

# DOCUMENTING YOUR NURSERY'S BMPs for DISEASE PREVENTION AND CONTROL

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# Outline for today's talk

- You need to document your BMPs, outlining your protocols for disease prevention and control.
- You need to stay involved in IPPS. It is a must for career propagators, and thank you IPPS.
- P.S. You need to tell your customers (in your BMP doc), that it is quite possible for disease to originate and occur on their watch.

# IPPS IS A TREASURE

- Thank you IPPS:
- Mike has been a member since 1976. 40-year anniversary.
- TREE OF LIFE NURSERY'S STORY
- Established 1978, specializing in California native plants, owners Mike Evans and Jeff Bohn are business partners since 1980.
- Our involvement in IPPS has played a major role in all aspects of our methods and protocols for plant propagation and production

# IPPS

- Diverse backgrounds and crop types, many universal themes, one of which is plant disease.
- Strong message throughout all aspects of horticulture on hygiene and sanitation, especially in nurseries.
- Disease prevention and control are key factors in successful plant propagation, and the topics of many papers in IPPS, world wide.

# GROW CLEAN PLANTS

- LICENSE TO SELL NURSERY STOCK - Legal ramifications, inspected nurseries, compliance agreements, quarantines, accountability, fees to support nursery programs.
- CONTINUING EDUCATION - Trade associations (CANGC), University of California Extension (UCCE), agencies (CDFFA), professional organizations (IPPS).

# NURSERY PRACTICES

- Disease prevention & control, sanitation, hygiene, critical control points, materials, monitoring, timing, biological & chemical tools, education.
- As a general rule, the smaller in size, or earlier in stage, or more contrived the procedure, (seed, cutting, microcutting, graft, gene splicing, etc.) the more intense need for excellent hygiene. Extreme examples include sterile laboratories for micropropagation procedures.

- Presumably, as plants are readied for market, they are grown in conditions similar to their eventual destination, and/or the receiver stands ready to acclimate the plants to the next stage in their production cycle. At each stage, including out-planting of landscape plants, appropriate sanitation practices should be employed.
- Your BMP documents should describe procedures and protocols used in the propagation/production nursery as well as proactively touch on your necessary protocols and practices anticipated for the subsequent stages of the plant's' journey to market, including conditions in the market or at the out-planting site.

# INTRODUCED PESTS AND DISEASES

A problem not to be taken lightly.

- New and present pests and diseases threaten agriculture, gardens, and natural ecosystems.
- Nurseries need to sell clean plants.
- We need a united effort to identify, control and eradicate these threats.
- All parties involved need to work together.



# DISEASE TRIANGLE

Susceptible Host



Virulent Pathogen

Favorable Conditions



IPPS tours allow us to see how other nurseries deal with sanitation issues.

A walk down Memory Lane - 40 years in IPPS with nursery tours "To Seek and To Share" in Canada and the U.S., England, Australia, Japan, Guatemala and Argentina



