



Forestry Department

Food and Agriculture Organization of the United Nations

Forest Health & Biosecurity Working Papers

OVERVIEW OF FOREST PESTS

CHILE

February 2007
Updated March 2008

Forest Resources Development Service
Forest Management Division
Forestry Department

Working Paper FBS/12E
FAO, Rome, Italy

DISCLAIMER

The aim of this document is to give an overview of the forest pest¹ situation in Chile. It is not intended to be a comprehensive review.

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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¹ Pest: Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products (FAO, 2004).

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Background

This paper is one of a series of FAO documents on forest-related health and biosecurity issues. The purpose of these papers is to provide early information on on-going activities and programmes, and to stimulate discussion.

In an attempt to quantify the impacts of the many factors that affect the health and vitality of a forest, the Global Forest Resources Assessment 2005 (FRA 2005) asked countries to report on the area of forest affected by disturbances, including forest fires, insects, diseases and other disturbances such as weather-related damage. However, most countries were not able to provide reliable information because they do not systematically monitor these variables.

In order to obtain a more complete picture of forest health, FAO continues to work on several follow-up studies. A review of forest pests in both naturally regenerating forests and planted forests was carried out in 25 countries representing all regions of the world. This *Overview of forest pests* represents one paper resulting from this review. Countries in this present series include Argentina, Belize, Brazil, Chile, China, Cyprus, Colombia, Ghana, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Malawi, Mauritius, Mexico, Moldova, Mongolia, Morocco, South Africa, Sudan, Thailand, Romania, Russian Federation, Uruguay; this list will be continuously updated.

Comments and feedback are welcome. For further information or if you are interested in participating in this process and providing information on insect pests, diseases and mammals affecting forests and the forest sector in your country, please contact:

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All contributions will be fully acknowledged.

Acknowledgements

Much of the information from Chile was provided by Dr. Aida Baldini Urrutia, Chief of the National Phytosanitary Protection Program, Corporacion Nacional Forestal (CONAF), Santiago, Chile, and other members of her staff during November 2004. Dr. Angelo Sartori Ruilova, technical assistant of the National Phytosanitary Protection Programme, CONAF, also provided valuable input to this document. Their efforts are acknowledged. Information was compiled by W. Ciesla.

CHILE

Introduction

Chile has a land area of 75 million ha. About 21 percent or 16 million ha of the land area is covered by forests (FAO, 2006). Forestry plays a key role in the country's economy. Chile has a modern forest industry, which is almost entirely dependent on planted forests established with fast-growing exotic species. Productive plantation forests cover an area of about 2.5 million ha (FAO, 2006). *Pinus radiata* is the principal planted forest species. Eucalypts, especially *Eucalyptus globulus* and *E. nitens*, are also important planted forest species. In the southern part of the country, several species of conifers native to North America, including *Pinus contorta*, *P. ponderosa* and *Pseudotsuga menzeisii*, are planted. These forests are becoming increasingly subject to damage by a number of indigenous and introduced forest insects and diseases.

Forest pests

Naturally regenerating forests

Insects

Indigenous insects

***Chilecomadia valdiviana* (Philippi)**

Other scientific names:

Lepidoptera: Cossidae

Common names: carpenter worm

Host type: broadleaf

Hosts: *Eucalyptus nitens*; *Eucalyptus gunnii*; *Nothofagus* spp.; *Nothofagus pumilio*; *Salix* spp.; *Trevoa* spp.; *Weinmannia trichosperma*

Chilecomadia valdiviana feeds on a wide range of trees including species of *Nothofagus*, *Salix*, *Trevoa*, *Eucalyptus* and *Weinmannia*. The larvae tunnel into trees; they attack healthy as well as stressed trees. The feeding of the larvae does not necessarily kill trees; however it weakens them and predisposes them to breakage by wind and also provides entry points for secondary pests. The life cycle is greater than one year. The larvae survive in cut timber and therefore there is significant potential to transport the species from one area to another.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=31&langdisplay=english>

<http://www.apsnet.org/online/ExoticPest/Papers/haugen.htm>

***Holopterus chilensis* Blanchard**

Other scientific names:

Coleoptera: Cerambycidae

Common names: wood borer of coigue

Host type: broadleaf

Hosts: *Nothofagus dombeyi*; *N. glauca*; *N. obliqua*

Holopterus chilensis is a beetle that bores into the stems of *Nothofagus* spp., particularly *N. obliqua*. It primarily attacks the base of trunks of trees. It has also been known to attack freshly sawn timber. The rate of infestation can be as high as 42 percent in some areas.

Holopterus chilensis is indigenous to Argentina and Chile. In Argentina, it occurs from the mountains near Neuquen to the Nahuel Huapi National Park. In Chile, it is found from the mountains near Curico south to Puerto Aisen.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=82&langdisplay=english>
<http://iufro-down.boku.ac.at/iufronet/d7/wu70307/victoria/lanfranco.pdf>
[http://www.aciar.gov.au/web.nsf/att/JFRN-6BN973/\\$file/mn68.pdf](http://www.aciar.gov.au/web.nsf/att/JFRN-6BN973/$file/mn68.pdf)

***Hornius grandis* (Philippi & Philippi, 1864)**

Other scientific names:

Coleoptera: Chrysomelidae

Common names:

Host type: broadleaf

Hosts: *Nothofagus dombeyi*; *N. glauca*; *N. obliqua*

This beetle feeds on a wide range of *Nothofagus* species including *Nothofagus obliqua*, *N. glauca* and *N. dombeyi*. It causes damage to the bark, stems, leaves and growing tips of small branches. The feeding leads to distorted growth, hence reduces the marketability of timber produced.

