

Phase 1
Cylindrocladium buxicola
Nursery Certification
Standard

August 2012

Acknowledgement

As per Rita et al.

Phase 1 *C. buxicola* Nursery Certification Standard August 2012

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Glossary

<i>Apparently free from Box Blight</i>	<i>Phrase used to describe shipments of inspected boxwood and pachysandra plants that do not display symptoms of Box Blight disease, but may harbour the disease at a stage which is not yet visible.</i>
<i>Appendix</i>	<i>A body of separate additional material at the end of a book, magazine, etc., especially one that is documentary or explanatory. For the purposes of this Certification Standard, the explanatory documents following the Standard are called ‘the Appendix’ or ‘Appendices’</i>
<i>Attachment</i>	<i>For the purposes of this Certification Standard, ‘Attachments’ are used by the nursery to provide the corroborating or additional information when writing their individual Nursery Manual</i>
<i>Audit Service Provider</i>	<i>An organization or entity, approved by the Canadian Nursery Certification Institute to conduct external audits.</i>
<i>Audit Report</i>	<i>Report produced by the approved audit service provider’s external auditor; copies are provided to the certified nursery, the approved audit service provider, and CNCI.</i>
<i>Biosecurity</i>	<i>Measures taken to prevent the introduction and/ or to minimize the risk of establishment and spread of a specific pest.</i>
<i>Box Blight</i>	<i>The common name for the disease caused by <u>Cylindrocladium buxicola</u> which infects all genera within the <u>Buxus</u> family. Other synonyms for this disease include <u>Cylindrocladium pseudonaviculatum</u> and <u>Calonectria pseudonaviculatum</u>. The abbreviation C. buxicola will be used in this Phase 1 Standard document.</i>
<i>Boxwood plants</i>	<i>All plant species in the genus Buxus</i>
<i>BMP’s</i>	<i>Best Management Practices. The BMP’s are methods and techniques, which, when implemented consistently and appropriately will reduce the risk that <u>C. buxicola</u> will be introduced or spread within the nursery. BMPs are a set of science-based protocols or approaches implemented by nurseries to prevent the introduction, establishment and spread of plant pests within and between nurseries and from nurseries to the natural environment.</i>
<i>CAR (Corrective Action Request)</i>	<i>A report created by an auditor to describe non-conformance detected during an audit and to describe the corrective action to be taken.</i>

<i>Certification Stamp</i>	<i>The stamp or seal issued annually by CNCI providing the nursery's certification identification number as well as any additional pest specific modules for use by the nursery on their own documents.</i>
<i>Certification Status</i>	<i>Status of a nursery that has undergone all components of a Certification Program and has been audited to verify that all components are properly implemented.</i>
<i>Certification Identification Number</i>	<i>The unique number assigned by the CNCI to a certified nursery.</i>
<i>Certification Manager</i>	<i>Nursery manager that is responsible for all aspects of the Nursery Certification program.</i>
<i>CFLA</i>	<i>Canadian Food Inspection Agency</i>
<i>CFLA Phytosanitary Certificate</i>	<i>An official document issued by the plant protection organization of Canada to the plant protection organization of an importing country. It attests that the plants or plant products covered by the certificate have been inspected according to appropriate procedures and are considered to be free from other injurious pests and that they are considered to conform with the current phytosanitary regulations of the importing country.</i>
<i>Clean Plants</i>	<i>An industry designed and delivered, systems-based certification program for the movement of nursery stock within Canada.</i>
<i>Clean Plants Standard</i>	<i>Document that outlines all the required components of the Clean Plants program.</i>
<i>Phase 1 C. buxicola Nursery Certification Standard</i>	<i>Document that outlines all the required components of the Phase 1 <u>C. buxicola</u> Nursery Certification program.</i>
<i>CNCI</i>	<i>Canadian Nursery Certification Institute, a nursery industry organization with the responsibility for accreditation of auditors and certification of nurseries for domestic phytosanitary purposes.</i>
<i>CNCI Accredited Auditor</i>	<i>Auditors that have been trained and accredited by CNCI for purposes of conducting Phase 1 <u>C. buxicola</u> Nursery Certification external audits.</i>
<i>CNCI Adjudication Committee</i>	<i>Committee which reviews Phase 1 Nursery Manuals, initial facility audit reports and audit reports, when critical non-conformances occur.</i>
<i>CNCP (CFLA D04-01)</i>	<i>The CNCP is a directive describing a phytosanitary certification program for Canadian nurseries and greenhouses that ship nursery stock to the United States (US) or within Canada.</i>

<i>Control Measures</i>	<i>Methods of pest control.</i>
<i>Corrective Action Plan</i>	<i>The plan, created by the nursery and agreed to by the auditor, to correct non-conformances identified in Corrective Action Requests (CARs).</i>
<i>Crop Protection Manager</i>	<i>A member of the certified nursery management team or a contractor who is responsible and accountable for the overall implementation of the Pest Management Plan.</i>
<i>CSI</i>	<i>Centre for Systems Integration, a national organization that conducts various types of independent verification or audits in the Agri-food sector.</i>
<i>External Audits</i>	<i>An objective appraisal of a nursery certification program at a facility that is carried out by a CNCI approved external auditor, or a CFLA Audit Team when the nursery is in the CNCP program, to verify that all components as specified in the certification Nursery Manual have been implemented. External auditors can conduct either systems or surveillance audits.</i>
<i>FAO</i>	<i>Food and Agriculture Organization of the United Nations</i>
<i>Facility</i>	<i>This term is used synonymously with “nursery” or refers to a part of a nursery that is physically separated and is under a separate management structure.</i>
<i>Growing Season</i>	<i>Period or periods of the year when plants actively grow in an area, place of production, or production site (FAO 2004). For the purposes of Phase 1 <u>C. buxicola</u> Nursery Certification program, a growing season must be no less than 120 days.</i>
<i>Internal Audit</i>	<i>An audit conducted by an approved staff member for the purpose of providing an objective appraisal of the system (certification program) used at the nursery. An internal audit may be a surveillance audit or a systems audit.</i>
<i>Internal Auditor</i>	<i>An employee or contractor that is independent and objective and is designated by management to perform an internal audit to verify that all of the components of the Certification Standard have been properly implemented as per the Nursery Manual.</i>
<i>Isolation Area</i>	<i>An area of the nursery set aside to hold plants that may pose a pest risk to other plants on the nursery. The isolation area must be separated from the production facility, preferably in a specially designated area which has a 2 meter buffer (canopy to canopy) of non-host plants (can also be empty) and/ or a barrier at least 0.5 meters (50 cm) higher than the highest plant adjacent. Special biosecurity measures must be employed within the isolation area, taking into account potential dispersal of infected material through water or air.</i>

