Box Tree Moth & Caterpillar

An EBTS Guide

Caterpillar Control Methods

Biological Insecticide

Most reports consider ***Bacillus thuringiensis*** (Bt) to be the best option for killing box tree caterpillars as it only kills caterpillars and stops them eating within an hour of ingesting a treated leaf and is harmless to humans, birds, fish, and other beneficial wildlife including bees.

Once sprayed onto leaves, Bt doesn't stay active for more than ten days as it breaks down under UV light and washes off in the rain.

XenTari, Dipel & Bruco are based on the Bt bacterium which contains protein endotoxin crystals and living spores. There are fifty subspecies, the most commonly used for caterpillars are subsp. kurstaki (in Dipel & Bruco) & aizawai (in XenTari). When the targeted caterpillar eats a treated leaf, the toxins dissolve in the high pH of the pest's stomach, causing holes in the lining which allow the spores into the gut. These then germinate causing the death of the caterpillar within a couple of days.

Nematodes

These are small worms supplied as a powder that is mixed with water and applied with a watering can or hose attachment and repeated twice at 7 day intervals. Nematodes need to be sprayed directly on caterpillars as soon as an infestation is found. They kill by entering through natural openings in the bodies of the caterpillars and producing bacteria that disrupt their digestive system. They then reproduce in the dead caterpillars spreading to others until they have nothing left to eat, at which point they die. However, they also die if the surroundings aren't moist or the temperature drops below 12c.

As nematodes are a live product (such as **Nemasys Fruit & Veg Protection by BASF**), they can only be stored for a maximum of 4 weeks and must be kept in a refrigerator during this time. They can be effective if applied correctly and at the right time.

Chemical Insecticides

These wide spectrum insecticides stay active for longer, 3-4 weeks, but are not safe with bees & other garden beneficals and are not always very effective at stopping the caterpillars eating. Professionals can use some products at higher dosage rates.

Pyrethrum based products such as...

- Py Spray Garden Insect Killer
- Bug Clear Gun for Fruit and Veg
- Defenders Bug Killer
- Ecofective Bug Killer
- Growing Success Fruit & Veg Bug Killer
- Growing Success Shrub & Flower Bug killer

Deltamethrin based products such as…

- Bayer PROVADO Ultimate Bug Killer
- Bayer Sprayday Greenfly Killer

Lambda-cyhalothrin products such as...

- Westland Resolva Bug Killer

What to do

Spraying Timetable

Over the years EBTS Belgium member, Karel Goossens has come up with a spraying timetable that will keep the caterpillar to a minimum.

March/April

Hopefully you won't need to spray if you killed off all the caterpillars effectively in October the previous year, but its worth checking in case you missed any.

July 10-15

This should be your first of four sprays needed to keep the caterpillars under control.

August 16-20

This is the mid summer spray for the second of three batches of caterpillars the UK gets in a year.

September 13-18

Your third spray to kill off the third batch of caterpillars.

October 10-15

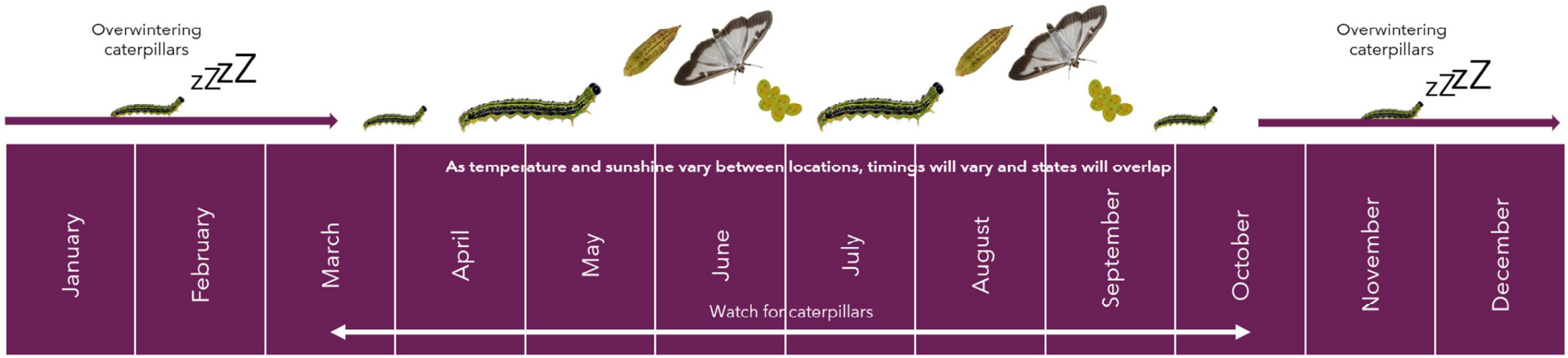
Spray no later than 15 October as some of the caterpillars are likely to start overwintering soon after this date which means they won't eat a treated leaf and will wake up hungry next year!

