

Pest profile – Pine processionary moth



Scientific name: *Thaumetopoea pityocampa* (Denis & Schiffermuller, 1775)

Taxonomic position: Insecta; *Lepidoptera*; *Thaumetopoeidae*

Common name: Pine processionary moth

Hosts: The Pine processionary moth (PPM) is the biggest cause of defoliation in pine trees. The genus *Pinus* is most susceptible to attack and the following species are particularly susceptible: Austrian pine (*P. nigra*), Scots pine (*P. sylvestris*), Stone pine (*P. pinea*), Jerusalem pine (*P. halepensis*), Cluster pine (*P. pinaster*), Lodgepole pine (*P. contorta*), Monterey pine (*P. radiata*) and Canary Island pine (*P. canariensis*).

Other recorded hosts include the conifers *Cedrus atlantica* (Atlas cedar) and *Larix decidua* (European larch).

Threats: PPM damages and weakens trees by feeding on their foliage and can be a direct cause of tree death. Caterpillars are nocturnal, leaving the nest at night to forage on the pine needles. The fine tiny hairs of the PPM caterpillar are a serious public health hazard. The hairs contain thaumetopoein, a toxin that if touched or ingested by humans or animals can cause extreme skin irritation, respiratory problems and conjunctivitis. Anaphylaxis (allergic reaction) and even one case of blindness have also been recorded.

Distribution and spread: PPM is a native of the southern Mediterranean region, North Africa and some areas of the Middle East and southern Europe. It has forged north and has now established colonies in pine forests north of Paris, in Brittany and around Strasbourg, where it was discovered among containerised pine trees in transit. The Pine processionary moth is heading north and experts warn it could cross the Channel.

Climate change: A favourable climate and suitable woodlands of Corsican and Scots pine which have become increasingly fashionable in the UK. The climate would make southern Britain particularly vulnerable, and it is expected that PPM will arrive, as did OPM, on nursery stock from Europe. Since the 1990's PPM has been responding to climate change and the pest has been moving north. Recent climate change is known to affect the distribution of a number of insect species, resulting in a modification of their range boundaries. The pine processionary moth is a highly damaging pine defoliator, extending its range northwards and upwards in response to winter warming.

Control: Swift and aggressive action will be the only way to deal with the pest should it emerge. It will be necessary to go into full eradication mode immediately. If it's found on young planted nursery stock, they should be destroyed straight away. It is believed that we shouldn't be trying to spray and retain the tree. Chemical and biological control treatments are mainly applied by ULV aerial spraying with rotary atomizers at 5 litres/ha, with petroleum oil or vegetable oils as solvents.

Monitoring: Pupae are unlikely to be detected by inspection and may remain in the soil for up to three years before the moths emerge. It is likely that pupae could be brought into the UK in the soil of plants for planting – most likely with hosts, but potentially with any plants which have been growing in the vicinity of infested host trees prior to export. A requirement for careful visual examination of host plants in places of production as well as the immediate surrounding areas to ensure they are free from egg masses, larvae and nests would be essential.



Life Cycle: The life cycle of *PPM* is normally annual but may extend over 2 years at high altitude or in northern latitudes for part or the whole of the population. The life cycle has two phases, the adult, egg and caterpillar being aerial and the pupa hypogeal.

- Moths lay their eggs high on pine trees.
- After hatching, the larvae start consuming pine needles while going through five instars.
- White silken protective nests are built to maintain ideal living conditions.
- Around the end of March the caterpillars are ready to leave their nests and move down the tree in a characteristic procession.
- They dig underground and pupate.
- At the end of the Summer the moths emerge

Lifecycle of the pine processionary moth



The caterpillars of the Pine Processionary moth are a serious pest in coniferous forests. An enormous number of eggs are laid by the female moth on fine shoots. The young caterpillars which hatch out feed at night on pine needles and soon strip the tree bare.

When they have to move to another tree they have an inherent instinct to travel nose-to-tail in a long procession. The leading caterpillar spins an endless thread which is added to by the caterpillars following behind him. This acts as a trail for any individual which might get detached from the procession. One chain of these caterpillars was recorded to consist of 300 individuals, and measured over thirteen yards long.

During the day, they shelter in large common nests which they spin for themselves in the branches of trees. Sometimes a whole forest is attacked by these pests, and when this happens, the best method of control is to destroy the nests.

