# Forestry Department

**Food and Agriculture Organization of the United Nations**

Forest Health & Biosecurity Working Papers

## OVERVIEW OF FOREST PESTS

## RUSSIAN FEDERATION

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**Forest Resources Development Service**
**Forest Management Division**
**Forestry Department**

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**DISCLAIMER**

The aim of this document is to give an overview of the forest pest[1] situation in the Russian Federation. 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.



[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

Information for the Russian Federation was compiled by W. Ciesla and B. Moore.

# RUSSIAN FEDERATION

## *Introduction*

The Russian Federation is the country that covers the largest area in the world (1689 million hectares). Forests cover approximately 809 million ha - about 48 percent of the land area (FAO, 2006).

Most of the forests of the Russian Federation are boreal forests. A major portion of these forests are characterized by slow growth and high sensitivity to any type of human intervention. These forests are dominated by various species of *Abies, Betula, Larix, Picea, Pinus* and *Populus* (Anonymous, 2003). Pests have had significant impacts on the forests of the Russian Federation (Anonymous, 2003). It was estimated that 4 953 000 ha of forests were affected by insect pests and 956 800 ha by diseases (FAO, 2006). They have also suffered damage from industrial pollution.

## *Forest pests*

### Naturally regenerating forests

Planted forests are established largely with indigenous species capable of growing in the harsh climates of the boreal forest. The area of exotic species is insignificant, comprising approximately 1-2 percent of the total area of forest plantations. Therefore, the same complex of insects and diseases that affect naturally regenerating forests also affect planted forests (Anonymous, 2003).

### Insects

#### *Indigenous insects*

***Bupalus piniarius* (Linnaeus, 1758)**

Other scientific names:
Lepidoptera: Geometridae
Common names: pine looper; bordered white
Host type: conifer
Hosts: *Pinus sylvestris*

The pine looper caterpillars feed on the needles of Scots pine. It attacks older trees and tends to feed on older needles. They defoliate trees causing growth loss of the trees. Frequently the same trees are attacked over 2 to 3 years. The eggs are laid in the crowns of trees. The moths are day-flying and move enmasse at times. There are regular fluctuations in the population numbers of the moths over several years. They pupate in the soil where they overwinter. The larvae take about 4 months to develop and emerge in spring with timing dependant on weather conditions.
http://www.forestryimages.org/browse/subimages.cfm?SUB=9718
http://www.pherobase.com/database/species/species-Bupalus-piniarius.php
http://www2.bren.ucsb.edu/~kendall/pubs/2005EcolMon.pdf

***Choristoneura murinana* (Hübner, 1799)**

Other scientific names:
Lepidoptera: Tortricidae
Common names: European fir budworm
Host type: broadleaf and conifer
Hosts: *Abies alba*; *Picea* spp.; *Larix* spp.; *Pinus* spp.; *Juniperus* spp.; *Fagus* spp.

The primary host tree of the the European fir budworm is *Abies alba*. It does feed on other conifers and a few broadleaf trees, however not to the same extent. There is generally only one generation per year with the young larvae going into diapause overwinter. The eggs are laid on the needles in the crowns of trees which then hatch and the caterpillars make silken shelters. The larvae come out of diapause in spring and continue development with the adults emerging in June-July. They attack mature trees and the younger instars feed within the needles and the older instars externally. They pupate within the larval shelters. The damage caused by these caterpillars includes reduction of growth rates as well as making the trees susceptible to attack by secondary pests.
http://www.forestryimages.org/browse/subimages.cfm?SUB=10320
http://ip30.eti.uva.nl/bis/tortricidae.php?menuentry=soorten&id=150

***Dendrolimus sibiricus* Tschetwerikov, 1908**

Other scientific names: *Dendrolimus laricus* Tschetverikov; *Dendrolimus superans sibiricus* Tschetverikov
Lepidoptera: Lasiocampidae
Common names: Siberian silk moth
Host type: conifer
Hosts: *Larix* spp.; *Pinus* spp.

The Siberian silk moth feeds on the foliage of *Larix* and *Pinus* spp. and is considered a major pest of forests in the Russian Federation. This pest is known to have spread over 6 million hectares with outbreaks occurring recently in areas as large as 330 000 ha.

*Dendrolimus sibiricus* caterpillars cause significant defoliation of both natural and planted forests. As well as the impact on trees, the caterpillars of this moth have stinging hairs that can cause significant problems in humans. This moth, unlike a number of other tree pests, is able to attack and kill healthy plants. Other effects are the loss of vigour, reduction in growth, reduced seed crops and tree mortality by secondary species. The life cycle of this species lasts for more than two years. Outbreaks of this moth are cyclic, occurring about every 10-11 years following a few years of drought. The period between outbreaks is becoming shorter partly due to changing climate.

The adults are strong fliers and can spread fairly rapidly. Pathways of introduction include natural movement of adults and the movement of eggs on nursery stock or forest products.
http://www.eppo.org/QUARANTINE/action_list.htm
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=45&langdisplay=english

***Ips cembrae* (Heer, 1836)**

Other scientific names: *Bostrichus cembrae* Heer, 1836; *Tomicus cembrae* (Heer, 1836); *Ips shinanoensis* Yono, 1924; *Ips cembrae* var. *engadinensis* Fuchs, 1913
Coleoptera: Scolytidae
Common names: large larch bark beetle
Host type: conifer
Hosts: *Larix* spp.; *Pinus* spp.; *Picea* spp.