ISPM	<i>International Standards for Phytosanitary Measures are the standards, guidelines and recommendations recognized as the basis for phytosanitary measures applied by Members of the World Trade Organization under the Agreement on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement).</i>
Japanese Spurge	Plants in the genus <u>Pachysandra</u>.
Non-Conformance	<i>Minor, major, and critical non-fulfillment of requirements of the nursery certification program.</i>
Non-Conforming Plant Material	<i>Plant material that is found to not conform with the requirements of the nursery certification program.</i>
Non Regulated Non-Quarantine Pest	<i>A pest that is not under official (federal or provincial) control, and whose presence does not affect the intended use of those infected plants with an economically unacceptable impact. A non-regulated or non-quarantine pest whose presence does not affect the intended use of those infected plants with an economically insignificant impact and which is therefore not regulated within the territory of the importing contracting party (ISPM No. 5).</i>
Non-Regulated Pests	<i>Often referred to as “other pests”, and includes pests that are not under official control.</i>
Nursery	<i>A facility for the production of woody or herbaceous plants either in ground or containers. Production may be outdoors or in a greenhouse.</i>
Nursery Stock	<i>Any plant for planting, propagation or ornamentation including greenhouse, containerized and field grown plants.</i>
Origin	<i>The point at which something comes into existence or from which it derives or is derived.</i>
Pachysandra	<i>Commonly known as Japanese Spurge (<u>Pachysandra terminalis</u>)</i>
Pest	<i>Anything that is injurious or potentially injurious, whether directly or indirectly, to plants or to products or by-products of plants and includes any plant prescribed as a pest (Plant Protection Act 1990).</i>
Pest Specific Module	<i>A certification program designed to control the spread of a specific pest which is integrated as part of an nursery’s overall Clean Plants Nursery Manual.</i>
Phytosanitary Risk	<i>The possibility of introducing a potentially harmful pest.</i>
Policy	<i>A set of guidelines or procedures which outlines the steps implemented at the nursery to reduce the risk of introduction or spread of a pest.</i>

<i>Practically Free</i>	<i>A consignment, field, or place of production, without pests (or a specific pest) in numbers or quantities in excess of those that can be expected to result from, and be consistent with, good cultural and handling practices employed in the production and marketing of the commodity (ISPM No. 5).</i>
<i>Quarantine Pest</i>	<i>A pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled (ISPM No. 5)</i>
<i>Regulated Pest</i>	<i>A quarantine pest or a regulated non-quarantine pest (ISPM No. 5).</i>
<i>Regulated Non-Quarantine Pest</i>	<i>A non-quarantine pest whose presence in plants for planting affects the intended use of those plants with an economically unacceptable impact and which is therefore regulated within the territory of the importing contracting party (ISPM No. 5).</i>
<i>Surveillance Audit</i>	<i>An audit of the facility to ensure all phytosanitary processes regarding inspections and monitoring are in place as specified in the Phase 1 <u>C. buxicola</u> Nursery Manual. Surveillance audits should also include field inspections to verify freedom from regulated pests.</i>
<i>Surveillance Inspection</i>	<i>Continual monitoring and verification of the status of an entity and analysis of records to ensure that specified requirements are being fulfilled (ISO 8402:1994)</i>
<i>Suspension</i>	<i>Nursery can no longer ship plants as C. buxicola certified under the CNCI program due to non-compliance resulting in loss of privileges including certification status, CNCI number and identifying logo.</i>
<i>Symptom free</i>	<i>Boxwood plants which have been inspected and no symptoms of Box Blight have been found. This designation <u>does not</u> mean that the plant is free of the disease, only that the symptoms have not yet manifested to the visible stages.</i>
<i>Systems Audit</i>	<i>A systematic examination of the organizational structure, procedures, processes and resources to ensure they are adequate to implement the requirements of a CNCI nursery certification program at an approved facility.</i>
<i>Traceability</i>	<i>The ability to follow an item or group of items – animals, plants, food products or ingredients – from one point in the supply chain to another. (AAFC Website definition)</i>

1.0 Introduction

1.1 The Phase 1 *C. buxicola* Nursery Certification Standard

The following Phase 1 *C. buxicola* Nursery Certification Standard outlines the criteria required for *Cylindrocladium buxicola*¹ (Box Blight) management. This document will hereafter be referred to as the **Phase 1 Standard**. This is a program to prevent the introduction and spread of *C. buxicola* in the Canadian nursery industry and in the Canadian environment. In addition, adopting this Standard moves toward protecting nurseries from other pests of concern. This program was developed in cooperation with the Canadian Nursery and Landscape Association, and industry members, phytopathologists and extension experts across Canada, the United States and the European Union.

The objectives of a *C. buxicola* Management Program are to:

1. Keep Canada open for trade in boxwood and pachysandra plants.
2. Reduce the risk of introduction, establishment and spread of *C. buxicola* into the nursery and throughout nursery industry and associated industries of garden retailers and the landscape trade.
3. Reduce the risk of spread of *C. buxicola* from the nursery into the Canadian environment.
4. Show due diligence by the nursery production facility proving that best efforts have been made to reduce the risk of *C. buxicola* spread.

