



## State of New Jersey

DEPARTMENT OF AGRICULTURE

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### **Box Tree Moth (BTM) Compliance Agreement for BTM Regulated Nurseries & Nursery Stock Plant Dealers**

**Agreement number:**

**Business Name and Address:**

**Location(s):**

**Email:**

Upon signing, this agreement remains in effect for one year unless revoked by the New Jersey Department of Agriculture or canceled by the establishment. If there is a change in establishment ownership, or any persons identified as the primary contact for the establishment, then a new agreement must be signed.

#### **REGULATED ARTICLES**

Boxwood plants (*Buxus* species)

#### **APPLICABLE LAW/REGULATION**

N.J.A.C. 2:20 Subchapter 11 - Box tree moth

#### **AGREEMENT SUMMARY**

This Compliance Agreement (CA) provides conditions required for the interstate/intrastate movement of boxwood plants from areas regulated for box tree moth (BTM) to non-regulated areas.

The signer, on behalf of the establishment named, agrees to process, and move regulated articles (*Buxus* spp; boxwoods), in accordance with the provisions of Federal and State regulations and the terms of this CA.

The establishment agrees to grow and ship boxwood plants in accordance with the requirements below. Boxwoods may only be shipped if accompanied by a certificate verifying that all conditions of this CA have been met.

The establishment must implement a systems approach for growing boxwood plants, involving multiple mitigation protocols to reduce the risk of spreading BTM from regulated areas, as outlined below. The

establishment must develop a pest management plan (PMP) for BTM to enter the CA and the PMP must be approved by the New Jersey Department of Agriculture.

Designated/assigned staff must be trained to identify the pest, its life stages, and signs of its presence such as webbing, frass, or feeding damage.

This CA does not preclude the inspection, sampling, and testing of plants by State or Federal authorities. This CA expires on \_\_\_\_\_ or at the discretion of the New Jersey Department of Agriculture.

## TRAPPING

1. Trapping is necessary to inform the establishment of BTM activity in the area and when to apply treatments (see # 4 below for trap specifications).
2. BTM traps must be used in establishments under compliance during all BTM flight periods.
  - a. Establishments must install BTM traps in outside production areas based on the following:

<u>Nursery size (acres)</u>	<u>No. traps</u>
<10	3
10 to 100	4
101 to 250	5
251 to 500	9
501 to 1000	13
1001 to 2000	19

- b. Enclosed production areas must have at least 2 traps per enclosure.
3. If BTM is not known to be present, the first detection of BTM in a trap must be reported to the Director, Division of Plant Industry within 2 business days.
4. For outside production areas, traps and lures must:
  - a. Be a bucket trap (Unitrap) with approved pheromone lure combination 5:1 (Z)-11hexadecenal:(E)-11-hexadecenal, loaded with a 3 mg dose on rubber septa. (see [BTM approved methods for surveillance](#))
  - b. Include an insecticidal strip (Dichlorvos, also known as DDVP and Vapona) to quickly kill captured moths.
  - c. If bucket trap (Unitrap) cannot be used in areas where endangered pollinators occur or there are restrictions for using the insecticidal strip, follow step 5 a-b of this section. Please consult the Director, Division of Plant Industry or State Plant Health Director (SPHD) prior to using large plastic delta traps.
  - d. Be replaced with new pheromone lures every 4 weeks.
  - e. Be placed at least 66 feet (20 meters) apart.
  - f. Be hung about five feet (1.5 meters) above soil surface, and
  - g. Be placed near the perimeter of the host area, within 10 feet (3 meters) in shade, when possible.
  - h. Be checked at least once a week during BTM flight periods. No trapping is required during nonflight periods.
5. For enclosed production areas, traps and lures must:
  - a. Be a red or green large plastic delta trap which uses a sticky inserts and does not require a kill strip. White delta traps should not be used as they may attract pollinators.

