



Forestry Department

Food and Agriculture Organization of the United Nations

Forest Health & Biosecurity Working Papers

OVERVIEW OF FOREST PESTS

CYPRUS

March 2008

Forest Resources Development Service
Forest Management Division
Forestry Department

Working Paper FBS/15E
FAO, Rome, Italy

DISCLAIMER

The aim of this document is to give an overview of the forest pest¹ situation in Cyprus. 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

The information with regards to Cyprus was provided and validated by the Department of Forests of the Ministry of Agriculture, Natural Resources and Environment; their efforts are acknowledged. The information was compiled by W. Ciesla and B. Moore.

CYPRUS

Introduction

With a land area of 924 000 hectares, Cyprus is the third largest island in the Mediterranean Sea. Forests cover 173 000 ha representing 18.7 percent of the total land area. Other wooded lands cover 214 000 ha (FAO, 2006). A combination of an arid to semi-arid climate, frequent wildfire episodes and insect outbreaks, and grazing by domestic animals has affected the health and productivity of the forests.

Afforestation and reforestation have been major activities on Cyprus ever since the British assumed control of the island in 1878. Planted forests cover about 5 000 ha or 2.9 percent of total forest area (FAO, 2006). Initially, several species of *Eucalyptus* were introduced. However, today, much of the plantations are composed of an indigenous species, *Pinus brutia*. More recently, mixed species plantations of *P. brutia*, *P. halapensis*, *Cupressus sempervirens* and occasionally *P. pinea* have been established. Consequently, the complex of insects affecting both naturally regenerating forests and planted forests is virtually identical.

Forest pests

Naturally regenerating forests

Insects

Indigenous insects

***Lymantria dispar* Linnaeus, 1758**

Other scientific names: *Bombyx dispar*; *Hypogymna dispar*; *Liparis dispar*; *Ocneria dispar*; *Phalaena dispar*; *Porthesia dispar*; *Porthetria dispar*; *Porthetria hadina* Butler, 1881; *Porthetria umbrosa* Butler, 1881

Lepidoptera: Lymantriidae

Common names: gypsy moth

Host type: broadleaf

Hosts: *Quercus* spp.; *Arbutus* spp.; *Pistacia* spp.

The gypsy moth is a destructive defoliator of a wide range of broadleaf trees including fruit trees and broadleaf forest trees. It can be found in Europe, Asia and Africa and has been introduced into North America. In Cyprus it is very common and periodically there are local outbreaks.

Lymantria dispar has a broad range of over 250 species of broadleaf and coniferous hosts. In Cyprus, it is a major defoliator of broadleaved trees and the main forest hosts are oak (*Quercus infectoria* ssp. *Veneris*), golden oak (*Quercus alnifolia*), strawberry tree (*Arbutus andrachne*), and terebinth (*Pistacia terebinthus*).

Larval defoliation severely weakens and reduces tree growth making them susceptible to secondary attacks by other pests. It causes periodical widespread defoliation, resulting in reduced growth, loss of vigour, diebacks though rarely, and it also reduces aesthetic and

recreational values. Gypsy moth larvae can be a serious nuisance in forest recreational areas.

Natural controls, such as introduced insect parasites and predators, diseases (bacterium or virus) and adverse climatic conditions, help control the gypsy moth. Ground applications of chemical (Diflubenzuron/Dimilin) and biological (*Bacillus thuringiensis*/Foray 48) insecticides have been used during outbreaks in Cyprus to prevent defoliation and minimize the damage caused by this pest.

