Box tree moth: An invasive pest on ornamentals in nurseries and landscapes

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Figure 1. Adult of box tree moth. Photo credit: Hannah Nadel at USDA (20210813-APHIS-HN-002). Box tree moth, *Cydalima perspectalis* (Figure 1), is an invasive pest of boxwood plants (*Buxus* spp.). It was introduced into New York in 2021 and is now reported in Michigan, Ohio, Connecticut, Massachusetts, New York, South Carolina, and Tennessee. It has not been reported in Georgia yet. The native range of the box tree moth is Asia, including Japan, China, Korea, and India. It is also reported as a serious problem in Canada, Europe, and Russia. Boxwoods are an important ornamental evergreen shrub in the southeastern U.S., widely planted in residential, commercial, and public landscapes in both urban and suburban areas.

Description and life history

Adult box tree moths are mostly white, with a white spot in the shape of a comma on each forewing. Their head, borders of wings, and tips of the abdomen are brown (Figure 1). However, approximately 10% of the moths are entirely brown with a comma-shaped mark on both forewings (Figure 1). Their wingspan is 1.6–1.8 in. with a slight iridescence. Adults can live up to 30 days and spread over a radius of approximately 6 mi. They lay translucent, flat, yellowish eggs in groups of 5–10 on the leaf surface (Figure 2).

Figure 2. Eggs of box tree moth. Photo credit: Hannah Nadel at USDA (20210811-APHIS-HN-006). Eggs appear as fish scales on the surface. The eggs hatch within 3–4 days, depending on the local temperature. The neonates (newly hatched young larvae) of the box tree moth are pale brown with a black head (Figure 3).

Figure 3. Neonates of box tree moth. Photo credit: Hannah Nadel at USDA (20210811-APHIS-HN-006). Late instar larvae are green with black and yellow stripes and black spots (Figures 4 and 5); the head is black. Larvae feed on the leaves for 2 weeks and pupate in silken webbing

Figure 4. Early instars of box tree moth. Photo credit: Mujezinovic Osman, Faculty of Forestry, Bugwood.org.?

and leaves.

Figure 5. Late instars of box tree moth preparing silken chambers. Photo credit: Hannah Nadel at USDA (20210810-APHIS-HN-005). The young pupa appears green with brown stripes (Figure 6). After approximately 2 weeks, the moths emerge from the pupae.

Figure 6. A box tree moth pupa. Box tree moths overwinter as larvae in silken chambers built between leaves. (Figure 7) As the weather warms in the spring, they emerge from the silken chambers and feed on leaves before pupating in the silk chamber.

Figure 7. Late instars of box tree moth preparing silken chambers. Photo credit: Hannah Nadel at USDA (20210816-APHIS-HN-008). Multiple generations are possible as all stages may be present throughout the summer. There could be up to five generations per year. The overwintering caterpillars can tolerate temperatures as low as -22 °F and resume development when temperatures reach approximately 46 °F in the spring.

Host plants

Boxwoods (*Buxus* spp.) serve as the host plants for box tree moths.

Damage

Figure 8. Damaged caused by box tree moth. Photo credit: Colette Walter,

http://www.lepiforum.de/webbbs/images/forum_2/pic13983.jpg.? Extensive feeding by larval stages causes defoliation of boxwoods (Figures 8, 9). Young larvae scrape off the tissues from the underside of the foliage. The affected leaves appear bleached.

Figure 9. Boxwood shrub destroyed by caterpillars of box tree moth. Photo credit: Ignacio Baez (l) and Mafalda Weldon (r), USDA.? As they grow into bigger caterpillars, they can eat the entire leaf, leaving behind the midrib. Caterpillars produce extensive webbing on the foliage. Upon complete defoliation of the plant, larvae feed on the bark. Heavy infestations can result in the complete collapse of the plants.

Management

After initial confirmation in Germany, the box tree moth spread rapidly to most European countries through the movement of native boxwood species. In the U.S., European boxwood cultivars are favored by the landscape industry, are actively planted in new residential and commercial developments, and are widely grown in container nurseries. Boxwood planting materials are actively moved around the states and can likely contribute to the rapid spread of this invasive pest. Since boxwood plants are not native to the U.S., they are not found in natural wild habitats. Therefore, careful inspection combined with proper phytosanitary measures could prevent the spread of this non-native insect pest in the landscape. Contact insecticides, such as pyrethroids (e.g., permethrin, cyfluthrin, deltamethrin, bifenthrin) or spinosad, should be effective against larval stages. Multiple applications during the growing season may be necessary. *Bacillus thuringiensis* subsp. *kurstaki* (*Btk*), widely recommended for caterpillar pest management, should also be effective against early instar larvae of box tree moth. Multiple weekly applications may be required for effective management using Btk products.

What should I do if an infestation is suspected?

If you suspect a box tree moth infestation or damage, please collect a few moths, contact a local UGA Extension agent or Georgia Department of Agriculture, and send the specimens for confirmation.

References

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