- b. Use approved pheromone lure combination 5:1 (Z)-11-hexadecenal:(E)-11-hexadecenal, loaded with two 3 mg dose on rubber septa that adds up to 6 mg.
- c. Be replaced with new pheromone lures every 4 weeks.
- d. Replace inserts once a month or when dirty or have more than 25% catch of other insects. e. Use two traps per enclosure.
- f. Place rubber septa in the center of the sticky insert.
- g. Be placed at least 66 feet (20 meters) apart.
- h. Be hung about five feet (1.5 meters) above soil surface.
- i. Be checked at least once a week during BTM flight periods. No trapping is required during nonflight periods.

## SCOUTING

1. The establishment must conduct routine scouting (see 3. below) of boxwood production areas to detect all life stages of BTM and eliminate them. Host plants with visible signs of BTM damage are prohibited from movement from the establishment.
2. Host plant scouting in production areas must be conducted by establishment personnel who have been trained to detect the life stages and signs associated with BTM, including webbing, frass, and feeding damage. Report any suspicious findings and signs of BTM immediately to establishment management.
3. Establishment personnel must conduct scouting monthly during non-flight periods, bi-weekly when larvae are known to be active, and weekly during BTM flight periods.
  - a. Develop a scouting plan. This plan must be included in the establishment's PMP.
  - b. Consult the [SAFARIS BTM adult phenology model](#) to determine flight periods.
  - c. Document all scouting episodes, including date, time, observations, and personnel who do the scouting.
4. If BTM is not known to be present within or near the establishment, the first detection of BTM signs or life stages must be reported immediately to the Director, Division of Plant Industry within 2 business days.

## INSECTICIDE TREATMENT

1. BTM treatment for production areas:
  - a. A PMP must be documented, implemented, and available for review upon request. The PMP should document the establishment's process to determine treatment times and applications.
  - b. See Appendix 1 for allowable insecticides. Follow all applicable laws for the application of insecticides.
  - c. Treatments must be applied within seven days of initial adult BTM trap captures for each generation.
    - i. Treatments are most effective targeting young caterpillars and must be applied to target the period when the majority of newly laid eggs are likely present on the plants. Re-treat according to label directions to ensure ongoing control. Treatments must be done at a level/frequency to prevent active infestations and damage to the plants.
  - d. The establishment must maintain records of all treatments for a minimum of 12 months.
  - e. Boxwoods that are received by the establishment (buy-ins) must be treated at least once as part of production, and once for pre-shipment.

2. BTM treatment for pre-shipment.
  - a. An approved insecticide must be applied to any host plants leaving the establishment within 14 days of shipment. If plants cannot be shipped within the 14-day period, the shipment must be retreated.
  - b. A list of insecticides for pre-shipment is available in Appendix 1 Table 1.
3. Exception from treatments for Enclosed Boxwood Production Areas.
  - a. Establishments that use screens or structures, which have been approved by the New Jersey Department of Agriculture, as pest-exclusion barriers to prevent exposure to adult BTM are not required to treat boxwood plants that have been produced exclusively inside structures.
  - b. Trapping within the enclosure is required during all BTM flight periods.
  - c. A detection of any BTM life stage will nullify this exception, and the plants will need to meet the requirements for plants that are not grown in Enclosed Boxwood Production Areas.
  - d. Report any detection from an enclosure to the Director, Division of Plant Industry within two business days.

### **PRE-SHIPMENT INSPECTION**

1. The establishment must visually inspect all outbound shipments, after treatment (see INSECTICIDE TREATMENT below and Appendix 1), for viable BTM life stages, webbing, frass, or feeding damage.
  - a. Inspections must be completed by trained personnel identified in the PMP.
  - b. Inspections must be completed no more than 24 hours before shipments leave the establishment.
  - c. If viable BTM life stages, webbing, frass, or feeding damage are detected on the shipment, the establishment must report immediately to the Director, Division of Plant Industry.
  - d. Potentially infested host plants must not be moved from the establishment until determined to be free of BTM by the New Jersey Department of Agriculture.
2. Shipments that have been inspected by the establishment and found free of BTM are eligible for a certificate.

