### INSTITUTE OF AGRICULTURE

### A Systems Approach to Plant Disease Management

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# Systems Approach to Disease Management

- Looks at production path
- High risk, vulnerable points of production are identified-"Critical Control Points"
- CCP's are where pathogens may be introduced

### **Critical Control Points**

- Receiving area
- Propagation area
- Container storage areas
- Substrate piles/storage areas
- Irrigation sources
- Cull piles

### Available from the Oregon Assoc of Nurseries



# How can you tell if a disease is noteworthy?

### • If it has its own website.



How are HRI and AmericanHort Righting this new threat to one of our industry's comerstone crops?

# Ornamental diseases are game changers when:

- Cause widespread damage or death
- Likelihood of infection is ever present
- Negative publicity leads to decreased sales
- Pathogen is exotic and/or invasive
- Pathogen is long lived in soil, media, water
- Regulated by state and federal agencies
- Leads to increased cost of production

### Let's look at some game changers

• Phytophthora ramorum (Sudden oak death, Ramorum blight)

### Phytophthora ramorum

- Sudden oak death on West Coast, coastal live oak
- Pathogen of over 100 plant species
- Ramorum blight Rhododendron, Viburnum, Camellia, Kalmia
- Increased regulations, quarantines, stop sales
- Contamination of soil and water
- Spawned "Systems Approach Management"
- New Phytophthora species are being identified



# Symptoms of *Phytophthora ramorum* diseases





# Let's look at some game changers

- Phytophthora ramorum (Sudden oak death, Ramorum blight)
- Boxwood Blight

### Boxwood Blight

- Calonectria pseudonaviculata
- First found in 2011 in the U.S.
- BoxwoodBlight.org clearinghouse
- Research Kelly Ivors, Cal Poly
- All cultivars susceptible to some degree
- Fungicides for prevention only
- In AL and FL in 2015

# Do you know the symptoms of boxwood blight?



### Leaf spots are diagnostic



### Boxwood Blight Stem Lesions





### Bundles of spores









Boxwood Blight after Two Fungicide cover Sprays



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### Other Boxwood Diseases

- Volutella blight
- Boxwood canker
- Phytophthora root rot

### Volutella blight/boxwood







Black stem of boxwood caused by Colletotrichum theobromic

### Let's look at some game changers

- Phytophthora ramorum (Sudden oak death, Ramorum blight)
- Boxwood Blight
- Rose Rosette

### Rose Rosette Virus

- Vectored by an eriophyid mite
- Widely reported on multiflora rose since 1970's
- Particularly on shrub roses
- Symptoms show up 2-3 yrs after planting
- Death can occur within 2-3 yrs of infection
- No curative treatment
- USDA funds 5 yr research project, 2015





Rose Rosette in a mass planting of Knockout Rose



### Reduce Risk Receiving and Shipping

- Sharpen diagnostic skills
- Inspect incoming and outgoing plants
- Work cooperative with state regulatory and Extension personnel
- Protect your reputation by following all shipping regulations

### Reduce Risk Propagation

- Limit access
- Propagate on site or buy local liners
- Grow stock plants or source cuttings locally
- Cuttings from diseased free plants only
- Propagate in raised beds or on benches to eliminate soil contamination
- Pay attention to detail/sanitation practices

# Raised propagation beds prevent soil contamination



### Hosta 'August Moon'



Foliar Nematode Damage





### Crown Rot of Liriope



### Reduce Risk Production Areas

- Avoid species/cultivars not resistant to common diseases
- Avoid fields with known soil-borne pathogen problems
- Use new containers stored on concrete pads
- Ground pads should be contoured, covered with fabric or gravel
- Muddy containers could indicate root rot issues
- Limit visitors
- Clean vehicles and implements



### Scab/Crabapple

- O Common on older crabapple cultivars
- O Causes premature leaf drop
- O Symptoms may be found on leaves and fruit
- O Also found on apple and pyracantha



Store media on concrete pad to prevent contamination by pathogens







Phytophthora root rot



Phytophthora root rot





Phytophthora Root Rot



### Reduce Risk Water Management

- How do you manage irrigation?
- Too much, too little or ill-timed can lead to issues
- Check water quality
- Assay for plant pathogens
- Drip irrigation on plants susceptible to foliar diseases

### Phytophthora

- Oomycete, not considered a fungus
- More closely related to brown algae
- Reproduces rapidly in water
- Easily moved in irrigation water
- Dead roots lead to dead plants



# Water inflow should be as far as possible from pumping station



### Drip irrigation to keep foliage dry and minimize foliar diseases



### Reduce Risk Integrated Pest Management

- Train and designate at least one person as a scout
- Post images of your top ten disease/pest issues
- Outbreaks should be mapped and reported
- Send employees to educational meetings
- Use social media to stay engaged

### Reduce Risk Relationship w gov/educ

- Build a relationship of trust with regulatory, extension, university employees
- Be a mentor to young employees
- Suggest workshops, seminars, publications, outreach that would benefit nursery industry
- Interact with policy makers, univ administrators; let them know the nursery industry is as deserving of research and outreach as any other agricultural commodity
- Be active in local and regional nursery organizations



# Real. Life. Solutions.

Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.