In infested pine forests, it is easy to detect the presence of *T. pityocampa* by the cylindrical egg masses laid on the low branches of trees and by the early damage caused by the 1st- and 2nd-instar caterpillars. They feed on the needles of twigs close to the silken nest; these partially eaten twigs remain on the tree with their brown and yellowing needles. During the winter, defoliation increases and the white nests stand out plainly.



Detail of silk 'tent' of the Pine Processionary Moth (*Thaumetopoea pityocampa*) atop a Scots Pine (*Pinus sylvestris*).

Eggs:

The typical cylindrical egg masses range in length from 4 to 5 cm. They are covered with the scales of the female anal tuft, which mimics the pine shoots.

Larva:

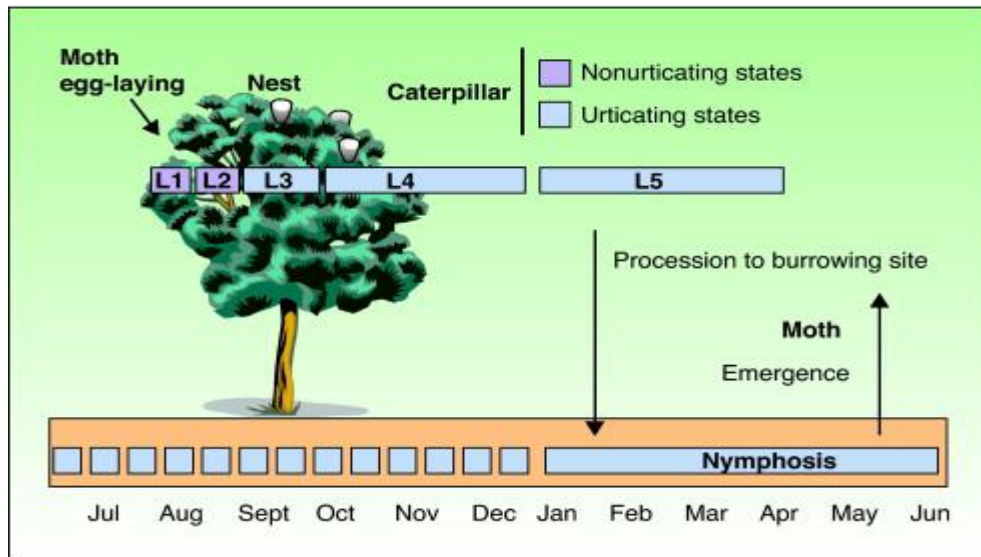
The larvae develop through five instars, recognized by differences in head capsule size. The average head width of the 5th-instar caterpillar is 4.8 mm for the male and 3.4 mm for the female. The full-grown caterpillar is about 40 mm in length. The head capsule is black. The body of the 1st-instar caterpillar is dull apple-green. After the second moult, the caterpillar assumes its definitive appearance and the reddish dorsal urticating hair patches on each body segment appear arranged in pairs. The integument and hairs that clothe the body vary considerably with different provenances. In general, the integument is darker in colder areas and varies from dull bluish-grey to black. The pleural hairs vary from white to dark-yellow; the dorsal hairs range from yellow to dull orange.

Pupa:

Pupation takes place in the soil in an oval, ochreous-white silken cocoon. The obtect pupae are about 20 mm in length, oval, and of a pale brownish-yellow colour that later changes to dark reddish-brown.

Adult:

The female moth has a wing-span of 36 – 49 mm while the male is 31 – 39 mm.



Experts advise to avoid any physical contact, not only with caterpillars but also with their nests or with trees affected by this pest, as their hairs can be easily blown great distances on the wind and brought into contact with people and pets.

Anyone who thinks they might have seen evidence of pine processionary moth in Great Britain, especially its distinctive nests or caterpillars, must contact the Forestry Commission's Plant Health Service on plant.health@forestry.gsi.gov.uk; telephone 0131 314 6414.

The IMPACT project, with partners Forest Research in Wales, Swansea University and the National University of Ireland, Maynooth is looking at improved pest control measures. Top of the agenda for the *Integrated Management of forest Pests Addressing Climate Trends (IMPACT)* team is assessing how changing climate will influence the damage caused by pests and pathogens. The project is part funded by the European Regional Development Fund through the Ireland – Wales Programme (INTERREG IVA) and Natural Resources Wales. For more information log on to:

www.impactproject.eu