Diversity of crops

Grafted cactus  
100% take



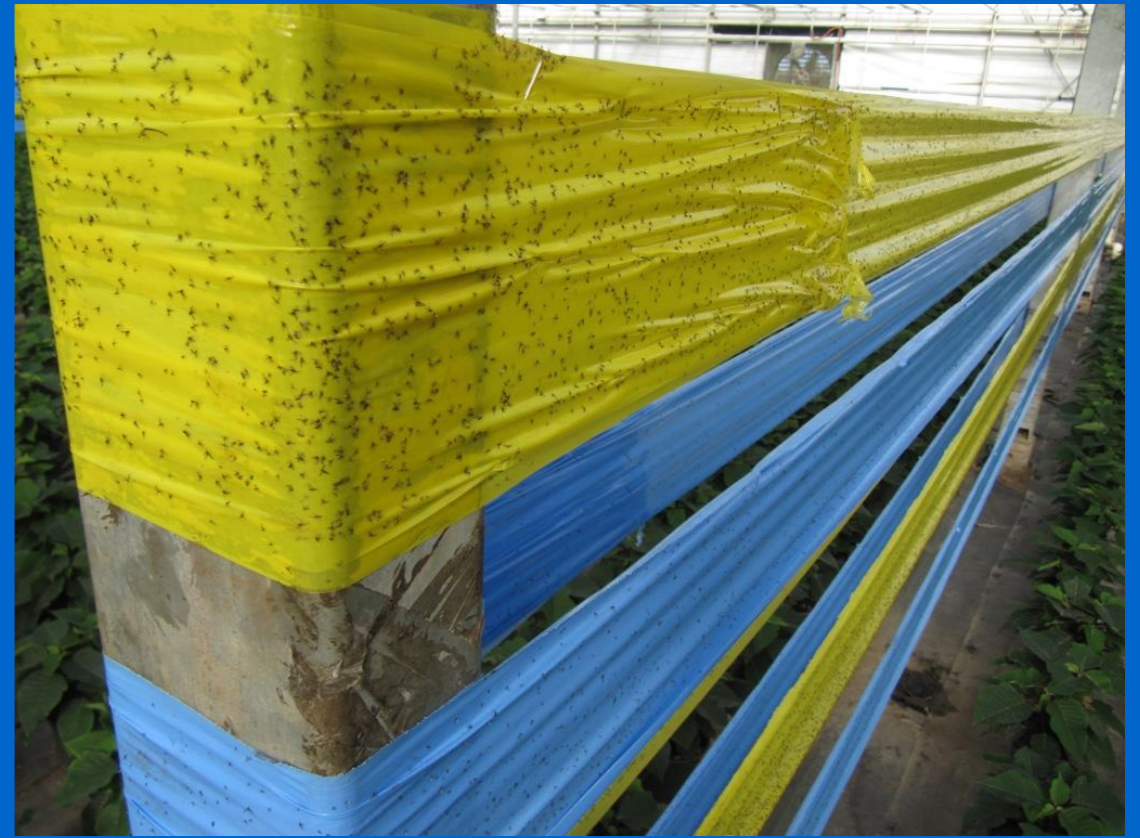
Cleanest production imaginable.



Extremely clean production  
of vegetable transplants

A large, rectangular metal mesh bench is the central focus of the image. It is made of a silver-colored metal grid and is supported by a metal frame. The bench is situated in a gymnasium with a polished wooden floor. In the background, there are other similar benches and a large window with a metal frame. The text "Clean benches." is overlaid in the center of the image.

Clean benches.



Varying configurations,  
not “one size fits all.”

Your BMPs will be  
written to suit  
your needs and  
your market.











Clean gravel bed on ground.

A large, long greenhouse structure with a black mesh roof. The interior is filled with rows of potted plants. In the foreground, there are rows of plants with silvery, fuzzy foliage. To the right, there are rows of darker green, bushy plants. The plants are arranged on a bed of light-colored gravel. The greenhouse is supported by a series of vertical wooden posts. The lighting is bright, suggesting a sunny day.

Native plants on clean gravel bed.



Clean ground cloth.




Clean concrete.

Clean everything.





Cleaning man.



Clean containers  
and clean handling



Clean components  
for potting media



Clean handling of  
clean potting medium.





