Oak Processionary Moth – species of concern

Status

- Oak Processionary Moth (OPM, *Thaumetopoea processionea*) is a tree pest; the caterpillars feed on the leaves of several species of oak trees. Large populations can strip whole oak trees bare (Figure 1, B), leaving them more vulnerable to other pests and diseases and to other stresses such as drought. OMP is known to attack various species of the genus *Quercus* and, occasionally, the genera *Betula*, *Carpinus*, *Castanea*, *Corylus* and *Fagus*.
- OPM caterpillars also present a hazard to human and animal health: Human contact with the hairs (setae) of the larvae (caterpillars) is associated with a range of symptoms of varying severity, from urticarial rash and dermatitis to anaphylaxis. Adult moths are undistinctive brown moths (Figure 2, B & D) and are difficult to identify accurately. They do not present a health hazard.
- OPM is a native of central and southern Europe, where predators and environmental and ecological factors usually keep its numbers in check and minimise its impact. However, its range has been expanding northwards over the past 20 years. The expansion has been aided by the movement of live oak trees in trade, which might have OPM present on them, and perhaps also by a warming climate. It is now established as far north as the Netherlands and northern Germany (it is regarded as a contributor to oak decline in Germany), and has occasionally been seen in Sweden. OPM is established in most of Greater London and in some surrounding countries, with the rest of the UK designated a Protected Zone. In July 2019, the UK Plant Health Service intercepted several cases of oak processionary moth caterpillars on recently planted oak trees imported from the Netherlands and Germany. Scottish Government have confirmed six interception cases in Angus, East Lothian, Fife, Inverness and two in Lanarkshire. Although only one infested tree was found at each site, all oaks within the import consignment were eradicated. Trees were initially sprayed with insecticide and then burnt under Statutory Plant Health Notice to preserve the protected zone. The Plant Health (Scotland) Order of 2005 has been amended: Plants of *Quercus* L. (other than fruit or seeds and excluding *Quercus suber*), intended for planting, with a girth at 1.2 m above the root collar of 8 cm or more, must be accompanied by an official statement that they have been grown throughout their life in a) places of production in countries in which *T. processionea* is not known to occur, b) a protected zone which is recognised as a protected zone for *T. processionea* or in an area free from *T. processionea,* established by the National Plant Protection Organisation in accordance with IPSM No. 4; or c) a site with complete physical protection against the introduction of *T. processionea* and have been inspected at appropriate times and found to be free from *T. processionea*.
- Larvae tend to move in nose-to-tail processions (Figure 1, A), giving the common name 'Oak Processionary Moth', with processions often 'arrow-headed'. They live almost exclusively on oak trees but will feed on other broad-leaved species if the oak they are feeding on is completely defoliated. They typically feed in clusters (Figure 2, A) and are active in May, June and July. They have long white hairs (in addition to the irritating hairs, which are shorter and nearly undetectable), a grey body and dark head (Figure 2, A, C & E). Older larvae have a central dark stripe with paler lines down each side. OPM larvae build nests (Figure 1, C) made of distinctive white silken webbing, which are connected by silk trails to the trunk and branches. Nests are built in early

summer on trunks and branches (but almost never amongst leaves) anywhere up the tree and range in size and shape. Sightings of OPM can be reported via Tree Alert (forestresearch.gov.uk/tools-and-resources/tree-alert).

- A research project funded by Forestry Commission England as part of the enhanced OMP control programme ran from 2013 to 2017 and supported by DEFRA aimed to: Develop standardised methods for assessing OPM populations; analyse variation in OPM population numbers in relation to habitat type, microclimate, the prevalence and diversity of naturally occurring parasitoids and predators, and variation in tree size and phenology; develop molecular techniques for identifying parasitoids and predators of OPM and use these techniques to quantify parasitism rates; construct and analyse ecological networks of natural enemies that attack OPM and other moth species living in the same habitats.

