



# Forestry Department

Food and Agriculture Organization of the United Nations

## Forest Health & Biosecurity Working Papers

### OVERVIEW OF FOREST PESTS

### REPUBLIC OF MOLDOVA

January 2007

**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<sup>1</sup> situation in the Republic of Moldova. 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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<sup>1</sup> 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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Information for the Republic of Moldova was compiled by B. Moore.

## REPUBLIC OF MOLDOVA

### **Introduction**

The Republic of Moldova is sparsely wooded and deficient in forest resources. The area of forest (329 000 ha) accounts for 10 percent of the total land area, which is considerably less than in other European countries (FAO, 2006). Other wooded lands cover 31 000 ha (FAO, 2006). The area of forest per capita is only 0.1 ha. Given the ruggedness of the terrain, the low proportion of forest area, the high level of soil erosion, the aridity of the climate and the high population density, forests in Moldova are very important, both ecologically and socially. Two-thirds of the forest is available for wood supply, while most of the remainder is reserved for nature conservation and protection, particularly soil protection against erosion; land degradation is a major problem throughout the country. In order to preserve rare species of plants and wild animals and the most valuable of forest habitats, the country has established national nature reserves, game reserves, natural monuments, especially valuable forest with meadow vegetation, and ancient trees.

Virtually all the forest area is classed as semi-natural, with a small area of plantations (1 000 ha), notably to address erosion; there are no remaining areas of forest undisturbed by humans (FAO, 2006). Broadleaved species account for all but a small part of the volume of growing stock, with oak species alone making up about half. Other important species are beech, hornbeam, maple, ash, lime, birch, aspen, poplar and false acacia, the latter being an introduced species. Pine and spruce species make up a small percentage of forest tree species. Most forest stands fall in the middle and younger age categories. As a result of the privatization of land, forest lands are being redistributed, but all forest is owned by the State.

The geographical distribution of forests is extremely uneven. Most are concentrated in the centre; Codri (Straseni, Calrasi, Hîncesti, Orheiu, Nisporeny districts), where 17 to 31 percent of the land is wooded. The least wooded districts are in the Balti and Budzhak areas and in the south-eastern Dniester basin (Drochia, Floresti, Grigoriopol, Taraclia and other districts), where the proportion of wooded land is no more than 0.6-4 percent. As a result of deterioration in the overall economic situation in the country and competing needs in areas such as health and infrastructure, there has been a decline in national and local level attention to environmental protection and management, including neglect in the management of forest resources.

Poorly managed and physiologically weak forests are susceptible to biotic and abiotic agents. This susceptibility coupled with frequent droughts and severe winters with low snowfall encourage periodic outbreaks of infestation and disease. Complex centres of infestation develop in the country's forests. Pest problems include winter moth (*Operophtera brumata*), mottled umber moth (*Erannis defoliaria*) and other species of loopers, tortricids (green oak-roller moth (*Tortrix viridana*) and other species), gypsy moth (*Lymantria dispar*) and slimy ash weevil (*Stereonychus fraxini*). In recent years, pure, single-species stands of *Robinia* and *Fraxinus* without understorey have been severely damaged; the annual area of clear felling resulting is about 2 000 ha.

Monitoring of the forests started in 1985, and the average annual area infested with leaf-eating pests was estimated between 50-70 000 ha (16-22 percent of wooded land), of

which 30-40 000 ha needed to be treated. At the beginning of 1999 the area affected by leaf-eating pests was estimated to be almost 96 000 ha, making 1998-1999 some of the worse outbreak years (FAO, 2005). The damage caused by leaf-eating pests has been estimated to contribute up to 60-90 percent losses of annual growth in standing trees, which corresponds to a total of 200 000 m<sup>3</sup>.

In 1999 of a total of 50 000 ha in need of treatment it has only been possible to spray 1 200 ha of high value flood plain forest, due to financial constraints. The present method of pest control involves aerial spraying using environmentally questionable products and inefficient, out of date equipment which undoubtedly contributes to both economic losses and environmental pollution.

Trees take more than one year to recover, and while stressed by defoliation, are more vulnerable to attack from pathogens. Thus the continuous progressive defoliation of the forest by leaf feeding insects experienced in the Republic of Moldova has led to a serious decline in the health of the trees with subsequent loss in wood volume and economic returns vital to the country's economy.

