

Box Tree Moth: Fact Sheet, Management & Visual Guide

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This fact sheet contains a preliminary list of insecticide options for managing box tree moth in nurseries and landscapes. Since its discovery in Europe, very few insecticides have been evaluated for efficacy against box tree moth. Following is a selection of active ingredients and commercial-use products labeled for caterpillar management likely to have efficacy against box tree moth. A few of these are also found in home garden formulations.

The box tree moth, *Cydalima perspectalis* is native to China, Korea, and other parts of Asia. Introduced to Europe in 2007 it rapidly spread across the continent. In 2018 it was found in Ontario, Canada, the first detection in North America, and in July 2021 was confirmed in western New York State. Though reported on a few other hosts (*Euonymus*, *Ilex*, *Murraya*), it has only been found feeding on boxwoods (*Buxus* spp.) in Europe and North America. Moths are capable of flying over two miles, and moths or immature stages can be transported on plants to new areas. Young caterpillars overwinter in protected spaces on plants and with multiple generations a year, few natural enemies, and cryptic feeding in dense plant canopies populations can build quickly before detected.

Box tree moth has a 4-cm wingspread with white or brown color morphs. Only the white form (white wings with brown borders), is found in North America. A brown form, also found in Europe, is almost entirely dark brown with characteristic white specks on the forewings. Caterpillars are yellow to lime green with dark stripes and a black head, reaching 2 cm before pupation. Among very few caterpillars able to feed on boxwood, they consume leaves and bark and can quickly defoliate and even kill large hedges. Their unsightly webbing and frass help protect from predators, reduce spray coverage, and insecticide efficacy.



Box tree moth, white morph. Szabolcs Sáfián, University of West Hungary, Bugwood.org



Late-instar box tree moth caterpillar with webbing. S.D. Frank, NCSU



Box tree moth damage. S.D. Frank, NCSU

Many insecticides (Table 1) are labeled for control of caterpillars. Some broad-spectrum materials, such as some pyrethroids and carbaryl, may flare spider mites or other pests. Note label cautions concerning environmental and non-target risks.

Table 1. A selection of insecticides labeled for caterpillar management in nursery and/or landscape sites where boxwoods are grown. Re-entry intervals (REI) apply to production (nursery, greenhouse) uses.

Active ingredient	IRAC MOA	Example products ¹	Notes	For Use in NY
Azadirachtin	UK	Azatin O, Aza-Direct, Ornazin, Molt-X, others	Use site (nursery, greenhouse, landscape, interiorscape) varies by product. Some organic-compatible formulations. Biopesticide. Most 4-hour REI .	Yes
Carbaryl	1A	Sevin, Carbaryl	Broad spectrum, harmful to beneficial insects, may cause secondary pest outbreaks. Not for BTM in NY. 12-hour REI.	No
Acephate	1B	Orthene, Acephate	Only certain caterpillars on the label. Broad spectrum, harmful to beneficials, may cause secondary pest outbreaks. Not for BTM in NY. 24-hour REI .	No
Bifenthrin	3A	OnyxPro, Talstar S, Talstar P, others	Use site (nursery, greenhouse, landscape, interiorscape) varies by product. Broad spectrum, highly toxic to bees exposed to direct treatment or residues, extremely toxic to fish and aquatic invertebrates. May cause secondary pest outbreaks. 12-hour REI .	Yes
Cyfluthrin, <i>beta</i> -cyfluthrin	3A	Decathlon, Tempo SC Ultra, others	Use site varies by product. Broad spectrum, highly toxic to bees exposed to direct treatment or residues, extremely toxic to fish and aquatic invertebrates. May cause secondary pest outbreaks. 12-hour REI .	Yes
<i>Lambda</i> -cyhalothrin	3A	Scimitar GC, others	Use site varies by product. Broad spectrum, harmful to beneficials, may cause secondary pest outbreaks. 24-hour REI .	Yes
Deltamethrin	3A	Suspend SC	Landscape use only. Broad spectrum, highly toxic to bees exposed to direct treatment or residues, extremely toxic to fresh-water and estuarine fish and invertebrates, may cause secondary pest outbreaks.	Yes
<i>Tau</i> -fluvalinate	3A	Mavrik	Container nursery stock, outdoor plantings, greenhouse. Broad spectrum, toxic to honey bees if exposed to direct application, however dried residuees are non-toxic to honey bees. Toxic to fish and aquatic organisms, may cause secondary pest outbreaks. 12-hour REI .	Yes
Permethrin	3A	Astro	Greenhouse, landscape, interiorscape. Broad spectrum, highly toxic to bees exposed to direct treatment or residues, extremely toxic to fish and aquatic invertebrates, may cause secondary pest outbreaks. 12-hour REI .	Yes
Pyrethrins	3A	Tersus, Pyganic, EverGreen EC 60-6, others	Nursery, greenhouse. Broad spectrum, highly toxic to bees exposed to direct treatment, toxic to aquatic organisms. 12 hour REI. Some organic-compatible formulations.	Yes
Acetamiprid	4A	TriStar, others	Nursery, greenhouse, landscape. Verify efficacy for target caterpillars. Toxic to bees and other pollinating insects exposed to direct treatment. Acetamiprid also used for other boxwood pests. EPA reduced-risk for ornamentals. 12-hr REI .	Yes
Spinosad	5	Conserve, Entrust, others	Nursery, greenhouse, landscape. Controls caterpillars via contact and ingestion. Toxic to bees exposed to treatment during 3 hours following application. Home garden formulations available. Entrust is organic-compatible. 4-hr REI	Yes
Spinetoram + sulfoxaflo	5 + 4C	XXpire	Nursery & greenhouse only. Not registered in NY or CA. Highly toxic to bees exposed through contact during spraying and while spray droplets are still wet. Toxicity is reduced when spray droplets are dry. Toxic to aquatic invertebrates. 12-hr REI.	No
<i>Bacillus thuringiensis kurstaki</i> and <i>B. t. aizawai</i>	11	Dipel Pro DF, Leprotec, Javelin, Deliver, Crymax (Btk); Agree (Bta); others	Bt <i>kurstaki</i> products are used in Europe for BTM management and appear to be effective. Must be ingested; apply when caterpillars are actively feeding. Biopesticide. 4-hr REI..	Yes
Diflubenzuron	15	Dimilin 4L, Adept	Use site varies by product. Labeled only for certain caterpillars and other pests. Toxic to aquatic invertebrates. Not for BTM in NY. 12-hour REI.	No
Methoxyfenozide	18	Intrepid 2F	Nursery, greenhouse landscape. Labeled for certain caterpillars. May be hazardous to sensitive aquatic invertebrates. Not for ornamentals or BTM in NY. 4-hour REI.	No
Indoxacarb	22A	Provaunt, Provaunt WDG	Landscape only. Highly toxic to bees exposed to direct treatment or residues. Toxic to fish and aquatic invertebrates.	Yes
Chlorantraniliprole	28	Acelepryn	Nursery, greenhouse, landscape. Foliar spray for caterpillars (systemic use for clearwing borers). Relatively low toxicity for bees and workers. EPA reduced-risk for ornamentals. Toxic to aquatic invertebrates, oysters, & shrimp. 4-hr REI	Yes