Large larch bark beetles are secondary pests that attack weakened or stressed trees or trees damaged by wind. The males initiate an attack on the trees and create a chamber to which they attract several females with pheromones. The females lay eggs in tunnels which they create under the bark. They introduce fungus into the trees on which the larvae feed. There are 1 to 2 generations per year depending on climatic conditions and the nutritional condition of the tree. They usually overwinter as adults, occasionally as late instar larvae or pupae. The primary hosts are *Larix* spp. although they will attack *Picea* and *Pinus* spp. They can cause the death of trees.
http://www.eppo.org/QUARANTINE/insects/Ips_cembrae/DSIPSXCE.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=152&langdisplay=english
http://www.forestpests.org/poland/largelarchbark.html
http://www.invasive.org/browse/subject.cfm?sub=11000
http://www.forestpests.org/hungary/weevilsic.html
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=159

### *Ips sexdentatus* (Börner, 1776)

Other scientific names: *Dermestes sexdentatus* Börner; *Bostrichus pinastri* Bechstein; *Tomicus stenographus* Duftschmidt; *Ips typographus* De Geer
Coleoptera: Scolytidae
Common names: six-spined engraver beetle; six-toothed bark beetle; twelve-spined ips; pine stenographer beetle
Host type: conifer
Hosts: *Picea* spp.; *Pinus* spp.; *Larix* spp.

*Ips sexdentatus* is a secondary pest that usually attacks only stressed or weakened trees; it rarely attacks healthy, vigorously growing trees.It also occasionally attacks freshly felled trees or windthrown trees. It can significantly affect the amount of timber that is able to be recovered from fire damaged areas because of the damage caused either by the larvae or the blue stain fungus associated with this beetle.
http://www.eppo.org/QUARANTINE/insects/Ips_sexdentatus/IPSXSE_ds.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=79&langdisplay=english
http://www.barkbeetles.org/exotic/ipsxdnts.html
http://www.invasive.org/browse/subimages.cfm?sub=887
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=162
http://www.forestpests.org/poland/sixtoothedbark.html
http://protect.forest.ru/english/en/pests/coleoptera/007.htm

### *Ips typographus* Linnaeus, 1758

Other scientific names: *Dermestes typographus* Linnaeus; *Bostrichus octodentatus* Paykull; *Ips japonicus* Niijima; *Ips sexdentatus* (Börner, 1776)

Coleoptera: Scolytidae
Common names: spruce beetle; European spruce bark beetle; spruce engraver beetle; eight-toothed spruce bark beetle
Host type: conifer
Hosts: *Abies* spp.; *Picea* spp.; *Pinus* spp.; *Larix* spp.

*Ips typographus* is considered Europe's most destructive bark beetle. These bark beetles attack trees enmass and overwhelm the defense mechanisms of the trees. They attack both stressed and healthy trees. The males initiate an attack on trees and create a chamber to which they attract several females with pheromones. The females lay eggs in tunnels which they create under the bark. They introduce fungus into the trees on which the larvae feed. There are 1 to 2 life cycles per year depending on climatic conditions and the nutritional condition of the tree.

In Europe, *Picea abies* is the main host but other species of *Picea* serve as hosts in Asia. *I. typographus* will also occasionally breed in species of *Pinus* or *Abies*.
http://www.eppo.org/QUARANTINE/insects/Ips_typographus/IPSXTY_ds.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=58&langdisplay=english
http://www.inspection.gc.ca/english/plaveg/pestrava/ipstyp/ipstype.shtml
http://ceris.purdue.edu/napis/pests/sbb/pstalert/pacanad1.html
http://www.invasive.org/browse/subject.cfm?sub=888
http://www.forestpests.org/poland/europeanspruce.html
http://www.forestpests.org/hungary/weevilsit.html
http://www.bugwood.org/barkbeetles/exotic/htypgrph.html
http://www.wcrl.ars.usda.gov/cec/insects/ipst.htm
http://www.forestry.gov.uk/forestry/HCOU-4U4J4K
http://www.cabicompendium.org/NamesLists/FC/Full/IPSXTY.htm;
http://warehouse.pfc.forestry.ca/pfc/5319.pdf.

### *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: Asian gypsy moth; gypsy moth
Host type: broadleaf and conifer
Hosts: *Betula* spp.; *Larix* spp.; *Pinus* spp.; *Populus* spp.; *Quercus* spp.; *Salix* spp.; *Ulmus* spp.

The gypsy moth is a destructive defoliator of a wide range of broadleaf trees including fruit trees and broadleaf forest trees although outbreaks generally occur on primary hosts such as oak trees (*Quercus* spp. and *Populus* spp.). Other favoured host species include *Salix, Populus*, *Betula*, *Quercus* and *Ulmus*. Outbreaks typically last for about three years and collapse when host trees are weakened to the point that they produce little or no foliage the following spring for the next generation of larvae. In some cases, high levels of parasitism can cause outbreaks to collapse. It can occur at low levels for many years without causing significant damage. However, at times there are significant outbreaks

that cause severe defoliation of trees, which at times causes death. Frequently outbreaks coincide with periods when the trees are under stress.

Adults of Asian strains are capable of flight, hence dispersal over large areas is possible and the risk of introduction to new areas is increased. Females of European strains cannot fly. Young larvae can move some distance by ballooning from tops of trees. Human activities can also facilitate the movement of this pest. Some of the pathways include vehicles, camping equipment, nursery stock, ships, vehicles, and equipment that have been exposed for a period to the outdoors.
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.forestpests.org/subject.html?SUB=165
http://www.padil.gov.au/viewPest.aspx?id=342
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=342
http://www.forestry.ubc.ca/fetch21/FRST308/lab5/lymantria_dispar/gypsy.html

### *Lymantria monacha* (Linnaeus, 1758)

Other scientific names:
Lepidoptera: Lymantriidae
Common names: nun moth; tussock moth; black arches moth; black arched tussock moth
Host type: broadleaf and conifer
Hosts: *Picea* spp.; *Pinus* spp.; *Abies* spp.; *Larix* spp.; *Fagus* spp.; *Carpinus* spp.; *Betula* spp.; *Acer* spp.; *Fraxinus* spp.; *Malus* spp.; *Quercus* spp.; *Prunus* spp.

