

UF UNIVERSITY of
FLORIDA

IFAS

*Citrus Research and
Education Center*

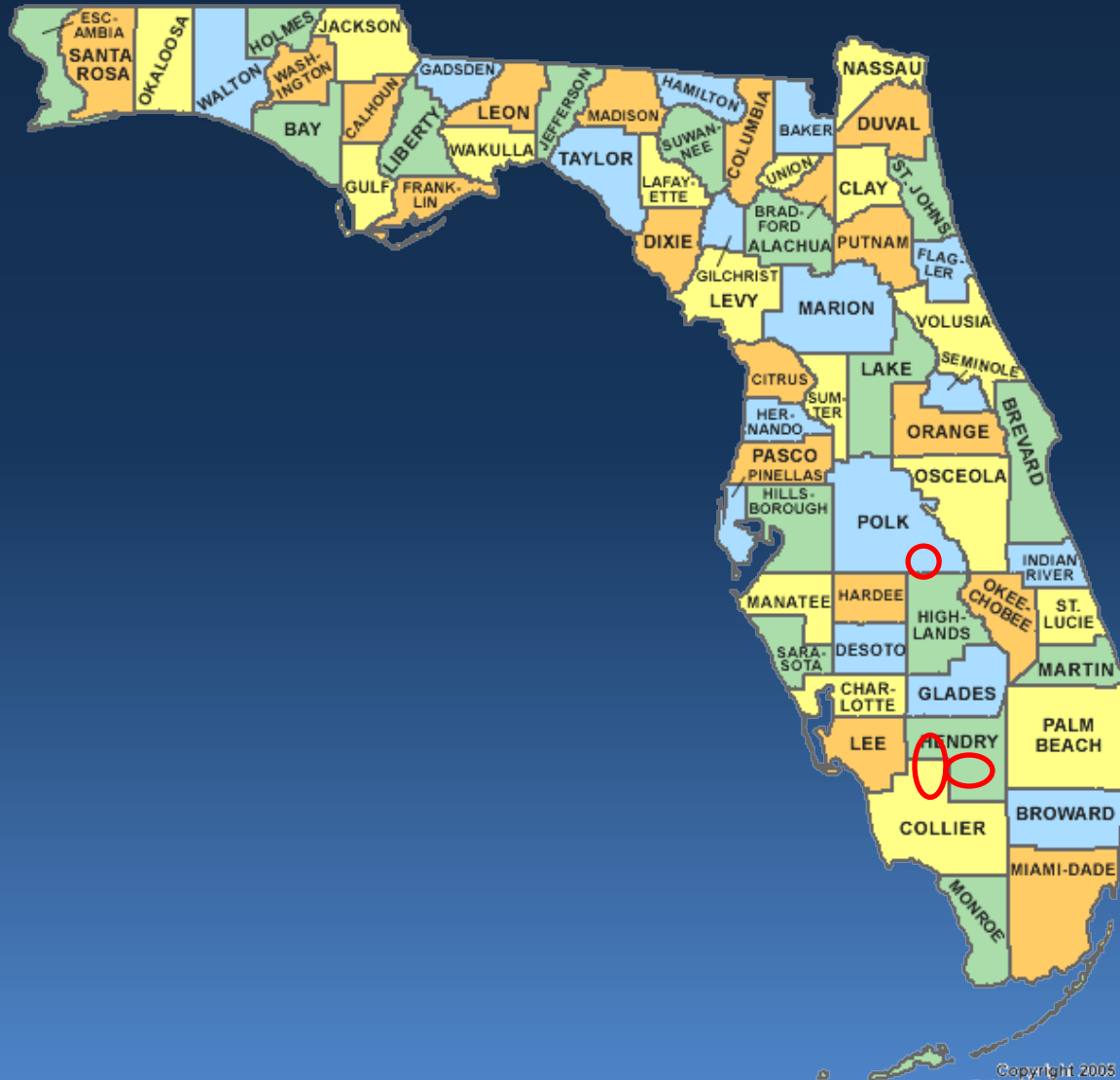


CITRUS BLACK SPOT RECOVERY PLAN