### **CERTIFICATION**

1. Boxwoods may only be shipped if accompanied by a certificate from the New Jersey Department of Agriculture.
2. New Jersey Department of Agriculture may issue the certificate for movement to the establishment operating under a compliance agreement for use with subsequent shipments of boxwoods.
3. A certificate may be issued for movement of boxwood if:
  - a. It is determined upon examination that the boxwood may be moved in accordance with this CA.
  - b. It is determined that the boxwoods may be moved in accordance with all other State and Federal domestic plant quarantines and regulations applicable to boxwood.
4. The certificate required for the movement of the boxwood must, at all times during the movement, be attached to the accompanying waybill or other shipping document.
5. The carrier must furnish the certificate to the consignee at the destination of the shipment.

## **NOTIFICATION**

1. The receiving state and shipper must agree on a notification protocol, which should include the notification frequency and timeliness.
2. The approved notification protocol must be documented and retained by both parties.
3. Notifications must be documented and retained.
4. The establishment will provide shipping documentation to the State Certifying Authority which includes the date, destination, and amount of host material to be sent. All shipments must also abide by all applicable quarantines of the receiving state.
5. A list of SPRO's contact information is available at [www.nationalplantboard.org](http://www.nationalplantboard.org).

## **TRAINING**

1. The establishment must educate and train appropriate personnel on the following:
  - a. Identification of BTM.
  - b. Recognizing the signs and life stages of BTM.
  - c. Understanding the stipulations of this BTM Program compliance agreement.
  - d. Proper Trapping and Scouting Techniques for BTM.
  - e. Knowledge of the BTM regulations and regulated areas.
2. Training resources are available at the [APHIS BTM website](#).
3. Training Records:
  - a. A record of training is documentation of training material used for training, date of training, and names of personnel who were trained.
  - b. Training records must be retained for at least 12 months.
  - c. New scouting personnel must receive training before monitoring boxwoods.
  - d. Scouting personnel names and dates of training must be listed in the establishment's PMP.

## **RECORD KEEPING**

1. Records must be maintained for a minimum of 12 months.
2. Records must be made available to the New Jersey Department of Agriculture or Plant Protection and Quarantine (PPQ) upon request.
3. Required records are:
  - a. Personnel training for ID, scouting, compliance, etc. (i.e., dates, attendees, training material, trainer).
  - b. Sourcing (or propagation records).
  - c. Scouting (i.e., personnel, dates, monitoring observations).
  - d. Treatment (i.e., personnel, dates, rates, locations).
  - e. Trapping (i.e., personnel, dates, number of moths, and control activities).
  - f. Plant movement (i.e., location(s) throughout crop cycle).
  - g. Pre-Shipment inspection (i.e., location, bulk quantity, quantity inspected, who inspected).
  - h. Notification protocols and notifications.
  - i. Outbound/shipping/sales documentation (i.e., customer invoices, dates, quantity, destinations).
4. Records of any pesticide application(s) must be kept and retained in accordance with the pesticide regulations for your state.

## NON-COMPLIANCE

1. Non-compliance with this agreement may result in its suspension or revocation.
2. Non-compliance involving the shipment of live BTM may result in plant destruction.

### Appendix 1. Insecticides for BTM control

The products listed below are for the treatment of boxwood plants for BTM. Use of a suitable adjuvant is required for boxwoods to get sufficient coverage, wetting, and penetration of the chemical treatment of the waxy foliage of these plants (Table 3). Spray products to wet the plants and use spray cards to ensure good coverage.

Listed in Table 1 are the products that can be used to treat boxwood for BTM before shipping from establishments under a compliance agreement. Abide by all applicable State and Federal laws.

A high labeled rate of a diamide (IRAC<sup>1</sup> chemical class 28) or a long-lasting formulation of one of the following synthetic pyrethroids (IRAC chemical class 3) will effectively control BTM larvae that may be present on plants. Plants must be treated within 14 days of plant shipment.