<http://iufro-down.boku.ac.at/iufronet/d7/wu70307/victoria/lanfranco.pdf>
[http://www.aciar.gov.au/web.nsf/att/JFRN-6BN973/\\$file/mn68.pdf](http://www.aciar.gov.au/web.nsf/att/JFRN-6BN973/$file/mn68.pdf)

***Hylamorpha elegans* (Burmeister)**

Other scientific names: *Aulacopalpus elegans* Burmeister; *Callichloris perelegans*; *Sulcipalpus subviolaceus*; *Hylamorpha rufimana*; *Hylamorpha cylindrical* Arrow

Coleoptera: Scarabaeidae

Common names: Cockchafer beetle; june beetle; scarab; white grub

Host type: broadleaf and conifer

Hosts: *Nothofagus* spp.; *N. dombeyi*; *N. obliqua*; *N. glauca*; *Betula* spp.; *Pinus* spp.; *Fraxinus* spp.

This beetle is only found in *Nothofagus* forests of Chile and Argentina. At times there are localized, very large increases in numbers of beetles such that they become significant pests to trees and crops. It feeds on a range of trees including species of *Nothofagus*, *Pinus*, *Fraxinus* and *Betula*.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=36&langdisplay=english>
<http://www-museum.unl.edu/research/entomology/Guide/Scarabaeoidea/Scarabaeidae/Rutelinae/Rutelinae-Tribes/Anoplognathini/Anoplognathini-generic-%20pages/Hylamorpha/Hylamorpha.html>

***Hylurgus ligniperda* (Fabricius, 1878)**

Other scientific names: *Bostrichus flavipes* Panzer, 1795; *Bostrichus elongatus* Herbst, 1793; *Bostrichus ligniperda* Fabricius, 1787; *Hylesinus flavipes* Panzer, 1795; *Hylesinus ligniperda* (Fabricius, 1792); *Hylurgus elongatus* (Herbst, 1793); *Hylurgus flavipes* (Panzer, 1795); *Hylurgus longulus* Kolenati, 1846

Coleoptera: Scolytidae

Common names: red-haired pine bark beetle; golden-haired pine bark beetle

Host type: conifer

Hosts: *Pinus* spp.; *Larix* spp.; *Abies* spp.

These bark beetles stress small trees and attack seedlings, stumps or newly cut timber. They can kill young trees by girdling. They are vectors of root rot fungus in the genus *Leptographium*. Hosts include *Pinus* spp, *Larix*, and *Abies*. The adult females are attracted to trees and create a nuptial chamber then construct an egg laying gallery out from this. They overwinter as adults.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=59&langdisplay=english>

<http://www.pestalert.org/Detail.CFM?recordID=47>

http://www.na.fs.fed.us/spfo/pubs/pest_al/redhaired/red_haired_bark_beetle.pdf

***Lagnopteryx botulata* (Felder & Rogenhofer)**

Other scientific names:

Lepidoptera: Geometridae

Common names: inchworm

Host type: broadleaf

Hosts: *Nothofagus obliqua*

The caterpillars of *Lagnopteryx botulata* are significant defoliators of *Nothofagus obliqua* in the X Region of Chile. The larvae feed on the leaves and are part of a complex of insects that cause defoliation in the area. These inchworms comprised over 50 percent of defoliators from *N. obliqua* in all areas sampled within the Region X over a 2 year period.

<http://iufro-down.boku.ac.at/iufro-net/d7/wu70307/victoria/lanfranco.pdf>

***Warrenaria* sp.**

Other scientific names:

Lepidoptera: Geometridae

Common names:

Host type: broadleaf

Hosts: *Nothofagus pumilio*

This species of geometrid moth, which has been identified as belonging to the genus *Warrenaria*, is as yet undescribed. It is a native species that feeds on leaves of *Nothofagus pumilio* and has caused extensive defoliation in some areas. In the XI Region of Chile, for example, the area of damage has been up to 200 000 ha (FAO, 2004a).

Introduced insects

***Cinara cupressi* Buckton 1881 (Lachnus)**

Other scientific names:

Hemiptera: Aphididae

Common names: cypress aphid

Host type: conifer

Hosts: *Austocedrus chilensis*; *Cupressus macrocarpa*; *C. sempervirens*

Cinara cupressi is a brownish soft-bodied insect classified as an aphid. It has been discovered around the world feeding on trees from various genera including *Cupressus*, *Juniperus*, *Thuja*, *Callitris*, *Widdringtonia*, *Chamaecyparis*, *Austrocedrus*, and the hybrid *Cupressocyparis*. *C. cupressi* sucks the sap from twigs causing yellowing to browning of the foliage on the affected twig. The overall effect on the tree ranges from partial damage to eventual death of the entire tree. This aphid has seriously damaged commercial and ornamental plantings of trees around the globe.

In Chile, this pest infests all exotic Cupressaceae, such as *Cupressus macrocarpa* and *C. sempervirens*, including those in the semi-desert Regions I, II, III and IV and even Region 12 (Antarctica). It has been found on *Austocedrus chilensis* in regions V, VI, VII, VIII, IX, X, XI and also in the Region Metropolitana (Santiago, Region XIII). It was first found on ornamentals in Region XI in 2003 and then found on *Austocedrus chilensis* in Region XIII also in 2003.

<http://www.issg.org/database/species/ecology.asp?fr=1&si=121&sts=>

<http://www.fao.org/docrep/u4200e/u4200e09.htm>

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=161&langdisplay=english>

<http://www.afaec.org/html/98-202.html>

<http://www.atpmn.org/html/98-202.html>

http://www.rhs.org.uk/advice/profiles0301/cypress_aphid.asp

***Cinara cupressivora* Watson and Voegtlin 1999**

Other scientific names:

Hemiptera: Aphididae

Common names: giant conifer aphid; cypress aphid

Host type: conifer

Hosts: *Austocedrus chilensis*; *Chamaecyparis* spp.; *Cupressus* spp.; *C. lusitanica*; *Juniperus* spp.; *Thuja* spp.; *Cupressocyparis* spp.

Cinara cupressivora, a species believed indigenous to the eastern Mediterranean region, is known to infest plantations of *Cupressus lusitanica* (Watson *et al.*, 1999). In Chile, it has been found on *Austocedrus chilensis* in regions V, VI, VII, VIII, IX, X, XI and also in the Region Metropolitana (Santiago, Region XIII). The original date and place of introduction into the country are not known but its presence was discovered in 2003.