There are five key elements to this *C. buxicola* Management Program:

1. Prevention of the disease from entering the facility.
2. Evaluation of the facility for the presence of *C. buxicola* by regular examination of host plants for symptoms of *C. buxicola* through the growing season and subsequent sampling and testing of those plants with symptoms.
3. Ensuring traceability of all boxwood and pachysandra plants.
4. Preparation and update of a Phase 1 Nursery Manual.
5. Verification that operations are compliant with processes as described in the Phase 1 *C. buxicola* Nursery Certification Standard by an independent, third party audit.

Disclaimer:

1. As the science of *C. buxicola* becomes clearer, the requirements of this program will change. This is a 'working' document.

¹ Synonyms are *Cylindrocladium pseudonaviculatum* and *Calonectria pseudonaviculata*.

2. Refer to the Canadian Nursery Certification Institute's website at www.cleanplants.ca for the most current version of the Phase 1 *C. buxicola* Nursery Certification Standard.
3. Implementing the actions that are outlined in this Phase 1 Standard will reduce but not eliminate the risk of *C. buxicola* being established or found on plants at the nursery.
4. This program CANNOT guarantee a nursery free from *C. buxicola*, although participating in the *C. buxicola* certification program demonstrates that the nursery has employed best practices and may consider itself 'symptom free' from this disease.

1.2 Application and Participation:

This document is specifically developed for nurseries which want to minimize the risk of importing and moving *Cylindrocladium buxicola* (Box Blight) in *Buxus* species through the application of Best Management Practices and other requirements, and do not currently participate in the CNCI's Clean Plants Domestic Phytosanitary Certification Program. Nurseries may choose to extend the BMP's to other potentially susceptible genera within the Buxaceae family.

To participate in this program, nurseries will follow this procedure:

1. Apply to CNCI to participate in the Phase 1 Program by filling out a Clean Plants Application form (Appendix 1). Note on the form that the nursery is applying for the new Phase 1 *C. buxicola* program. (Application can be found at www.cleanplants.ca – Appendix 1 of the Clean Plants Standard.
2. Pay applicable fees. The Application Fee is the same for all programs.
3. Review the Phase 1 Standard (this document). Further training will be required as per Section 9. Contact the CNCI Administrator for details about training in your area.
4. Implement the requirements of the Phase 1 Standard on the applicant nursery.
5. Write the Phase 1 Nursery Manual using the Phase 1 Nursery Manual Template (Appendix 2). The Nursery Manual outlines the BMPs and requirements implemented on the nursery, which then is sent to CNCI for review by a technical expert. The manual will be approved when the reviewer is satisfied the requirements of the Phase 1 program are being met.
6. The nursery must undergo an external audit within 4 months of the manual approval to ensure the requirements of the Phase 1 *C. buxicola* Standard are met at the facility.
7. The nursery will expand its participation to the full 'Clean Plants' program within one year of the Phase 1 Nursery Manual approval. This will include expanding its BMP's to include those written in the Clean Plants Standard, writing a full 'Clean Plants Nursery Manual' and implementing the BMP's, including the *C. buxicola* module if it so chooses.
8. The nursery shall undergo an external audit of the full Clean Plants program on the nursery within 24 months of the application to participate in Phase 1.

Nurseries participating in the program will be considered Phase 1 *C. buxicola* Certified when they have successfully completed steps 1 through 6 above.

Clean Plants or CNCP Certified nurseries may participate in *C. buxicola* Certification by appending the Clean Plants *C. buxicola* Module (not Phase 1) to their Clean Plants or CNCP Manual. CNCP nurseries must provide a copy of the Clean Plants *C. buxicola* Module to CNCI annually in order to verify that they are participating in the program.

1.3 The Canadian Nursery Certification Institute

The Phase 1 *C. buxicola* Certification Program is accredited under the auspices of the Canadian Nursery Certification Institute (CNCI). This independent organization was created in 2005 specifically to provide nursery certification accreditation in Canada. CNCI is a not-for-profit entity, which is at arm's length to the production nursery industry.

The Board of Directors is made up largely of experienced ornamental nursery professionals. The CNCI aims to be efficient and effective, and to be responsive to industry, consumer and government needs.

The CNCI is responsible for the design and implementation of this, and other, pest specific modules under the umbrella of the Clean Plants Standard. The CNCI is responsible for the delivery of the Clean Plants program within all provinces and territories. The CNCI policy ensures uniform national certification processes are in place and that audits are conducted in accordance with the specifications outlined in this document. Various audit tasks will be delegated to an accredited audit service provider. The CNCI is currently administered by the Canadian Nursery Landscape Association in Milton, Ontario.

1.4 Systems Approach

The Phase 1 Standard, as well as the Clean Plants program, incorporates all the common systems required to produce nursery stock that is relatively free of pests and free of regulated pests. As per ISPM No. 14:

“A systems approach requires two or more measures that are independent of each other, and may include any number of measures that are dependent on each other. An advantage of the systems approach is the ability to address variability and uncertainty by modifying the number and strength of measures to meet phytosanitary import requirements.

Measures used in a systems approach may be applied pre- and/or post-harvest wherever national plant protection organizations (NPPOs) have the ability to oversee and ensure compliance with phytosanitary procedures. Thus a systems approach may include measures applied in the place of production, during the post-harvest period, at the packing house, or during shipment and distribution of the commodity.

Cultural practices, crop treatment, post-harvest disinfestation, inspection and other procedures may be integrated in a systems approach. Risk management measures designed to prevent contamination or re- infestation are generally included in a systems approach (e.g. maintaining the integrity of lots, requiring pest-proof packaging, screening packing areas, etc.). Likewise, procedures such as pest surveillance, trapping and sampling can also be components of a systems approach.