*Lymantria monacha* is a major defoliator of coniferous and deciduous trees in Europe and Asia. It shows preferences for particular species of trees, such as Scots pine, oak and Norway spruce, but the tree preference varies between areas. In the Russian Federation, nun moth larvae feed on conifers (*Picea*, *Pinus*, *Abies* and *Larix* spp.) as well as broadleaf trees (*Fagus*, *Carpinous*, *Betula*, *Acer*, *Fraxinus*, *Malus*, *Prunus*, and *Quercus* spp.). They cause significant damage to trees that they defoliate and have been known to cause tree mortality. It is known, for example, to kill up to 50 percent of Norway spruce during outbreaks. In the Russian Federation, the nun moth has damaged more than 23 million hectares of forests. These moths tend to attack monoculture stands of trees that are growing in poor conditions.

There is one generation per year. The females usually lay eggs in crevices or under bark scales however they also lay on any hard surface such as vehicles. They overwinter as eggs, hatch in spring with adults emerging in mid-summer. The young larvae feed on young foliage, often towards the top of trees, with the older larvae feeding on older foliage. Adults are strong fliers and can spread fair distances and young larvae can balloon from tree tops. Eggs may also be transported on logs, ships or vehicles.
http://www.inspection.gc.ca/english/sci/surv/data/lymmone.shtml
http://warehouse.pfc.forestry.ca/pfc/20008.pdf
http://www.na.fs.fed.us/spfo/pubs/pest_al/nunmoth/nun_moth.shtm
http://tncweeds.ucdavis.edu/products/gallery/lymmo1.html
http://www.affa.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060A1B01691
http://www.forestryimages.org/browse/subimages.cfm?SUB=4059

http://www.forestpests.org/poland/nunmoth.html
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=304

***Monochamus urussovi* (Fischer von Waldheim, 1806)**

Other scientific names:
Coleoptera: Cerambycidae
Common names: black spruce beetle
Host type: conifer
Hosts: *Abies* spp.

*Monochamus urussovi* is a wood-boring insect that occurs in the Russian Federation. Outbreaks have been known to affect areas as large as 300 000 hectares in the Russian Federation and is one of the most destructive insects in this region.

These insects tend to attack trees already under stress. Upon emergence, the adults feed on the bark of twigs and branches to mature which can cause stress in trees if the population of adults is sufficiently high. The adult feeding inoculates the trees with spores of blue-stain fungus upon which the larvae feed. The adult beetles act as vectors of the fungus by carrying spores on their bodies as they emerge from the larval host trees. Larval feeding produces feeding tracks on the sapwood under the bark and bore holes into the wood which decreases the value of the wood.
http://www.invasive.org/symposium/baranchi.html
http://protect.forest.ru/english/en/pests/coleoptera/002.htm
http://www.zin.ru/Animalia/Coleoptera/eng/monuruob.htm
http://www.uochb.cas.cz/~natur/cerambyx/monochur.htm

***Tetropium castaneum* (Linneaus)**

Other scientific names: *Lsarthron castaneum* Linneaus; *Tetropium luridum* Gyllenhal
Coleoptera: Cerambycidae
Common names: black spruce beetle; black spruce longhorn beetle; European spruce longhorn beetle
Host type: conifer
Hosts: *Abies* spp.

*Tetropium castaneum* attacks trees enmass and overwhelm the defense mechanisms of the trees. They attack both stressed and healthy trees. The males initiate an attack on trees and create a chamber to which they attract several females with pheromones. The females lay eggs in tunnels which they create under the bark. They introduce fungus into the trees on which the larvae feed. There are 1 to 2 life cycles per year depending on climatic conditions and the nutritional condition of the tree.
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=123&langdisplay=english
http://www.invasive.org/browse/subject.cfm?sub=4116
http://www.forestpests.org/poland/blackspruce.html
http://www.forestpests.org/hungary/longhorntc.html
http://www.wcrl.ars.usda.gov/cec/insects/ipst.htm

***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.; *Picea* spp.; *Pseudotsuga menziesii*; *Larix* spp.

*Tomicus piniperda* tends to attack the crowns of stressed or weakened trees as well as recently cut or fallen trees. The most damage is done by the adult beetles when they are feeding for maturation which can cause stunting and malformation of trees hence reducing its commercial value. When shoot feeding is severe, tree height and diameter growth is reduced. This beetle has one generation per year in cooler areas and two in warmer climates. It overwinters in dead twigs and branches.
http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=86&langdisplay=english
http://www.na.fs.fed.us/spfo/pubs/pest_al/shootbeetle/shootbeetle.htm
http://www.forestryimages.org/browse/subimages.cfm?SUB=980
http://www.barkbeetles.org/browse/subject.cfm?SUB=980
http://www.invasive.org/publications/aphis/fspsb.pdf
http://www.barkbeetles.org/exotic/tmcspnpe.html
http://www.forestpests.org/poland/commonpine.html
http://www.forestpests.org/hungary/weevilstp.html
http://www.inspection.gc.ca/english/plaveg/pestrava/tompin/tompine.shtml

***Xylotrechus altaicus* (Gebler, 1836)**

Other scientific names: *Xyloclytus altaicus* Gebler
Coleoptera: Cerambycidae
Common names: Altai longhorn beetle; Altai larch cerambycid; Altai larch longhorn beetle
Host type: conifer
Hosts: *Larix* spp.; *L. sibirica*; *L. gmelinii*; *L. olgensis*; *L. kamtschatica*

