sprays at approximately weekly intervals during October and November 2003 over an area of 1250 hectares. No more moths have been trapped and extensive ground searches have no signs of the insect. It is planned to have a further intensive ground search in December 2004 and maintain the pheromone trapping grid until April 2005. For further up to date information see:
http://www.maf.govt.nz/biosecurity/pests-diseases/forests/gypsy-moth/index.htm

### *Post-border (new records)*

The following fungi were recorded as new to New Zealand. None was considered significant and no response action was taken. There were no new forest insects recorded this year

*Cylindrocladium pacificum* was isolated from *Quercus palustris* in Auckland. Also known from Hawaii on Araucaria. Pathogenicity is unknown in New Zealand and elsewhere.

*Stilbospora* sp. was found fruiting on a dead twig of *Ulmus glabra*. Specimens of *Stilbospora* in the Forest Research and Landcare herbaria are all from Europe and North America. Species of *Stilbospora* are not known to be pathogenic.

*Trimmatostroma betulinum* was found on a small, dead branch of *Betula pendula.* There was no indication that it was acting as a pathogen; this is consistent with overseas literature.

### *Surveillance*

***Forest condition monitoring***
Procedures for monitoring plantation forest health are likely to change shortly. Two systems have been independently developed and refined to suit New Zealand's requirements. The Viewpoint system is based on a stand-wide assessment of crown condition and specific pests and diseases by observing the canopy, usually with the aid of binoculars. The PSP system assesses crown condition and two foliar diseases of individual trees in established permanent sample plots. While the two systems use very different techniques their characteristics are very similar – they both provide a quantified measure of crown condition and pest status that can be used as an indicator of tree health. The systems have been well tested in the field and deliver precise and repeatable results.

Researchers are confident that both systems can work in tandem whereby the detailed information from a small number of trees obtained from the PSP assessments augments the information captured over a large area by the Viewpoint system. They are planning assessor training programmes for the respective systems and now wait with anticipation for the NZFOA to promote a forest condition monitoring strategy that can be instigated nation-wide.

## RECENT PUBLICATIONS AND WEBSITE FEATURES

The monthly Forest Research publication *Forest Health News* can be viewed on line. See:
www.foresthealth.co.nz. To subscribe to this newsletter electronically, contact ian.hood@forestresearch.co.nz.

**TABULAR SUMMARY OF THE ACTIVITY OF THE MAIN PESTS AND DISEASES OF *EUCALYPTUS* AND *PINUS* PLANTATIONS**

***Tasmania***

## *Eucalyptus* spp.

| Pest | Area with moderate damage (Ha) | | | | | Area with severe damage (Ha) | | | | | Area inspected (Ha) | Area treated (Ha) | Hosts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <10 | 10-100 | 100-500 | 500-1000 | >1000 | <10 | 10-100 | 100-500 | 500-1000 | >1000 | | | |
| Autumn gum moth | | | | | | | | | | | 33,000 | | nitens, glob |
| Christmas beetle | | | | | | | | | | | | | |
| Paropsines | | | | ✓ | | | | ✓ | | | 33,000 | | nitens, glob |
| Gum leaf skeletoniser | | ✓ | | | | ✓ | | | | | 33,000 | | nitens, glob |
| Sawfly | | | | | | | | | | | | | |
| Leaf blister sawfly | | | | | | | | | | | | | |
| Spring beetles (scarabs) | | | | | | | | | | | | | |
| Jarrah leaf miner | | | | | | | | | | | | | |
| Phasmatids | | | | | | | | | | | | | |
| Weevils (defoliating) | | | | ✓ | | | ✓ | | | | 33,000 | | |
| Psyllids | | | | | | | | | | | | | |
| Phoracanthines | | | | | | | | | | | | | |
| Wood moths | | | | | | | | | | | | | |
| Wingless grasshopper | | | | | | | | | | | | | |
| *Mycosphaerella* spp. | | ✓ | | | | | ✓ | | | | 33,000 | | nitens, glob |
| *Aulographina eucalypti* | | | | | | | | | | | | | |
| *Cylindrocladium* spp. | | | | | | | | | | | | | |
| *Quambalaria pitereka* | | | | | | | | | | | | | |
| *Armillaria* spp. | | ✓ | | | | ✓ | | | | | 33,000 | | nitens, glob |
| *Phytophthora* spp. | | | | | | | | | | | 33,000 | | nitens, glob |

