Observatree
monitoring tree health

Field Identification Guide

Pine processionary moth

Photograph: Mat Holloway, Observatree volunteer

Forest Research
Llywodraeth Cymru Welsh Assembly Government
Scottish Forestry Coilltearachd na h-Alba
fera
Forestry Commission
National Trust
WOODLAND TRUST
Animal & Plant Health Agency
Department for Environment Food & Rural Affairs

Pine processionary moth

The caterpillars (larvae) of the pine processionary moth (PPM) (*Thaumetopoea pityocampa*) can threaten the health of pine trees (*Pinus* species) by feeding on their needles. Large populations cause extensive defoliation of pine trees, leaving them vulnerable to attack by other pests and diseases, and less able to withstand adverse environmental events such as floods and droughts. Timber production and tree growth can be reduced as a result of attack. The caterpillars are also a significant public and animal health risk, as they bear toxic hairs which can cause itching skin rashes, eye and throat irritation and breathing problems. Hence it is important not to approach or touch the caterpillars, or their nests.

Species affected	The main hosts for PPM are pine trees with our native Scots pine (*Pinus sylvestris*) and the widely planted Corsican pine (*P. nigra* ssp. *laricio*) being at the greatest risk from this pest in the UK. Other species that are susceptible include the Aleppo pine (*P. halepensis*), Austrian pine (*P. nigra*), Canary Island pine (*P. canariensis*), lodgepole pine (*P. contorta*), maritime pine (*P. pinaster*), Monterey pine (*P. radiata*) and stone pine (*P. pinea*). The Atlas cedar (*Cedrus atlantica*) and European larch (*Larix decidua*) are also occasionally attacked.
Signs and symptoms	The main indicator of PPM attack is the presence of nests that are constructed by the caterpillars amongst the branches and foliage of pine trees. The caterpillars start to build the nests shortly after hatching. By late autumn to early winter the nests can become very conspicuous because they are white, silken, webbed and 'tent-like' and can reach the size of a football. The nests tend to occur at the end of the branches where they can absorb the maximum amount of sunlight and several nests can be present in a single tree. The nests degrade over time and become damaged and discoloured and therefore less easy to see. Adult moths have cream forewings with brown markings, white hindwings and a wingspan of 31–45 mm. The adults are difficult to distinguish from other species of moth. The adults emerge and fly in the summer, and live for only one or two days, during which time they mate and lay their eggs. Females lay batches of 70–300 eggs on a cylindrical 40–50-mm-long egg plaque on pine needles or occasionally twigs. The eggs hatch after 30–45 days.

	PPM caterpillars hatch in the autumn and begin feeding on the tree's needles almost immediately. The larval stage is the easiest part of the lifecycle to recognise with its hairy, orange-brown body and transverse blue bands. PPM caterpillars move about in nose-to-tail processions which are often just one line thick. Discolouration (yellowing and then browning) and defoliation of the needles are other indicators of infestation by the PPM. The extent of damage increases with severity of infestation and these signs and symptoms only becomes noticeable when PPM populations are large and infestations severe. In extreme cases the caterpillars can strip the tree almost bare of needles. It is worth noting that discolouration and defoliation of needles in the absence of nests is not diagnostic of PPM as there are a number of other pests/ diseases and conditions which can cause similar signs and symptoms. The PPM is closely related to the oak processionary moth (OPM) (*Thaumetopoea processionea*). Please refer to the Field Identification Guide in this series covering OPM. The PPM is distinguishable from the OPM because: • PPM caterpillars are most likely to be found in pine trees. • PPM caterpillars usually process in a single line. • PPM caterpillars are covered with dense clumps of hairs with less variation in length than those of OPM caterpillars. • PPM caterpillars are most likely to be seen in the winter and early spring. • Conspicuous PPM nests are built in the winter. • PPM caterpillars pupate in the soil rather than in nests. • Mature PPM caterpillars are orange-brown with horizontal dark blue bands.