Damage to hosts includes browning and defoliation which, in some cases, causes dieback and death of trees.

Conifers attacked include species in the genera *Chamaecyparis*, *Cupressus*, *Juniperus*, *Thuja* and species in the hybrid genus *Cupressocyparis*. Heavy foliar damage and tree mortality occurs on *Cupressus macrocarpa*. Frequently specimens of this species of aphid were initially identified as *C. cupressi*; however, detailed diagnostic work determined that they belonged to a new species (which was described as *Cinara*

cupressivora by Watson and Voegtlin in 1999). [Note that numerous references (Web sites and texts) use the name *Cinara cupressi*, these are frequently misidentified specimens of *Cinara cupressivora*. As well, some references incorrectly synonymize these two species.]

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=161&langdisplay=english>
<http://www.issg.org/database/species/ecology.asp?si=121&fr=1&sts=>
<http://www.invasive.org/browse/subimages.cfm?sub=3636>
<http://www.afaec.org/html/98-202.html>

***Cinara fresai* Blanchard, 1939**

Other scientific names:

Hemiptera: Aphididae

Common names: cypress aphid; juniper aphid

Host type: conifer

Hosts: *Austocedrus chilensis*

Cinara fresai has been found on *Austocedrus chilensis* in regions V, VI, VII, VIII, IX, X, XI and also in the Region Metropolitana (Santiago, Region XIII). The original date and place of introduction into the country are not known but its presence was discovered in 2003.

http://www.ento.csiro.au/aicn/name_s/b_1048.htm

[http://www.deh.gov.au/cgi-](http://www.deh.gov.au/cgi-bin/abrs/fauna/details.pl?pstrVol=APHIDOIDEA;pstrTaxa=562;pstrChecklistMode=2)

[bin/abrs/fauna/details.pl?pstrVol=APHIDOIDEA;pstrTaxa=562;pstrChecklistMode=2](http://www.deh.gov.au/cgi-bin/abrs/fauna/details.pl?pstrVol=APHIDOIDEA;pstrTaxa=562;pstrChecklistMode=2)

***Cinara tujafilina* (del Guercio, 1909)**

Other scientific names:

Hemiptera: Aphididae

Common names: cypress pine aphid

Host type: conifer

Hosts: *Austocedrus chilensis*

Cinara tujafilina has been found on *Austocedrus chilensis* in regions V, VI, VII, VIII, IX, X, XI and also in the Region Metropolitana (Santiago, Region XIII). The original date and place of introduction into the country are not known but its presence was discovered in 2003.

http://www.ento.csiro.au/aicn/name_s/b_1051.htm

<http://www.ento.okstate.edu/ddd/insects/arborvitaeaphid.htm>

Diseases

Indigenous diseases

There are no clearly diagnosed records of indigenous pathogens affecting Chile's naturally regenerating forests available, however there is a disease that affects native forests but the causative agent is not known.

Introduced diseases

No records of introduced pathogens in Chile's naturally regenerating forests were available.

Other pests

Indigenous other pests

***Lama guanicoe* (Muller, 1776)**

Other scientific names:

Artiodactyla: Camelidae

Common name(s): guanaco

Host type: broadleaf

Hosts: *Nothofagus pumilio*

The guanaco is the largest of Chile's four indigenous species of camelids. These mammals graze on a wide range of forest plants. Significant affects of the grazing is seen in areas of natural regeneration of lenga (*Nothofagus pumilio*). At times the grazing is sufficient to hinder the establishment of new forests (Baldini Urrutia and Pancel, 2000; Vázquez, 2002).

http://www.animaldiversity.ummz.umich.edu/site/accounts/information/Lama_guanicoe.html

***Misodendrum* spp.**

Other scientific names:

Santalales: Misodendraceae

Common names: feather mistletoe

Host type: conifer and broadleaf

Hosts: *Nothofagus* spp.; *Austrocedrus chilensis*

Several genera of parasitic plants are known to infest trees and shrubs in Chile's native forests. Among the more common parasitic plants are the feather mistletoes (*Misodendrum* spp.). Eight species of *Misodendrum* infest native trees in Chile. The most common is *M. punctulatum*, which infests several species of *Nothofagus* and the indigenous conifer *Austrocedrus chilensis* (Baldini Urrutia and Pancel, 2000). Heavy infestations of these semi-parasitic plants can cause branch dieback and, in extreme cases, tree mortality.

<http://www.forestryimages.org/browse/detail.cfm?imgnum=1244013>

***Subanguina chilensis* Vovlas, Troccoli & Morens, 2000**

Other scientific names:

Tylenchida: Tylenchidae

Common names: nematode

Host type: broadleaf

Hosts: *Nothofagus obliqua*; *N. alpina*

The nematode, *Subanguina chilensis*, causes premature defoliation of *Nothofagus obliqua* and *N. alpina* (= *N. nervosa*). A single defoliation weakens trees and makes them

susceptible to secondary pests such as wood-boring insects and disease (FAO, 2004a). In some areas this nematode is considered to be the major factor in the decline of the health of *Nothofagus obliqua*.

<http://iufro-down.boku.ac.at/iufro-net/d2/wu20806/actas.pdf>

Introduced other pests

A number of mammals native to Europe and North America have been introduced into Chile where they have adverse effects on the native flora and fauna.

***Capra hircus* Linnaeus, 1758**

Other scientific names:

Artiodactyla: Bovidae

Common name(s): domestic goat

Host type: broadleaf

Hosts:

Goats are considered one of the most destructive herbivorous species to natural ecosystems. They prevent successful regeneration of favoured plant species and their heavy browsing decreases biomass and percentage cover of vegetation often resulting in severe erosion on the degraded landscape. The problem is especially acute in island ecosystems. Now established on the Juan Fernández Archipelago in Chile, goats are causing significant damage to these fragile island ecosystems and are impacting several endemic species (Cuevas and van Leersum, 2001).