<http://www.padil.gov.au/viewPest.aspx?id=342>

<http://www.forestpests.org/subject.html?SUB=165>

<http://www.issg.org/database/species/ecology.asp?si=96&fr=1&sts=sss>

<http://www.inspection.gc.ca/english/sci/surv/data/lymdise.shtml>

http://www.forestry.ubc.ca/fetch21/FRST308/lab5/lymantria_dispar/gypsy.html

***Orthotomicus erosus* (Wollaston, 1857)**

Other scientific names: *Bostrichus duplicatus* Ferrari; *Bostrichus laricis* Perris; *Ips erosus* (Wollaston); *Ips erosus* var. *robustus* Knotek; *Tomicus erosus* Wollaston; *Tomicus rectangulus* Eichoff

Coleoptera: Scolytidae

Common names: European bark beetle; Mediterranean pine beetle; Mediterranean pine engraver beetle

Host type: conifer

Hosts: *Pinus* spp.- *P. brutia*; *P. nigra* ssp. *pallasiana*; *Cedrus brevifolia*

Orthotomicus erosus is a bark beetle that kills pines planted at low elevations and on dry sites. This insect appears to be most common from mid-summer to late fall. It occurs in the Mediterranean region of Europe across to the Caucasus mountain range. It has been introduced into North and South America, China and Australia. In Cyprus, *Orthotomicus erosus* is a very common insect and there are periodical outbreaks in certain locations.

It primarily attacks *Pinus* spp., but will attack other genera of conifers. In Cyprus it primarily attacks calabrian pine (*Pinus brutia*) and less frequently, black pine (*Pinus nigra* ssp. *pallasiana*). Sometimes it attacks the Cyprus cedar (*Cedrus brevifolia*) primarily for maturation feeding.

Orthotomicus erosus attacks are secondary and they cause damages to plants, mainly in areas where plantations have been established under unfavourable environmental conditions and in natural forests where drought and other environmental stress factors are common. Generally it attacks freshly fallen trees or trees that are under stress, particularly those under drought stress. Attacks on stressed trees frequently leads to death of the tree.

Control measures for *Orthotomicus erosus* and the other bark beetles are fairly standard and they mainly involve clean forest practices to avoid population build-ups.

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument

<http://www.barkbeetles.org/exotic/oreross.html>

<http://www.issg.org/database/species/ecology.asp?si=787&fr=1&sts>

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=9&langdisplay=english>

http://www.ncrs.fs.fed.us/pubs/jrnl/2004/nc_2004_Haack_001.pdf

<http://tncweeds.ucdavis.edu/products/gallery/orter1.html>

***Phloeosinus armatus* Reitter, 1887**

Other scientific names:

Coleoptera: Scolytidae

Common names: Cyprus shoot beetle; bark beetle

Host type: conifer

Hosts: *Cupressus sempervirens*

The bark beetle, *Phloeosinus armatus*, occurs in southern and Central Europe, southern Russian Federation, the Middle East and North Africa. This insect is very common in Cyprus and periodically there are local outbreaks.

In Cyprus the main host of this insect is the indigenous cypress tree (*Cupressus sempervirens*). It also attacks exotic ornamental plants such as the gold crest or Monterey cypress (*Cupressus macrocarpa* Hartw.).

Phloeosinus armatus is associated with both naturally regenerating forests and planted forests of *Cupressus sempervirens*. It is primarily a secondary pest attacking environmentally stressed cypress trees in areas where plantations have been established in unfavourable environmental conditions and rarely in natural cypress forests where drought and other stress factors are common. This insect invades recently dead trees, windthrow and broken branches and does not appear to kill living trees. The most severe damage caused by this insect is the destruction of the shoots during maturation feeding which results in reduced tree height and diameter growth. Maturation feeding by emerging adults occurs on the bark of branches of living trees. During years when this insect is abundant, maturation feeding can cause extensive branch death (Ciesla, 2004).

Control measures for *Phloeosinus armatus* and other bark beetles are fairly standard and involve clean forest practices to avoid population build-ups.

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument

<http://www.forestryimages.org/browse/subimages.cfm?SUB=4143>

***Thaumetopoea wilkinsoni* Tams, 1924**

Other scientific names:

Lepidoptera: Thaumetopoeidae

Common names: pine processionary caterpillar; Cyprus processionary caterpillar

Host type: conifer

Hosts: *Pinus* spp. - *P. brutia*; *P. nigra* ssp. *pallasiana*; *P. canariensis*; *P. halepensis*

Thaumetopoea wilkinsoni, the pine processionary caterpillar, is present in the eastern Mediterranean basin (Middle East), mainly in Cyprus, Israel, Jordan, Lebanon, Syria and Turkey. This pest is considered an eastern Mediterranean form (race) of *Thaumetopoea pityocampa*, whose taxonomic status is in question. It is a very common and destructive insect pest and periodically there are outbreaks in certain locations in Cyprus.