Measures that do not kill pests or reduce their prevalence but reduce their potential for entry or establishment (safeguards) can be included in a systems approach. Examples include designated harvest or shipping periods, restrictions on the maturity, colour, hardness, or other condition of the commodity, the use of resistant hosts, and limited distribution or restricted use at the destination.”

1.5 Phase 1 Nursery Manual Description

The nursery must prepare a Phase 1 Nursery Manual that describes the responsibilities, procedures and documentation required in the Phase 1 Standard. The nursery must follow the template found in Appendix 2. The completed Nursery Manual is submitted as part of the application process to become ‘Phase 1 *C. buxicola*’ certified.

2.0 Responsibilities of Management and Key Staff

The management at the nursery must implement all aspects of the Phase 1 *C. buxicola* Nursery Manual. Management must make a statement of confirmation of the nursery’s commitment to the Phase 1 Standard (and the Clean Plants program that is to be implemented within one year) and adherence to the Phase 1 *C. buxicola* Nursery Manual.

- Managers and staff will be given assignments with specific tasks and responsibilities.
- Adequate training for these tasks will be arranged and conducted as necessary. All training for this program must be recorded.
- The management will make available all records and access to nursery staff to the auditor for external audits.
- It will be the responsibility of management to determine actions to be taken to correct non-conformances.
- It is the responsibility of management to ensure the Phase 1 Manual is kept up-to-date as necessitated by changes in nursery operations or by changes to the Phase 1 Standard.
- Management is responsible for ensuring that all relevant fees are paid.

Facility management is defined as follows:

Certification Manager:

- a) Develops and updates the Phase 1 Nursery Manual that meets the Phase 1 Standard for the nursery production facility.
- b) Administers record keeping, inventory management, plant traceability, and appropriate handling of boxwood and pachysandra plants on the nursery.
- c) Ensures that all documentation is properly kept for internal and external audits.
- d) Schedules and attends the external audits and follow-up sessions; designates the internal auditor.
- e) Oversees the preventative and corrective actions that are identified by internal or external audits or brought to the attention of the administration manager by other channels.

- f) Ensures that all staff involved with aspects of the Phase 1 *C. buxicola* Nursery Certification Program is trained.
- g) Ensures that the facility has in its employ sufficient competent staff to carry out the requirements of this Standard.
- h) Designates an alternate.

Crop Protection Manager:

- a) Implements all elements of the Program that pertain to the facility operations are in place and monitors these elements on a regular basis. (This refers to the day-to-day activities.)
- b) Maintains IPM and related records.
- c) Initiates preventative and corrective actions on an ongoing basis.
- d) Notifies the Certification Manager if *C. buxicola* is suspected and/or identified.
- e) Designates an alternate.

Note: In some operations the Certification Manager and the Crop Protection Manager may be the same person.

Internal Auditor:

- a) Verifies that the processes and biosecurity measures outlined in the approved Nursery Manual have been correctly implemented by completing an internal audit twice per year.
- b) Is designated by the Certification Manager
- c) May be an outside contractor.

All Phase 1 administrative positions must receive training for the Phase 1 *C. buxicola* Nursery Certification Program. Training sessions can be in person or by watching a Phase 1 Training DVD. Training records shall be kept for three (3) years. See Section 9.0 for more details.

3.0 Pest Risk Assessment

The Phase 1 Nursery Manual (Appendix 2) developed by the nursery must include a pest risk assessment. The analysis must highlight pathways for possible introduction into the nursery of *C. buxicola*. Appendix 3 outlines the steps for completing a Risk Assessment Questionnaire. The nursery should use the results of the Risk Assessment Questionnaire to ensure that the procedures described in the Nursery Manual reduce the nursery's risk of introduction.

4.0 Record Keeping and Traceability

Good record keeping enables efficient traceability, which is one of the most critical aspects of *C. buxicola* management. Record keeping and traceability of plant movement enables quick determination of when a pest has entered and moved within the facility and when and where it has been shipped out. It is a basic requirement for all nursery certification programs. All records relating to traceability, pest management and audit reports/corrective actions shall be kept for a minimum of seven (7) years,

A copy of the Phase 1 Standard, associated written procedures and BMP's, all records associated with the *C. buxicola* program, as well as the Phase 1 Nursery Manual shall be available to nursery staff, internal auditors and external auditors to ensure compliance. After the Phase 1 Nursery Manual has been approved by CNCI, additional growing sites and major updates or changes of procedures must be documented in the Phase 1 Nursery Manual at least one month before an external audit. An up-to-date nursery map showing production areas must also be available.

Nursery facilities have a variety of forms to record purchases and sales. The Receiving Report (including Packing Slip, Inbound Load List Form, any Phytosanitary or Domestic Movement certificate documents), and Delivery Form / Invoice are sufficient to use as records for incoming or outgoing plants, respectively.

4.1 Incoming Plants

Records shall be kept such that the audit can ensure that all incoming boxwood and pachysandra plants meet the requirements of the Phase 1 Standard. Records must include the following:

1. Name and description of plants.
2. Date of receiving.
3. Source of plants (supplier name and nursery location).
4. Certification status of the plants.
5. Receiving documentation that states the date of inspection and inspector's name, as well as a statement or certification that confirms that boxwood and pachysandra plants were shipped free from symptoms of Box Blight. Please note that this does not mean that the boxwood plants do not harbor *C. buxicola* spores or infections, but only that the symptoms of the disease were not detectable at the time of shipping.
6. The customer may request the date when the boxwood plants were last sprayed with a fungicide.
7. Copies of the Phytosanitary Certificates and international certification documentation (if applicable) for imported plant material.
8. History of plants, including original propagator details.
9. Date of visual inspection at receiving, name of trained staff conducting inspection and inspection results.