<http://www.issg.org/database/species/ecology.asp?si=40&fr=1&sts=sss>

***Castor canadensis* Kuhl, 1820**

Other scientific names:

Rodentia: Castoridae

Common names: beaver; American beaver; Canadian beaver

Host type: broadleaf

Hosts:

In 1947, 25 mating pairs of beavers (*Castor canadensis*) were introduced to the Argentinean side of Tierra del Fuego to develop a furrier industry. The first record of beavers in the Chilean side of Tierra del Fuego was in 1964. In 1999, the Forest Research Institute estimated the total population of beaver in Tierra del Fuego and the Isla Navarino at 61 363. The Forest Research Institutes expects the population to continue to expand. In 2005, the area of damage on the island was approximately 15 000 hectares. To date, the principal concern in Chile is the detection of the species in the continental part of the region of Magallanes. The beaver has significant impacts on the structure of riparian areas primarily by felling many trees, including *Nothofagus pumilio* and *Nothofagus antarctica*, shrubs and some herbaceous plants. Their dam-building activities also modify water flow in streams causing flooding and the creation of wetlands, increase soil erosion, and destroy infrastructure such as roads, bridges and enclosures. Mature forests, protected forests, shrublands, high altitude forests, peat bogs, fertile lowlands and

meadows are all negatively impacted by *C. canadensis*. They are colonial animals and are relatively long lived (Jaksic, 1998).

http://www.animaldiversity.ummz.umich.edu/site/accounts/information/Castor_canadensis.html

<http://www.aquatic.uoguelph.ca/mammals/freshwater/accounts/beaver.htm>

***Cervus elaphus* Linnaeus, 1758**

Other scientific names:

Artiodactyla: Cervidae

Common name(s): red deer; elk; wapiti

Host type: conifer and broadleaf

Hosts:

Red deer were introduced to several countries in South America, including Chile where they can now be found between regions VII and XI (Vázquez, 2002). They are considered considerable pests as overbrowsing can cause damage to valued trees and agricultural crops. Red deer can have significant impact even at low numbers. Because of selective browsing, red deer are known to affect the composition of native ecosystems. One of the significant impacts in forests is to cause the eventual destruction of the canopy of a forest because they prevent regeneration of the large trees that form the canopy.

<http://www.issg.org/database/species/ecology.asp?si=119&fr=1&sts=sss>

http://www.animaldiversity.ummz.umich.edu/site/accounts/information/Cervus_elaphus.html

***Lepus capensis* Linnaeus, 1758**

Other scientific names:

Lagomorpha: Leporidae

Common name(s): European hare; cape hare; brown hare; common hare

Host type: conifer and broadleaf

Hosts:

The European hare was introduced into Tierra del Fuego in southern Chile in 1896 and is now established throughout the southern part of the country. They cause significant damage to natural regeneration in native forests, especially in forests destroyed by wildfire (Baldini Urrutia and Pancel, 2000). At high population densities, they can cause damage to young planted forests and agricultural crops.

http://www.animaldiversity.ummz.umich.edu/site/accounts/information/Lepus_capensis.html

http://www.borealforest.org/world/mammals/brown_hare.htm

Diebacks and other conditions

A dieback of ñirre, *Nothofagus antarctica*, has been reported from the Patagonia region of southern Chile. This condition is believed to be the result of fire exclusion, which allows *N. antarctica*, a short-lived species that rarely attains ages of 120 years to reach a stage of senescence, setting the stage for episodes of crown dieback and tree mortality (Veblen and Lorenz, 1988).

Planted forests

Insects

Indigenous insects

***Ormiscodes cinnamomea* (Guérin-Méneville, 1839)**

Other scientific names:

Lepidoptera: Saturniidae

Common names: spiny caterpillar

Host type: conifer and broadleaf

Hosts: *Pinus radiata*; *Populus nigra*; *Nothofagus obliqua*; *Shinus* spp.; *Peumus boldus*; *Nothofagus dombeyi*; *Muhlenbeckia sagittaeifolia*; *Populus* spp.; *Juglans* spp.

Ormiscodes cinnamomea has a broad host range. It feeds on the leaves of trees in several plant families, both broadleaf and conifers, including *Pinus radiata*, *Populus nigra*, *Nothofagus obliqua*, *Shinus* spp., *Peumus boldus*, *Nothofagus dombeyi* and *Muhlenbeckia sagittaeifolia*. It causes damage to both native and introduced species. Outbreaks occur in plantations causing significant damage to young trees (e.g. in pine plantations). The larvae feed in colonies on the foliage of *Pinus radiata* and one colony, produced from a single egg mass, can strip a 4-5 year old pine of its foliage in about 4-6 weeks. *O. cinnamomea* also infests broadleaf tree species, including poplar, walnut and many fruit tree species, and has caused problems in native broadleaf tree nurseries.

<http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=69&langdisplay=english>

<http://www.insectcompany.com/silkmoth/kwocinnamomea.htm>

<http://www2.udec.cl/entomologia/O-cinnamomea.html>

<http://entomologa.blog.ijjiji.com/>

Introduced insects

***Buprestis novemmaculata* Linnaeus, 1767**

Other scientific names: *Ancylochira novemmaculata*

Coleoptera: Buprestidae

Common names: jewel beetle; flat headed woodborer; metallic woodborer; painted borer

Host type: conifer

Hosts: *Pinus* spp.; *Larix* spp.; *Picea* spp.

Buprestis novemmaculata feeds primarily on dead woody tissue (including that attached to living trees) and also may attack severely stressed trees. The larvae can live in freshly cut pine logs. *B. novemmaculata* is established in Chile where it invades dead Monterey pine (*Pinus radiata*). This species was likely introduced into the country via wood or wood products imported from within its natural range.