The Altai larch cerambycid is one of the most important pests of *Larix* spp. in the region of its present distribution. It feeds on *Larix* species and has been recorded from *Larix sibirica*; *L. gmelinii*, *L. olgensis* and *L. kamtaschatica*. It attacks slightly stressed and healthy trees of different ages and continues to damage the same trees during several consecutive years causing their death. It takes two years to complete one generation. The eggs are laid in slits created by the adult female in the bark. The young larvae feed on the bark and cambium; this feeding can ring bark a tree. The older larvae feed on the timber of the trees such that even if the attack by the beetle does not kill the tree it significantly degrades the timber value. Prior to pupating the last instar larvae create a chamber just below the surface of the tree where pupation takes place. Several generations can attack the same tree. The adults tend not to fly long distances, however are known to fly up to distances of 30km.
http://www.eppo.org/QUARANTINE/insects/Xylotrechus_altaicus/DSXYLOAL.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=46&langdisplay=english
http://www.invasive.org/browse/subimages.cfm?sub=4099

***Zeiraphera diniana* (Geunee, 1845)**

Other scientific names:
Lepidoptera: Tortricidae
Common names: dingy bell larch; larch bud moth; grey larch moth
Host type: conifer
Hosts: *Larix* spp.; *Pinus* spp.; *Picea* spp.

The larch moth is a small grey moth whose caterpillars feed on the needles of coniferous trees, particularly young needles. To feed they web the needles together incorporating needle remnants that are left over from feeding. The damage that occurs to the trees does not necessarily kill the trees but causes the trees to branch and change form that often reduces the value of the timber. Other affects include reduction in growth, lower levels of seed production and stress affects that make the trees that have been attacked more susceptible to attack by secondary invasives.

They over winter as eggs with hatching occuring in spring; the hatching time depends on climate conditions. They are found from around July through to September and in some areas are common in spruce plants. Large outbreaks of this species have occurred in Poland and can cause significant damage. At times this insect suffers from viral outbreaks which can cause up to 50 percent reduction in populations. In some areas the adults are thought to be migratory. There appear to be cyclic population fluctuations that occur over 8-10 years.

There have been problems with the usage of the scientific name for this species which were resolved by Benz (1991) where *Zeiraphera griseana* is a nomen dubium hence not available for use.
http://www.insectimages.org/browse/subimages.cfm?SUB=13405
http://www.entom.unibo.it/Insetti%20Alberi/Larice/Z_griseana.htm
http://ip30.eti.uva.nl/bis/tortricidae.php?selected=beschrijving&menuentry=soorten&id=280

### *Introduced insects*

No information was available on introduced insects affecting naturally regenerating forests in the Russian Federation.

## Diseases

### *Indigenous diseases*

***Gremmeniella abietina* (Lagerberg) Morelet**

Other scientific names: *Ascocalyx abietina* (Lagerberg) Schalpfer; *Crumenula abietina* Lagerberg; *Lagerbergia abietina* (Lagerberg) J. Reid; *Scleroderris abietina* (Lagerberg) Gremmen; *Scleroderris lagerbergii* Gremmen; *Brunchorstia pinea* (P. Karsten) Höhnel (anamorph); *Brunchorstia destruens* Eriksson (anamorph synonym); *Brunchorstia pini* Allescher (anamorph synonym); *Excipulina pinea* P. Karsten (anamorph synonym); *Septoria ponea* P. Karsten (anamorph synonym)
Ascomycota: Helotiaceae

Common names: Brunchorstia disease (in Europe); scleroderris canker (in USA)
Host type: conifer
Hosts: *Abies* spp.; *Pinus* spp.; *Picea* spp.

*Gremmeniella abietina* is possibly the causal agent responsible for affecting nearly half a million hectares of conifers in the Russian Federation. The fungus enters via wounds on the tree and causes decline of the trees. The extent of outbreaks depends on weather conditions as well as the health status of the trees. *G. abietina* is indigenous to Europe and has spread to parts of eastern North America and Japan.
http://www.eppo.org/QUARANTINE/fungi/Gremmeniella_abietina/GREMAB_ds.pdf
http://www.inspection.gc.ca/english/plaveg/pestrava/greabi/greabie.shtml
http://www.cfl.scf.rncan.gc.ca/imfec-idecf/fichemaladie_e.asp?id=7
http://www-ssko.slu.se/ForskOmr/GremPHa1.htm

### *Introduced diseases*

No information was available on introduced diseases affecting forests in the Russian Federation.

## Other pests

### *Indigenous other pests*

No information was available on other indigenous pests (i.e. mites, nematodes, mammals, etc.) affecting the naturally regenerating forests of the Russian Federation.

### *Introduced other pests*

No information was available on other introduced pests (i.e. mites, nematodes, mammals, etc.) affecting the naturally regenerating forests of the Russian Federation.

## Diebacks and other conditions

No records were available for diebacks and other conditions affecting naturally regenerating forests in the Russian Federation.

## Planted forests

## Insects

### *Indigenous insects*

#### *Bupalus piniarius* (Linnaeus, 1758)

Other scientific names:
Lepidoptera: Geometridae
Common names: pine looper; bordered white
Host type: conifer
Hosts: *Pinus sylvestris*

The pine looper caterpillars feed on the needles of Scots pine. It attacks older trees and tends to feed on older needles. They defoliate trees causing growth loss of the trees. Frequently the same trees are attacked over 2 to 3 years. The eggs are laid in the crowns of trees. The moths are day-flying and move enmasse at times. There are regular fluctuations in the population numbers of the moths over several years. They pupate in the soil where they overwinter. The larvae take about 4 months to develop and emerge in spring with timing dependant on weather conditions.
http://www.forestryimages.org/browse/subimages.cfm?SUB=9718
http://www.pherobase.com/database/species/species-Bupalus-piniarius.php
http://www2.bren.ucsb.edu/~kendall/pubs/2005EcolMon.pdf

***Choristoneura murinana* (Hübner, 1799)**

Other scientific names:
Lepidoptera: Tortricidae
Common names: European fir budworm
Host type: broadleaf and conifer
Hosts: *Abies alba*; *Picea* spp.; *Larix* spp.; *Pinus* spp.; *Juniperus* spp.; *Fagus* spp.