Figure 1 - Oak Processionary Moth A) classic procession formation, B) defoliation of an oak tree and C) Nest [images courtesy of Forest Research]

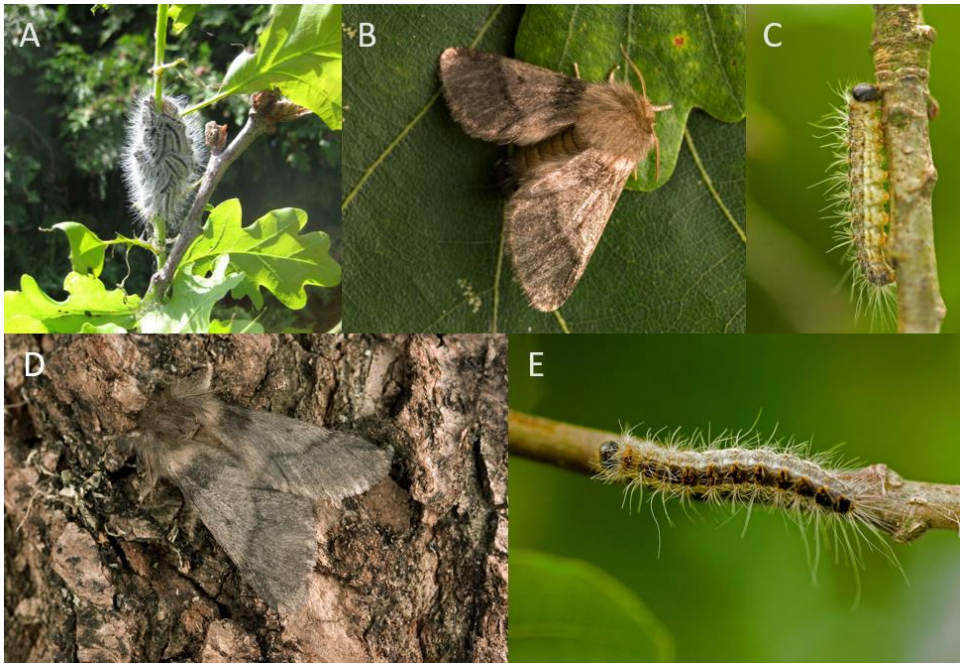

Figure 2 - Images of larval (A, C & E) and adult (B & D) Oak Processionary Moth [images courtesy of Forest Research]

Scottish-specific issues

- Oak (pendunculate and sessile) are amongst Scotland's most common native trees. *Quercus* sp., both native and planted for landscaping are at risk.
- Oaks are famous for their role in supporting other species. Recent work has listed 2300 species associated with oak, of which 320 are only found on oak and a further 229 species are rarely found on species other than oak (OakEcol).
- Oak trees are currently at risk from a range of pests and pathogens including Acute Oak Decline, Chronic Oak Decline and powdery mildews. In addition, a changing climate is thought to increase the susceptibility of oak trees to pests and diseases.
- Controls have been put in place to limit the movement of *Quercus* sp. into Scotland from outside protected zones. However, risks remain from failure of these controls or the spread northwards if populations in England are not kept in check.
- Scottish Government have confirmed six interception cases in Angus, East Lothian, Fife, Inverness and two in Lanarkshire. Following eradication of all infested material, pheromone traps were deployed and follow up survey work will commence over the next few years.

Knowledge Gaps

- Given its cooler climate, how likely is it that OPM would become established in Scotland, both currently and under future climate change scenarios (survivability and spread)?
- Would the ecological range of OPM natural enemies allow their use in Scotland?
- How will OPM interact with other threats to oak (Acute Oak Decline, Chronic Oak Decline and powdery mildews) in terms of disease outcome from a Scottish perspective.
- How do land owners and land managers perceive the risk of OPM and what actions would they take if they found the pest?

PHC Perspective

OPM represents a serious threat to iconic and ecologically important species of oak in natural and managed landscapes. Since OPM is established in and around London, programmes already exist to monitor, eradicate and prevent the spread of this pest, which appear to be limiting its movement out with the established area.
Given that Scotland's climate is cooler than the South East of England, this may limit the potential of OPM to establish in Scotland. However, this is speculative and more information is required regarding the potential climatic range of OPM.

Key Priorities and Recommendations (for policy, industry or scientific stakeholders)

- Increase the knowledge base with regards to the potential survivability and spread of OPM in Scotland.
- Maintain strict controls over the movement of oak plants into Scotland from areas with OPM.
- Pro-actively investigate the suitability of natural enemies of OPM for deployment, should establishment occur.