<http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=90&langdisplay=english>

<http://www.forestryimages.org/browse/subimages.cfm?sub=4021>

<http://www.padil.gov.au/viewPest.aspx?id=139>

***Cinara maritimae* (Dufour, 1833)**

Other scientific names:

Hemiptera: Aphididae

Common names:

Host type: conifer

Hosts: *Pinus* spp.; *Pinus radiata*

In 2006, *Cinara maritimae* was reported for the first time in Chile infesting *Pinus radiata* plantations in Region VIII and in the Region Metropolitana (Santiago, Region XIII).

While populations are very small at the present time and the impacts on trees could not be determined, this species has the potential to be a significant pest in Chile. This pest has also been recorded on other *Pinus* spp. in Argentina (*P. contorta*, *P. elliottii*, *P. halepensis*, *P. pinaster*, *P. radiata*, *P. taeda*) and Brazil (*P. elliottii*, *P. densiflora*, *P. thumbergii*, *P. caribea bahamensis*).

http://www.scielo.br/scielo.php?pid=S0085-56262004000200019&script=sci_arttext

***Ctenarytaina eucalypti* (Maskell, 1890)**

Other scientific names: *Psylla eucalypti* Maskell, 1890

Hemiptera: Psyllidae

Common names: blue gum lerp

Host type: broadleaf

Hosts: *Eucalyptus nitens*; *E. globulus*

Ctenarytaina eucalypti is a pest of eucalypts and was detected in Chile in August, 1999. The blue gum lerp had an initial limited distribution in the Region I but has since expanded its distribution south to the Region X. It causes damage particularly to *Eucalyptus globulus* and *E. nitens*, both planted forest species.

<http://www2.udec.cl/entomologia/Psyllidae.html>

[http://www.deh.gov.au/cgi-](http://www.deh.gov.au/cgi-bin/abrs/fauna/details.pl?pstrVol=PSYLLOIDEA;pstrTaxa=310;pstrChecklistMode=1)

[bin/abrs/fauna/details.pl?pstrVol=PSYLLOIDEA;pstrTaxa=310;pstrChecklistMode=1](http://www.deh.gov.au/cgi-bin/abrs/fauna/details.pl?pstrVol=PSYLLOIDEA;pstrTaxa=310;pstrChecklistMode=1)

***Eulachnus rileyi* (Williams, 1911)**

Other scientific names: *Lachnus rileyi* Williams

Hemiptera: Aphididae

Common names: pine needle aphid

Host type: conifer

Hosts: *Pinus* spp.

Eulachnus rileyi has been recorded in planted pine forests in Chile. Typically, this insect causes only minor damage where it has been introduced, however, it has the potential to cause serious damage. Heavy infestations cause needles to turn yellow and drop prematurely, resulting in growth reduction.

All life stages feed on the underside of pine needles. In temperate climates, both sexual and asexual forms exist. Adults are normally wingless, but winged forms are sometimes produced. Populations tend to increase during dry periods. These insects could be moved

with scion material. Once established in a new location, they are subject to wind dispersal.

<http://www.ipgri.cgiar.org/publications/pdf/828.pdf>

<http://www.cabicompendium.org/NamesLists/FC/Full/EULARI.htm>

***Glycaspis brimblecombei* Moore, 1964**

Other scientific names:

Hemiptera: Psyllidae

Common names: red gum lerp

Host type: broadleaf

Hosts: *Eucalyptus* spp.; *E. camaldulensis*; *E. grandis*; *E. urophylla*; *E. blakelyi*; *E. brassiana*; *E. bridgesiana*; *E. dealbata*; *E. mannifera*; *E. tereticornis*

Glycaspis brimblecombei is native to Australia and was possibly introduced into Chile via nursery stock. It was detected in planted forests of *Eucalyptus camaldulensis* near Santiago and also in the V and VI Regions of central Chile in 2002 (Faundez *et al.*, 2004). The infestations have caused leaf drop, dieback and stressed trees of *Eucalyptus camaldulensis*, *E. grandis* and *E. urophylla* (Wilcken *et al.*, 2003). The stressed trees are vulnerable to attack by other organisms. Other hosts include *Eucalyptus tereticornis*, *E. mannifera*, *E. dealbata* and *E. blakelyi*.

As a juvenile, the red gum lerp feeds on sap from leaves and excretes large volumes of a sugary solution. The young create finely woven shelters from the sugary solutions they excrete which protect them from the environment and predators. These insects produce large volumes of sugary solution, in excess of that required to build lerp shelters, and this sugary exudate provides a substrate that enables large amounts of sooty mould to grow and blacken trees.

<http://www.insectimages.org/browse/subimages.cfm?SUB=12356>

http://www.eppo.org/QUARANTINE/Alert_List/deleted%20files/insects/Glycaspis_brimblecombei.doc

<http://www.deh.gov.au/cgi-bin/abrs/fauna/details.pl?pstrVol=PSYLLOIDEA;pstrTaxa=369;pstrChecklistMode=1>

<http://commserv.ucdavis.edu/CESanDiego/redgumlp.pdf>

<http://www.cnr.berkeley.edu/biocon/dahlsten/rglp/index.htm>

***Gonipterus scutellatus* Gyllenhal, 1833**

Other scientific names:

Coleoptera: Curculionidae

Common names: eucalyptus weevil; eucalyptus snout beetle; gum tree weevil

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Gonipterus scutellatus is a leaf-feeding beetle that is a major defoliator of eucalypts. In Australia, where this beetle is a native, some eucalypt plantations have significant problems because of attacks by this beetle. Attack by this beetle can cause tree mortality, reduction in growth, coppicing and stunting of trees although some *Eucalyptus* spp. are more susceptible to damage than others. The females lay eggs in batches on both surfaces

of mature leaves; the eggs are covered by a capsule. The larvae emerge and feed on leaves and twigs then pupate in the soil; adults also feed.