***Queensland***

| Pest | Area with moderate damage (Ha) | | | | | Area with severe damage (Ha) | | | | | Area inspected (Ha) | Area treated (Ha) | Hosts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <10 | 10-100 | 100-500 | 500-1000 | >1000 | <10 | 10-100 | 100-500 | 500-1000 | >1000 | | | |
| Paropsines | | | √ | | | | | | | | 200 | - | E. cloeziana |
| Sawfly | | | | | | | √ | | | | 50 | - | E. cloeziana |
| Leaf blister sawfly | | √ | | | | | | | | | 100 | - | E. argophloia, E. globulus x cam., E. cloeziana, E. dunnii |
| Spring beetles (scarabs) | | √ | | | | | | | | | 50 | - | E. globulus x E. cam. |
| Phasmatids | | | | | | | | | | | | | |
| Weevils (defoliating) | | | | | | | | | | | | | |
| Psyllids | | | | | | | √ | | | | 100 | - | E. dunnii |
| Phoracanthines | | | | | | | | | | √ | * | - | Eucalyptus cloeziana, Eucalyptus spp |
| Wood moths | | | | | | | | | | √ | * | - | Eucalyptus spp |
| Erinose mite (Rhombacus sp) | | | | | √ | | | √ | | | 1700 | - | C.c. v |
| Flea beetle (Chaetocnema sp) | | | | | | | | | | | | | |
| Wingless grasshoppetr | | | | | | | √ | | | | 200 | | E. argophloia, C. c. v |
| Quambalaria | | | | | | | | | | | | | |
| Sphaeropsis sapinaea | | | | | | | | | | | | | Pinus spp |
| Phellinus noxius and Rigidoporus vinctus | | √ | | | | | √ | | | | 200 | | Araucaria cunninghamii |

***South Australia***

| Pest | Area with moderate damage (ha) | | | | | Area with severe damage (ha) | | | | | Area inspected (ha) | Area treated (ha) | Hosts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *<10* | *10-100* | *100-500* | *500-1000* | *>1000* | *<10* | *10-100* | *100-500* | *500-1000* | *>1000* | | | |
| | | | | | | | | | | | | | |
| *Pines* | | | | | | | | | | | | | |
| Sirex | X | | | | | | | | | | 108,000 | 2.1 | P radiata |
| Essigella | | | | | X | | | X | | | 18,000 | | P radiata |
| Bark beetles | X | | | | | | | | | | 200 | | P radiata |
| Sphaeropsis | | | | | | | | | | | | | |
| Cyclaneusma | | | | | X | | | X | | | ? | | P radiata |
| | | | | | | | | | | | | | |
| *Eucalypts:* | | | | | | | | | | | 600 in total | | |
| Autumn Gum Moth | | | | | | | | | | | | 4.3 | Various – see written report |
| Sawflies | | | | | | | | | | | | | |
| Scarab beetles | | | | | | | | | | | | | |
| Psyllids | | | | | | | | | | | | | |
| Weevils | | | | | | | | | | | | | |
| Chrysomelid beetles | X | | | | | | | | | | | | various |
| Longicorn beetles | | | | | | | | | | | | | |
| Mycosphaerella | | | | | | | | | | | | | |
| Other disease | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| *General:* | | | | | | | | | | | | | |
| Wingless grasshopper | | | X | | | | | | | | 1,700 | 340 | P. radiata + eucalypts |

***Western Australia***

| Pest | Area with moderate damage (Ha) | | | | | Area with severe damage (Ha) | | | | | Area inspected (Ha) | Area treated (Ha) | Hosts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | <10 | 10-100 | 100-500 | 500-1000 | >1000 | <10 | 10-100 | 100-500 | 500-1000 | >1000 | | | |
| Autumn gum moth | | | x | | | | | x | | | 800 | 120 (1) | *E. globulus* |
| Leaf blister sawfly | | | | | x | | | x | | | 1000 | 0 | *E. globulus* |
| Spring beetles (scarabs) | | x | | | | | | | x | | 1000+ | 566 (8) | *E. globulus* |
| Weevils (defoliating) | | | | | x | | | | | x | About 30,000 | 12370 (66) | *E. globulus* |
| Heteronyx | | | | | x | | | | x | | 2000+ | 770 (2) | *E. globulus* |
| Wingless grasshopper | | | | | | | | x | | | ? | 200 (8) | *E. globulus* |
| Psyllids | Nil | | | | | Nil | | | | | nill | 0 | *E. globulus* |
| *Creis periculosa* | | | | | | | | | | Estimate 50,000 | Nil (not specifically inspected) | Nil | *Eucalyptus rudis* |
| Jarrah leaf miner | | | | | Estimate 50,000 | | | | | | Nil (not specifically inspected) | Nil | *Eucalyptus marginata* |
| Gum leaf skeletonizer | Nil | | | | | | | | | | Nil (not specifically inspected) | | *Eucalyptus marginata* |
| Bark beetles (*Ips*) | Nil | | | | | | | | | | Nil (not specifically inspected) | | *Pinus radiata* |
| Monterey Pine aphid | Nil | | | | | | | | | | Nil (not specifically inspected) | | *Pinus radiata* |