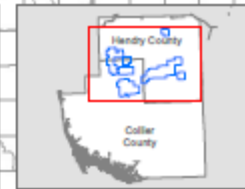
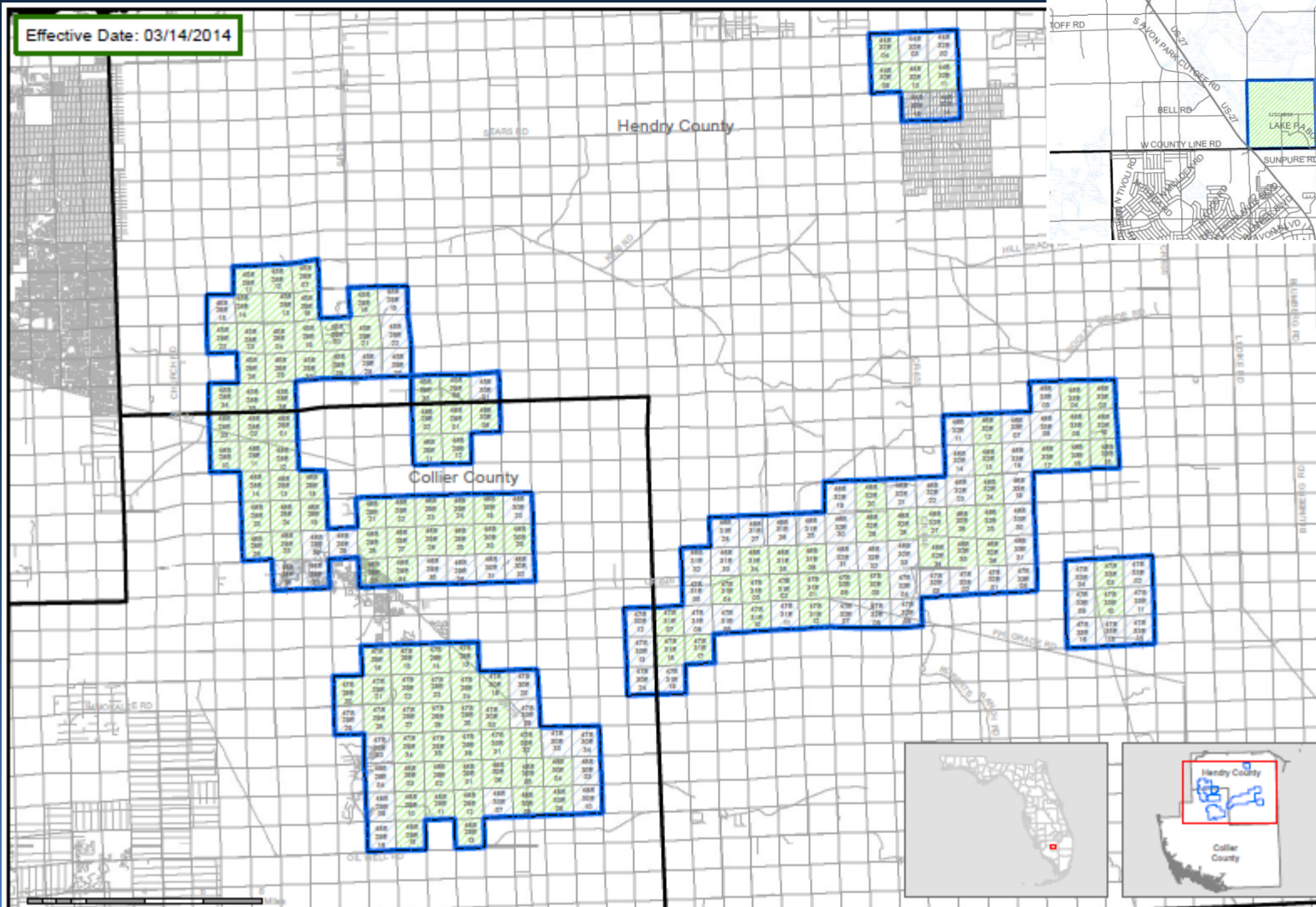
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Where in Florida is the Disease?