This insect is a tent-making caterpillar that feeds gregariously and defoliates various species of pine. In Cyprus it primarily attacks the calabrian pine (*Pinus brutia*), the

dominant tree species of the country, and less frequently the black pine (*Pinus nigra* ssp. *pallasiana*). It also attacks few exotic pine species such as *P. canariensis*, *P. halepensis* and the hybrid *P. brutia* x *P. halepensis*. *Thaumetopoea wilkinsonii* does not attack stone pine (*P. pinea*).

Thaumetopoea wilkinsonii is a major defoliator of pine trees in Cyprus. Natural forests, plantations and individual trees are subject to periodic outbreaks. Outbreaks and defoliation tend to be more severe during years with mild winter temperatures and below normal precipitation. The caterpillar is most active during the cooler months of the year. In addition, young stands (<15 years old and <2 metres in height) usually suffer more damage than older stands. Sites below 200m in elevation tend to suffer more damage than higher elevation sites and planted forests on south-facing slopes are often more severely damaged than those on north-facing slopes. In mixed plantations of *Pinus brutia* and *P. halapensis*, both tree species appear to suffer similar levels of defoliation. While few trees die as a result of recurrent defoliations, infected trees suffer from decreased growth and they also have increased susceptibility to secondary attacks by bark beetles.

Defoliation by pine processionary caterpillar has intensified in recent years, partially due to climatic conditions that favour the insect but also because of the large volume of suitable host material available in the extensive areas of young pine plantations established to replace forests destroyed by fire (Ciesla, 2004).

The larvae have urticating hairs that can cause skin irritation in humans. During outbreaks, the entire environment becomes contaminated with microscopic hairs to the extent that campsites and other forest recreation areas become unusable.

Aerial and ground application of chemical and biological insecticides is widely used every year in Cyprus. In recent years though, only biological insecticides have been used such as *Bacillus thuringiensis* (Foray 48) and Spinosad (Tracer).

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument

***Tomicus destruens* (Wollaston, 1865)**

Other scientific names: *Blastophagus piniperda* Linnaeus; *Hylurgus destruens* Wollaston; *Tomicus piniperda* (Linnaeus); *Tomicus piniperda* (Linnaeus) var. *destruens*

Coleoptera: Scolytidae

Common names: pine shoot beetle

Host type: conifer

Hosts: *Pinus* spp. - *P. brutia*

Tomicus destruens is a species of bark beetle that occurs throughout the Mediterranean area and attacks *Pinus* spp. It is very similar to *Tomicus piniperda* and often has been misidentified as this species (further complicating the issue of identification is that, in the opinion of some entomologists, these two species actually represent only one species). However, even though the two species are morphologically very similar, they are apparently reproductively isolated – *T. piniperda* has its mating flights in early spring, whereas *T. destruens* has mating flights in autumn and early winter (Gallego *et al.*, 2004).

Most collections made in Cyprus have been identified as *T. piniperda*. However, during 2003, collections taken from groups of *Pinus brutia* killed by what was believed to be *T. piniperda* were identified as *T. destruens* (Ciesla, 2004). In Cyprus, *Tomicus destruens* attacks the entire bole of small diameter pines and confines its attacks to the thin barked portions of the upper crowns of larger pines causing top kill. Group kills of up to 30 trees are common during the early spring.

