

**Box Tree Moth (BTM)
Compliance Agreement for Production Nurseries in BTM Regulated Nurseries**

Agreement #: _____

Establishment Name: _____

Establishment Address: _____

City: _____ **State:** _____ **Zip:** _____

Establishment Location(s) and Contact Information:

Upon signing, this agreement remains in effect for one year unless revoked by the State Certifying Authority 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

[INSERT State Regulation]

Federal Orders: Federal Orders as applicable

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 State Certifying Authority.

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 State Certifying Authority.

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 the production area based on the following:

| Nursery size (acres) | No. traps |
|----------------------|-----------|
| <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 1 trap per enclosure.
3. If BTM is not known to be present, the first detection of BTM in a trap must be reported to the State Plant Regulatory Official (SPRO) office within 2 business days.
4. Traps and lures must:
 - a. Be a bucket trap (Unitrap) with approved pheromone lure combination 5:1 (Z)-11-hexadecenal:(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. Be replaced with new pheromone lures every 4 weeks.
 - d. Be placed at least 66 feet (20 meters) apart.
 - e. Be hung about five feet (1.5 meters) above soil surface, and
 - f. Be placed near the perimeter of the host area, within 10 feet (3 meters) in shade, when possible.
 - g. Be checked at least once a week during BTM flight periods. No trapping is required during non-flight 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 SPRO office 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 seven days of shipment. If plants cannot be shipped within the seven-day period, the shipment must be re-treated.
 - b. A list of insecticides for pre-shipment is available in Appendix 1 Table 1.
3. Exception from treatments for Enclosed Production Areas.
 - a. Establishments that use screens or structures, which have been approved by the State Certifying Authority, as pest-exclusion barriers to prevent exposure to adult BTM are not required to treat boxwood plants.
 - 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 Production Areas.
 - d. Report any detection from an enclosure to the SPRO office 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 BTM eggs and 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 BTM eggs and/or BTM life stages, webbing, frass, or feeding damage are detected on the shipment, the establishment must report immediately to the SPRO office.

- d. Potentially infested host plants must not be moved from the establishment until determined to be free of BTM by the State Certifying Authority.
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 State Certifying Authority.
2. The State Certifying Authority 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 establishment shipping the boxwood must notify the State Certifying Authority of the receiving state where the host material is being sent no less than one week prior to shipping.
2. 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.
3. A list of SPRO's contact information is available at 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 State Certifying Authority or PPQ upon request.
3. Required records are:
 - a. Personnel training for identification, 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, notifications).
 - h. Outbound/shipping/sales documentation (i.e., customer invoices, dates, quantity, destinations).

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.

TERMS AND AGREEMENT

Failure to meet the terms of this Agreement may result in cancellation of the agreement. On behalf of the Establishment:

Signature:

Printed Name:

Title:

Date:

FOR VDACS OFFICE USE ONLY

On behalf of the Virginia Department of Agriculture and Consumer Services,

Signature:

Printed Name:

Title:

State Plant Regulatory Official

Date:

On behalf of USDA, APHIS, PPQ,

Signature:

Printed Name:

Title:

State Plant Health Director

Date:

Compliance Agreement Number:

Expiration Date:

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 (IRAC¹ chemical class 28) or a long-lasting formulation of one of the synthetic pyrethroids (IRAC chemical class 3) will effectively control BTM larvae that may be present on plants. Plants must be treated within 7 days of plant shipment.

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

| Active ingredient | Commercial name | EPA Reg. # | REI | IRAC ¹ Chemical Class | Rates | Remarks |
|---------------------|--|------------|--------|----------------------------------|-----------------|--|
| bifenthrin | Talstar P (7.9% active ingredient) | 279-3206 | 12 hrs | 3 | 21.7 oz/100 gal | Tested by FPML ² , 100% mortality for eggs, 1st to 3rd instar; complete control of 2nd instars when exposed to foliage treated 4 and 7 days prior. Mortality 98% in NY field test mixed populations of small and large larvae (Sept. 2023) at 21.7 oz/100 gal). |
| chlorantraniliprole | Acelepryn (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. Mortality 97%-99% in NY field mixed populations of small and large larvae test (July & Sept. 2023). |
| lambda-cyhalothrin | Scimitar GC (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. Mortality 95% in NY field test (Sept. 2023). |

¹ 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>)

² 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. 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> | Javelin WG (85% active ingredient) | 70051-66 | 4 hr | biological | 1.0 lb/100 gal | Highly effective when early larval stages are targeted. Used in Europe ³ 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. |
| spinosad | Conserve SC 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. |
| methoxy fenozide | Intrepid 2F (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. Mortality in NY field test (July 2023) was 98-99%. User may see active caterpillars after application. Product prevents molting, and caterpillars do not die until they try to molt. |

³ Barbero, F., C. Pogolotti, S. Bonelli, C. Ferracini. 2024. Is microbiological control of the box tree moth feasible? Effectiveness and impact on non-target diurnal Lepidoptera. *Biological Control*, 188:105427.

Table 3. Recommended adjuvant products⁴ to include with insecticides⁵ when treating boxwood for BTM.

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

⁴ 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.

⁵ Choice of material might depend upon insecticide and adjuvant modes of action, label recommendations and whether tank is mixed with other products.