

Nursery Industry of California Best Management Practices Program

California Department of Food and Agriculture

Kathleen Kosta
Primary State Plant
Pathologist

Ruben Arias
Nursery and Seed Biologist

We would like to thank the National Plant Board for sponsoring
tonight's presentation.

Development of this BMP Program for California nurseries was
funded by

The California Association of Nurseries
and Garden Centers

and

Farm Bill Funding through the U.S. Department
of Agriculture

WHAT ARE BEST MANAGEMENT PRACTICES?

- Basic, common sense practices previously known by most of us as good phytosanitary measures and methods.

WHO COMPILED THIS LIST OF BMPS?

- Members of industry, state departments of agriculture, university, federal agencies, scientists, among others, have compiled the best management practices deemed essential in the production of healthy nursery stock. They have been reviewed, revised, rewritten and revisited again. Not set in stone and open for additions, revisions, or deletions, this set of BMPS is a fluid document. Intended to be adaptable to the various nursery settings.

Primary Collaborators

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

Drivers in This Process

- Continued disease presence
- Protection of the natural ecosystem
- Protection of the nursery industry
- Regional concerns – CA,OR,WA
- National concerns – NPB
- Bilateral (US – Canadian) trade

WHO IS USING BEST MANAGEMENT PRACTICES?

In a survey of the 350 growers of hosts and associated plants, 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

Regulated
Site Specific rBMP



Avoid or minimize accumulation of standing surface water in containerized high-risk plant beds.

Rationale:

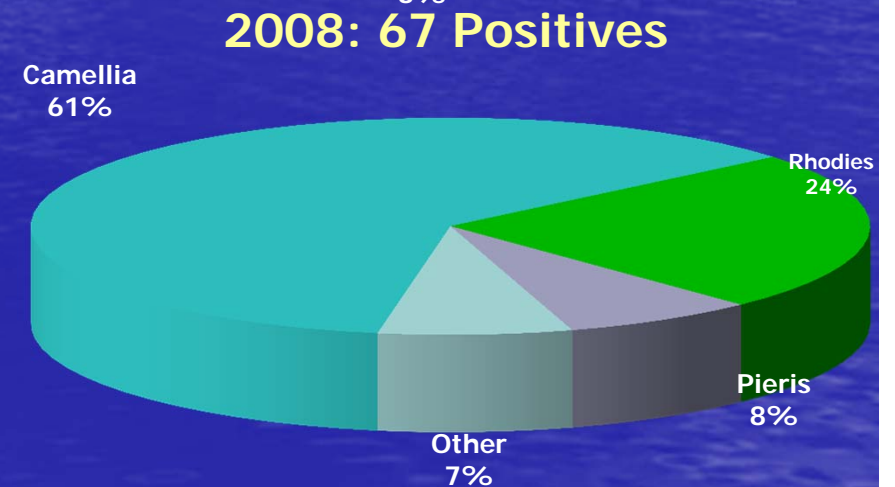
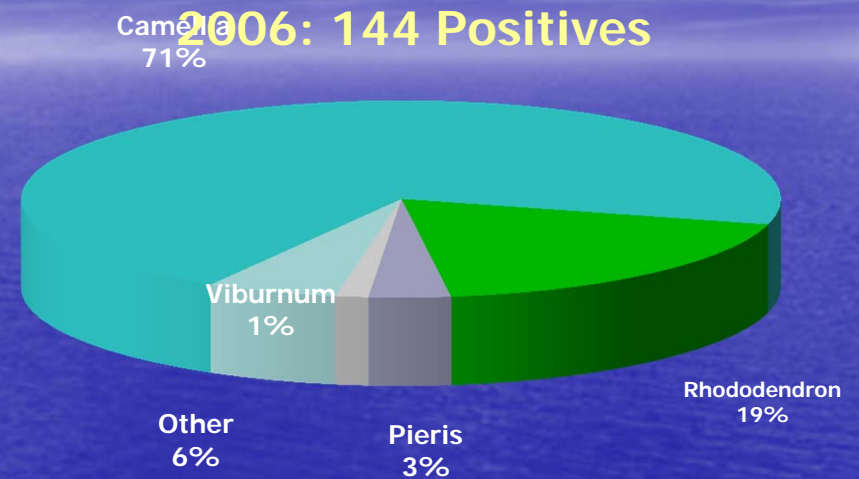
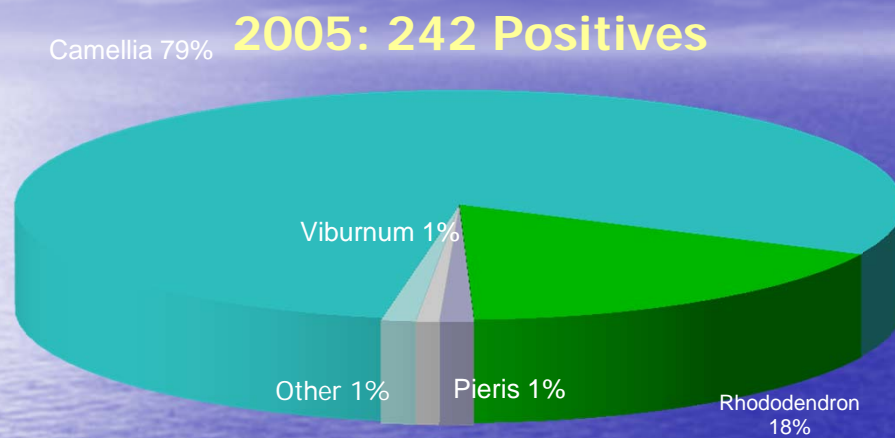
- *Phytophthora* spp. are transmitted via water and repeat finds occur more often in high-risk plant beds where standing water accumulates.
- The pathogen may potentially enter either through the roots or by splashing onto leaf surfaces