Cyantraniliprole	28	Mainspring GNL	Greenhouse, nursery, landscape. Foliar spray or systemic drench for caterpillars. No outdoor uses in NY. EPA reduced-risk for nursery & greenhouse ornamentals. Note bee advisory; highly toxic to bees exposed to direct treatment or residues. 4-hr REI	Yes
Cyclaniliprole	28	Sarisa	Greenhouse, nursery; no residential use. Note bee advisory. Flonicamid combination broadens efficacy for aphids, psyllids and other sucking insects. Highly toxic to bees and other pollinating insects exposed to direct treatment or residues. Toxic to aquatic invertebrates and oysters. REI 4 hr (Saria), 12 hr (Pradia)	Yes
Cyclaniliprole + flonicamid	28 + 29	Pradia		Yes

¹Products listed are examples for informational purposes and are not recommendations. There may be other formulations and generics. Verify product registration, uses, restrictions, and pollinator warnings before applying, some products not registered for use some states.

REI = re-entry interval following application, applies to uses in agriculture production (greenhouse, nursery)

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The species of moths pictured below were collected in bucket traps to survey for BTM presence in the Northwest and Mid Atlantic United States. They are ordered in decreasing abundance within traps.

Priesterognatha agilana

Collected: Burlington, Cumberland, Mercer Counties, NJ;
Lancaster, Somerset Counties, PA
Month(s): May, June, July
Wingspan: 12-18mm



***Habrosyne gloriosa* (Glorious habrosyne)**

Collected: Huntingdon County, PA
Month(s): July, September
Wingspan: ~37mm
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***Glaphyria fuminalis* (black-patched glaphyria)**

Collected: Mercer County, NJ; York, Berks, Huntingdon,
Lackawanna, Lycoming, Philadelphia, PA
Month(s): July, August, October
Wingspan: ~ 15mm
Copyright © 2009 Beatriz Moisset



***Resapamea passer* (Dock rustic moth)**

Collected: Crawford County, PA
Month: June
Wingspan: 30-36mm



***Hecatera dysodea* (Small ranunculus)**

Collected: Pierce & Kitsap Counties, WA
Month(s): August, September
Wingspan: 32-34mm
<http://www.biopix.com/>



***Anhimella pacifica* (Owlet moth)**

Collected: Pierce County, WA
Month(s): August, September
Wingspan: 24-26mm
Copyright © 2019 Mark Dreiling



***Leucania pseudargyria* (False wainscot)**

Collected: Pike County, PA

Month: July

Wingspan: 40-45mm



***Orthodes cynica* (Cynical Quaker)**

Collected: Cumberland County, New Jersey; Somerset County, Pennsylvania

Month(s): June, July

Wingspan: 27-34 mm

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***Lithomoia germana* (American brindle)**

Collected: Kitsap County, WA

Month(s): September, October

Wingspan: ~40mm

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***Parapediasia teterrellus* (Bluegrass webworm)**