Dispersal is by adult flight, adults hitch-hiking on non-plant material, or movement of infested plant material or soil. There is usually more than one generation per year, with females living for about three months and larval development taking between 30 and 80 days. In some places there are continuous generations.

http://www.eppo.org/QUARANTINE/insects/Gonipterus_gibberus/DSGONPSP.pdf

http://www.acwm.co.la.ca.us/pdf/Eucalyptusweevileng_pdf.pdf

[http://www.webs.uvigo.es/adolfo.cordero/PDF/Forestry_vol_73_pp_21-29_\(2000\).pdf](http://www.webs.uvigo.es/adolfo.cordero/PDF/Forestry_vol_73_pp_21-29_(2000).pdf)

http://www.forestry.sa.gov.au/privateforestry/insect_fact_sheets/Fact_Sheet_html/FHS%2007%20Eucalyptus%20Weevil.htm

<http://www.fabinet.up.ac.za/biennialreport/docs/report1.pdf>

***Nematus desantisi* Smith**

Other scientific names: *Nematus oligospilus* Foerster, 1854

Hymenoptera: Tenthredinidae

Common names: sawfly; willow sawfly

Host type: broadleaf

Hosts: *Salix* spp.; *Populus* spp.

This species of sawfly damages species of poplars and willows in Chile. This is a northern hemisphere species that has been introduced into several locations in the southern hemisphere. It was first reported in Chile in the mid 1980s. It can cause severe defoliation of *Salix* spp. and *Populus* spp. and sometimes mortality. There are efforts to undertake joint biological control of this species in both Argentina and Chile. Female sawflies lay eggs in the leaf tissue, the larvae then emerge and feed on the leaves and pass through several instars. When mature, the larvae then pupate in a cocoon either on the tree or in the soil under the trees. There are two to three generations per year with development from egg to adult at around 3 weeks.

<http://www.umce.cl/~entomolo/2002.doc>

http://www.hortnet.co.nz/publications/guides/willow_sawfly/wsawfly.htm

***Phoracantha semipunctata* (Fabricius, 1775)**

Other scientific names:

Coleoptera: Cerambycidae

Common names: common eucalypt longhorn; eucalypt longhorn; eucalyptus longhorned borer; longicorn beetle

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Phoracantha semipunctata is a large black and yellow longicorn beetle that lays eggs under loose bark of *Eucalyptus* spp. The adults of this species are strong fliers, hence can disperse significant distances. However movement over greater distances occurs in infested timber. This species tends to attack unhealthy or stressed trees, particularly drought stressed trees, or freshly felled timber. The larvae tunnel deep into the trees and form galleries. The larval feeding can girdle trees killing them. They cause significant

damage to the timber of affected trees; hence affecting the quality of salvaged materials. The adults live for several weeks and larvae take 2 to 6 months to develop depending on moisture conditions in the logs.

<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7425.html>

http://www.ento.csiro.au/aicn/system/c_616.htm

<http://www.invasive.org/browse/subimages.cfm?sub=394>

***Rhyacionia buoliana* (Denis & Schiffermüller)**

Other scientific names: *Evetria buoliana*; *Retinia buoliana*; *Tortrix buoliana*

Lepidoptera: Tortricidae

Common names: European pine shoot moth

Host type: conifer

Hosts: *Pinus radiata*

The European pine shoot moth was discovered in *Pinus radiata* planted forests in Chile's X Region in 1985. The initial introduction occurred near the southern limit of Chile's pine planted forests where cool temperatures and high rainfall resulted in low levels of damage and a slow rate of spread. It occurs throughout the central and southern regions of Chile and is considered the number one pest of pine plantations in some areas (Koch and Waterhouse, 2000).

The European pine shoot moth does not directly kill plants however it may cause a significant reduction in the quality of timber produced. *R. buoliana* attacks commercial pine species including *Pinus radiata*, *P. ponderosa* and *P. contorta* var. *latifolia*. Eggs are laid on or near buds in spring and early summer. The larvae mine the base of the needles which causes tree deformations such as forking and bushing which can lead to considerable economic losses. Infestation rates as high as 80 percent have been recorded. There is apparently only one generation per year. Adults of this species spread moderate distances naturally; however it is also spread, often longer distances, by the movement of infected nursery stock.

http://www.forestry.ubc.ca/fetch21/FRST308/lab4/rhyacionia_buoliana/europe.html

<http://www.nrcan-rncan.gc.ca/cfs->

scf/science/prodserv/pests/euro_pine_shootmoth_e.html

http://www.pfc.forestry.ca/diseases/nursery/pests/europeal_e.html

<http://www.padil.gov.au/viewPest.aspx?id=294>

<http://www.entomology.umn.edu/cues/Web/130EuropeanPineShootMoth.pdf>

http://www.esbc.harbour.com/2003_Heeley.pdf

<http://www.invasive.org/browse/subimages.cfm?sub=411>

***Sirex noctilio* Fabricius, 1793**

Other scientific names: *Sirex melanocerus* Thomson, 1871; *Paururus noctilio*

Hymenoptera: Siricidae

Common names: European wood wasp; sirex; sirex wood wasp; steel-blue horntail

Host type: conifer

Hosts: *Pinus radiata*; *P. taeda*; *P. pinaster*; *P. sylvestris*; *P. nigra*; *P. pinea*; *P. elliottii*; *P. echinata*; *P. palustris*; *P. patula*; *P. caribaea*; *P. kesiya*; *P. strobes*; *Larix* spp.;

Pseudotsuga menziesii

The European wood wasp attacks *Larix* spp., *Pseudotsuga menziesii* and various *Pinus* spp. including *P. caribaea*, *P. echinata*, *P. elliottii*; *P. kesiya*, *P. nigra*, *P. palustris*, *P. patula*, *P. pinaster*, *P. pinea*, *P. radiata*, *P. strobes*, *P. sylvestris*, and *P. taeda*. In 2001, the European wood wasp was detected in planted forests of *Pinus radiata* in Chile. This insect can kill susceptible trees via a combination of toxic mucus and a fungus, *Amylostereum areolatum*, both of which are inoculated into trees during oviposition (Klasmer, Corley and Botto, 1997). This insect is presently established on about 30 000 ha of pine planted forests in the IX and X regions of southern Chile (Baldini Urrutia, 2004).