<http://www.barkbeetles.org/browse/subject.cfm?SUB=10996>

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=156&langdisplay=english>

***Tomicus minor* Hartig**

Other scientific names: *Blastophagus minor* (Hartig); *Dendroctonus minor* Hartig;
Myelophilus minor (Ritchie)

Coleoptera: Scolytidae

Common names: lesser pine shoot beetle

Host type: conifer

Host: *Pinus* spp.; *P. brutia*; *P. nigra* var. *caramanica*

Tomicus minor is commonly found in the thin barked portions of pines attacked by *Orthotomicus erosus*. This species of beetle infests stressed and weakened trees and causes stunting of tree growth. It attacks pines and, to a lesser degree, species of spruce (*Picea* spp.) and larch (*Larix* spp.) in Europe. In Cyprus, *Pinus brutia* and *Pinus nigra* var. *caramanica* are known hosts. In addition to the direct damage caused by feeding, *T. minor* transmits the blue stain fungus, *Ophiostoma minus*, which discolours and lowers the value of some wood products.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=115&langdisplay=english>

<http://www.invasive.org/browse/subject.cfm?sub=4160>

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

***Tomicus piniperda* (Linnaeus, 1758)**

Other scientific names: *Blastophagus piniperda*; *Blastophagus major* Eggers;
Blastophagus testaceus

Coleoptera: Scolytidae

Common names: common pine shoot beetle

Host type: conifer

Hosts: *Pinus* spp. - *P. brutia*; *P. nigra* ssp. *pallasiana*; *P. halepensis*; *P. pinea*

Tomicus piniperda is widely distributed across Europe from the United Kingdom to the Mediterranean basin, eastwards to European Russia and China. It has also been introduced into North America and many other areas. This insect is very common in Cyprus and periodically there are outbreaks in certain locations.

Pines are the main hosts of *Tomicus piniperda* and in Cyprus it primarily attacks calabrian pine (*Pinus brutia*) and less frequently, black pine (*Pinus nigra* ssp. *pallasiana*). It also attacks a few exotic pine species such as Aleppo pine (*P. halepensis*) and the stone pine (*P. pinea*).

Tomicus piniperda is mainly a secondary pest attacking the crowns of stressed or weakened trees as well as recently cut or fallen trees. It causes damages to host trees

mainly in areas where plantations have been established under unfavourable environmental conditions and rarely in natural forests where drought and other environmental stress factors are common. The most severe damage caused by this pest is the destruction of shoots during maturation feeding which results in reduced tree height and diameter growth. Adult and larval feeding rarely causes dieback of host trees. This beetle has one generation per year in cooler areas and two in warmer climates. It overwinters in dead twigs and branches.

Control measures for *Tomicus piniperda* and other bark beetles are fairly standard and mainly involve clean forest practices to avoid population build-ups. In Europe where harvested timber is often left in the forest for extended periods, bark beetle breeding attacks are prevented by debarking the timber, exposing the timber to solar radiation or the application of chemical insecticides in a spray form.

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument

<http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=86&langdisplay=english>

<http://www.barkbeetles.org/browse/subject.cfm?SUB=980>

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

<http://www.barkbeetles.org/exotic/tmcspnpe.html>

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

Introduced insects

No damaging introduced insects are known to occur in Cyprus.

Diseases

Indigenous diseases

Pathogens apparently are a minor problem in the forests of Cyprus and are of little or no concern to forest managers.

Introduced diseases

No records of introduced pathogens are known from Cyprus.

Other pests

Indigenous other pests

There are no records for damage caused by indigenous other pests (e.g. mites, nematodes, mammals, etc.) in the planted and naturally regenerating forests of Cyprus.

Introduced other pests

Several species of rats, possibly introduced, feed on the branches of carob, *Ceratonia siliqua*, a tree whose fruits/pods are rich in protein and sugar and are used in chocolate and pastry manufacturing and for photographic emulsions. Feeding injury causes death of branches. Damage is most severe during periods of extremely dry weather.

Diebacks and other conditions

Occasional episodes of high winds or heavy snows can cause extensive mechanical injury, especially to pine and cypress forests. These disturbances often predispose the forests to attacks by insects and diseases. A severe storm occurred during the winter of 2003 which caused extensive breakage to trees in the Pentadactylos Mountains of northern Cyprus.