10. Record of placement of uncertified boxwood and pachysandra plants in isolation area. Record of certified boxwood and pachysandra plants placed in isolation if deemed a 'high risk' for Box Blight introduction by the Certification Manager.
11. Record keeping for boxwood and pachysandra plants placed in isolation to determine when plants can be moved into the production areas.
12. Record of sampling and testing of incoming plants with symptoms held in restricted areas or isolation. See Section 6.1 and Appendix 6 for a sampling and testing protocol. Or, record of shipment refusal, or destruction method used if incoming plants with symptoms were not sampled and tested.

4.2 Verification of Internal Plant Movement and Monitoring

Records of the movement and monitoring of all boxwood and pachysandra plants shall be maintained. The purpose of record keeping is to:

1. Maintain traceability of all boxwood and pachysandra plants.
2. Demonstrate the origin of plants or parents of plants (where the boxwood and pachysandra plants were propagated and grown)..
3. Locate boxwood and pachysandra plant production blocks within the nursery.
4. Locate boxwood and pachysandra plants within the staging and shipping areas.
5. Confirm that the monitoring program for *C. buxicola* symptomatic material is consistently implemented.
6. Follow the pathway for boxwood and pachysandra plants from receiving through to shipping or scrapping (culling).

4.3 Outgoing Plants

The nursery shall keep records of shipped boxwood and pachysandra plants. The nursery can use any of the in-house records for the information listed below (e.g. order, pick slip, delivery form, and/or invoice). Not all of the information needs to be on the same record, but an auditor must be able to access all of the information listed above in the nursery's record keeping system. Records shall include:

1. Name and description of boxwood and pachysandra plants to be shipped.
2. The certification status of the boxwood and pachysandra plants.
3. Records of sale of each outbound shipment.
4. Last growing location prior to movement to the shipping area. This can be recorded in a variety of ways such as notation on the pick or pull slips, notation in an electronic inventory system, or another commonly used shipping document or system.
5. Destination of boxwood and pachysandra plants.
6. Date of shipment.
7. Record of final visual inspection at shipping, signed or initialled and dated by trained person carrying out inspections of outgoing boxwood and pachysandra plants.

8. Copy of Phytosanitary Certificate, for exported boxwood and pachysandra plants.

4.4 Integrated Pest Management Records

Monitoring records must be kept to prove regular and thorough inspections have been made of all host plants throughout their crop cycle.

Nurseries should note that customers may request spray records for boxwood and pachysandra plants purchased including the last day of fungicide use.

Spray records of all fungicides applied within the nursery must be recorded. Records must be kept as per provincial or federal regulatory agency requirements.

4.5 Visitors Policy

The nursery must have a policy for movement of visitors within the nursery. It is recommended that records of visitors to the nursery site be kept. The facility may determine that a Visitor's Log Book be part of the recorded data. See Section 5.6 for more details.

5.0 Preventing the Introduction and Spread of *C. buxicola*

Participants in the Phase 1 *C. buxicola* Nursery Certification program agree to develop a 'systems approach' to prevent the introduction of *C. buxicola* into their nursery. The critical pathway by which the nursery industry can potentially introduce and spread *C. buxicola* is through the movement of infected plants.

5.1 Purchasing

Basic requirements of the Phase 1 Standard for purchase of boxwood and pachysandra plants are outlined below. Additional risk reducing activities may be established at the nursery's discretion.

1. To substantially reduce the risk of introduction and spread of *C. buxicola* and to enable the plants to express the disease, the nursery may choose to place ALL boxwood and pachysandra plants in isolation for one growing season (120 days) without fungicide use prior to moving into the production areas.
2. The nursery may include a policy specifying the level of BMP's that the nursery requires from its boxwood and pachysandra suppliers in the Phase 1 Nursery Manual.

5.1.1 Purchasing from Canadian certified sources

Received certified boxwood and pachysandra plants do not require isolation from the following sources. When purchasing from certified facilities, a nursery participating in the Phase 1 *C. buxicola* Nursery Certification Program may purchase boxwood and pachysandra plants from the following sources:

1. Nurseries which participate in the Clean Plants Domestic Phytosanitary Certification Program with the *C. buxicola* module or
2. Nurseries which participate in the Phase 1 *C. buxicola* Nursery Certification program approved by the CNCI or

- Nurseries that are certified under the Canadian Nursery Certification Program with a *C. buxicola* management plan as part of their Nursery Manual.

5.1.2 Purchasing from internationally certified sources

Currently, international certification programs are not harmonized with Canadian standards, and therefore are **not** necessarily equivalent to this Phase 1 Standard, the Clean Plants program with the *C. buxicola* Module, or the CNCP with the incorporated *C. buxicola* module.

When importing boxwood and pachysandra from international sources, a Phytosanitary Certificate is not equivalent to certification status. However, a nursery participating in the Phase 1 *C. buxicola* Nursery Certification Program may purchase boxwood and pachysandra plants from nurseries that participate in CNCI-approved *C. buxicola* certification programs. The imported boxwood and pachysandra plants from these nurseries can be designated as certified.

The nursery should evaluate the risk of introduction of *C. buxicola* from each of the international suppliers before purchasing boxwood and pachysandra.

5.1.3 Purchasing from uncertified sources

When purchasing boxwood and pachysandra from uncertified Canadian or international sources, the plants must be placed in an isolation area for one growing season (120 days) or longer before they are shipped from the nursery. Symptomatic plants shall be sampled and tested as stated in the Phase 1 Nursery Manual. See additional information in Section 5.2.3.

5.1.4 Plants purchased for resale

Boxwood and pachysandra plants can be sold immediately as Phase 1 Certified if they come from a Canadian certified nursery. In addition, boxwood and pachysandra plants may also be sold as Phase 1 Certified if they come from a CNCI-approved internationally certified nursery. **Otherwise, boxwood and pachysandra plants can only be re-sold immediately as uncertified plants.**

5.2 Receiving

5.2.1 Incoming host plants from Canadian and internationally CNCI approved certified sources

All plants certified under a CNCI approved programs maintain the certified status and can be placed in production areas or re-shipped immediately. See a list of CNCI approved Canadian programs in Section 5.1.1.