**Table 1.** Products for use as the pre-shipment treatment. Specific products listed are those that were tested in 2023 and 2024, but use of products with the same active ingredient and percent active ingredient and rate are also acceptable if allowed by the label.

Active ingredient	Commercial name	EPA Reg. #	REI	IRAC <sup>1</sup> Class	Rates	Remarks
<b>bifenthrin</b>	<b>Talstar S</b> (7.9% active ingredient)	279-3155	12 hrs	3	21.7 oz /100 gal	Tested by FPML <sup>2</sup> , 100% mortality for eggs, 1st to 3rd instar; complete control of 2nd instars when exposed to foliage treated 4 and 7 days prior (2023). Mortality 98% in NY field test mixed populations of small and large larvae (Sept. 2023) at 21.7 oz/100 gal. Mortality 100% for 3 <sup>rd</sup> instar when exposed for 7 days to foliage treated up to 2 weeks prior at 10.8 oz/100 gal (2024).
<b>chlorantraniliprole</b>	<b>Acelepryn</b> (18.4% active ingredient)	100-1489	4 hrs	28	16 oz /100 gal	Tested by FPML, 100% mortality for eggs, 1st to 3rd instar; complete control of 2nd instars when exposed to foliage treated 4 and 7 days prior (2023). Mortality 97%-99% in NY field mixed populations of small and large larvae test (July & Sept. 2023). Mortality 100% for 3 <sup>rd</sup> instar when exposed for 7 days to foliage treated up to 3 weeks prior (2024).
<b>cyantraniliprole</b>	<b>Mainspring GNL</b> (18.66% active ingredient)	100-1543	4 hrs	28	8 oz /100 gal	Tested by FPML, 100% mortality for 3 <sup>rd</sup> instar when exposed for 7 days to foliage treated up to 3 weeks prior (2024).

<b>lambdacyhalothrin</b>	<b>Scimitar GC</b> (9.7% active ingredient) Restricted use.	100-1088	24 hrs	3	5 oz /100 gal	Tested by FPML, 100% mortality for eggs, 1st to 3rd instar; complete control of 2nd instars when exposed to foliage treated 4 and 7 days prior (2023). Mortality 95% in NY field test (Sept. 2023). Mortality 100% for 3 <sup>rd</sup> instar when exposed for 7 days to foliage treated up to 3 weeks prior (2024).
<b>permethrin</b>	<b>Perm-Up 3.2 EC</b> (36.8% active ingredient)	70506-9	12 hrs	3	8 oz /100 gal	Tested by FPML, 100% mortality for 3 <sup>rd</sup> instar when exposed for 7 days to foliage treated up to 3 weeks prior (2024).

<sup>1</sup> IRAC or Insecticide Resistance Action Committee has developed a numbering system for each mode of action to select the most appropriate rotation alternatives by assigning a unique group number. (<https://irac-online.org>)

<sup>2</sup> USDA-PPQ-Science and Technologies' Forest Pest Methods Laboratory (FPML)

In addition to the products in Table 1, the products listed in Table 2 may be considered for managing BTM in the production system. But should not be used as a treatment for boxwood plants before shipment. All active ingredients target larvae.

A list of additional products for managing caterpillars in commercial landscape and nursery use is available at [https://ir4.cals.ncsu.edu/EHC/InvasiveSpecies/BTM\\_FactSheet\\_VisualGuide.pdf](https://ir4.cals.ncsu.edu/EHC/InvasiveSpecies/BTM_FactSheet_VisualGuide.pdf). These products may be considered for managing BTM in the production system. Consult with your local Extension office to determine if an active ingredient is registered for use in your state or county.