Clean handling of cuttings and grafts

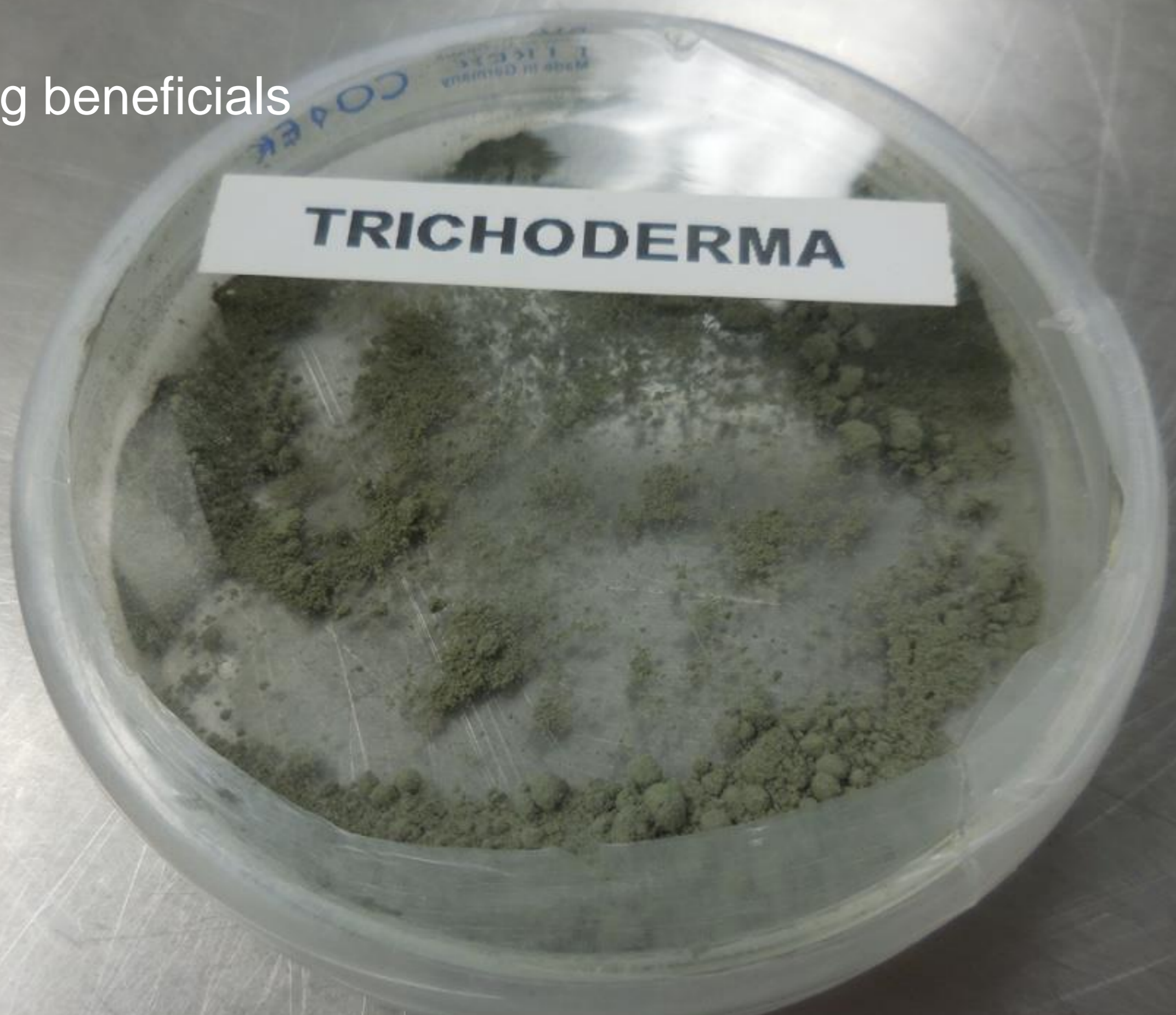


# Adding beneficials



Mycorrhizal  
inoculum

Adding beneficials



“Biologicals” can offer disease resistance



Clean as a whistle.



Finding negative examples as well

Liverwort as erosion control  
in run-off channel -  
probably not ideal.

Dealing with  
irrigation run off.

San Diego



England



Washington



Most sanitation issues  
are universal.