Remember

- Always on a dry day – it must not rain within six hours of spraying
- Spray up to five days earlier if needed, depending on the weather, but no later
- The point of this system is to interrupt the moth's reproductive cycle

Please register your trap, moths caught and any caterpillar sightings online

www.ebts.org/bmctracker



Common variant

Melanic variant

By Ccsnin Manci Shutterstock.com

Caterpillars/Larvae

Greenish yellow in colour, developing black heads and dark & light strips with spots along their length. Growth is dependent on temperature, taking 3-4 weeks to become fully grown at 4cm long and then living a further 2 weeks.

Temperature threshold for growth >8.4c

Can survive to -30c overwinter wrapped between leaves.

Pupae

Are cocooned in white webbing spun around leaves and are between 1.5-2.0cm long.

The process of turning from caterpillar to moth takes about a week.

Temperature threshold for this state >11.5c

Moths

Have a wing span of about 4cm and either have a thick dark brown border around a white coloured wing with distinctive dots halfway down the leading edge of the wings (common variant) or less commonly the wings are almost entirely brown with white dots (melanic variant).

During their lives they can fly up to 10km and they start laying eggs 2-3 days after they first start flying.

Eggs

Each female can lay up to 700 eggs of 0.8-1.0mm diameter which are laid in groups of 5-30 on the underside of leaves and look like fried eggs. These are coloured greenish yellow at first with black dots appearing as the larval head capsule is formed.

Temperature threshold for egg development >10.9c

Using a Mating Disruptor

Pheromones that only affect male box tree moths can be used to cause mating disruption. This is achieved by using higher concentrations, around 7 times stronger, than is used in the lures found in box moth monitoring traps . It is applied at even spacings in the area of box plants that needs protection. This cause confusion in the male moths as everywhere in the area smells of female moths which means they can't find the real females to mate with them. Consequently the females eggs are not fertilised and therefore no caterpillars hatch.

However, there is still the potential for a fertilised female to fly in from another area, but the use of mating disruption can significantly reduce caterpillar damage. For example in France, gardens like Versailles, Marqueyssac and Eyrignac use a product from M2i with a 95% reduction of damage to their plants. The product, Box T Pro Press is available from Fargro. Our former chairman Chris Poole has used it at the National Trusts Ham House, near Richmond and at Chiswick House & Gardens, West London and found it to reduce damage by around 80%.

This method of control is only available to professionals with PA1 & PA6 licences, so check out the Company Profiles on the EBTS UK website to find one of our members who can apply the product for you.

When & how did it get here?

Since 2007 box tree moth caterpillars have been devastating our boxwood hedging and topiary in domestic, commercial and historic gardens across Europe. However, the impact is not just in gardens; the caterpillar is decimating large areas of Europe's natural box woodlands. The Northern Caucasus as well as Bulgaria, Germany, NW Italy, Romania and southern France have all been badly affected. In the UK wild box is now under threat with small infestations reported at Box Hill, and most recently at another large area of box woodland in the Chilterns.

The severity of the infestations was demonstrated dramatically in Germany's Grenzarch-Whylen Nature Reserve which contains the country's largest box tree forest. Between 2009 and 2010, the caterpillars attacked all the box trees causing more than 90% de-foliation and 27% lost all their leaves. Although the population of moths then decreased, having eaten most of their food source, by 2012 the trees that had been fully defoliated died as their bark had also been eaten and thus exposed the trees to fungal infection. Observations show the eco-system in the forest is beginning to change with new ground cover taking the place of the box which will likely now only remain in smaller clumps.

The origin of the moth is recorded as North China, but it has spread a long way since

1859 when it was first identified and now covers large areas of the continent of Europe.

The consensus is that the wide scale spread is not caused by the flight of the moths, but by commercial movement of infected plants carrying undetected eggs or caterpillars. An example of this was the 2012 Sochi Winter Olympic Games, where Italian box was imported for planting in the Olympic village, after which Russian experts found box tree moth/caterpillars in the site. Control measures failed, resulting in a rapid spread into the natural boxwood in the Caucasian Biosphere Reserve. It has since spread further across Georgia. Damage has also been observed on *Rubus* spp., *Ruscus colchicus, Ruscus*

Arrival across Europe

Cydalima perspectalis

Box Moth were first described by Francis Walker (1809-1874) in 1859 when he was working on the '*List of the specimens of lepidopterous insects in the collection of the British Museum*'.

Since its initial description and classification, it has been placed in a number of genera, including *Glyphodes perspectalis*, *Neoglyphodes perspectalis*, *Palpita perspectalis*, *Diaphania perspectalis* and since 2010 *Cydalima perspectalis* (Walker, 1859).

Francis Walker
(Wikipedia)

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Devoted to encouraging the appreciation cultivation
and knowledge of Boxwood & Topiary

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