2014 Quarantine Areas



From DPI, Aug 2014

The Pathogen

- *Guignardia citricarpa* (anamorph: *Phyllosticta citricarpa*)
 - *Botryosphaeriaceae*
 - Locule ascomycte
- Confusion occurs with nearly morphologically identical endophyte *P. captitalensis*
 - Commonly isolated from citrus in Florida
- Can be separated phylogenetically and with oatmeal agar media assay
 - *P. citricarpa* forms yellow halo but others do not

Other Citrus Associated *Phyllosticta*

- *P. citriasiatica* – isolated from lesions on *C. maxima* from Asia (tan spot)
- *P. citrichinaensis* – minor lesions on multiple citrus species in China
- *P. citribraziliensis* – an endophyte isolated from *Citrus* spp.
- None of these have been found in Florida thus far

THE DISEASE SYMPTOMS

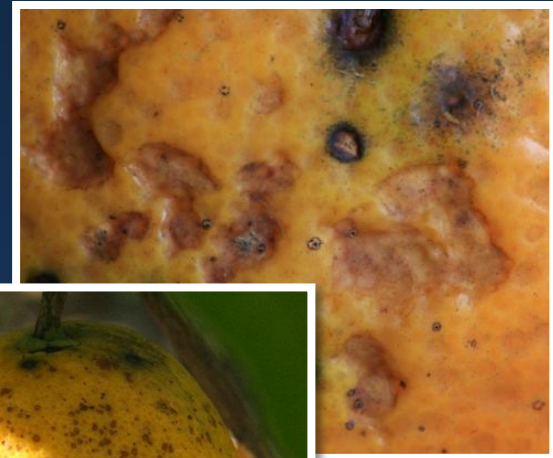
Symptoms Occur on Maturing Fruit

- Unusual to see hard spot more than 2 months before maturity but infection months before
- Exposure to sunlight increases lesion number
 - Warm temps ($\sim 27^{\circ}\text{C}$) also increase disease
- Symptoms generally occur on the 'sunny side of trees' *first*
- Warm weather stimulates symptom development
 - Saw symptoms Dec 2012 during warm weather
 - Symptom development slower in 2014 with cool temps

Cracked Spot and Hard Spot



False Melanose and Virulent Spot



Leaf and Stem Symptoms

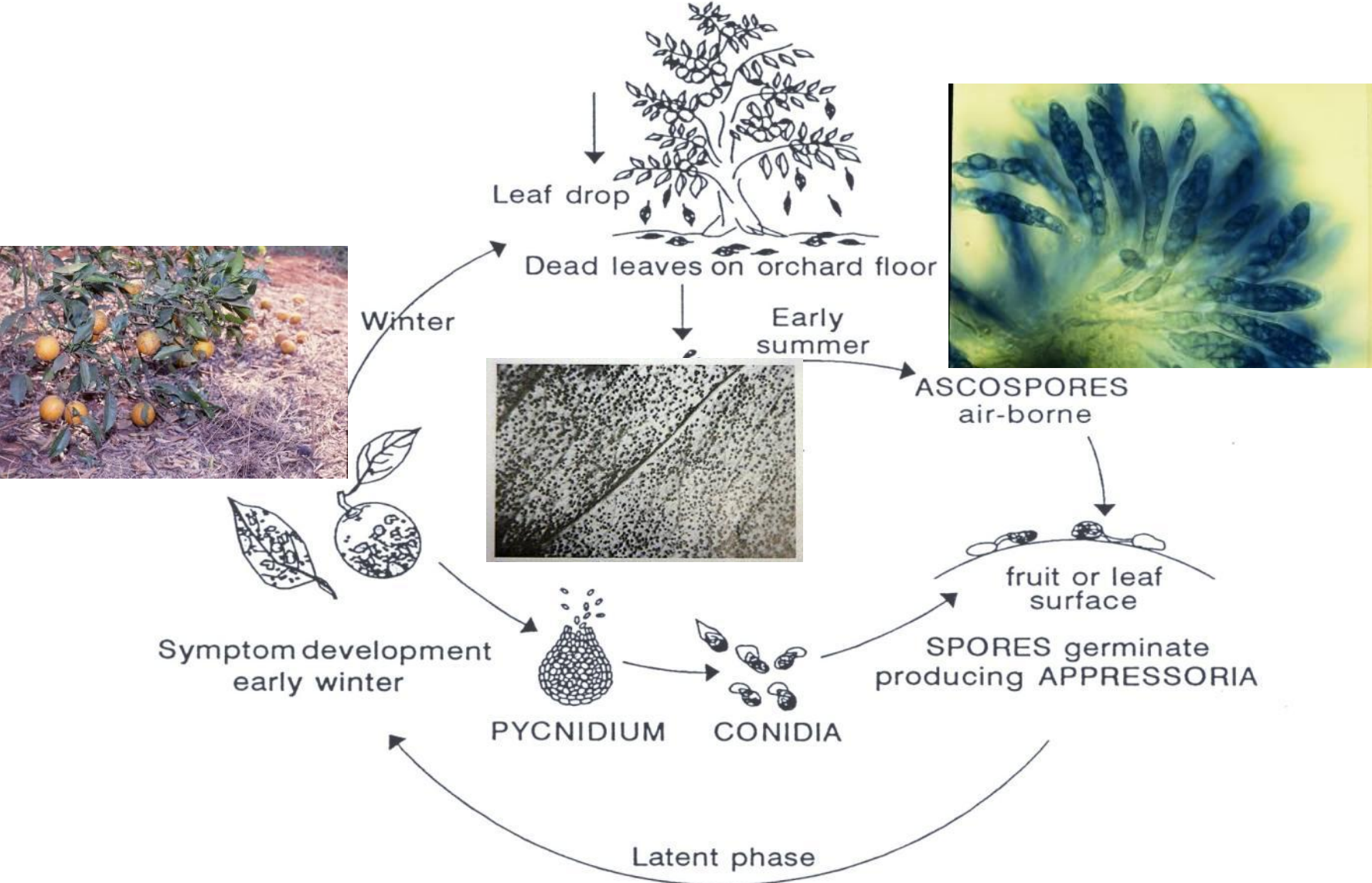
- Leaf symptoms uncommon but present at low levels with little or no control measures
 - Most commonly found on highly susceptible lemons
 - Can be found on any cultivar
 - Often on leaves near senescence
- Small reddish-brown lesions
 - Tan center forms as lesions age
 - Old lesions have dark brown margin sometimes with large yellow halo