The primary host tree of the the European fir budworm is *Abies alba*. It does feed on other conifers and a few broadleaf trees, however not to the same extent. There is generally only one generation per year with the young larvae going into diapause overwinter. The eggs are laid on the needles in the crowns of trees which then hatch and the caterpillars make silken shelters. The larvae come out of diapause in spring and continue development with the adults emerging in June-July. They attack mature trees and the younger instars feed within the needles and the older instars externally. They pupate within the larval shelters. The damage caused by these caterpillars includes reduction of growth rates as well as making the trees susceptible to attack by secondary pests.
http://www.forestryimages.org/browse/subimages.cfm?SUB=10320
http://ip30.eti.uva.nl/bis/tortricidae.php?menuentry=soorten&id=150

***Dendrolimus sibiricus* Tschetwerikov, 1908**

Other scientific names: *Dendrolimus laricus* Tschetverikov; *Dendrolimus superans sibiricus* Tschetverikov
Lepidoptera: Lasiocampidae
Common names: Siberian silk moth
Host type: conifer
Hosts: *Larix* spp.; *Pinus* spp.

The Siberian silk moth feeds on the foliage of *Larix* and *Pinus* spp. and is considered a major pest of forests in the Russian Federation. This pest is known to have spread over 6 million hectares with outbreaks occurring recently in areas as large as 330 000 ha.

*Dendrolimus sibiricus* caterpillars cause significant defoliation of both natural and planted forests. As well as the impact on trees, the caterpillars of this moth have stinging hairs that can cause significant problems in humans. This moth, unlike a number of other tree pests, is able to attack and kill healthy plants. Other effects are the loss of vigour,

reduction in growth, reduced seed crops and tree mortality by secondary species. The life cycle of this species lasts for more than two years. Outbreaks of this moth are cyclic, occurring about every 10-11 years following a few years of drought. The period between outbreaks is becoming shorter partly due to changing climate.

The adults are strong fliers and can spread fairly rapidly. Pathways of introduction include natural movement of adults and the movement of eggs on nursery stock or forest products.
http://www.eppo.org/QUARANTINE/action_list.htm
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=45&langdisplay=english

***Ips cembrae* (Heer, 1836)**

Other scientific names: *Bostrichus cembrae* Heer, 1836; *Tomicus cembrae* (Heer, 1836); *Ips shinanoensis* Yono, 1924; *Ips cembrae* var. *engadinensis* Fuchs, 1913
Coleoptera: Scolytidae
Common names: large larch bark beetle
Host type: conifer
Hosts: *Larix* spp.; *Pinus* spp.; *Picea* spp.

Large larch bark beetles are secondary pests that attack weakened or stressed trees or trees damaged by wind. The males initiate an attack on the trees and create a chamber to which they attract several females with pheromones. The females lay eggs in tunnels which they create under the bark. They introduce fungus into the trees on which the larvae feed. There are 1 to 2 generations per year depending on climatic conditions and the nutritional condition of the tree. They usually overwinter as adults, occasionally as late instar larvae or pupae. The primary hosts are *Larix* spp. although they will attack *Picea* and *Pinus* spp. They can cause the death of trees.
http://www.eppo.org/QUARANTINE/insects/Ips_cembrae/DSIPSXCE.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=152&langdisplay=english
http://www.forestpests.org/poland/largelarchbark.html
http://www.invasive.org/browse/subject.cfm?sub=11000
http://www.forestpests.org/hungary/weevilsic.html
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=159

***Ips sexdentatus* (Börner, 1776)**

Other scientific names: *Dermestes sexdentatus* Börner; *Bostrichus pinastri* Bechstein; *Tomicus stenographus* Duftschmidt; *Ips typographus* De Geer
Coleoptera: Scolytidae
Common names: six-spined engraver beetle; six-toothed bark beetle; twelve-spined ips; pine stenographer beetle
Host type: conifer
Hosts: *Picea* spp.; *Pinus* spp.; *Larix* spp.

*Ips sexdentatus* is a secondary pest that usually attacks only stressed or weakened trees; it rarely attacks healthy, vigorously growing trees.It also occasionally attacks freshly felled trees or windthrown trees. It can significantly affect the amount of timber that is able to

be recovered from fire damaged areas because of the damage caused either by the larvae or the blue stain fungus associated with this beetle.
http://www.eppo.org/QUARANTINE/insects/Ips_sexdentatus/IPSXSE_ds.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=79&langdisplay=english
http://www.barkbeetles.org/exotic/ipsxdnts.html
http://www.invasive.org/browse/subimages.cfm?sub=887
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=162
http://www.forestpests.org/poland/sixtoothedbark.html
http://protect.forest.ru/english/en/pests/coleoptera/007.htm

### *Ips typographus* Linnaeus, 1758

Other scientific names: *Dermestes typographus* Linnaeus; *Bostrichus octodentatus* Paykull; *Ips japonicus* Niijima; *Ips sexdentatus* (Börner, 1776)
Coleoptera: Scolytidae
Common names: spruce beetle; European spruce bark beetle; spruce engraver beetle; eight-toothed spruce bark beetle
Host type: conifer
Hosts: *Abies* spp.; *Picea* spp.; *Pinus* spp.; *Larix* spp.