Timing	The caterpillars might be seen in winter and early spring. However, they remain in their nests during the day and emerge only in the night to feed, returning to the nests at dawn. Caterpillar processions may be seen on the ground in late winter or early spring (occasionally as late as June) as the fully grown caterpillars leave the tree to find pupation sites in the soil. They bury themselves in a suitable location at the earliest opportunity and therefore do not remain in the open for long. Feeding damage and defoliation can be surveyed for from the time the caterpillars hatch in the autumn, until they pupate in late winter/early spring. Nests should be surveyed for in the winter when they are white, fresh and conspicuous. Adult moths emerge in the summer but are unlikely to be seen as they only live for one or two days. Egg plaques are present in the canopy in the summer and autumn.
Biosecurity	The main risk of spread is during pupation as this stage occurs hidden in the soil and so would not be obvious. It is therefore important not to remove any soil from a potentially infested site, including on boots, clothing and vehicles. Pupae may be present in the soil all year round as this stage can remain dormant and extend to two or three years and sometimes even longer. Also, no tree material should be moved from a potentially infested site as it may harbour eggs or early stage caterpillars which can be difficult to spot. Particular care should be taken from the late summer to early winter as this is when eggs may be present and/or caterpillars too small to be noticeable.
Reporting requirements	If you find this pest, please report it through Tree Alert (https://treealert.forestresearch.gov.uk). In Northern Ireland please report via the TreeCheck website (www.treecheck.net) or phone app, or by emailing planthealth@daera-ni.gov.uk For traded plants and any non-tree hosts please email

	planthealth.info@apha.gov.uk (England & Wales), or hort.marketing@gov.scot (Scotland).
Public health warning	PPM caterpillars have thousands of tiny hairs which, on contact, can cause itching skin rashes, sore throats, breathing difficulties, eye problems and allergic reactions. Please do not touch, approach or attempt to remove nests or caterpillars yourself. Please keep children and animals away from nests and caterpillars. If you think that you have been affected by PPM please see a pharmacist for relief from skin or eye irritations. Seek medical advice if you think you have had a serious allergic reaction. Consult a vet if you think your pet has been seriously affected.

Based on information available in August 2016.

Contact with hairs of the pine processionary moth caterpillar can cause a skin rash similar to the one pictured here (which is a rash caused by contact with hairs of the oak processionary moth caterpillar).

Photograph: Andrea Battisti, Universita di Padova, Bugwood.org

Adult pine processionary moth (wingspan of 31–45 mm) and egg plaque.

Signs and symptoms

Photograph: D.D. Cadahia, Subdireccion General de Sanidad Vegetal, Bugwood.org

Egg plaque of the pine processionary moth.

Photograph: William M. Ciesla, Forest Health Management International, Bugwood.org

Egg plaque of the pine processionary moth.

Signs and symptoms

Photograph: Beat Forster, Swiss Federal Institute for Forest, Snow and Landscape Research, Bugwood.org

Pine processionary moth caterpillars in procession on the ground.

Photograph: D.D. Cadahia, Subdireccion General de Sanidad Vegetal, Bugwood.org

Maturing caterpillars of the pine processionary moth feeding on pine needles.

Signs and symptoms

Photograph: William M. Ciesla, Forest Health Management International, Bugwood.org

Pine processionary moth larvae congregating on the trunk of an infested pine tree.

Photograph: Mat Holloway, Observatree volunteer

Pine processionary moth caterpillars constructing a nest.

Signs and symptoms

Photograph: François-Xavier Saintonge, Forest Health Department, Bugwood.org

Pine processionary moth caterpillars constructing a nest.

Photograph: Beat Forster, Swiss Federal Institute for Forest, Snow and Landscape Research, Bugwood.org

Multiple pine processionary moth nests within the crown of a pine tree.

Photograph courtesy of Forestry Commission / Ana Perez-Sierra

Fresh pine processionary moth nest in young pine tree.