Leaf and Stem Symptoms



DISEASE CYCLE AND SUPPRESSION

Black Spot Disease Cycle

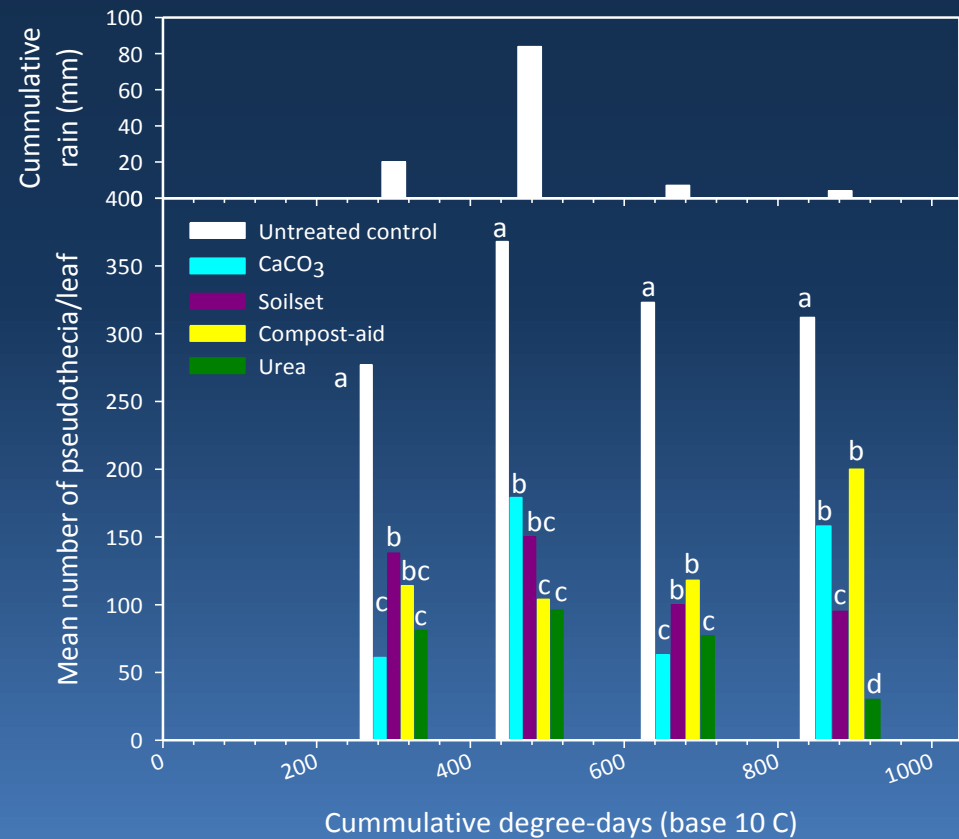


Cultural Controls

- Remove declining trees
 - Tend to have more disease than healthy trees
 - Greater leaf drop
 - More dead twigs in canopy