*Ips typographus* is considered Europe's most destructive bark beetle. These bark beetles attack trees enmass and overwhelm the defense mechanisms of the trees. They attack both stressed and healthy trees. The males initiate an attack on trees and create a chamber to which they attract several females with pheromones. The females lay eggs in tunnels which they create under the bark. They introduce fungus into the trees on which the larvae feed. There are 1 to 2 life cycles per year depending on climatic conditions and the nutritional condition of the tree.

In Europe, *Picea abies* is the main host but other species of *Picea* serve as hosts in Asia. *I. typographus* will also occasionally breed in species of *Pinus* or *Abies*.
http://www.eppo.org/QUARANTINE/insects/Ips_typographus/IPSXTY_ds.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=58&langdisplay=english
http://www.inspection.gc.ca/english/plaveg/pestrava/ipstyp/ipstype.shtml
http://ceris.purdue.edu/napis/pests/sbb/pstalert/pacanad1.html
http://www.invasive.org/browse/subject.cfm?sub=888
http://www.forestpests.org/poland/europeanspruce.html
http://www.forestpests.org/hungary/weevilsit.html
http://www.bugwood.org/barkbeetles/exotic/htypgrph.html
http://www.wcrl.ars.usda.gov/cec/insects/ipst.htm
http://www.forestry.gov.uk/forestry/HCOU-4U4J4K
http://www.cabicompendium.org/NamesLists/FC/Full/IPSXTY.htm;
http://warehouse.pfc.forestry.ca/pfc/5319.pdf.

### *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: Asian gypsy moth; gypsy moth
Host type: broadleaf and conifer
Hosts: *Betula* spp.; *Larix* spp.; *Pinus* spp.; *Populus* spp.; *Quercus* spp.; *Salix* spp.; *Ulmus* spp.

The gypsy moth is a destructive defoliator of a wide range of broadleaf trees including fruit trees and broadleaf forest trees although outbreaks generally occur on primary hosts such as oak trees (*Quercus* spp. and *Populus* spp.). Other favoured host species include *Salix, Populus*, *Betula*, *Quercus* and *Ulmus*. Outbreaks typically last for about three years and collapse when host trees are weakened to the point that they produce little or no foliage the following spring for the next generation of larvae. In some cases, high levels of parasitism can cause outbreaks to collapse. It can occur at low levels for many years without causing significant damage. However, at times there are significant outbreaks that cause severe defoliation of trees, which at times causes death. Frequently outbreaks coincide with periods when the trees are under stress.

Adults of Asian strains are capable of flight, hence dispersal over large areas is possible and the risk of introduction to new areas is increased. Females of European strains cannot fly. Young larvae can move some distance by ballooning from tops of trees. Human activities can also facilitate the movement of this pest. Some of the pathways include vehicles, camping equipment, nursery stock, ships, vehicles, and equipment that have been exposed for a period to the outdoors.
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.forestpests.org/subject.html?SUB=165
http://www.padil.gov.au/viewPest.aspx?id=342
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=342
http://www.forestry.ubc.ca/fetch21/FRST308/lab5/lymantria_dispar/gypsy.html

### *Lymantria monacha* (Linnaeus, 1758)

Other scientific names:
Lepidoptera: Lymantriidae
Common names: nun moth; tussock moth; black arches moth; black arched tussock moth
Host type: broadleaf and conifer
Hosts: *Picea* spp.; *Pinus* spp.; *Abies* spp.; *Larix* spp.; *Fagus* spp.; *Carpinus* spp.; *Betula* spp.; *Acer* spp.; *Fraxinus* spp.; *Malus* spp.; *Quercus* spp.; *Prunus* spp.

*Lymantria monacha* is a major defoliator of coniferous and deciduous trees in Europe and Asia. It shows preferences for particular species of trees, such as Scots pine, oak and Norway spruce, but the tree preference varies between areas. In the Russian Federation, nun moth larvae feed on conifers (*Picea*, *Pinus*, *Abies* and *Larix* spp.) as well as broadleaf trees (*Fagus*, *Carpinous*, *Betula*, *Acer*, *Fraxinus*, *Malus*, *Prunus*, and *Quercus* spp.). They cause significant damage to trees that they defoliate and have been known to cause tree mortality. It is known, for example, to kill up to 50 percent of Norway spruce during outbreaks. In the Russian Federation, the nun moth has damaged more than 23 million hectares of forests. These moths tend to attack monoculture stands of trees that are growing in poor conditions.

There is one generation per year. The females usually lay eggs in crevices or under bark scales however they also lay on any hard surface such as vehicles. They overwinter as eggs, hatch in spring with adults emerging in mid-summer. The young larvae feed on young foliage, often towards the top of trees, with the older larvae feeding on older foliage. Adults are strong fliers and can spread fair distances and young larvae can balloon from tree tops. Eggs may also be transported on logs, ships or vehicles.
http://www.inspection.gc.ca/english/sci/surv/data/lymmone.shtml
http://warehouse.pfc.forestry.ca/pfc/20008.pdf
http://www.na.fs.fed.us/spfo/pubs/pest_al/nunmoth/nun_moth.shtm
http://tncweeds.ucdavis.edu/products/gallery/lymmo1.html
http://www.affa.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060A1B01691
http://www.forestryimages.org/browse/subimages.cfm?SUB=4059
http://www.forestpests.org/poland/nunmoth.html
http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=304

***Monochamus urussovi* (Fischer von Waldheim, 1806)**

Other scientific names:
Coleoptera: Cerambycidae
Common names: black spruce beetle
Host type: conifer
Hosts: *Abies* spp.