**Table 2.** Recommended products to treat boxwood for BTM in the production system.

Active ingredient	Commercial name	EPA Reg. #	REI	IRAC Chemical Class	Rates	Remarks
<i>Bacillus thuringiensis, kurstaki</i>	<b>Javelin WG</b> (85% active ingredient)	70051-66	4 hr.	biological	1.0 lb. /100 gal	Highly effective when early larval stages are targeted. Used in Europe <sup>3</sup> and Canada to control BTM. Applied in NY pilot project, in urban gardens area-wide control experiment with high degree of control achieved. Two applications timed 7-10 days apart achieve good control. Sprays should target young larvae for best results. No residual efficacy.
<b>spinosad</b>	<b>Conserve SC</b> T&O (11.6% active ingredient)	62719-291	4 hr.	5	6 oz /100 gal	Tested by FPML, 100% mortality for eggs, 1st to 3rd instar. Mortality 98-100% in NY field test (July & Sept. 2023). This product is short lived. Should not be used when residual control efficacy is needed.

<b>methoxy fenozide</b>	<b>Intrepid 2F</b> (22.6% active ingredient)	62719-442	4 hr.	18	8 oz /100 gal	Tested by FPML, 100% mortality for eggs, 1st to 3rd instar; complete control of 2nd instars when exposed to foliage treated 4 and 7 days prior, once molting occurred (2023). Mortality in NY field test (July 2023) was 98-99%. Mortality 100% for 3 <sup>rd</sup> instar when exposed for 7 days to foliage treated up to 3 weeks prior, at 16 oz/100 gal (2024). User may see active caterpillars after application. Product prevents molting, and caterpillars do not die until they try to molt.
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<sup>3</sup> Barbero, F., C. Pogolotti, S. Bonelli, C. Ferracini. 2024. Is microbiological control of the box tree moth feasible? Effectiveness and impact on nontarget diurnal Lepidoptera. *Biological Control*, 188:105427.

**Table 3.** Recommended adjuvant products<sup>1</sup> to include with insecticides<sup>2</sup> when treating boxwood for BTM.

<b>Commercial name</b>	<b>Active ingredient(s)</b>	<b>Rates</b>
<b>Pentra-Bark</b>	Alkylphenol ethoxylate, polysiloxane polyether copolymer, propylene glycol	6 fl. oz./100 gal.
<b>Stik-Kote</b>	Polyether modified heptamethyltrisloxane	12.75 fl. oz./100 gal.
<b>CapSil</b>	Blend of polyether-polymethylsiloxane-copolymer and nonionic surfactant	6 fl. oz./100 gal.
<b>Induce</b>	Alky aryl polyoxylkane ethers, alkanolamides, dimethyl siloxane, and free fatty acids	16 fl. oz./100 gal.
<b>Polymer Taxi</b>	Acrylic polymer sodium	128 fl. oz./100 gal.
<b>Aero Dyne-Amic</b>	Methyl esters of fatty acids, alcohol ethoxylate phosphate ester, alkyl phenol ethoxylate	64 fl. oz./100 gal.
<b>Nu Film P</b>	Pinene (polyterpenes) polymers, petrolatum, alkyl amine ethoxylate	16 fl. oz./100 gal.

<sup>1</sup> Tested by Cornell Cooperative Extension Suffolk County. Based upon ratings immediately after application, on two cultivars (*Buxus* x 'Green Mountain' and *B. microphylla* 'Winter Gem') Pentra-bark and Stik-Kote had the highest ratings for wetting and spreading of spray material on both new and old foliage. Most other adjuvants also provided at least moderate wetting and spreading on old and new foliage, similar in most cases to the water-based controls. Ratings after dark under UV light showed very good coverage on new foliage among all adjuvants and the dye control treatments, and on old foliage in nearly all adjuvant treatments. Coverage with Nu Film P was somewhat less, though not always significantly, on old foliage compared with other adjuvants tested. Nu Film P may still be an option to consider for organic production situations.

<sup>2</sup> Choice of material might depend upon insecticide and adjuvant modes of action, label recommendations and whether tank is mixed with other products.