 - Greater susceptibility
- Phytosanitary pruning
 - Remove twig inoculum within canopy

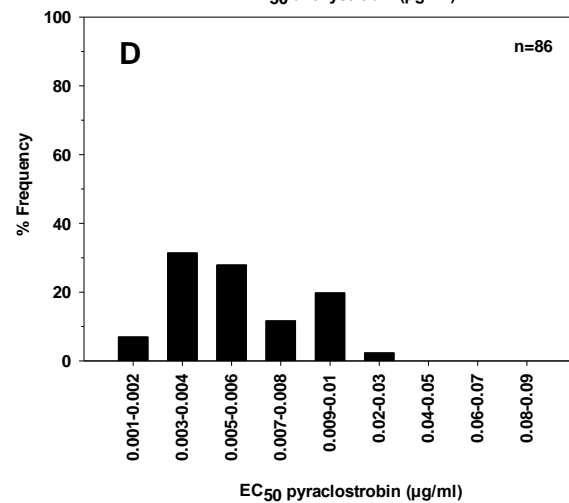
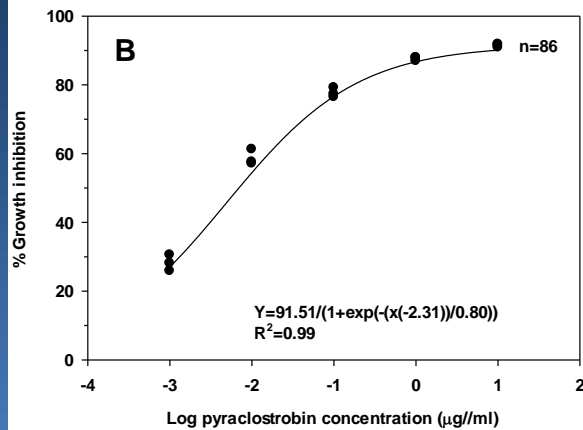
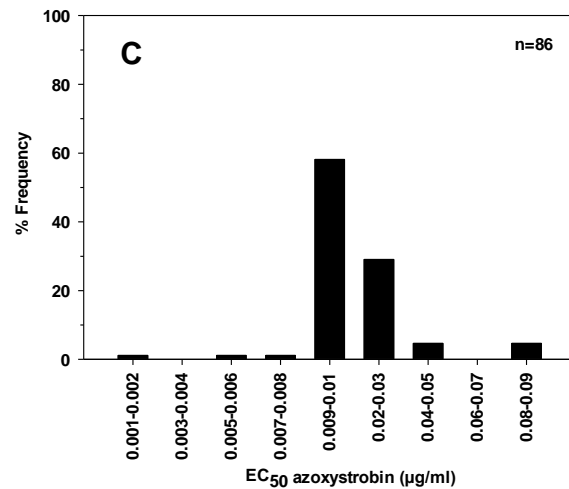
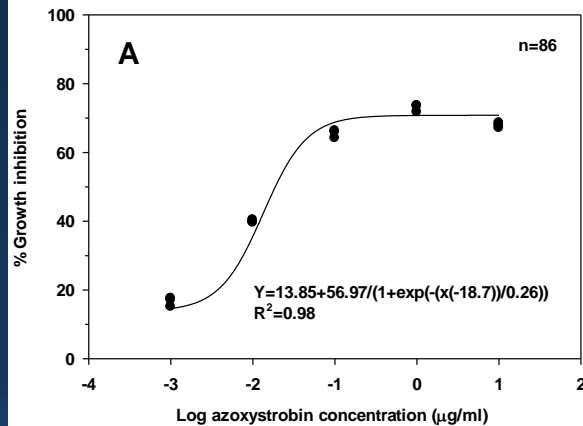
Cultural Controls