Planted forests

Insects

Indigenous insects

Lymantria dispar Linnaeus, 1758

Other scientific names: *Bombyx dispar*; *Hypogymna dispar*; *Liparis dispar*; *Ocneria dispar*; *Phalaena dispar*; *Porthesia dispar*; *Porthetria dispar*; *Porthetria hadina* Butler, 1881; *Porthetria umbrosa* Butler, 1881

Lepidoptera: Lymantriidae

Common names: gypsy moth

Host type: broadleaf

Hosts: *Quercus* spp.; *Arbutus* spp.; *Pistacia* spp.

The gypsy moth is a destructive defoliator of a wide range of broadleaf trees including fruit trees and broadleaf forest trees. It can be found in Europe, Asia and Africa and has been introduced into North America. In Cyprus it is very common and periodically there are local outbreaks.

Lymantria dispar has a broad range of over 250 species of broadleaf and coniferous hosts. In Cyprus, it is a major defoliator of broadleaved trees and the main forest hosts are oak (*Quercus infectoria* ssp. *Veneris*), golden oak (*Quercus alnifolia*), strawberry tree (*Arbutus andrachne*), and terebinth (*Pistacia terebinthus*).

Larval defoliation severely weakens and reduces tree growth making them susceptible to secondary attacks by other pests. It causes periodical widespread defoliation, resulting in reduced growth, loss of vigour, diebacks though rarely, and it also reduces aesthetic and recreational values. Gypsy moth larvae can be a serious nuisance in forest recreational areas.

Natural controls, such as introduced insect parasites and predators, diseases (bacterium or virus) and adverse climatic conditions, help control the gypsy moth. Ground applications of chemical (Diflubenzuron/Dimilin) and biological (*Bacillus thuringiensis*/Foray 48) insecticides have been used during outbreaks in Cyprus to prevent defoliation and minimize the damage caused by this pest.

<http://www.padil.gov.au/viewPest.aspx?id=342>

<http://www.forestpests.org/subject.html?SUB=165>

<http://www.issg.org/database/species/ecology.asp?si=96&fr=1&sts=sss>

<http://www.inspection.gc.ca/english/sci/surv/data/lymdise.shtml>

http://www.forestry.ubc.ca/fetch21/FRST308/lab5/lymantria_dispar/gypsy.html

***Orthotomicus erosus* (Wollaston, 1857)**

Other scientific names: *Bostrichus duplicatus* Ferrari; *Bostrichus laricis* Perris; *Ips erosus* (Wollaston); *Ips erosus* var. *robustus* Knotek; *Tomicus erosus* Wollaston; *Tomicus rectangulus* Eichhoff

Coleoptera: Scolytidae

Common names: European bark beetle; Mediterranean pine beetle; Mediterranean pine engraver beetle

Host type: conifer

Hosts: *Pinus* spp.- *P. brutia*; *P. nigra* ssp. *pallasiana*; *Cedrus brevifolia*

Orthotomicus erosus is a bark beetle that kills pines planted at low elevations and on dry sites. This insect appears to be most common from mid-summer to late fall. It occurs in the Mediterranean region of Europe across to the Caucasus mountain range. It has been introduced into North and South America, China and Australia. In Cyprus, *Orthotomicus erosus* is a very common insect and there are periodical outbreaks in certain locations.

It primarily attacks *Pinus* spp., but will attack other genera of conifers. In Cyprus it primarily attacks calabrian pine (*Pinus brutia*) and less frequently, black pine (*Pinus nigra* ssp. *pallasiana*). Sometimes it attacks the Cyprus cedar (*Cedrus brevifolia*) primarily for maturation feeding.

Orthotomicus erosus attacks are secondary and they cause damages to plants, mainly in areas where plantations have been established under unfavourable environmental conditions and in natural forests where drought and other environmental stress factors are common. Generally it attacks freshly fallen trees or trees that are under stress, particularly those under drought stress. Attacks on stressed trees frequently leads to death of the tree.