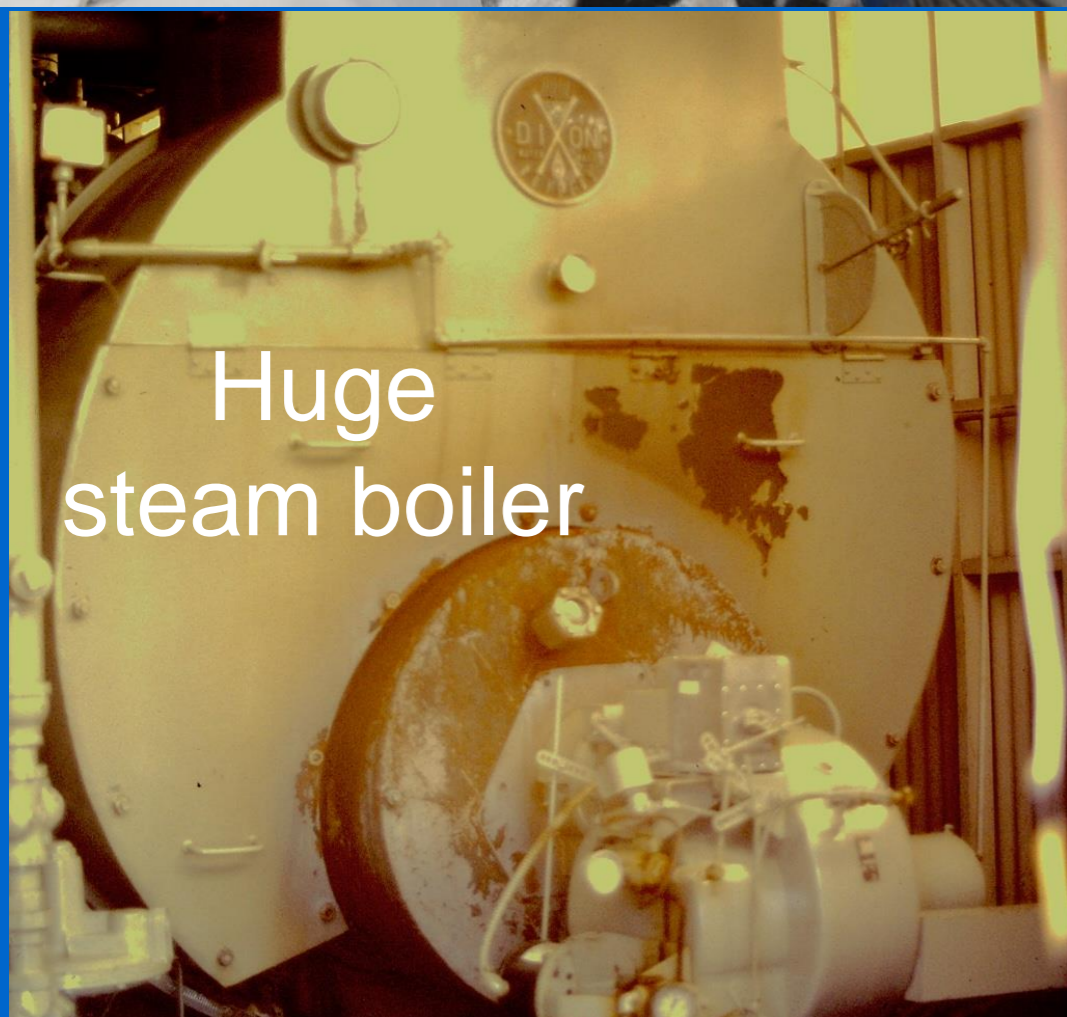
Vehicle tire  
fungicidal bath



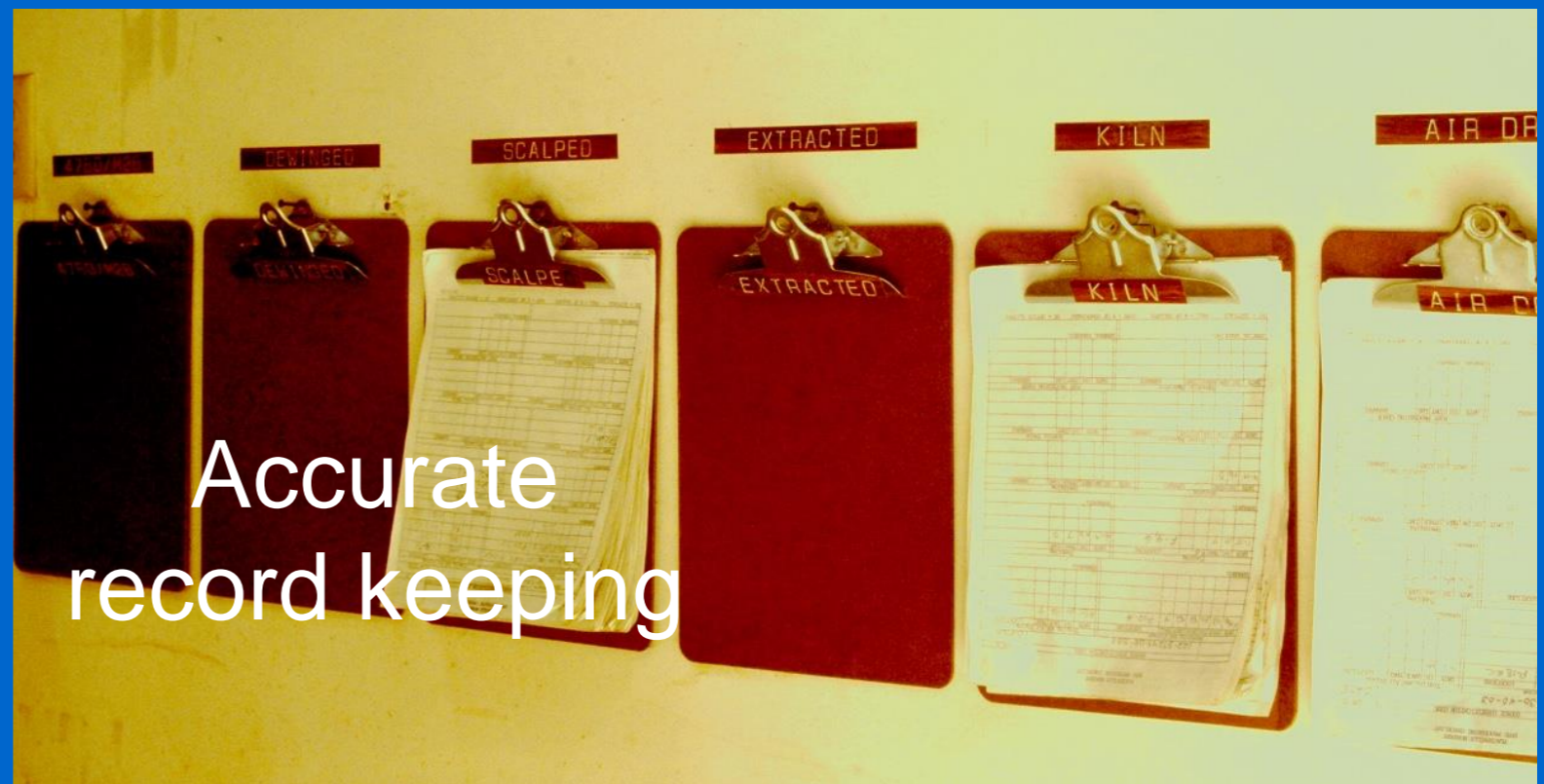
Fungicidal  
foot bath



Sterile  
growth chamber



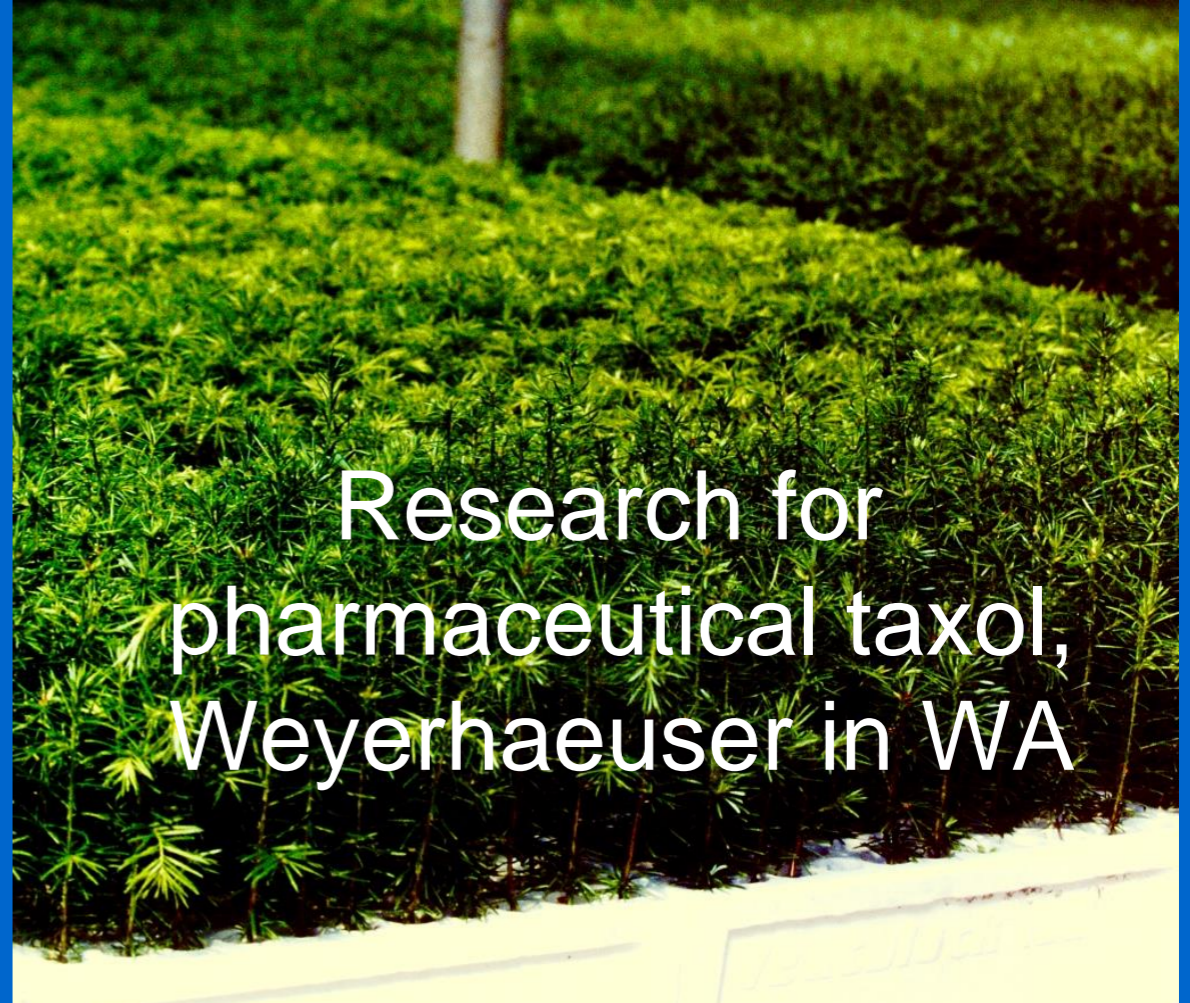
Huge  
steam boiler



Accurate  
record keeping



Compost tea, England