## **Forest pests**

### **Naturally regenerating forests**

#### **Insects**

##### ***Indigenous insects***

###### ***Archips crataegana* (Hübner, 1799)**

Other scientific names:

Lepidoptera: Tortricidae

Common names: brown oak tortrix; leaf roller

Host type: broadleaf

Hosts: *Quercus* spp.; *Ulmus* spp.; *Fraxinus* spp.; *Salix* spp.

*Archips crataegana* is a defoliator of broadleaf trees including oak, elm, ash and willow. Larvae feed in a tightly-rolled leaf. In the Republic of Moldova, *A. crataegana* and other species of tortricids such as *A. xylosteana* and *Pandemis cerasana* were associated with outbreaks of *Tortrix viridana*. Moths in the family Tortricidae are strong fliers and for some tortricid species, the first-instar larvae are transported on silken threads by air currents and wind.

<http://www.fao.org/forestry/site/20528/en/mda>

<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>

<http://www.insectimages.org/browse/subimages.cfm?SUB=13152>

<http://ukmoths.org.uk/show.php?bf=979>

###### ***Archips xylosteana* (Linnaeus, 1758)**

Other scientific names: *Archips xylosteana* (Carter 1984); *Cacoecia xylosteana* (Zhang 1994); *Tortrix xylosteana* (Zhang 1994)

Lepidoptera: Tortricidae

Common names: brown oak tortrix; variegated golden tortrix; apple leaf roller

Host type: broadleaf

Hosts: *Quercus* spp.; *Ulmus* spp.; *Acer* spp.; *Fraxinus* spp.

*Archips xylosteana* is a defoliator of a wide range of broadleaf trees including oak, elm, maple and ash species. Larvae are omnivorous and are known to damage orchard, ornamental and forest trees. In the Republic of Moldova, *A. xylosteana* and other species of tortricids such as *A. crataegana* and *Pandemis cerasana* were associated with outbreaks of *Tortrix viridana*. Moths in the family Tortricidae are strong fliers and for some tortricid species, the first-instar larvae are transported on silken threads by air currents and wind.

<http://www.fao.org/forestry/site/20528/en/mda>

<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>

<http://www.insectimages.org/browse/subimages.cfm?SUB=12405>

[http://cphst.aphis.usda.gov/npag/docs/Archips\\_xylosteanus\\_Datasheet\\_060126.pdf](http://cphst.aphis.usda.gov/npag/docs/Archips_xylosteanus_Datasheet_060126.pdf)

[http://cphst.aphis.usda.gov/npag/docs/Archips\\_xylosteanus\\_NPAG\\_et\\_Report\\_060505.pdf](http://cphst.aphis.usda.gov/npag/docs/Archips_xylosteanus_NPAG_et_Report_060505.pdf)

<http://ukmoths.org.uk/show.php?bf=980>

### ***Erannis defoliaria* (Clerck, 1759)**

Other scientific names: *Hybernia defoliaria* (Clerck)

Lepidoptera: Geometridae

Common names: mottled umber moth

Host type: broadleaf

Hosts: *Quercus* spp.

*Erannis defoliaria* can cause severe defoliation of trees and successive defoliations over several years can cause growth loss, branch dieback and eventual tree mortality. In the Republic of Moldova, it was found that *Erannis defoliaria* created local outbreaks in all forest vegetation zones of the country to differing degrees. During the major outbreak of defoliators in 2000, 200 ha of forests had a low degree of threat of defoliation, 4 900 ha a medium degree of threat and 300 ha a high degree of threat.

This insect occurs throughout Europe, from the British Isles, north to Norway, Sweden and Finland, east to Russia and the Republic of Georgia. It was introduced into North America on the Pacific side many years ago.

*E. defoliaria* has one generation a year. Adults are active in autumn (October). After mating, females, which are wingless, crawl up the host trees and deposit eggs, either singly or in small groups in bark crevasses, under moss or in other sheltered places. Individual females can lay 300-400 eggs. Eggs are the overwintering stage. The larvae hatch in the spring and feed openly on the buds and foliage of host trees. Later they bind leaves together with silken webbing. When the larvae are not actively feeding, they remain inside this shelter. Pupation occurs in the soil.

Since adult females are wingless and incapable of flight, the major agent of dispersal is ballooning of early instar larvae by air currents. This insect could also be spread over long distances by egg masses hidden in logs destined for export.