Control measures for *Orthotomicus erosus* and other bark beetles are fairly standard and involve clean forest practices to avoid population build-ups.

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument

<http://www.barkbeetles.org/exotic/oreross.html>

<http://www.issg.org/database/species/ecology.asp?si=787&fr=1&sts>

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=9&langdisplay=english>

http://www.ncrs.fs.fed.us/pubs/jrnl/2004/nc_2004_Haack_001.pdf

<http://tncweeds.ucdavis.edu/products/gallery/orter1.html>

***Phloeosinus armatus* Reitter, 1887**

Other scientific names:

Coleoptera: Scolytidae

Common names: Cyprus shoot beetle; bark beetle

Host type: conifer

Hosts: *Cupressus sempervirens*

The bark beetle, *Phloeosinus armatus*, occurs in southern and Central Europe, southern Russian Federation, the Middle East and North Africa. This insect is very common in Cyprus and periodically there are local outbreaks.

In Cyprus the main host of this insect is the indigenous cypress tree (*Cupressus sempervirens*). It also attacks exotic ornamental plants such as the gold crest or Monterey cypress (*Cupressus macrocarpa* Hartw.).

Phloeosinus armatus is associated with both naturally regenerating forests and planted forests of *Cupressus sempervirens*. It is primarily a secondary pest attacking environmentally stressed cypress trees in areas where plantations have been established in unfavourable environmental conditions and rarely in natural cypress forests where drought and other stress factors are common. This insect invades recently dead trees, windthrow and broken branches and does not appear to kill living trees. The most severe damage caused by this insect is the destruction of the shoots during maturation feeding which results in reduced tree height and diameter growth. Maturation feeding by emerging adults occurs on the bark of branches of living trees. During years when this insect is abundant, maturation feeding can cause extensive branch death (Ciesla, 2004).

Control measures for *Phloeosinus armatus* and other bark beetles are fairly standard and involve clean forest practices to avoid population build-ups.

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument

<http://www.forestryimages.org/browse/subimages.cfm?SUB=4143>

***Thaumetopoea wilkinsoni* Tams, 1924**

Other scientific names:

Lepidoptera: Thaumetopoeidae

Common names: pine processionary caterpillar; Cyprus processionary caterpillar

Host type: conifer

Hosts: *Pinus* spp. - *P. brutia*; *P. nigra* ssp. *pallasiana*; *P. canariensis*; *P. halepensis*

Thaumetopoea wilkinsoni, the pine processionary caterpillar, is present in the eastern Mediterranean basin (Middle East), mainly in Cyprus, Israel, Jordan, Lebanon, Syria and Turkey. This pest is considered an eastern Mediterranean form (race) of *Thaumetopoea pityocampa*, whose taxonomic status is in question. It is a very common and destructive insect pest and periodically there are outbreaks in certain locations in Cyprus.

This insect is a tent-making caterpillar that feeds gregariously and defoliates various species of pine. In Cyprus it primarily attacks the calabrian pine (*Pinus brutia*), the dominant tree species of the country, and less frequently the black pine (*Pinus nigra* ssp. *pallasiana*). It also attacks few exotic pine species such as *P. canariensis*, *P. halepensis* and the hybrid *P. brutia* x *P. halepensis*. *Thaumetopoea wilkinsonii* does not attack stone pine (*P. pinea*).

Thaumetopoea wilkinsoni is a major defoliator of pine trees in Cyprus. Natural forests, plantations and individual trees are subject to periodic outbreaks. Outbreaks and defoliation tend to be more severe during years with mild winter temperatures and below normal precipitation. The caterpillar is most active during the cooler months of the year. In addition, young stands (<15 years old and <2 metres in height) usually suffer more damage than older stands. Sites below 200m in elevation tend to suffer more damage than higher elevation sites and planted forests on south-facing slopes are often more severely damaged than those on north-facing slopes. In mixed plantations of *Pinus brutia* and *P.*

halapensis, both tree species appear to suffer similar levels of defoliation. While few trees die as a result of recurrent defoliations, infected trees suffer from decreased growth and they also have increased susceptibility to secondary attacks by bark beetles.