5.2.2 Incoming host plants from uncertified sources

Boxwood and pachysandra plants must be isolated for a period of one growing season (120 days) with no fungicide sprays applied and regular monitoring.

- The isolation area requires a barrier at least 0.5 meters (50 cm) higher than the highest plant adjacent, and/or a two (2) metre (canopy to canopy) host-free buffer. An isolation area shall be separate from the shipping areas with a two (2) meter host free buffer.

2. Any symptomatic material must be sampled and tested as per the recommendations in Section 6.1.
3. If after one growing season or 120 days the plants are symptomless, and testing of symptomatic material shows no trace of *C. buxicola*, the plants are considered Phase 1 Certified and may be moved to the production areas.
4. These plants can be sold as 'Phase 1 Certified' **after** they have successfully completed one growing season (120 days) period. If sold before this growing period is complete, they must be designated as '**uncertified**' on all shipping documentation and separated from certified plants through the shipping process.

5.2.3 Host plants received with visible symptoms

When plants are received with visible symptoms of Box Blight, a policy must be in place that establishes appropriate action such as:

1. Refusal of the shipment and return to supplier (ideally before the plants have been unloaded)
2. Isolation of the plants for sampling or testing to confirm presence of *C. buxicola*
3. Immediate destruction by bagging and disposing of offsite, burning to ash, or burial 1 meter deep.

5.2.4 Plant returns

All certified or uncertified boxwood and pachysandra plants shall **not** be returned to the nursery.

5.3 Nursery Practices (BMP's) which Reduce Risk of *C. buxicola* Spread

As the science of *C. buxicola* becomes better understood, mandatory and recommended production practices may change. These 'Best Management Practices' (BMP's) are based on the known science at the time of writing. See Appendix 4 for more details.

Highly recommended practices include:

1. Appropriate staff training regarding BMP's applicable to their areas of responsibility.
2. Managing movement of staff, equipment and plants to minimize potential Box Blight spore movement within the nursery. This may include working in lower risk crops early in the day or having a dedicated crew to maintain host plants.
3. Sanitizing equipment and tools when working in host plant blocks.
4. Removing leaf litter and other boxwood and pachysandra plant debris to reduce inoculum levels². A policy for maintenance and cleaning debris from boxwood and pachysandra beds and shipping areas should be in place. All debris from host plants shall be bagged and disposed of offsite, burned or buried. Debris shall not be composted.
5. Using only new posts and media for host plant production.

² This is a highly critical Best Management Practice.

6. Minimizing leaf wetness and overhead irrigation. Irrigation application should result in a period of leaf wetness of less than five hours per day. Direct runoff water away from host crops.
7. Separating blocks of boxwood and pachysandra plants to minimize the chance of cross-infection. A minimum two (2) meter buffer of non-host or no plants is recommended in the buffer area between blocks.
8. Avoid mingling of recently received host plants and host plants assembled for shipping if the facility has a single receiving/shipping area.

If infected plants are suspected, it is strongly recommended that the nursery should view the production block as a potential risk and manage it accordingly. See Section 6.0.

5.4 Integrated Pest Management

An Integrated Pest Management (IPM) program must be in place. All risk factors such as the source of plants, irrigation practices and other production process must be considered when developing the IPM program. The IPM program should consider practices and control measures to minimize the risk of infection, disease development, spore movement and/or spore transfer if an infected plant is unknowingly brought into the nursery. See Appendices 4, 6 and 7 for more details.

Fungicide applications are appropriate and necessary to control disease on boxwood and pachysandra during the propagation phase. A preventative spray program that reduces the risk of spore transfer during the growing on phase is recommended. However, nurseries are encouraged to avoid fungicide use when plants are ready for sale. Fungicides, currently registered for use on boxwood and pachysandra, do not kill the fungus but only suppress the disease. Infected plants may not express any symptoms if sprayed regularly with a fungicide.

5.4.1 Monitoring and inspections

1. Regular visual monitoring inspections for symptoms of *C. buxicola* shall take place by trained staff or a third party on all boxwood and pachysandra plants within the nursery.
2. The appropriate number and timing of visual inspections required depends on the season and climatic conditions. During the growing season, monitoring must occur at a minimum of every two weeks for the entire production area. Inspection frequency should increase during optimum disease development conditions (warm and rainy weather).
3. Recorded, visual inspections of all shipments of boxwood and pachysandra shall be conducted by trained nursery employees of the nursery or third party contractors, who meet the requirements outlined in Section 9.0.
4. Permanent landscape boxwood and pachysandra plantings within and around the nursery must also be visually inspected on a regular schedule.
5. Monitoring inspection records shall be kept and any symptomatic plants shall be handled as defined in Section 6.0.
6. Maintain spray records and follow up inspection results.

7. When boxwood and pachysandra plants are found to have visual symptoms of *C. buxicola*, the plants must be handled as defined in Section 6.0. Refer to Appendix 5 for further information regarding sampling and testing. Records must be kept for all plants moved to the isolation area (Section 4.1).

5.5 Shipping

5.5.1 Shipping Phase 1 certified or uncertified host plants

1. Each shipment of boxwood and pachysandra plants must be inspected prior to shipping to ensure that the plants are free of *C. buxicola* symptoms.
2. Each shipment inspection must be recorded. Include inspector's name, date, and results of the inspection on at least one piece of the shipping documentation.
3. Boxwood and pachysandra plants with *C. buxicola*-like symptoms that have not been sampled and tested (there is no definitive diagnosis of the disease organism without sampling and testing) within the past month **cannot** be shipped as 'Certified' plants.
4. Plants with *C. buxicola*-like symptoms which have been identified as another disease can be shipped as Certified, if they meet the tolerance threshold of the nursery's IPM policy.
5. Incoming boxwood and pachysandra plants and outgoing boxwood and pachysandra plants must be kept separate by a two (2) meter buffer canopy to canopy to minimize the transfer of spores regardless of certification status.
6. Shipping documentation shall specify if the boxwood and pachysandra plants are certified or uncertified.