Research for  
pharmaceutical taxol,  
Weyerhaeuser in WA



Trimming and bagging



Containerized  
State nursery  
Olympia, WA



Bare root  
USFS Nursery  
Placerville, CA

Forest tree production

Specialized clean clothing and equipment.



Old Ecke Ranch  
Encinitas, CA



Micro propagation,  
“tissue culture.”





Transfer stages



X-plants being introduced to Planet Earth stage.



Sterile laboratory work spaces.







Cruising.  
The best thing you can  
put on your crops  
is your shadow.



Monitoring.



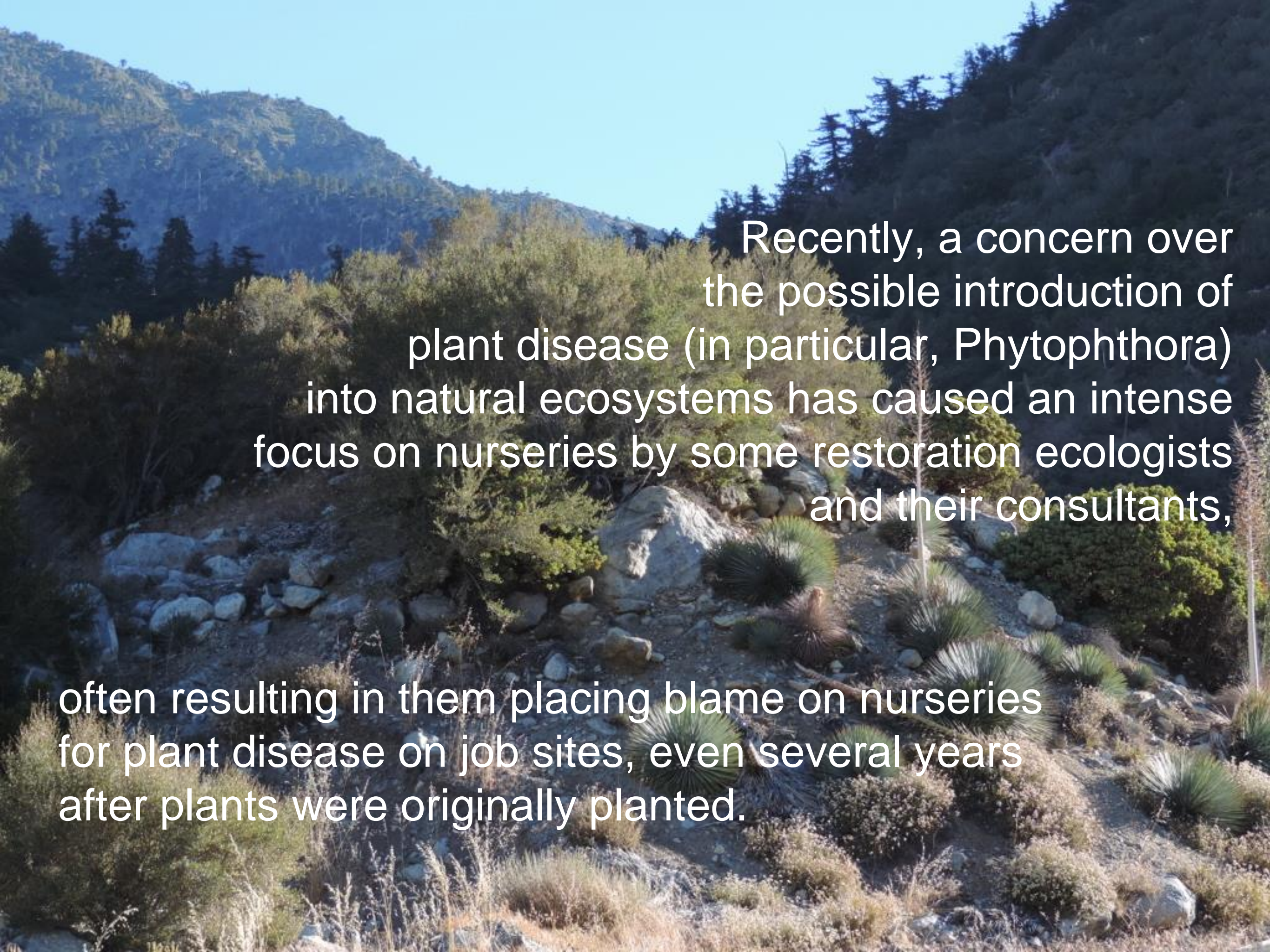
In-house training.