Defoliation by pine processionary caterpillar has intensified in recent years, partially due to climatic conditions that favour the insect but also because of the large volume of suitable host material available in the extensive areas of young pine plantations established to replace forests destroyed by fire (Ciesla, 2004).

The larvae have urticating hairs that can cause skin irritation in humans. During outbreaks, the entire environment becomes contaminated with microscopic hairs to the extent that campsites and other forest recreation areas become unusable.

Aerial and ground application of chemical and biological insecticides is widely used every year in Cyprus. In recent years though, only biological insecticides have been used such as *Bacillus thuringiensis* (Foray 48) and Spinosad (Tracer).

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument

***Tomicus destruens* (Wollaston, 1865)**

Other scientific names: *Blastophagus piniperda* Linnaeus; *Hylurgus destruens* Wollaston; *Tomicus piniperda* (Linnaeus); *Tomicus piniperda* (Linnaeus) var. *destruens*

Coleoptera: Scolytidae

Common names: pine shoot beetle

Host type: conifer

Hosts: *Pinus* spp. - *P. brutia*

Tomicus destruens is a species of bark beetle that occurs throughout the Mediterranean area and attacks *Pinus* spp. It is very similar to *Tomicus piniperda* and often has been misidentified as this species (further complicating the issue of identification is that, in the opinion of some entomologists, these two species actually represent only one species). However, even though the two species are morphologically very similar, they are apparently reproductively isolated – *T. piniperda* has its mating flights in early spring, whereas *T. destruens* has mating flights in autumn and early winter (Gallego *et al.*, 2004).

Most collections made in Cyprus have been identified as *T. piniperda*. However, during 2003, collections taken from groups of *Pinus brutia* killed by what was believed to be *T. piniperda* were identified as *T. destruens* (Ciesla, 2004). In Cyprus, *Tomicus destruens* attacks the entire bole of small diameter pines and confines its attacks to the thin barked portions of the upper crowns of larger pines causing top kill. Group kills of up to 30 trees are common during the early spring.

<http://www.barkbeetles.org/browse/subject.cfm?SUB=10996>

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=156&langdisplay=english>

***Tomicus minor* Hartig**

Other scientific names: *Blastophagus minor* (Hartig); *Dendroctonus minor* Hartig;

Myelophilus minor (Ritchie)

Coleoptera: Scolytidae

Common names: lesser pine shoot beetle

Host type: conifer

Host: *Pinus* spp.; *P. brutia*; *P. nigra* var. *caramanica*

Tomicus minor is commonly found in the thin barked portions of pines attacked by *Orthotomicus erosus*. This species of beetle infests stressed and weakened trees and causes stunting of tree growth. It attacks pines and, to a lesser degree, species of spruce, *Picea* spp. and larch, *Larix* spp. in Europe. In Cyprus, *Pinus brutia* and *Pinus nigra* var. *caramanica* are known hosts. In addition to the direct damage caused by feeding, *T. minor* transmits the blue stain fungus, *Ophiostoma minus*, which discolours and lowers the value of some wood products.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=115&langdisplay=english>

<http://www.invasive.org/browse/subject.cfm?sub=4160>

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

***Tomicus piniperda* (Linnaeus, 1758)**

Other scientific names: *Blastophagus piniperda*; *Blastophagus major* Eggers;

Blastophagus testaceus

Coleoptera: Scolytidae

Common names: common pine shoot beetle

Host type: conifer

Hosts: *Pinus* spp. - *P. brutia*; *P. nigra* ssp. *pallasiana*; *P. halepensis*; *P. pinea*

Tomicus piniperda is widely distributed across Europe from the United Kingdom to the Mediterranean basin, eastwards to European Russia and China. It has also been introduced into North America and many other areas. This insect is very common in Cyprus and periodically there are outbreaks in certain locations.