Photograph: Mat Holloway, Observatree volunteer

Pine processionary moth nest hanging from the branches of a pine tree.

Photograph: Milan Zubrik, Forest Research Institute - Slovakia, Bugwood.org

Degrading pine processionary moth nest.

Photograph: Milan Zubrik, Forest Research Institute - Slovakia, Bugwood.org

Degraded pine processionary moth nest.

Photograph: William M. Ciesla, Forest Health Management International, Bugwood.org

Multiple pine processionary moth nests and feeding damage in a pine tree.

Photograph: Mat Holloway, Observatree volunteer

Severe defoliation and damage to pine trees caused by pine processionary moth caterpillars.

Photograph: D.D. Cadahia, Subdireccion General de Sanidad Vegetal, Bugwood.org

Feeding damage and discolouration of pine needles caused by the pine processionary moth.

Photograph courtesy of Forestry Commission

The fungus *Lophodermella sulcigena* causes serious needle browning in pine. However, in the absence of nests, this foliar discolouration would not be diagnostic of pine processionary moth.

Photograph courtesy of Forestry Commission

Cyclaneusma minus is a fungal disease that causes pine needles to become yellow, mottled and brown. This discolouration would not be diagnostic for pine processionary moth in the absence of nests.

Photograph courtesy of Forestry Commission

The pine beauty moth (*Panolis flammea*) caterpillars feed on pine needles and can defoliate pine trees from May to late July. The pine beauty moth does not build nests in the pine trees.

Photograph courtesy of Forestry Commission

The pine looper moth (*Bupalus piniaria*) caterpillars can defoliate pine trees from June to October. The pine looper moth does not build nests in the pine trees. Defoliation alone is not diagnostic for pine processionary moth.

Photograph courtesy of Forestry Commission

The caterpillars of the pine shoot moth (*Rhyacionia buoliana*) mine and kill buds and shoots in pine trees during September to June. They produce very small, resinous, tent-like structures which bear no resemblance to those of the pine processionary moth. The caterpillars also look different from those of the pine processionary moth.

Photograph courtesy of Forestry Commission

The caterpillars of the common pine sawfly (*Diprion pini*) feed on pine needles in the summer and can defoliate individual branches to whole trees, causing severe damage. This sawfly does not build nests.

Photograph courtesy of Forestry Commission

The caterpillars of the European pine sawfly (*Neodiprion sertifer*) feed on pine needles from May to June and often only attack older needles leaving tufts of younger foliage on shoots. This sawfly does not build nests.

Published by Forest Research as part of the Observatree project.

Observatree aims to create a tree-health early-warning system using citizen science.

Observatree is a partnership project led by Forest Research, the research agency of the Forestry Commission. Project partners are the Animal & Plant Health Agency (APHA), Department for Environment, Food & Rural Affairs (Defra), Fera Science Ltd, the Forestry Commission, the National Trust, Scottish Forestry, the Welsh Government and the Woodland Trust. Supporting the project is Natural Resources Wales. The first four years of this project was 50% funded by the EU's LIFE programme.

Acknowledgements:

Dr Suzanne Sancisi-Frey, Forest Research, for compiling this guide based on a review of current literature and with technical contributions from experts across the Observatree partnership.

All those who have given permission for images to be used within the guide.

The Communications Team, Forest Research, for the original design and creation of the guide.

This booklet forms part of a set that supports Observatree volunteers when out looking for priority pests and diseases. It supplements face-to-face training and is not intended as a full or detailed description. It will also be useful for others who have some knowledge of the particular pest or disease and understand how to look for these. Further information is available online from the websites listed below:

www.observatree.org.uk

www.forestresearch.gov.uk/tools_and_resources/fthr/pest-and-disease-resources/

www.gov.uk/guidance/prevent-the-introduction-and-spread-of-tree-pests-and-diseases

https://planthealthportal.defra.gov.uk

FR(GB-SSF)/FG350/AUG16/0028