- Leaf litter management
- 5% urea best treatment in small plots
 - South African researchers found effect but determined impractical



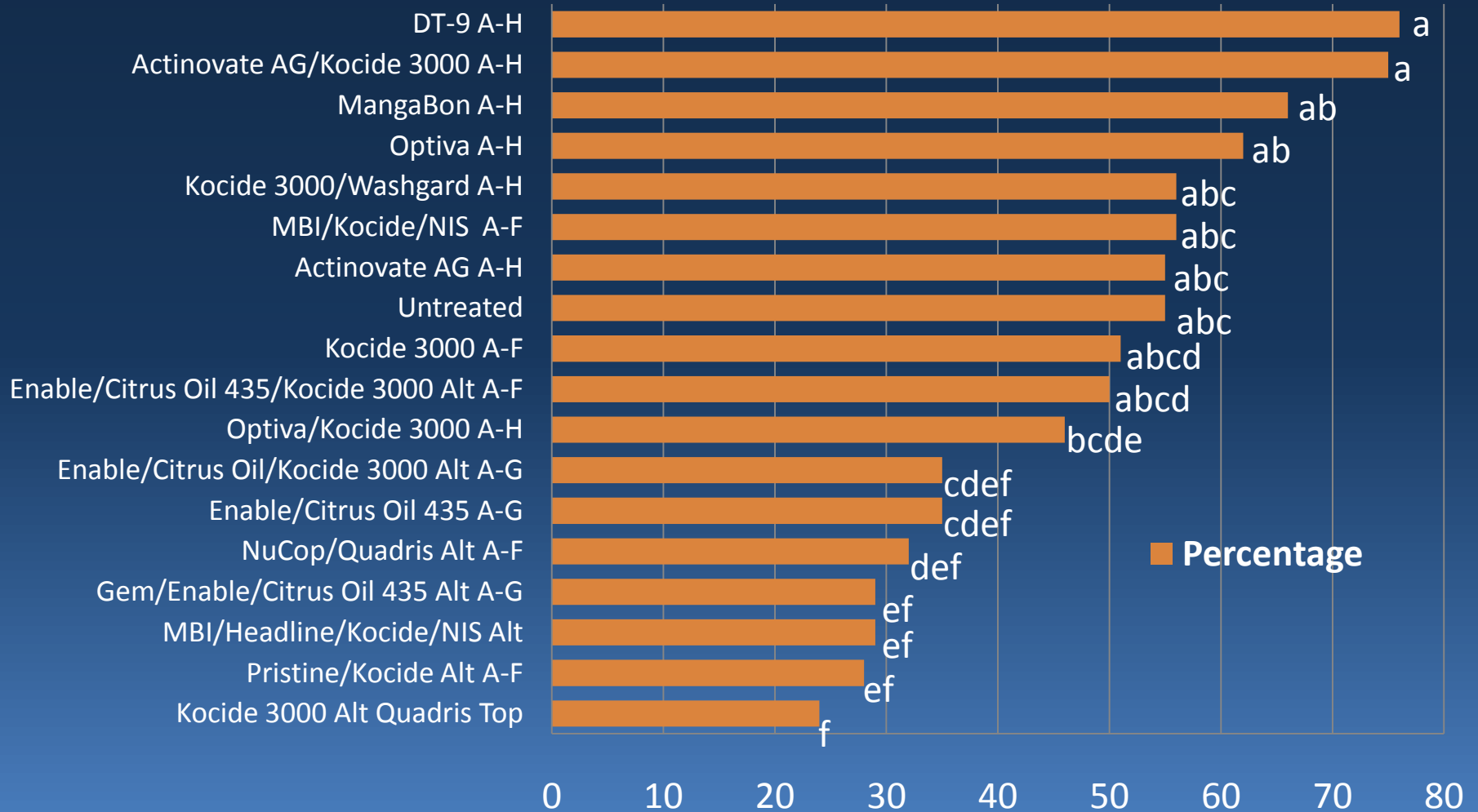
FUNGICIDAL CONTROL

In Vitro Assay for Native Sensitivity