Inspecting and  
testing.

Chemical tools,  
including fungicides



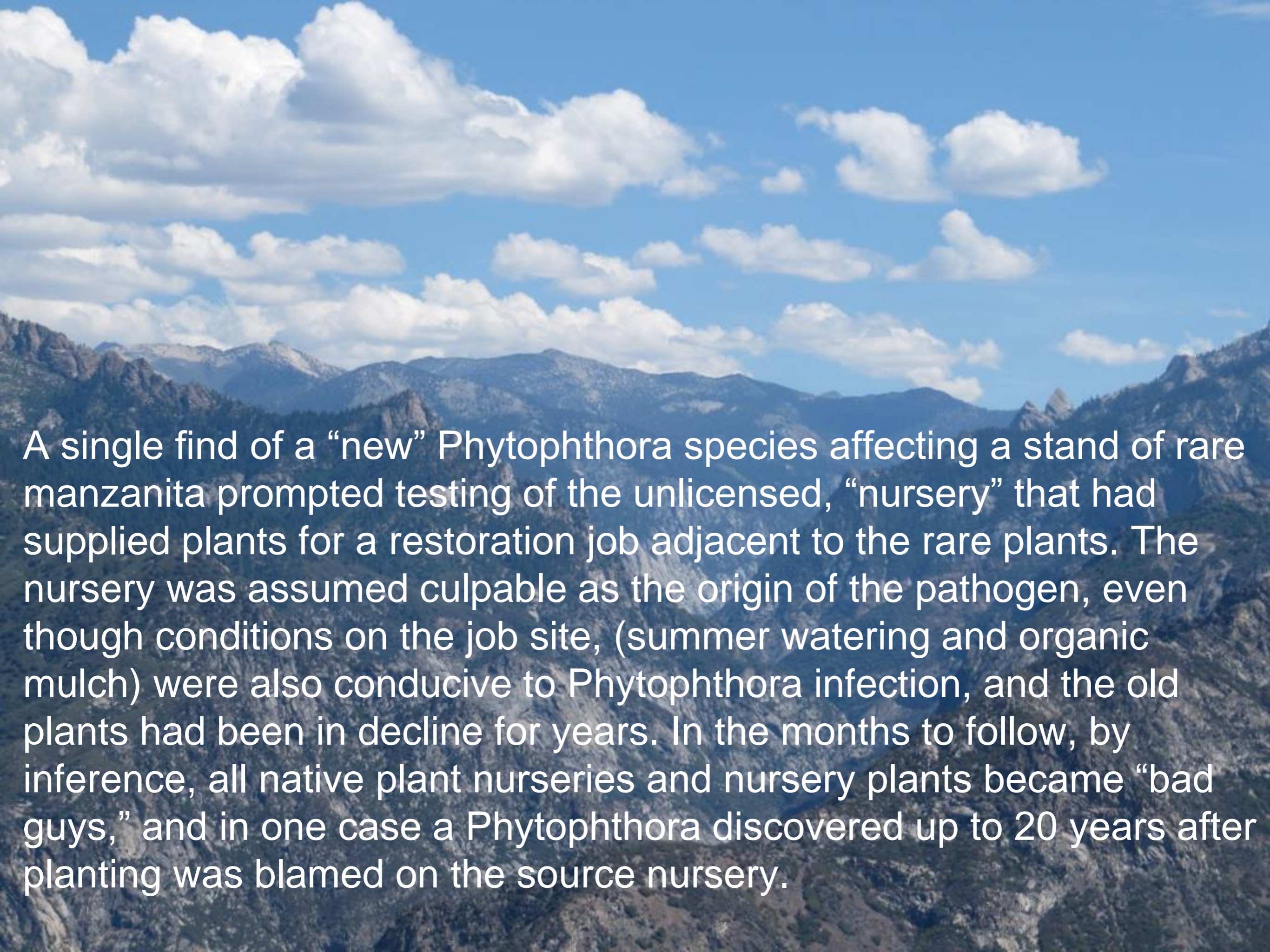
A landscape photograph showing a rocky hillside with various plants and trees. The foreground is dominated by large, light-colored rocks and several spiky, green plants. The middle ground features a mix of green shrubs and small trees. In the background, a larger, forested hillside rises under a clear blue sky. The overall scene is bright and sunny.

