

California Department of Food and Agriculture

Nursery Industry of California Best Management Practices Program

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Who Created the list of BMPs

- **ANLA/HRI**
- **CANGC**
- **OAN**
- **WSNLA**
- **CDFA**
- **ODA**
- **WSDA**
- **Nursery Operations**
- **Land Grant universities**
- **USDA – APHIS**
- **USDA – ARS**
- **National Plant Board**

So... what are these BMPs?

The following selection of BMPs are a few examples of practices which are effective in preventing the introduction, establishment and spread of diseases and pests. Most are time honored, good phytosanitary practices already in use by growers. Each nursery can choose and customize BMPs to address their specific needs.

The list of BMPs is not set in stone; new practices are often discovered or designed to address situations in nurseries and greenhouses.

WHO IS USING BEST MANAGEMENT PRACTICES?

In a survey of the 350 growers of hosts and associated plants of Phytophthora ramorum, 232 indicated that BMPs were already in use.

Components of BMPs

- Prevention/Management
 - Moisture management
 - Nursery layout
 - Cleaning and Sanitation
 - Weed control and established nursery landscape plants
- Training
- Internal/External Monitoring/Audits
- Records/Traceability
- Documentation of Program procedures



- Assess the risk
- Review it with your third-party auditor
- Do not implement a program that unknowingly increases your risk

Risk awareness is critical !!!



Avoid or minimize accumulation of standing surface water, especially in beds of potted plants.

Rationale:

- *Phytophthora* spp. and some other pathogens are transmitted via water and higher levels of disease are often found where standing water accumulates.
- The pathogens may potentially enter either through the roots or by splashing onto leaves and stems.

Requirement for External Audit:

- Documentation of irrigation practices.



Avoid overhead irrigation when possible. If unavoidable, irrigate in a manner to avoid prolonged leaf wetness of 12 hours or more.

Rationale:

- *Properly time irrigation events to reduce conditions favorable for disease development.*
- *Free water on the leaf surfaces for extended time periods enables infection by pathogens.*

Requirement for External Audit:

- *Documentation of irrigation practices*



Review your Field Layout Plan. Determine how you can minimize the impact of spread if a pathogen is introduced. Break up long sections of the same host species with physical breaks or barriers.

Rationale:

- *Nursery production bed layout can help prevent a disease from sweeping through a nursery by eliminating large contiguous monocultures of plants.*

Requirement for External Audit:

- *Mapping of stock location*





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After every crop rotation, disinfect propagation mist beds, sorting area, cutting benches, machines and tools to minimize the spread or introduction of pathogens.

Rationale:

- Basic sanitation practices should be followed using registered fungicides in accordance with label instructions to reduce possible points of entry/contamination in the production cycle.

Requirement for External Audit:

- Documentation of nursery personnel training



Use new or clean and sanitized pots for plant production.

Rationale:

- *This measure reduces the potential of any residual contamination by soil borne pathogens which could infect the new potted plants.*
- *New pots should be stored and handled in such a manner as to avoid contact with the native soil possibly resulting in contamination.*
- *Recycled pots should be thoroughly cleaned of any residual substrate and disinfected before reuse. Recycled pots should also be stored and handled in such a manner as to avoid contact with the soil.*

Requirement for External Audit:

- *Documentation of nursery sanitation practices*



**Inspect plants in the nursery monthly throughout the growing season.
Train employees to look for and report symptoms of pests and diseases.**

Rationale:

- *Nursery employees that handle the plants on a daily basis are likely to be the first to note disease symptoms.*
- *Early detection of diseases and pests is critical in their management and control .*

Requirement for External Audit:

- *Documentation of nursery practices*



Routinely monitor incoming plant materials, including buy-ins, transfers, and returns (if allowed).

Rationale:

- *First line of defense. Growers priority should be to ensure that potentially contaminated stock is not allowed to enter the production site.*

Requirement for External Audit:

- *Documentation of nursery practices*



Ensure the use of clean growing media/growth substrate.

Rationale:

- *As many pathogens are soil borne, it is critical for the grower to reduce any sources of contamination in peat, bark, and other organic components of the substrate.*
- *Proper documentation of disease free substrate materials shipped into the site should be obtained.*
- *Proper storage and prompt use of substrate materials is critical.*

Requirement for External Audit:

- *Documentation of nursery practices*



Avoid product returns of nursery stock from a receiver in an area under quarantine for pest or disease. If unavoidable, contact your county agriculture department or appropriate regulatory agency prior to accepting the nursery stock return.

Rationale:

- *Avoids possible introduction of a new pest or disease.*
- *Returned nursery stock may have been exposed to pest or disease of quarantine significance and could potentially carry it into your nursery or greenhouse.*

Requirement for External Audit:

- *Nursery map*
- *Documentation of nursery practices*

If possible, nurseries should avoid commingling incoming nursery stock with existing stock until proven pest free.

Rationale:

- *Avoids cross contamination of clean and potentially diseased material.*
- *Assists with inventory control and tracking of plant material in the nursery.*

Requirement for External Audit:

- *Documentation of nursery practices*
- *Nursery site inspection*

Off load incoming plant shipments to an area that can be cleaned of debris. Sweep up plant debris in the receiving area and dispose of appropriately.

Rationale:

- *Basic sanitation to remove possible sources of diseases and pests.*
- *Proper disposal of plant debris should be adequate to prevent spread of any pests or diseases to the nursery or greenhouse. (true composting, bagging, burning, burying offsite, etc.).*

Requirement for External Audit:

- *Documentation of nursery practices*



Monitor sanitation practices of incoming and outgoing delivery trucks. Assure that trucks are properly cleaned of plant debris between shipments in an area that can be safely cleaned of debris.

Rationale:

- *Trucks may be a source of pests and diseases if not cleaned properly.*
- *Debris from trucks should be disposed of in a manner to prevent further spread of pest and disease.*

Requirement for External Audit:

- *Documentation of nursery practices*



Document What You Do

- Record keeping to document your efforts can be key in identifying successful methods.
- Development of a manual identifying the good practices used in your nursery or greenhouse demonstrates a dedication to the production of clean stock, potentially a good marketing tool.

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BMP #1

Overhead watering of plants

Overhead irrigation not used

Overhead irrigation:

**Time irrigation early enough to allow for
leaf drying**

Circulation fans used

**Plant spacing is adequate and allows for
foliage to dry within 12 hours**

**Other method used to minimize leaf wetness,
(explain) _____**

_____ initial and date



Thank You