Collected: Cumberland & Mercer Counties, New Jersey

Month(s): July

Wingspan: ~21 mm

Copyright © 2020 Mari Michaelis



***Helicoverpa zea* (Corn earworm)**

Collected: Erie County, PA

Month(s): July, August

Wingspan: 32-45mm



***Caenurgina crassiuscula* (Clover looper)**

Collected: Crawford County, PA

Month(s): July, October

Wingspan: ~30-40mm

© J. Allen Ratzlaff 2015



***Leucania amygdalina* (Northern linen wainscot)**

Collected: Lancaster County, PA

Month: May

Wingspan: ~32mm

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***Noctua comes* (Lesser yellow underwing)**

Collected: Pierce County, WA

Month: September

Wingspan: ~40mm

Photo Credit: Dumi 2011



***Crambus agitatellus* (Double-banded grass-veneer)**

Collected: York County, PA

Month(s): July, October

Wingspan: 17-22mm

Copyright © 2007 Canadian National Collection



***Lacinipolia renigera* (Bristly cutworm)**

Collected: Crawford County, PA

Month: October

Wingspan: 21-30mm

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***Sunira bicolorago* (Bicolored sallow/ Shield-backed cutworm)**

Collected: Huntingdon County, PA

Month: October

Wingspan: 28-38mm

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***Agnorisma badinodis* (Pale-banded dart)**

Collected: Westmoreland County, PA

Month: October

Wingspan: ~36mm

© John Pickering, 2004-2019



***Cerma cerintha* (Tufted bird dropping moth)**

Collected: Schuylkill County, PA

Month: June

Wingspan: 28-33mm



Chionodes pereyra

Collected: Pike County, PA

Month: July

Wingspan: ~14-18mm

Copyright © 2010 Mark Dreiling



***Chalcoela iphitalis* (Sooty-winged chalcoela)**

Collected: Philadelphia, PA

Month: May

Wingspan: ~9-11mm



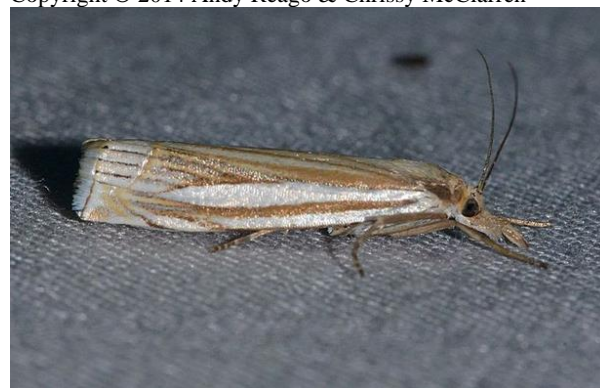
***Crambus laqueatellus* (Eastern grass-veneer)**

Collected: Crawford County, PA

Month: June

Wingspan: 23-30mm

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***Chionodes mediofuscella* (Black-smudged Chionodes)**

Collected: Lancaster County, PA

Month: June

Wingspan: ~16mm



***Epinotia transmissana* (Walker's epinotia moth)**

Collected: Lackawanna County, PA

Month: July

Wingspan: 14-17mm

Copyright © 2019 Solomon Hendrix



***Hypena scabra* (Green cloverworm)**

Collected: Erie County, PA

Month: August

Wingspan: 25-35mm



***Idia americalis* (American snout/idia)**

Collected: Monroe County, PA

Month: August

Wingspan: 20-30mm

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***Nomophila nearctica* (American celery webworm)**

Collected: Erie County, PA

Month: September

Wingspan: 24-35mm

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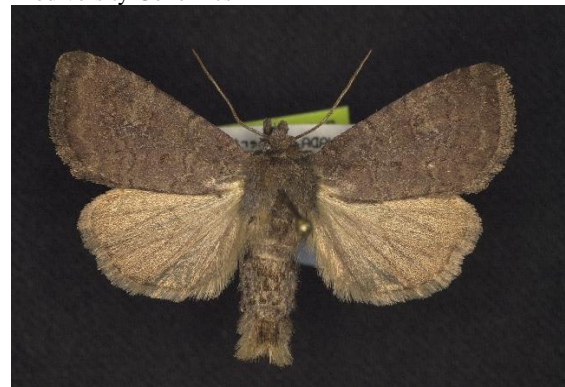
***Orthodes goodelli* (Goodell's arches moth)**

Collected: Huntingdon County, PA

Month: July

Wingspan: ~26-32mm

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***Pandemis limitata* (Three-lined leafroller)**

Collected: Pike County, PA

Month: June

Wingspan: 14-24mm

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***Spodoptera frugiperda* (Fall armyworm)**

Collected: Erie County, PA

Month: September

Wingspan: 32-40mm

Photograph by Lyle J. Buss, University of Florida



***Spodoptera ornithogalli* (yellow-striped armyworm)**

Collected: Erie County, PA

Month: September

Wingspan: 32-44mm

Image by Robert J. Bauernfeind, Kansas State University,
Bugwood.org



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***Xylomoia chagnoni* (Chagnon's borer moth)**

Collected: Lancaster County, PA

Month: June

Wingspan: 24-26mm

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