*Monochamus urussovi* is a wood-boring insect that occurs in the Russian Federation. Outbreaks have been known to affect areas as large as 300 000 hectares in the Russian Federation and is one of the most destructive insects in this region.

These insects tend to attack trees already under stress. Upon emergence, the adults feed on the bark of twigs and branches to mature which can cause stress in trees if the population of adults is sufficiently high. The adult feeding inoculates the trees with spores of blue-stain fungus upon which the larvae feed. The adult beetles act as vectors of the fungus by carrying spores on their bodies as they emerge from the larval host trees. Larval feeding produces feeding tracks on the sapwood under the bark and bore holes into the wood which decreases the value of the wood.
http://www.invasive.org/symposium/baranchi.html
http://protect.forest.ru/english/en/pests/coleoptera/002.htm
http://www.zin.ru/Animalia/Coleoptera/eng/monuruob.htm
http://www.uochb.cas.cz/~natur/cerambyx/monochur.htm

***Tetropium castaneum* (Linneaus)**

Other scientific names: *Lsarthron castaneum* Linneaus; *Tetropium luridum* Gyllenhal
Coleoptera: Cerambycidae
Common names: black spruce beetle; black spruce longhorn beetle; European spruce longhorn beetle
Host type: conifer
Hosts: *Abies* spp.

*Tetropium castaneum* attacks trees enmass and overwhelm the defense mechanisms of the trees. They attack both stressed and healthy trees. The males initiate an attack on trees and create a chamber to which they attract several females with pheromones. The females lay eggs in tunnels which they create under the bark. They introduce fungus into the trees on which the larvae feed. There are 1 to 2 life cycles per year depending on climatic conditions and the nutritional condition of the tree.
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=123&langdisplay=english
http://www.invasive.org/browse/subject.cfm?sub=4116
http://www.forestpests.org/poland/blackspruce.html
http://www.forestpests.org/hungary/longhorntc.html
http://www.wcrl.ars.usda.gov/cec/insects/ipst.htm

***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.; *Picea* spp.; *Pseudotsuga menziesii*; *Larix* spp.

*Tomicus piniperda* tends to attack the crowns of stressed or weakened trees as well as recently cut or fallen trees. The most damage is done by the adult beetles when they are feeding for maturation which can cause stunting and malformation of trees hence reducing its commercial value. When shoot feeding is severe, tree height and diameter growth is reduced. This beetle has one generation per year in cooler areas and two in warmer climates. It overwinters in dead twigs and branches.
http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=86&langdisplay=english
http://www.na.fs.fed.us/spfo/pubs/pest_al/shootbeetle/shootbeetle.htm
http://www.forestryimages.org/browse/subimages.cfm?SUB=980
http://www.barkbeetles.org/browse/subject.cfm?SUB=980
http://www.invasive.org/publications/aphis/fspsb.pdf
http://www.barkbeetles.org/exotic/tmcspnpe.html
http://www.forestpests.org/poland/commonpine.html
http://www.forestpests.org/hungary/weevilstp.html
http://www.inspection.gc.ca/english/plaveg/pestrava/tompin/tompine.shtml

***Xylotrechus altaicus* (Gebler, 1836)**

Other scientific names: *Xyloclytus altaicus* Gebler
Coleoptera: Cerambycidae
Common names: Altai longhorn beetle; Altai larch cerambycid; Altai larch longhorn beetle
Host type: conifer
Hosts: *Larix* spp.; *L. sibirica*; *L. gmelinii*; *L. olgensis*; *L. kamtschatica*

The Altai larch cerambycid is one of the most important pests of *Larix* spp. in the region of its present distribution. It feeds on *Larix* species and has been recorded from *Larix*

*sibirica*; *L. gmelinii*, *L. olgensis* and *L. kamtaschatica*. It attacks slightly stressed and healthy trees of different ages and continues to damage the same trees during several consecutive years causing their death. It takes two years to complete one generation. The eggs are laid in slits created by the adult female in the bark. The young larvae feed on the bark and cambium; this feeding can ring bark a tree. The older larvae feed on the timber of the trees such that even if the attack by the beetle does not kill the tree it significantly degrades the timber value. Prior to pupating the last instar larvae create a chamber just below the surface of the tree where pupation takes place. Several generations can attack the same tree. The adults tend not to fly long distances, however are known to fly up to distances of 30km.
http://www.eppo.org/QUARANTINE/insects/Xylotrechus_altaicus/DSXYLOAL.pdf
http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=46&langdisplay=english
http://www.invasive.org/browse/subimages.cfm?sub=4099

***Zeiraphera diniana* (Geunee, 1845)**

Other scientific names:
Lepidoptera: Tortricidae
Common names: dingy bell larch; larch bud moth; grey larch moth
Host type: conifer
Hosts: *Larix* spp.; *Pinus* spp.; *Picea* spp.

The larch moth is a small grey moth whose caterpillars feed on the needles of coniferous trees, particularly young needles. To feed they web the needles together incorporating needle remnants that are left over from feeding. The damage that occurs to the trees does not necessarily kill the trees but causes the trees to branch and change form that often reduces the value of the timber. Other affects include reduction in growth, lower levels of seed production and stress affects that make the trees that have been attacked more susceptible to attack by secondary invasives.

They over winter as eggs with hatching occuring in spring; the hatching time depends on climate conditions. They are found from around July through to September and in some areas are common in spruce plants. Large outbreaks of this species have occurred in Poland and can cause significant damage. At times this insect suffers from viral outbreaks which can cause up to 50 percent reduction in populations. In some areas the adults are thought to be migratory. There appear to be cyclic population fluctuations that occur over 8-10 years.