5.5.2 Shipping protocol

Basic protocols should be in place to minimize the spread of *C. buxicola* during shipping.

1. Ensure trailers are free of debris before loading boxwood and pachysandra plants. The collected debris should be bagged and disposed of offsite, burned to ash, or buried one meter (1) deep.
2. Where transport containers are also used for production purposes, the container must be cleaned and sanitized prior to use.
3. Consider strict biosecurity protocols for cross-over areas between boxwood and pachysandra production and the assembly/shipping areas.
4. Maintain traceability for boxwood and pachysandra that is brought to shipping areas.
5. Protocols must be developed for situations when boxwood and pachysandra plants have been pulled and staged for shipping and the order has been cancelled.

5.6 Biosecurity

Biosecurity guidelines have been developed to assist each facility in developing measures specific to their own operations and will further help prevent the introduction and spread of *C. buxicola* into the facility. The biosecurity guidelines, which supplement the recommended Best Management

Practices, are outlined in Appendix 6. The nursery shall determine its policy and include it in its Phase 1 Nursery Manual. Note that these guidelines are subject to revision as new data and scientific information become available.

General Biosecurity Practices

1. A visitor policy should govern entry and movement restrictions within the boxwood and pachysandra production areas.
2. Movement of staff while working in boxwood and pachysandra blocks should be restricted. Footwear and equipment should be sanitized on a regular basis, i.e. after every block of x number of plants, or every block, or under certain conditions to minimize potential spore transmittal.
3. Movement of plants should be managed to minimize potential spore movement when working in boxwood and pachysandra blocks.
4. A sanitation policy (cleaning and disinfection) must be developed and implemented to minimize the risk of moving spores into and around the nursery. Refer to Appendix 7.
5. All boxwood and pachysandra plant debris from any source, including debris in delivery trucks, must be collected and disposed of by either bagging and dumping off-site, or burning/burying on-site.

6.0 Detection of *C. buxicola* Symptoms

Through regular visual inspections of incoming plants, monitoring production plants and inspections prior to shipping boxwood and pachysandra, plants with *C. buxicola*-symptoms may be detected. See Appendix 5 for a visual symptom resource.

When symptomatic material is detected, specific actions shall take place:

1. The Certification Manager must be advised to determine the scope of restricted access and arrange sampling and testing.
2. When symptomatic plants are found in the production area, they should not be moved. Create a restricted area to control staff and visitor access with signage and/or barriers. Non-symptomatic boxwood and pachysandra plants should be separated from this restricted area by a two (2) meter buffer which is plant-free or filled with non-host plants.
3. Sample and test the symptomatic boxwood and pachysandra plants immediately. If these plants are found to be positive for *C. buxicola*, destroyed them immediately (bagged and disposed of offsite, .burn to ash, or bury 1 meter deep). Non-symptomatic plants that have surrounded the infected plants within a 2 meter radius should also be destroyed.
4. The restricted area must have the following biosecurity measures in place.
 - a. Boxwood and pachysandra leaf litter and debris from the restricted block (after testing confirmation) must be gathered and disposed off-site, buried one (1) meter underground or burned. Infected fallen leaves are the major source of pathogen survival and spread.

- b. Any vehicles, tools, boots, clothing, or other objects which have been used in the restricted area must be sanitized as designated by the Certification Manager. Sanitation should be repeated after every use in the block. See Appendix 7 for details.
- c. Use disposable equipment/supplies for sampling and monitoring in the boxwood and pachysandra blocks and leave such equipment on the premises; carry minimal equipment/supplies.
- d. Document all finds and follow-up actions.
- e. When sampling and testing is complete, the Certification Manager will determine the next steps.

6.1 Sampling and Testing for *C. buxicola*

The appropriate number and timing of visual monitoring for symptoms depend on the season and climatic conditions.

1. During the growing season, monitoring of the entire production area must occur every two weeks (minimum). The nursery is encouraged to increase the monitoring frequency during warm and high humidity weather conditions.
2. Because there are other Box Blight diseases that resemble *C. buxicola* symptoms, sampling boxwood and pachysandra plants is strongly recommended when symptoms are found. The sampling can be done by a third party or trained in-house samplers.
3. Identification and confirmation can be done by microscopy observation of the uniquely shaped spores. Further confirmation may be achieved by PCR or DNA sequencing at an accredited lab. The nursery should consider that internal findings be confirmed by an independent laboratory prior to any actions to destroy plants.

The Certification Manager will determine the degree and scheduling of testing required in consultation with the Crop Protection Manager to verify visual diagnosis. Destroy plants within a minimum of a 2 meter radius of the infected plant. However, destroying all host plants within the block of plants containing the infection is highly recommended, as dead leaf debris from the infected plant has been likely scattered. Follow the biosecurity measure as outlined in Section 6.0.

Positive results must be noted in the Nursery's IPM log. This confirmed positive will be noted at the nursery's external audit. See Appendix 5 for sampling details.