<http://www.fao.org/forestry/site/20528/en/mda>

<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>  
<http://www.invasive.org/browse/subject.cfm?sub=9719>  
<http://www.spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=160&langdisplay=english>

***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.fao.org/forestry/site/20528/en/mda>  
<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>  
<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=11&langdisplay=english>  
<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](http://www.forestry.ubc.ca/fetch21/FRST308/lab5/lymantria_dispar/gypsy.html)

***Operophtera brumata* Linnaeus, 1758**

Other scientific names: *Cheimatobia brumata* Linnaeus; *Phalaena brumata* Linnaeus

Lepidoptera: Geometridae

Common names: winter moth; common winter moth; European winter moth; small winter moth; winter bud moth w w



Host type: broadleaf

Hosts: *Quercus* spp.

In the Republic of Moldova, outbreaks of *Operophtera brumata* affected an area of 14 200 ha, of which 4 000 ha had a low degree of threat of defoliation, 9 700 ha a medium degree of threat and 500 ha a high degree of threat. *O. brumata* feeds on a variety of deciduous trees and shrubs including apricot, cherry, apple, plum, blueberry, crabapple, sweet chestnut, red currant and black currant, oaks, maples, basswood and white elm.

Young larvae tunnel into and feed inside buds, especially on fruit trees (apple, blueberry, cherry, and crabapple) in the early spring before bud break. These caterpillars move from bud to bud as they feed. Delayed bud opening due to cool weather conditions can lead to bud death as the caterpillars have longer time to feed. Older larvae feed in the expanding leaf clusters and are capable of creating defoliation in high populations. Sometimes the larvae occur in great numbers, reaching pest status and occasionally completely defoliating small trees.

<http://www.fao.org/forestry/site/20528/en/mda>

<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>

<http://www.inra.fr/hyppz/RAVAGEUR/6opebru.htm>

<http://www.invasive.org/browse/subimages.cfm?sub=8671>

<http://ukmoths.org.uk/show.php?bf=1799>

[http://www.umassgreeninfo.org/fact\\_sheets/defoliators/winter\\_moth.pdf](http://www.umassgreeninfo.org/fact_sheets/defoliators/winter_moth.pdf)

<http://www.massnrc.org/pests/pestFAQsheets/winter%20moth.html>

### ***Pandemis cerasana* (Hübner, 1786)**

Other scientific names: *Cheimatobia brumata* Linnaeus; *Phalaena brumata* Linnaeus

Lepidoptera: Tortricidae

Common names: leaf roller; barred fruit tree tortrix; fruit tree tortrix

Host type: broadleaf

Hosts: *Quercus* spp.

*Pandemis cerasana* feeds on many species of deciduous trees, especially fruit trees. In the Republic of Moldova, *P. cerasana* and other species of tortricids such as *Archips crataegana* and *A. xylosteana* were associated with outbreaks of *Tortrix viridana*.

<http://www.invasive.org/browse/subject.cfm?sub=9349>

<http://www.fao.org/forestry/site/20528/en/mda>

<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>

<http://www.inra.fr/hyppz/RAVAGEUR/6pancer.htm>

<http://ukmoths.org.uk/show.php?bf=970>

### ***Stereonychus fraxini***

Other scientific names:

Coleoptera: Curculionidae

Common names: slimy ash weevil; ash weevil

Host type: broadleaf

Hosts: *Fraxinus excelsa*

A weevil, *Stereonychus fraxini*, is a pest of ash, *Fraxinus excelsa*. Both the larvae and adults feed on the foliage. This insect is a particular pest in forests where 40 percent or more of the forest is comprised of ash.

<http://www.fao.org/forestry/site/20528/en/mda>  
<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>

### ***Tortrix viridana* Linnaeus, 1758**

Other scientific names: *Phalaena viridana* Linnaeus; *Phalaena tortrix viridana* Linnaeus, 1758; *Tortrix viridana coeruleana* Sorhagen, 1881; *Tortrix suttneriana* Denis & Schiffermüller, 1775; *Tortrix viridana* (f.) *flavana* Zincken, 1821; *Tortrix viridana* f. *pflegeriana* Vlach, 1942

Lepidoptera: Tortricidae

Common names: European oak leaf roller; oak leaf roller; green oak leaf roller; green oak tortrix; pea-green oak curl moth

Host type: broadleaf

Hosts: *Quercus* spp.