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=33&langdisplay=english>

http://www.na.fs.fed.us/spfo/pubs/pest_al/sirex_woodwasp/sirex_woodwasp.htm

<http://www.invasive.org/browse/subimages.cfm?sub=4093>

<http://www.metla.fi/iufro/iufro95abs/d2pos86.htm>

http://www.forestrytas.com.au/forestrytas/pdf_files/forest_health_leaflets/insect_pests/pestsinfosheet7sirexwasp.pdf

<http://www.maine.gov/agriculture/pi/pestsurvey/pestinfo/woodwasp.htm>

***Tremex fuscicornis* (Fabricius, 1787)**

Other scientific names: *Sirex fuscicornis* Fabricius

Hymenoptera: Siricidae

Common names: tremex wasp

Host type: broadleaf

Hosts: *Populus* spp.

A woodwasp native to China, *Tremex fuscicornis* was detected in Chile in February 2000 in the V Region and the Region Metropolitana (Santiago) where plantings of poplar (*Populus* spp.) are being attacked. It is believed that this insect was established for at least two years prior to its discovery. The larvae are wood borers and cause significant losses of wood quality. All attacked trees are killed. To date, extensive damage has occurred to windbreak and shelterbelt plantings. Attacks are typically so heavy, that a single poplar can produce 2 000 individual brood adults. Therefore the wood is worthless for lumber or other wood products. Moreover, the rate of decay of infested wood is accelerated because of symbiotic fungi associated with *T. fuscicornis*. The loss of poplar windbreak plantings around agricultural crops and fruit orchards has significant impacts as the exposure to high winds results in reduced crop yields (Baldini Urrutia, 2002).

<http://www.pestalert.org/viewArchPestAlert.cfm?rid=55>

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=157&langdisplay=english>

http://www.infor.cl/webinfor/publicaciones/Documentos_2005/presentacion_silvotecnia.pdf

***Urocerus gigas* (Linnaeus, 1767)**

Other scientific names: *Ichneumon gigas*; *Sirex gigas*; *Urocerus taiganus*

Hymenoptera: Siricidae

Common names: yellow-horned horntail; banded horntail; giant woodwasp; grand sirex; greater horntail wasp; horntail; Siricid wood wasp

Host type: conifer

Hosts: *Pinus radiata*; *Pinus sylvestris*; *Picea abies*; *Picea sitchensis*; *Abies alba*; *Pseudotsuga menziesii*

The yellow-horned horntail has a Holarctic distribution with several subspecies reported from Asia, Europe and North America. The European subspecies *Urocerus gigas gigas* has become established in Argentina and Chile where it infests Monterey pine, *Pinus radiata*. In other parts of the world it infests many species of conifers including *Picea abies*, *Picea sitchensis*, *Abies alba*, *Pseudotsuga menziesii*, *Larix* spp. and *Pinus sylvestris*. In 1993, it was discovered in the Argentinian Provinces of Chebut, Rio Negro and Neuquén. It was discovered in Chile some time after 1970 and is probably distributed throughout the area of North American conifer plantations in Chile. The subspecies *U. gigas flavicornis* (Fabricius) is widely distributed across Canada and the western US and is not economically important. The ability of European and Asian subspecies to compete with the indigenous subspecies of *U. gigas* or other woodborers and their ability to cause serious damage is not known.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=24&langdisplay=english>

<http://www.padil.gov.au/viewPest.aspx?id=306>

<http://www.forestpests.org/poland/greaterhorn.html>

<http://www.invasive.org/browse/subject.cfm?sub=20>

<http://www.forestpests.org/hungary/hymenopteraug.html>

Diseases

Indigenous diseases

No information was available on indigenous diseases that are damaging to Chile's planted forests.

Introduced diseases

***Botryosphaeria ribis* Grossenbacher & Duggar**

Other scientific names:

Ascomycota: Botryosphaeriaceae

Common names: Botryosphaeria canker; branch dieback; cane blight canker of roses; dieback; stem-end rot

Host type: broadleaf and conifer

Hosts: *Eucalyptus nitens*; *E. globulus*; *E. camaldulensis*

Botryosphaeria ribis, a canker-causing fungus, was detected for the first time in Chile's VIII Region in a two-year old planted forest of *Eucalyptus nitens* in 1998. This fungus kills branches, causes tree deformity and tree death. The fungus is now known to occur from the V to X Regions and has also been found on *E. globulus* and *E. camaldulensis* (Baldini Urrutia *et al.*, 2003). This pathogen is known to occur over an area of about 20 000 ha (FAO, 2004a).

<http://www.invasive.org/browse/subimages.cfm?SUB=545>

***Mycosphaerella pini* Rostrup**

Other scientific names: *Cytosporina septospora*; *Dothistroma septosporum*; *Eruptio pini*; *Mycosphaerella pini* E. Rostrup; *Septoria septospora*

Ascomycota: Mycosphaerellaceae

Common names: dothistroma needle blight; needle fungus; dothistroma needle blight; red band needle blight

Host type: conifer

Hosts: *Pinus radiata*

Dothistroma blight is a disease of a wide range of pine species that infects and kills needles. This disease causes infections that last several years leading to the eventual death of trees. *Pinus radiata* is particularly susceptible and the disease has devastated many *P. radiata* planted forests in the Southern Hemisphere, particularly in East Africa, New Zealand and Chile. The fungus has both a sexual stage (*Scirrhia pini*) and an asexual stage (*Mycosphaerella pini*).

<http://www.na.fs.fed.us/spfo/pubs/fidls/dothistroma/doth.htm>

http://www.eppo.org/QUARANTINE/fungi/Mycosphaerella_dearnessii/SCIRSP_ds.pdf

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=39&langdisplay=english>

***Sphaeropsis sapinea* (Fr.) Dyko & Sutton**

Other scientific names: *Botryodiplodia pinea* (Desm.) Petrak (1922); *Diplodia conigena* Desm. (1846); *Diplodia pinastri* Grove (1916); *Diplodia pinea* (Desm.) Kickx f. (1867); *Diplodia sapinea* (Fr.) Fuckel (1870); *Granulodiplodia pinea* (Desm.) Zambettakis (1955); *Granulodiplodia sapinea* (Fr.) M. Morelet & Lanier (1973); *Macrophoma pinea* (Desm.) Petrak & Sydow; *Macrophoma sapinea* (Fr.) Petr. (1962) [1961]; *Phoma pinastri* L. Jv.; *Sphaeria sapinea* Fr.; *Sphaeropsis ellisii* Sacc.; *Sphaeropsis micromegala* Berk. & Curti; *Sphaeropsis pinastri* (LJv.) Sacc.

