Implementing a Systems Approach of Best Management Practices at a Native Plant Nursery

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WHAT IS A SYSTEMS APPROACH OF BEST MANAGEMENT PRACTICES?

Implementation of practices from the very first steps of producing a plant through to the finished product...

"from cradle to grave."

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

Good record keeping

Up to date training for all employees





>300,000 potentially infected Camellias were shipped to nurseries in 39 States.

...and our ways of regulating plant diseases changed forever more. Pathogens can be cryptic!

The use of molecular diagnostics became an accepted method to trigger a regulatory response.

2004:

Phytophthora ramorum found in a large interstate shipping nursery



The importance of a clean stock production system became clear



Nursery Industry BEST MANAGEMENT PRACTICES for Phytophthora ramorum

- to prevent the introduction or establishment in California nursery operations Version 1.0 ENDORSEMENTS CA Association of Nurseries and Garden Centers Nursery Growers Association CA Farm Bureau San Diego Flower and Plant Association Garden Rose Council CA Oak Mortality Task Force California Center for Urban Horticulture. UC Davis In 2007 this manual was completed and published.

It was developed based on NAPPO RSPM 24.

It was a collaboration of many nationwide.

Nursery industry was part of the development team.

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 !!!

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



Ensure the use of pathogen free growing media/growth substrate.

Rationale:

- Since P. ramorum or other pathogens 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



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

Rationale:

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- 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



The story of the dirty pots and how they are spreading the pathogens.



"Well, when the restoration project installation is done, we pick up our used pots and bring them back to the nursery for reuse." "Do you always get your own pots back?" "No." Do you wash them prior to re-use?" "No." Nursery 1 (Monterey Co) + P. tentaculata 2012 and 2015

Nursery 5 (Monterey Co.) + *P. tentaculata* 2014

Nursery 4 (Santa Cruz Co.) + *P. tentaculata* 2014

Restoration site 2 (Monterey Co.) Planted in late 2012 + *P. tentaculata* 2014

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Restoration site 3 (Monterey Co.) + *P. tentaculata* 2015

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Common Restoration Site?

Nursery 2 (Placer Co.) + *P. tentaculata* 2014

Nursery 3 (Butte Co.) + *P. tentaculata* 2014 ---->

Nursery B (Santa Clara Co.) so far (-)

2

2

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Restoration site 4 (Santa Clara Co.) Planted in 2011-12 + P. tentaculata 2015 *Artemisia douglasiana

Nursery 6 (San Mateo Co.) + *P. tentaculata* 2015 (**Diplacus* landscape only) + *P. tentaculata* 2014 Restoration site 4

Restoration site 1

(Alameda Co.) Planted in late 2013

Nursery A

(Monterey Co.)

so far (-)

Phytophthora tentaculata found in restoration sites and native plant nurseries in 2014

The California Department of Food and Agriculture inspected and sampled all nurseries that had provided product to the sites.

Five nurseries were found to have *P. tentaculata* infected plants.

Plants were destroyed under the supervision of the County Agricultural Commissioner. (This pathogen is regulated at the county level.)

CDFA is working with all the nurseries involved in these incidents to develop and implement practices to prevent further disease introduction and spread.



In response to this situation, the California native plant nurseries and restoration communities are stepping up the to plate and implementing best management practices which presents new challenges for a clean stock program development.

Ornamental Plant Nursery

Plants sourced from existing cultivars and typically grown from cuttings. Nurseries tend to be larger than the native plant and restoration nurseries.

Native Plant Nursery

Plants sourced from the native environment either from seeds, cuttings or dug up. Many native plant nurseries are very small and operate as a non-profit business with volunteer help.

One other major difference....

Most of the people who have chosen to specialize in the native plants and to become stewards of the wildlands through restoration are a breed of their own... Exceedingly passionate about their work.

They have assumed a heartfelt obligation to protect the environment from the introduction of pests and diseases into the wildlands.

On short notice, 170 folks showed up for a meeting on this subject!

They are committed to the implementation of best management practices at their nurseries.





However, one nursery has taken the lead, implementing changes in their operation immediately. They have not been found positive for *P. tentaculata* but chose to initiate major changes in their nursery to avoid a problem.





Diana Benner & Laura Hanson Co-Owners

Looking at the Pathways and Critical Control Points in the Nursery



The flow of products through the nursery- avoid allowing dirty things to cross the clean pathways. Soil source – Insure that the potting soil is from a reliable location. Water source – Municipal system, well water, surface water, or recycled water? Pots - New or re-used and sanitized? Plants – Clean & healthy source of propagative materials; buy-in product? Cull piles and used soil piles – are they located away from production and clean areas?



Early stages of transformation







Signage and Foot Bath at the Front Gate





Help Us Prevent the Spread of Invasive Plant Pathogens

OUR SPECIAL STERILIZATION MAT HELPS REDUCE THE SPREAD OF HARMFUL PLANT DISEASES LIKE SUDDEN OAK DEATH (SOD)

THE PLANTS WOULD THINK IT SWEET IF YOU WOULD DIP YOUR FEET



p.s. won't damage shoes

Foot baths within the nursery





Disinfectant on your belt and tools devoted to specific tasks or areas of the nursery







Soil Storage Area
Reliable Soil Sources
Delivery trucks with clean tires!
Truck route through the nursery does not jeopardize production
Employees have clean shoes – See Foot bath!
Clean, devoted tools



they are further fine tuned and made

better yet!

As things are changed...









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Cull pile and used soil pile location in the nursery.





Ground Fabric to create a barrier between soil and plants can help break the disease cycle in a nursery.
Pots on raised benches.



Easier to clean up plant debris and potting soil dropping from pots.

Workers shoes kept cleaner.

At the end of the day, we want to protect the environment from the introduction of new plant pathogens



Thanx to my colleague Kristina Weber at CDFA