When a positive sample is confirmed:

1. When a positive has been confirmed, the nursery must assess its options and risk of infection to other blocks of boxwood and pachysandra. The risk of infection is based on:
 - a. Positioning of other blocks of host plants
 - b. Irrigation practices (avoiding or halting overhead irrigation) and drainage of water moving potentially infected plant debris through the nursery
 - c. Area of scatter of infected leaves
 - d. Spacing of host plants (overlapping canopies can spread the disease more quickly)

- e. Movement of vehicles and people through the infected block to other blocks of host plants.
2. To assess the severity of infection (number and scope of positive findings) and following strict biosecurity, sampling and testing should take place immediately to determine the scope of the infection. When the extent of the infection has been determined, the Certification Manager and the Crop Protection manager should agree to the scope of destruction.
3. **Minimize traffic in and through the infected block.**
4. Disposal or destruction of the infected plants or blocks of plants within a two (2) meter radius of the infected plant(s) shall follow one of the following options:
 - a. Incineration to ash
 - b. Deep burial: to a depth of one (1) metre covered by soil
 - c. Disposal off-site in landfill by removal of plants and debris using bagging or large bins.
5. Fallen leaves and debris from the infected block should be raked and disposed of in a similar manner as the infected plants.
6. All transport containers and vehicles must be thoroughly cleaned and sanitized after transporting infected plants and debris.
7. The Certification Manager will review the source of the plants, how long they have been at the production facility as well as sales of the host plants from the infected block. The Certification Manager will determine the next course of action which may include:
 - Advising the source/supplier of the plants in the infected block of the find.
 - Advising clients who have purchased boxwood and pachysandra from the infected blocks of the find.
8. In consultation with the Crop Protection Manager, the Certification Manager shall develop a preventative spray program to minimize sporulation and potential for re-infection.

6.2 Sanitation and Disinfection

Regular sanitation once *C. buxicola* is detected (see Appendix 7):

1. **Container Beds:** Once infected host plants are destroyed, debris removed and the bed or field area is thoroughly cleaned, non-host plants may be grown in the area with no further remediation.
2. **Field Beds:** It is not known how long the disease may remain active in the soil on leaf debris. As a precaution, limit the replanting of host plants in a previously infected field for a period of 5 years until more scientific data is available.
3. Continue to sanitize vehicles, equipment, tools and boots/clothes between boxwood and pachysandra plant blocks and fields.
4. Avoid the infected area when moving uninfected boxwood and pachysandra plants to minimize risk of spread.

5. Burning is an accepted method of sanitation provided that a burn pile can be regularly used at the nursery.
6. Burying at a depth of one meter (1) is an acceptable method
7. Protocols must be in place for sanitizing polyhouses and growing beds when using these production areas for boxwood and pachysandra plants (see Appendix 7).

7.0 Audit Requirements

7.1 Internal Audit

1. The Certification Manager shall designate an employee or a third party to perform internal audits.
2. The facility's internal auditor shall produce a written report for each audit performed which will be made available to the external auditor.
3. A checklist to assist in the internal audit can be found in Appendix 9b.
4. Internal audits shall take place a minimum of two (2) times per year. The internal audits must be conducted once during the shipping season and once during the growing season with a minimum of 60 days between audits and a maximum of six months apart.
5. If non-conformances are detected during the internal audit, control measures must be taken to ensure compliance with the Phase 1 *C. buxicola* Nursery Certification Standard.

7.2 External Audit

1. External audits shall be performed annually by CNCI designated auditors.
2. The annual external audit shall be scheduled and attended by the Certification Manager.
3. The external audit will verify that all actions noted in the facility's approved Phase 1 Nursery Manual are being carried out at the nursery. The external audit check list is available in Appendix 9b.
4. Nurseries participating in the Canadian Nursery Certification Program (CNCP) are not required to undergo a separate *C. buxicola* external audit. Their appended *C. buxicola* Module on their CNCP Manual should be audited by CFIA.

8.0 Non-Conformance

A nursery on the Phase 1 *C. buxicola* Nursery Certification Program must be able to successfully complete an external audit on the basis of its practices and adherence to its Phase 1 Nursery Manual.

8.1 Major Non-Conformance

The following are considered major non-conformances and will result in suspension from the Phase 1 *C. buxicola* Nursery Certification Program:

1. Failure to meet the mandatory requirements as outlined in the facility's Phase 1 *C. buxicola* Nursery Manual.

2. Failure to correct non-conformance issues resulting from an external audit within the time frame prescribed by CNCI Administration or CNCI designate.
3. Failure to carry out internal audits twice yearly.
4. Refusal to participate in the external audit.
5. Non-payment of CNCI and /or external audit fees in a timely manner.

8.2 Minor Non-Conformance

The following are considered minor non-conformances and will result in required corrections and follow-up within a prescribed period of time:

1. Inconsistent record keeping
2. Actions at the facility that are inconsistent with the facility's Phase 1 Nursery Manual, except as noted in 'Major Non-Conformance;' above.
3. Not keeping the Nursery Manual up-to-date.

9.0 Training and Education

In order to meet the Phase 1 *C. buxicola* Nursery Certification program requirements, qualified personnel must be trained as specified below. Records of all off-site and on-site training must be maintained for three (3) years. Sampling and inspection staff should also participate in appropriate training.

Certification & Crop Protection Managers and Internal Auditors:

Attend a Phase 1 *C. buxicola* Nursery Certification workshop, which may be online, via webinar or classroom.

Internal Auditor

Training of the internal auditor includes:

1. Be familiar with the Phase 1 Nursery Manual for the facility.
2. Be familiar with the Phase 1 *C. buxicola* Nursery Certification Standard.
3. Know the functions of an auditor, as specified by CNCI.
4. Have completed the CNCI internal auditor orientation including: "Compulsory Basic Training for Internal Auditors" which includes the two web pieces as follows:

a) Overview:

http://www.canadanursery.com/Storage/35/2807_Clean_Plants_Internal_Auditor_Basic_Training_-_General_Overview_FINAL.pdf

b) Auditor Procedures PowerPoint:

Go to the following webpage and scroll down to the 'Compulsory Basic Training for Internal Auditors' and click on the "Internal Audit Procedures"

<http://www.canadanursery.com/Page.asp?PageID=122&ContentID=1224&SiteNodeID=125>