Ascomycota: Incertae sedis

Common names: *Sphaeropsis* shoot blight; diplodia canker; diplodia shoot blight; knot; leaf spot

Host type: conifer

Hosts: *Pinus radiata*

Sphaeropsis shoot blight infects many conifer hosts worldwide. Although pine species are the main hosts reported this disease causes severe damage only to trees that are predisposed by unfavourable environmental conditions. Non-native, exotic pine species growing outside their natural range are especially vulnerable to attack.

<http://www.forestryimages.org/browse/subimages.cfm?SUB=706>

<http://www.na.fs.fed.us/spfo/pubs/factsheets/sphaeropsis/shootblight.htm>

<http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=91&langdisplay=english>

Other pests

Indigenous other pests

No information was available on other indigenous pests (e.g. mites, nematodes, mammals, etc.) causing significant damage to planted forests.

Introduced other pests

***Oryctolagus cuniculus* (Linnaeus, 1758)**

Other scientific names:

Lagomorpha: Leporidae

Common names: European rabbit; rabbit

Host type: broadleaf and conifer

Hosts: *Pinus radiata*; *Eucalyptus globulus*

The European rabbit was introduced into central Chile from Spain in 1884. It feeds on the tender bark of young seedlings of many plants including *Pinus radiata* and *Eucalyptus globulus* and is considered a major damaging agent (Baldini Urrutia and Pancel, 2000).

<http://www.issg.org/database/species/ecology.asp?si=18&fr=1&sts=>

Diebacks and other conditions

No records were available for diebacks or other conditions affecting Chile's planted forests.

Capacity for forest health protection

Approximately 20 percent of Chile's forests are in public ownership; the remainder is privately owned (FAO, 2004b). A high proportion of Chile's planted forests are industrial plantings, owned and managed by private forest companies. Both government agencies and private industry have a significant and complimentary role in protecting forests from damaging insects and diseases.

Government level

The government agency responsible for management and protection of Chile's publicly owned forests and other wildlands is Corporacion Nacional Forestal (CONAF). This organization also provides technical assistance and information on all aspects of forestry, fire, insect and disease management, and protection of non-industrial private lands and manages the country's extensive network of national parks and reserves. CONAF has a team of forest insect and disease specialists at its headquarters in Santiago and at least one staff specialist in forest insect and disease management at each of its regional offices.

Responsibility for prevention and management of accidental pest introductions rests with the Servicio Agrícola y Ganadero of the Ministry of Agriculture. Research on forest insects and diseases is carried out by several universities and the Instituto Forestal (INFOR). One of the country's largest programmes in forest insect and disease research is housed at the Faculty of Forest Sciences of the Universidad Austral de Chile in Valdivia (Ciesla, 1997). The Instituto de Investigaciones Agropecuarias (INIA) also performs research particularly in the fields of environmental protection and biological controls.

Monitoring and detection

Forest insect and disease monitoring and detection are accomplished primarily through surveillance by foresters and forest workers. In some cases aerial surveys have been used to map areas of extensive damage caused by insects and diseases.

Data management

Much of the data on insects and diseases in Chile's forests is qualitative in nature. However, statistics are available on the areas infested by several pests of both natural and planted forests (FAO, 2004a; FAO, 2004b). In addition, several publications have been prepared by CONAF on pests of planted and naturally regenerating forests (e.g. Ramírez Grez *et al.*, 2000; Baldini Urrutia *et al.*, 1994). More recently a book has been published on damaging agents of Chile's naturally regenerating forests (Baldini Urrutia and Pancel, 2000).

Pest management

To date, pest management activities have been concentrated in Chile's planted forests with emphasis on classic biological control programmes directed against exotic pests. The most important activity of the integrated pest management programme for the European pine shoot moth was the introduction of the parasitoid, *Orgilus obscurator* (Hymenoptera: Braconidae). The experience obtained in this programme, has allowed the development and implementation of other biological control programmes, which have been applied to other introduced forest pests of economic importance. These have been directed at all pests of eucalypt species including *Phoracantha semipunctata* and *Phoracantha recurva* (Coleoptera: Cerambycidae), *Gonipterus scutellatus* (Coleoptera: Curculionidae), *Ctenarytaina eucalypti* (Hemiptera: Psyllidae) and *Glycaspis brimblecombei* (Homoptera: Psyllidae), as well as *Sirex noctilio* (Hymenoptera: Siricidae) in pine planted forests and *Tremex fuscicornis* (Hymenoptera: Siricidae) in poplar planted forests. These programmes have been a combined effort of public institutions like Servicio Agrícola y Ganadero, the National Institute of Agriculture Research (INIA), INFOR, CONAF and some private companies.

Private landowners

Forest industries operating in Chile have active forest insect and disease management programmes and work closely with public agencies such as CONAF, SAG and INFOR in their implementation. Most forest companies have at least one person having primary responsibility for forest insect and disease management activities.

Forest companies are responsible for the protection of their forest resources. With the introduction of the European pine shoot moth into Chile, many companies initiated innovative pest management programmes including classic biological control. In some instances, groups of companies have established laboratories for mass rearing and release of the European pine shoot moth parasitoid, *Orgilus obscurator*. One such laboratory, Controladora de Plagas Forestales, was established in 1992 and is supported by 25 forest companies (Ciesla, 1997).

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^{OSN} = Other Scientific Name (other names, synonyms, other combinations, etc. that have been used for this species)

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