*Tortrix viridana* was the most widespread species in the Republic of Moldova during the major outbreak of defoliators in 2000. It was responsible for all outbreaks in all forest zones. The total area affected was about 55 800 ha, of which 19 800 ha had a low degree of threat of defoliation (up to 29 percent), 24 800 ha a medium degree of threat (30-60 percent) and 11 200 ha a high degree of threat (61 percent and above).

*T. viridana* reaches outbreak levels in the same forest regions as does the gypsy moth but outbreaks are more localized and defoliation can be more intense. Repeated defoliation can cause growth loss, dieback and tree death and alter species composition in favour of non-host species. Outbreak cycles are poorly defined and chronic infestations can occur. Several species of caterpillars of the family Geometridae are often associated with oak leaf roller including *Erannis defoliaria* and *Operophtera brumata*.

<http://www.fao.org/forestry/site/20528/en/mda>  
<http://www.fao.org/docrep/007/y5507e/y5507e07.htm>  
<http://www.invasive.org/browse/subimages.cfm?sub=9319>  
<http://www.cabicompendium.org/NamesLists/FC/Full/TORTVI.htm>  
<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=162&langdisplay=english>

### **Introduced insects**

#### ***Cameraria ohridella* Deshka and Dimic**

Other scientific names:

Lepidoptera: Gracillariidae

Common names: horse chestnut leaf miner

Host type: broadleaf

Hosts: *Aesculus hippocastanum*

Horse chestnut is a popular ornamental and street tree in both Europe and parts of North America. In Europe, this tree had few health problems until the appearance of *Cameraria ohridella* whose larvae mine within the leaves of horse chestnut causing significant

damage. Severely damaged leaves shrivel and turn brown by late summer and fall early, well before normal leaf fall in the autumn making ornamental trees unsightly. There is no evidence from Europe that trees have died or shown a progressive decline in health as a direct consequence of attack by *C. ohridella*.

Up to 700 leaf mines have been recorded on a single leaf under favourable conditions. Once established, the population density increases rapidly within one to two years. Population densities increase so rapidly that many trees are completely infested with up to several hundred miners per leaf at the end of the first generation in late June. In extreme cases up to 700 young miners per leaf with 200-300 young larvae per leaflet can be found during the first generation of the moth.

The horse chestnut leaf miner was first observed in Macedonia in northern Greece in the late 1970s. In 1989, it appeared in Austria and has since spread throughout central and Eastern Europe. Its current distribution includes Belgium, Denmark, Germany, The Netherlands, Poland, southern Sweden and the central European countries, and is currently spreading west through France and south through Italy. Since 2002 it has been reported from Spain, Albania, Turkey, Ukraine, Moldova, Belarus and western Russia.

Dispersal of the moth from infested areas occurs on a broad front through adult flight, assisted by the wind, and through the passive transport of adult moths or infested leaves in or on cars and other vehicles. Transportation by vehicles appears to be responsible for the sudden appearance of the moth in towns and cities a long way from known areas of infestation.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=165&langdisplay=english>  
[http://www.eppo.org/QUARANTINE/Alert\\_List/deleted%20files/insects/Cameraria\\_ohridella.doc](http://www.eppo.org/QUARANTINE/Alert_List/deleted%20files/insects/Cameraria_ohridella.doc)  
<http://www.invasive.org/browse/subject.cfm?sub=10971>  
<http://www.forestresearch.gov.uk/fr/INFD-68JJRC>  
[http://www.forestresearch.gov.uk/pdf/horsechestnut.pdf/\\$FILE/horsechestnut.pdf](http://www.forestresearch.gov.uk/pdf/horsechestnut.pdf/$FILE/horsechestnut.pdf)  
<http://ukmoths.org.uk/show.php?bf=366a>  
[http://www.cameraria.de/MAIN/cameraria\\_e.html](http://www.cameraria.de/MAIN/cameraria_e.html)

### ***Hyphantria cunea* Drury**

Other scientific names: *Hyphantria textor* (Harris)

Lepidoptera: Arctiidae

Common names: fall webworm; mulberry moth; black-headed webworm; red-headed webworm; American white moth

Host type: broadleaf

Hosts: *Betula* spp.; *Salix* spp.; *Prunus virginiana* var. *demissa*; *Populus deltoides*

The North American fall webworm, *Hyphantria cunea*, is a major pest of trees in Europe and Asia. It was reported as spreading into the Republic of Moldova though information on damage and distribution was unavailable (CBD, 2002). This insect is a late summer, tent-making defoliator of broadleaf trees and shrubs including birch, willow, western chokecherry, and cottonwood. Fruit and nut trees are also common hosts.