Pines are the main hosts of *Tomicus piniperda* and in Cyprus it primarily attacks calabrian pine (*Pinus brutia*) and less frequently, black pine (*Pinus nigra* ssp. *pallasiana*). It also attacks a few exotic pine species such as Aleppo pine (*P. halepensis*) and the stone pine (*P. pinea*).

Tomicus piniperda is mainly a secondary pest attacking the crowns of stressed or weakened trees as well as recently cut or fallen trees. It causes damages to host trees mainly in areas where plantations have been established under unfavourable environmental conditions and rarely in natural forests where drought and other environmental stress factors are common. The most severe damage caused by this pest is the destruction of shoots during maturation feeding which results in reduced tree height and diameter growth. Adult and larval feeding rarely causes dieback of host trees. This beetle has one generation per year in cooler areas and two in warmer climates. It overwinters in dead twigs and branches.

Control measures for *Tomicus piniperda* and other bark beetles are fairly standard and mainly involve clean forest practices to avoid population build-ups. In Europe where harvested timber is often left in the forest for extended periods, bark beetle breeding attacks are prevented by debarking the timber, exposing the timber to solar radiation or the application of chemical insecticides in a spray form.

http://www.moa.gov.cy/moa/fd/fd.nsf/DMLharmorg_en/DMLharmorg_en?OpenDocument
<http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=86&langdisplay=english>
<http://www.barkbeetles.org/browse/subject.cfm?SUB=980>
http://www.na.fs.fed.us/spfo/pubs/pest_al/shootbeetle/shootbeetle.htm
<http://www.barkbeetles.org/exotic/tmcspnpe.html>
<http://www.forestpests.org/poland/commonpine.html>

Introduced insects

No damaging introduced insects are known to occur in Cyprus.

Diseases

Indigenous diseases

Pathogens apparently are a minor problem in the forests of Cyprus and are of little or no concern to forest managers.

Introduced diseases

The fungus *Seridium cardinalis*, native to North America and a major pest of ornamental *Cupressus sempervirens* in many Mediterranean countries, was detected in Cyprus in 2007 on three imported individual plants of Monterey cypress (*Cupressus macrocarpa* Hartw.) at one private nursery.

Other pests

Indigenous other pests

There are no records for damage caused by indigenous other pests (e.g. mites, nematodes, mammals, etc.) in the planted and naturally regenerating forests of Cyprus.

Introduced other pests

Several species of rats, possibly introduced, feed on the branches of carob, *Ceratonia siliqua*, a tree whose fruits/pods are rich in protein and sugar and are used in chocolate and pastry manufacturing and for photographic emulsions. Feeding injury causes branch death. Damage is most severe during periods of extremely dry weather.

Diebacks and other conditions

Occasional episodes of high winds or heavy snows can cause extensive mechanical injury, especially to pine and cypress forests. These disturbances often predispose the forests to attacks by insects and diseases. A severe storm occurred during the winter of 2003 which caused extensive breakage to trees in the Pentadactylos Mountains of northern Cyprus.

Capacity for forest health protection

Government level

More than 95 percent of the forest area in Cyprus is publicly owned and administered.

Monitoring and detection

Monitoring and detection activities for forest pests is typically an informal process consisting of foresters and forest workers observing and reporting the occurrence of abnormally high levels of pest activity.

Recently, a method was developed for prediction of defoliation by pine processionary caterpillar based on counts of egg masses or colonies of early instar larvae in plantations less than 2 meters in height. This method defines thresholds for when direct control is needed (Ciesla, 2003).

Data management

Little quantitative data is presently collected on the status of insects and diseases in Cyprus.

Pest management

Rapid removal and utilization of windthrown, storm damaged or bark beetle infested trees is the most common means of treating bark beetle infestations. In recent years, control projects against pine processionary caterpillar have been conducted annually involving removal and destruction of infested branches, ground application of chemical insecticides or aerial application of *Bacillus thuringiensis*.

Private landowners

Private forestry in Cyprus is characterized by “passive ownership”, and there is often no formal forest management.

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