Requirement for External Audit:

- Documentation of irrigation practices.

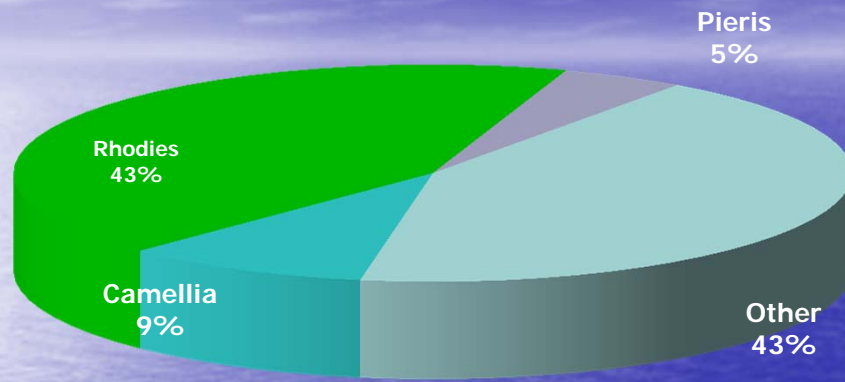


POSITIVE SPECIES IN CA NURSERIES

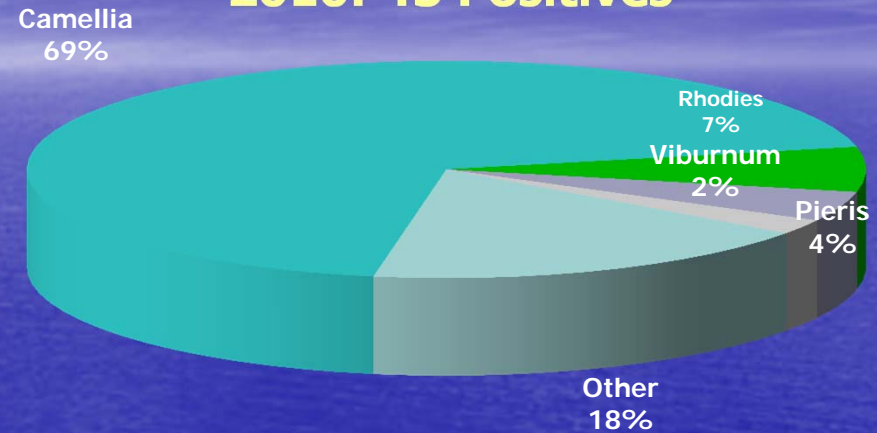


POSITIVE SPECIES IN CA NURSERIES

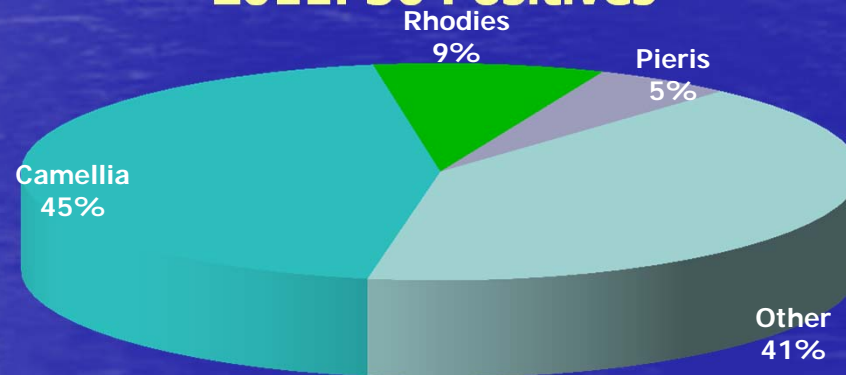
2009: 9 Positives



2010: 45 Positives



2011: 56 Positives



Regulated
Site Specific rBMP



Avoid overhead irrigation of high-risk plants. 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.
- Extended leaf wetness (such as overnight) is conducive to pathogen infection.

Requirement for External Audit:

- Documentation of irrigation practices





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

Risk awareness is critical !!!



Regulated
Site Specific rBMP



Review your Field Layout Plan. Determine how you can minimize the impact of spread if *P. ramorum* is found. Break up long sections of host and associated host plants (HAP) with non-HAP material to the genus level.

Rationale:

- Nursery production bed layout, mixing or alternating of HAP and non-HAP plant material in production beds can help eliminate large contiguous monocultures of plants that are *P. ramorum* susceptible.

Requirement for External Audit:

- Mapping of stock location





15 9:42 AM

Regulated
Site Specific rBMP



Reduce inoculum splash from heavy sporulating HR plants, Camellias and Rhodys, to all other crops.

Rationale:

- *These two HR genera are prolific sporulators and are in association with infected plants at a frequency rate of 88%*
(See High Risk Proposal)
- *Space All plants a minimum of 2 meters from HR plants or*
- *Create a physical barrier between HR plants and all other crops or*
- *Apply preventative fungicide to HR crops throughout the growing season or*
- *Intersperse HR plants with 2 meters of resistant plants, e.g. grasses, Buxus sempervirens*

Requirement for External Audit: Nursery site inspection