The larvae are gregarious defoliators which share and continually expand the web under which they shelter. In severe infestations, larvae may defoliate entire trees. Young larvae

feed upon the upper and lower leaf surfaces, leaving the veins. Larger larvae will consume the whole leaf.

Fall webworm is primarily a pest of open, roadside or orchard trees and is not often found in forests. However, shade trees and ornamentals can be heavily defoliated and the presence of the large, numerous, unsightly webs can make them aesthetically detracting. The extensive tents or webs, for which the insect is named, may be numerous on one or more trees at a locality. Persistent infestations of individual trees may cause limb and branch dieback.

<http://www.vaxteko.nu/html/sll/eppo/EDS/E-HYPHCU.HTM>

<http://www.bugwood.org/factsheets/webworm.html>

<http://www.forestryimages.org/browse/subthumb.cfm?sub=158>

[http://www.forestry.ubc.ca/fetch21/FRST308/lab5/hyphantria\\_cunea/webworm.html](http://www.forestry.ubc.ca/fetch21/FRST308/lab5/hyphantria_cunea/webworm.html)

<http://warehouse.pfc.forestry.ca/pfc/2201.pdf>

<http://www.ento.vt.edu/~sharov/insect/webworm.html>

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

<http://ohioline.osu.edu/hyg-fact/2000/2026.html>

## Diseases

### **Indigenous diseases**

#### ***Microsphaera abbreviata* Peck (1876)**

Other scientific names:

Ascomycota: Erysiphaceae

Common names: powdery mildew; powdery oak mildew

Host type: broadleaf

Hosts: *Quercus* spp.

During the outbreaks of defoliators in 2000, an infestation of *Microsphaera abbreviata* on oak standings was also reported to be intensifying over an area of about 40 000 ha.

<http://www.fao.org/forestry/site/20528/en/mda>

<http://www.forestryimages.org/browse/subimages.cfm?sub=12129>

### **Introduced diseases**

No records were available of introduced diseases affecting naturally regenerating forests in the Republic of Moldova.

## Other pests

### **Indigenous other pests**

No records were available of other indigenous pests (i.e. mites, nematodes, mammals, etc.) affecting naturally regenerating forests in the Republic of Moldova.

### **Introduced other pests**

***Cervus nippon* Temminck, 1838**

Other scientific names:

Artiodactyla: Cervidae

Common names: Sika deer; Japanese deer

Host type: broadleaf

Hosts:

*Cervus nippon* is primarily a forest-dwelling deer that particularly prefers forested areas with a dense understory (Nowak 1991). However, these animals are able to adapt quite well to a variety of other habitats such as freshwater marshes (Maryland) and grasslands. It was reported as spreading within the Republic of Moldova though information on damage and distribution was unavailable (CBD, 2002). There is concern about the interbreeding of *Cervus nippon* with two *Cervus elaphus* and subsequent spread of the offspring throughout a designated conservation area.

Sika deer prefer forested habitat with a dense understorey but will inhabit a range of environments including woodland, open grassland, swamps and human-modified pastures. They are highly adaptable feeders and can be either grazers or browsers in response to the situation at hand. A sika deer's diet can include marsh grasses, fallen leaves, trees, brushy vegetation, herbs, fungi, bamboo, ferns and poison ivy depending on environmental conditions. They also feed on crops such as soya beans, corn, oats and pasture grass and cause significant browsing damage to forestry plantations.

The natural distribution of the sika deer is described as the southern Ussuri district of eastern Siberia, China, Taiwan, Japan, Korea, Manchuria, and parts of northern Vietnam. In addition, there have been numerous introductions resulting in established populations in Australia, Austria, Czechoslovakia, Denmark, France, Germany, Ireland, Jolo Island (south of the Philippines), New Zealand, Poland, the Russian Federation and adjacent independent republics, Switzerland, United Kingdom and Ireland and the USA.

