



Box Tree Moth in the United States

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Introduction

The box tree moth (BTM), *Cydalima perspectalis* (Lepidoptera: Crambidae), is an invasive pest of boxwood (*Buxus* spp.) in both ornamental and landscape settings. The first sighting of BTM in the urban landscape in the United States was in western New York in 2021. As of 2022, BTM populations are only known to occur in localities of 3 counties in western NY; and it is not known to occur in Virginia. For information regarding this pest's biology and origin, visit the Virginia Tech Cooperative Extension report: Box Tree Moth. https://www.pubs.ext.vt.edu/content/dam/pubs_ext_vt_edu/ENTO/ENTO-445/ENTO-445.pdf

Life Cycle

Based on previous research, BTM can complete its life cycle up to 4 times (south Asia) in a single season, making it difficult to control. In other parts of its invasive range, this insect would complete either 3 (southern Europe) or 2 cycles (southern Europe and Canada). They start as egg masses on the underside of leaves then undergo 5 larval stages (Fig. 1 and 2) before pupating and emerging as adults (Fig 3).



Figure 1. Early instar BTM larvae (Photo by Elidah Sisk, Virginia Tech Department of Entomology).



Figure 2. Late instar BTM larva (Photo by Elidah Sisk, Virginia Tech Department of Entomology).



Figure 3. Adult male BTM scaled next to inch ruler (Photo by Elidah Sisk, Virginia Tech Department of Entomology).

Damage

BTM larvae create the damage on boxwood by chewing through the leaves. They have the potential to completely defoliate a plant in within one growing season. Figure 4 is an example of injury on boxwood caused within two weeks by heavy larva infestation.



Figure 4. Left: Boxwood from 11 July 2022. Right: Same boxwood from 25 July 2022; Niagara Co., NY. (Photo by Elidah Sisk, Virginia Tech Department of Entomology).

Monitoring

For BTM, weekly checking of sex pheromone-baited bucket traps for male adult moths and visual scouting individual boxwood shrubs for eggs, larvae, and pupae have been conducted in Niagara County, NY since July 1, 2022. As of October 2022, two complete life cycles have been documented in western New York. The data for these cycles suggests that larval activity could last for approximately 4 weeks before adults start to peak in population.

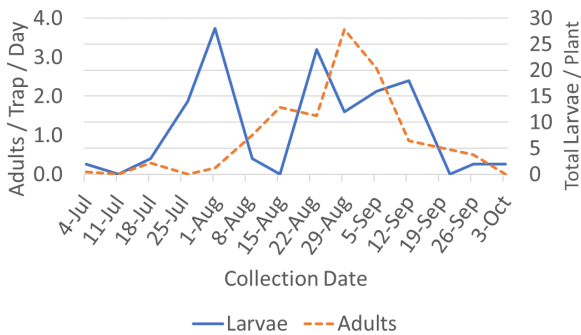


Figure 5. Phenology of BTM from one site in Western, NY during 2022 (Data generated by Virginia Tech Department of Entomology).

Figure 5 shows that larvae were observed throughout the entire month of July (1453- 2052 Growing Degree Days, in base 50°F, GDD₅₀, with activity peaking at 1842 GDD₅₀), and adult presence began in early August, peaking at the end of the month (2052-2876 GDD₅₀, with the activity peaking at

2575 GDD₅₀). Larval populations increased again in September, where BTM begins to overwinter for the season as early instars. Additional monitoring efforts will track mortality over the fall and winter months of young larvae.

Scouting Observations

There are a few signs to look for when scouting for BTM. Newly injured leaves (including skeletonization), fresh webbing from caterpillars, and round, greenish-brown excrement on the tips of boxwood leaves are all indicators of an active infestation. See Figure 6 for example, where surface leaf feeding is caused by early instar larvae (left side of Fig. 6), while later instars will feed on entire leaf sections (bottom right of Fig. 6). Additionally, BTM larvae can even do some bark stripping, if high infestations are present and no foliage tissue is left.



Figure 6. Larval nest on tips of boxwood shoots (Elidah Sisk, Virginia Tech Department of Entomology).

Field observations indicate that certain cultivars, such as ‘Winter Gem,’ are prone to BTM defoliation. It was also documented that other cultivars such as ‘Green Mountain’ appear to be less susceptible to damage from this insect. Overwintering caterpillars may create silken hibernaculum (Fig. 7) on leaves of boxwood where they can be found ‘sandwiched’ between the webbing and leaf surface.



Figure 7. Possible overwintering larva on boxwood (Photo by Elidah Sisk, Virginia Tech Department of Entomology).

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Management

Home owners are advised to closely monitor the boxwood for larvae and manage based on their presence and life stage. Pruning damaged portions of boxwood and bagging it for dumpster disposal is one way of combatting this pest. Removing larvae by hand and killing them is useful for locations that have few boxwood. Pesticide applications can be used but are expected to be more effective when the larvae are small. This is because late instar caterpillars create webbing that act as physical barriers that can affect insecticide penetration onto the plant canopy. For information on optional insecticides, please visit the IR-4 Project's Fact Sheet: Insecticide Options for Box Tree Moth Management.

https://ir4.cals.ncsu.edu/EHC/InvasiveSpecies/BTM_Fact_Sheet_PotentialMitigationOptions_20210527.pdf

Additional information on BTM could be found at the NY Department of Agriculture website <https://agriculture.ny.gov/plant-industry/boxtree-moth>

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