Regulated
Site Specific rBMP



Maintain a separate cull pile for HR plants so they are not included in the soil recycling pile for potential future reuse. If infested plants are found, the pile must be quarantined and treated, or disposed of, according to regulatory requirements.

Rationale:

- *Proper sanitation measures reduces the risk of spreading the pathogen in the recycled soil within the nursery.*

Requirement for External Audit:

- *Nursery site inspection*



Regulated
Site Specific rBMP



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*



Regulated
Site Specific rBMP



Use new or clean and sanitized pots for high-risk plant production.

Rationale:

- *This measure reduces the potential of any unknown residual *P. ramorum* contamination on the nursery site and possible further dissemination of the pathogen throughout the nursery*
- *New pots should be stored and handled in such a manner as to avoid contact with potential *P. ramorum* sources.*
- *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 *P. ramorum* sources.*

Requirement for External Audit:

- *Documentation of nursery sanitation practices*



Regulated
Site Specific rBMP



If you visit known *P. ramorum* infested areas, wash shoes, tools and vehicles that may have contacted contaminated soils before traveling to disease free areas.

Rationale:

- *Best defense is to not visit areas where known infestations are occurring to reduce accidental introduction of the pathogen into the nursery production site.*
- *If grower has visited infested areas, appropriate sanitation measures (washing and steam cleaning of trucks, etc.) as recommended by regulatory authorities should be undertaken*

Requirement for External Audit:

- *Documentation of nursery sanitation procedures training*



Regulated
Site Specific rBMP



Educate nursery personnel to recognize and report pest or disease problems.