<http://www.nsrl.ttu.edu/tmot1/cervnipp.htm>

[http://animaldiversity.ummz.umich.edu/site/accounts/information/Cervus\\_nippon.html](http://animaldiversity.ummz.umich.edu/site/accounts/information/Cervus_nippon.html)

<http://www.iucnredlist.org/search/details.php/41788/summ>

***Dama dama* (Linnaeus, 1758)**

Other scientific names:

Artiodactyla: Cervidae

Common names: fallow deer

Host type: broadleaf

Hosts:

*Dama dama* was reported as spreading in the Republic of Moldova though information on damage and distribution was unavailable (CBD, 2002).

<http://www.iucnredlist.org/search/details.php/42188/all>

***Nyctereutes procyonoides* (Gray, 1834)**

Other scientific names:

Carnivora: Canidae

Common names: raccoon dog

Host type: broadleaf

Hosts:

*Nyctereutes procyonoides* is native to eastern Siberia, northern China, North Vietnam, Korea, and Japan. The species has been widely introduced and is now widespread in northern and Eastern Europe, thriving in moist forests with abundant undergrowth. It was reported as spreading into the Republic of Moldova though information on damage and distribution was unavailable (CBD, 2002).

The raccoon dog is an opportunistic omnivore. On land, it hunts insects, small rodents, amphibians, birds, eggs, mollusks, snakes and lizards. It also fishes in lakes, rivers and streams using its paws to scoop prey out of the water. also eat plant material including stems, roots, leaves, bulbs, fruits, nuts berries, and seeds according to the season and location.

[http://animaldiversity.ummz.umich.edu/site/accounts/information/Nyctereutes\\_procyonoides.html](http://animaldiversity.ummz.umich.edu/site/accounts/information/Nyctereutes_procyonoides.html)

<http://www.iucnredlist.org/search/details.php/14925/all>

## **Diebacks and other conditions**

No records were available for diebacks and other conditions affecting the naturally regenerating forests of the Republic of Moldova.

## **Planted forests**

### **Insects**

#### ***Indigenous insects***

No information was available on indigenous insects affecting the planted forests of the Republic of Moldova.

#### ***Introduced insects***

No information was available on introduced insects affecting the planted forests of the Republic of Moldova.

### **Diseases**

#### ***Indigenous diseases***

No information was available on indigenous diseases impacting the planted forests of the Republic of Moldova.

#### ***Introduced diseases***

No information was available on introduced diseases impacting the planted forests of the Republic of Moldova.

## **Other pests**

### ***Indigenous other pests***

No information was available on indigenous other pests (e.g. mites, nematodes, mammals, etc.) impacting the planted forests of the Republic of Moldova.

### ***Introduced other pests***

No information was available on introduced other pests (e.g. mites, nematodes, mammals, etc.) impacting the planted forests of the Republic of Moldova.

## **Diebacks and other conditions**

No records were available for diebacks and other conditions affecting the Republic of Moldova's planted forests.

## ***Capacity for forest health protection***

### **Government level**

The Republic of Moldova State Forestry Agency "Moldsilva" is responsible for management of the State forested lands. Moldsilva manages approximately 87 percent of Moldova's forests. Municipalities or agricultural farms manage the rest but depend on Moldsilva for management direction.

Moldsilva has an exceptionally strong forest protection programme with highly skilled staff. Personnel at the Forest Protection Station annually monitor forest health conditions throughout the country. Decision-making and planning for possible treatments are based on the severity of current damage, hazard rating of forest stands and available resources. The organizational structure for forest health monitoring and the survey intensity exceed those in the United States. However, financial constraints and outdated application equipment have limited an effective response to large-scale outbreaks.

### **Monitoring and detection**

Personnel at the Forest Protection Station annually monitor forest health conditions throughout the country.

### **Data management**

A database for long-term management of the forests to update and complement existing systems has been developed in response to the outbreak of defoliators in 2000. This addresses the need to monitor pest situations on a continuing basis to allow interventions at an early stage if problems arise.

### **Pest management**

In 2000, in response to the outbreak of defoliators, aerial application was carried out on 24 100 ha of affected forest areas. The forest stands were sprayed with preparation Dimilin 25WP, mixed with Ikar 95 EC oil sticker. The aerial spray treatment of forests

successfully suppressed outbreaks of forest defoliators with a 96-98 percent efficacy. These operations thus prevented significant defoliation of forests and decreased the possibility of transboundary transfer.

## Private landowners

All forests are state property in the Republic of Moldova.

## References

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<http://www.fao.org/docrep/008/a0400e/a0400e00.htm>

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

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