Recently, a concern over the possible introduction of plant disease (in particular, *Phytophthora*) into natural ecosystems has caused an intense focus on nurseries by some restoration ecologists and their consultants,

often resulting in them placing blame on nurseries for plant disease on job sites, even several years after plants were originally planted.



Unfortunately, these consultants are largely unaware of the professional horticultural industry, our awareness of disease issues, and our passion for growing healthy plants using Best Management Practices for Prevention and Control of Plant Disease.



A single find of a “new” *Phytophthora* species affecting a stand of rare manzanita prompted testing of the unlicensed, “nursery” that had supplied plants for a restoration job adjacent to the rare plants. The nursery was assumed culpable as the origin of the pathogen, even though conditions on the job site, (summer watering and organic mulch) were also conducive to *Phytophthora* infection, and the old plants had been in decline for years. In the months to follow, by inference, all native plant nurseries and nursery plants became “bad guys,” and in one case a *Phytophthora* discovered up to 20 years after planting was blamed on the source nursery.

A wide-angle landscape photograph showing a ranch in the foreground with several large, arched greenhouses and various farm buildings. The middle ground is filled with lush green trees, and the background features a range of blue mountains under a dramatic sky with large, dark, grey clouds and patches of bright blue sky. The overall scene is a rural, agricultural setting.

Meanwhile, back on our little ranch...

we think about *Phytophthora*... a lot.

35+ years - All summer,  
every summer, all we think about:

- P h y t o p h t h o r a
- Irrigation
- Irrigation as it relates to water molds
- Are our plants watered but not waterlogged
- And, oh yeah, should we start over and just grow the easy stuff everybody else grows

Added to.....

40 years absorbing “To seek and to share”  
with focus on sanitation



IPPS tours



We receive in a bid packet: “Over the past several years, over 25 species of the pathogen *Phytophthora* (pronounced Fie-TOF-ther-uh) have been discovered in California native plant nurseries and restoration sites. Phytophthoras, which means “plant destroyers’, are water molds.....etc. etc. etc.”

Including: SPECIFICATIONS FOR GROWING PLANTS

Mandatory *Phytophthora* testing

Nursery “guidelines” (some protocols unattainable) developed without industry involvement or endorsement by CDFA.

Zero tolerance for pathogen presence in the nursery

And, oh yeah, use of fungicides - prohibited

Tell me more about this here  
Fie-TOF-ther-uh  
stuff.



OLECHKA DESIGN

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I. Exclusion of Pathogens

II. Moisture Management

III. Nursery Layout

IV. Cleaning, Sanitation and Materials Handling

V. Weed Control and Established Native Plants on Site

VI. Inspections and Testing

VII. Training

VIII. Record Keeping

IX. Prevention

X. Shipping

Cultural Considerations

advising all parties that impacts and conditions in transit, in the market, or at the job site may be conducive to new disease.

## Tree of Life Nursery Best Management Practices (BMP) Protocol for the Prevention and Control of Plant Diseases



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This document describes the principles and practices employed at Tree of Life Nursery to prevent and control plant diseases, with particular emphasis on water mold pathogens including *Phytophthora* spp. This copy was printed 25 February, 2016.

**Tree of Life Nursery** BMP Manual was developed in-house with guidance from a template made by:

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Kathy and Karen are assembling a *Phytophthora* working group to develop voluntary protocols for nurseries. We're in.

Thank you Kathy and Karen!

- **BRING IT HOME...**
- If you are already practicing good nursery sanitation, turn your practices into protocols and document them in a BMP manual.
- Keep your manual dynamic. Update and improve it regularly and as necessary.
- Use it for in house training including refresher courses.
- Use it for educating your customers regarding your commitment to provide healthy plants, and their responsibility to keep them healthy.

- If you are new to IPPS this year, WELCOME. We're glad you're here! Get involved and stay involved. Good times ahead.
- If you have been in IPPS a while, say hi to old friends and find the new members to make them feel welcomed. Get involved and stay involved. Good times ahead.
- Don't forget "TO SEEK AND TO SHARE." This is the best place to learn the best lessons in the green industry. This is the cream of the crop.



Thank you