There have been problems with the usage of the scientific name for this species which were resolved by Benz (1991) where *Zeiraphera griseana* is a nomen dubium hence not available for use.
http://www.insectimages.org/browse/subimages.cfm?SUB=13405
http://www.entom.unibo.it/Insetti%20Alberi/Larice/Z_griseana.htm
http://ip30.eti.uva.nl/bis/tortricidae.php?selected=beschrijving&menuentry=soorten&id=280

## *Introduced insects*

No information was available on introduced insects affecting planted forests in the Russian Federation.

## Diseases

### *Indigenous diseases*

***Gremmeniella abietina* (Lagerberg) Morelet**

Other scientific names: *Ascocalyx abietina* (Lagerberg) Schalpfer; *Crumenula abietina* Lagerberg; *Lagerbergia abietina* (Lagerberg) J. Reid; *Scleroderris abietina* (Lagerberg) Gremmen; *Scleroderris lagerbergii* Gremmen; *Brunchorstia pinea* (P. Karsten) Höhnel (anamorph); *Brunchorstia destruens* Eriksson (anamorph synonym); *Brunchorstia pini* Allescher (anamorph synonym); *Excipulina pinea* P. Karsten (anamorph synonym); *Septoria ponea* P. Karsten (anamorph synonym)
Ascomycetes: Helotiaceae
Common names: Brunchorstia disease (in Europe); scleroderris canker (in USA)
Host type: conifer
Hosts: *Abies* spp.; *Pinus* spp.; *Picea* spp.

*Gremmeniella abietina* is possibly the causal agent responsible for affecting nearly half a million hectares of conifers in the Russian Federation. The fungus enters via wounds on the tree and causes decline of the trees. The extent of outbreaks depends on weather conditions as well as the health status of the trees. *G. abietina* is indigenous to Europe and has spread to parts of eastern North America and Japan.
http://www.eppo.org/QUARANTINE/fungi/Gremmeniella_abietina/GREMAB_ds.pdf
http://www.inspection.gc.ca/english/plaveg/pestrava/greabi/greabie.shtml
http://www.cfl.scf.rncan.gc.ca/imfec-idecf/fichemaladie_e.asp?id=7
http://www-ssko.slu.se/ForskOmr/GremPHa1.htm

### *Introduced diseases*

No information was available on introduced diseases affecting planted forests in the Russian Federation.

## Other pests

### *Indigenous other pests*

No information was available on other indigenous pests (i.e. mites, nematodes, mammals, etc.) affecting planted forests of the Russian Federation.

### *Introduced other pests*

No information was available on other introduced pests (i.e. mites, nematodes, mammals, etc.) affecting planted forests of the Russian Federation.

### Diebacks and other conditions

No records were available for diebacks and other conditions affecting planted forests in the Russian Federation.

## *Capacity for forest health protection*

### Government level

The Ministry of Natural Resources (MNR) manages 95 percent of the total area of the Russian Federation's forests. The remaining part is managed by other ministries and agencies (Anonymous, 2003).

### Monitoring and detection

Monitoring activities are carried out to detect pests, diseases and other damage agents and to assess the health and condition of the forests. Monitoring is undertaken in areas where there are large outbreaks of pests, areas significantly affected by abiotic factors (e.g. fire, wind, snow) and areas affected by industrial pollution. The average annual survey area is typically around 8 million hectares with further monitoring undertaken as required to assess the affects of very significant pest outbreaks (Anonymous, 2003).

In 1993, a cooperative monitoring programme was initiated by the Russian Federation and the United States to determine population levels of three forest defoliators in port areas of the Russian Far East: *Lymantria dispar*; *L. monacha*; and *L. mathura*. The purpose of the monitoring was to develop a database to determine infestation levels and risk of importing populations of these insects from ports in the Russian Far East to North America. Monitoring consisted of surveys of larvae, pupae and egg masses in forested areas near the ports and adult and egg mass surveys in the port areas (Munson *et al.*, 1995).

### Data management

The veracity of data that are available on insect and disease conditions over much of the Russian Federation is unclear. In 2002, there were vast insect and disease outbreaks over areas of 10.3 million ha and 1.1 million ha respectively. Forests of highly populated and industrialized territories of the European-Ural Mountains part of Russia are more susceptible to pests and diseases than are the more remote forest areas (Anonymous, 2003). As a result, the total area affected by outbreaks of insects and diseases is considerably larger in these areas.

### Pest management

Biological and chemical insecticides are widely used as either a ground or aerial method to control outbreaks. Usually, the area where insect and disease suppression measures are conducted is much smaller than the area of an outbreak itself (Anonymous, 2003).

### Private landowners

There are no private forest landowners in the Russian Federation (Anonymous, 2003).

## References

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**Food and Agriculture Organization of the United Nations (FAO).** 2004. *International Standards for Phytosanitary Measures #5: Glossary of phytosanitary terms (2004): terms, definitions and supplements (ISPM#5).* Rome, Italy. Available at: https://www.ippc.int/id/13399?language=en https://www.ippc.int/servlet/BinaryDownloaderServlet/76431_ISPM_05_2004_English.pdf?filename=1118414766488_English_final_c.pdf&refID=76431

**FAO.** 2006. *Global Forest Resources Assessment 2005 – progress towards sustainable forest management*. Forestry Paper No. 147. Rome, Italy. Available at: http://www.fao.org/docrep/008/a0400e/a0400e00.htm

**Munson, A.S., Leonard, D., Mastro, V., McGovern, T., Levy, J. & Kucera, D.** 1995. *Russian Far East Lymantriid monitoring project, project summary 1993-1994.* USDA Forest Service, Intermountain Region, Ogden, UT, FPM Report 95-02, 34 pp.

## Index

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