Rationale:

- Personnel should be trained to not only look for *P. ramorum* symptoms but for any symptoms of plant abnormality in the production system.

Requirement for External Audit:

- Documentation of training



Regulated
Site Specific rBMP



Nursery to inspect high-risk plants, such as Rhododendron and Camellia, monthly throughout the growing season.
Train employees to look for and report symptoms when working with the HR plants.

Rationale:

- *Camellia and Rhododendron species have comprised the majority of the total positive plants in nursery settings throughout the regulated area.*

Requirement for External Audit:

- *Documentation of nursery practices*



Regulated
Site Specific rBMP



Routinely monitor incoming (buy-ins, transfers) HAP for symptoms of *P. ramorum*

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*



Regulated
Site Specific rBMP



Ensure the use of *P. ramorum* free growing media/growth substrate.

Rationale:

- Since *P. ramorum* may contaminate potting substrates, 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



Regulated
Site Specific rBMP



Avoid product returns of nursery stock from a receiver in a quarantined area or from nurseries that are not under *P. ramorum* compliance. If unavoidable, contact your county agriculture department or appropriate regulatory agency prior to accepting the nursery stock return.

Rationale:

- *Avoids possible cross contamination.*
- *Returned nursery stock may have been exposed to *P. ramorum* prior to return.*

Requirement for External Audit:

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

Regulated
Site Specific rBMP



If possible, nurseries should avoid commingling incoming HAP nursery stock with existing stock.

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*

Regulated
Site Specific rBMP



Off load incoming high-risk plant shipment to an area that can be cleaned of leafy debris. Sweep incoming plant debris from the receiving area and the delivery truck, collect debris and dispose of appropriately.

Rationale:

- *Basic sanitation to remove possible sources of disease inoculum.*
- *Proper disposal of leafy debris should be governed by appropriate local/state/federal recommendations (bagging, burning, burying offsite, etc.).*
- *Composting of infected plant debris is not an acceptable practice. Leaf litter has been shown to be a potential source of inoculum.*

Requirement for External Audit:

- *Documentation of nursery practices*



Regulated
Site Specific rBMP



Monitor sanitation practices of delivery trucks that ship high-risk plants. Assure that trucks are properly cleaned of plant debris between shipments.

Rationale:

- Trucks may be a source of inoculum if not cleaned properly.

Requirement for External Audit:

- Documentation of nursery practices



Regulated
Site Specific rBMP



Maintain for two years minimum: accurate shipping documentation identifying product, amount, date and origin or receiver for the purpose of identifying trace backs and trace forwards.

Rationale:

- *Proper documentation protects not only the grower but also the receiver of plant material.*
- *Production operation should investigate methods for quick recording and retrieval of documentation.*
- *Disease monitoring and scouting results should be integrated with inventory control to provide rapid trace forward and back of suspected infested nursery stock.*

Requirement for External Audit:

- *Nursery records inspection*

Regulated
Site Specific rBMP

Consider strategies that would facilitate the rapid identification and segregation of product based upon production location from the time it has left the growing operation through final sale.

Rationale:

- Operations personnel should develop a “Code Red” crisis management plan for dealing with possible *P. ramorum* infestations that stresses containment and considers all aspects of the plant production cycle, but especially the movement of plant material around site and shipping offsite.

Requirement for External Audit:

- Written nursery “Code Red” plan

079465E	CAMELLIA X 'SNOW FLURRY'	#5 CON. ESPALIER	AL	10 TORCK	262	147	495
		Futures	138	15			
				11/11 TORCK, MED, B&B	FG(18)NO	TORCK, LIGHT(I7)	

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**

BMP #1a Addendum

Overhead watering of HR plants

If a practice is changed, update this addendum

- ☐ 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

*THANX TO MANY,
especially...
AMBER MORRIS, CDFA,
& KAREN SUSLOW,
HINES NURSERIES, LLC*

National Ornamental Research Site – Dominican University of California



Site Construction: Nov. 10, 2009



Thanks to Michael Henkes for an
incredible design and site
installation