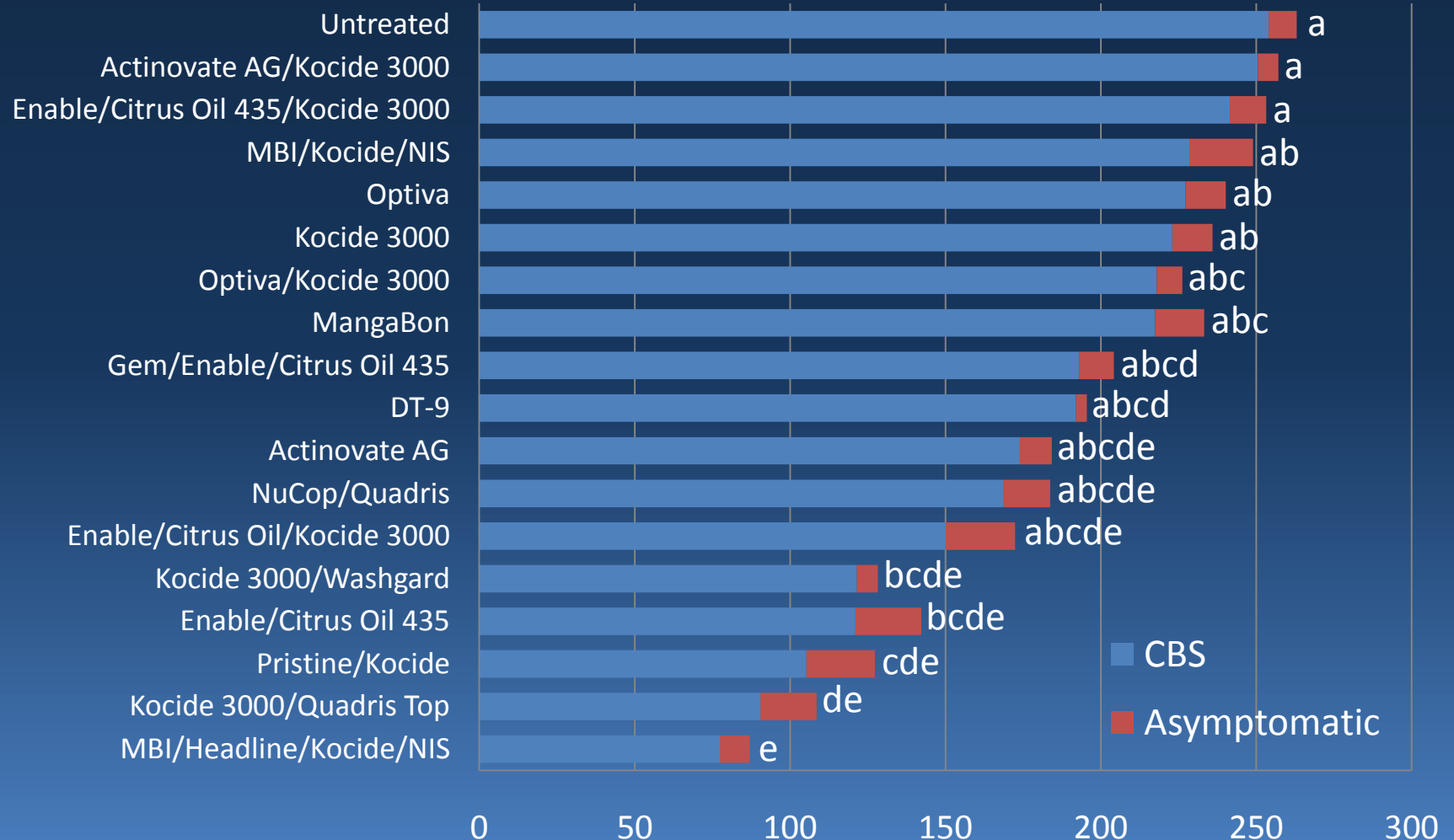


- Baseline study for strobilurins
- Mycelium highly sensitive to strobs
 - Spores even more sensitive
- Have this information for future resistance monitoring

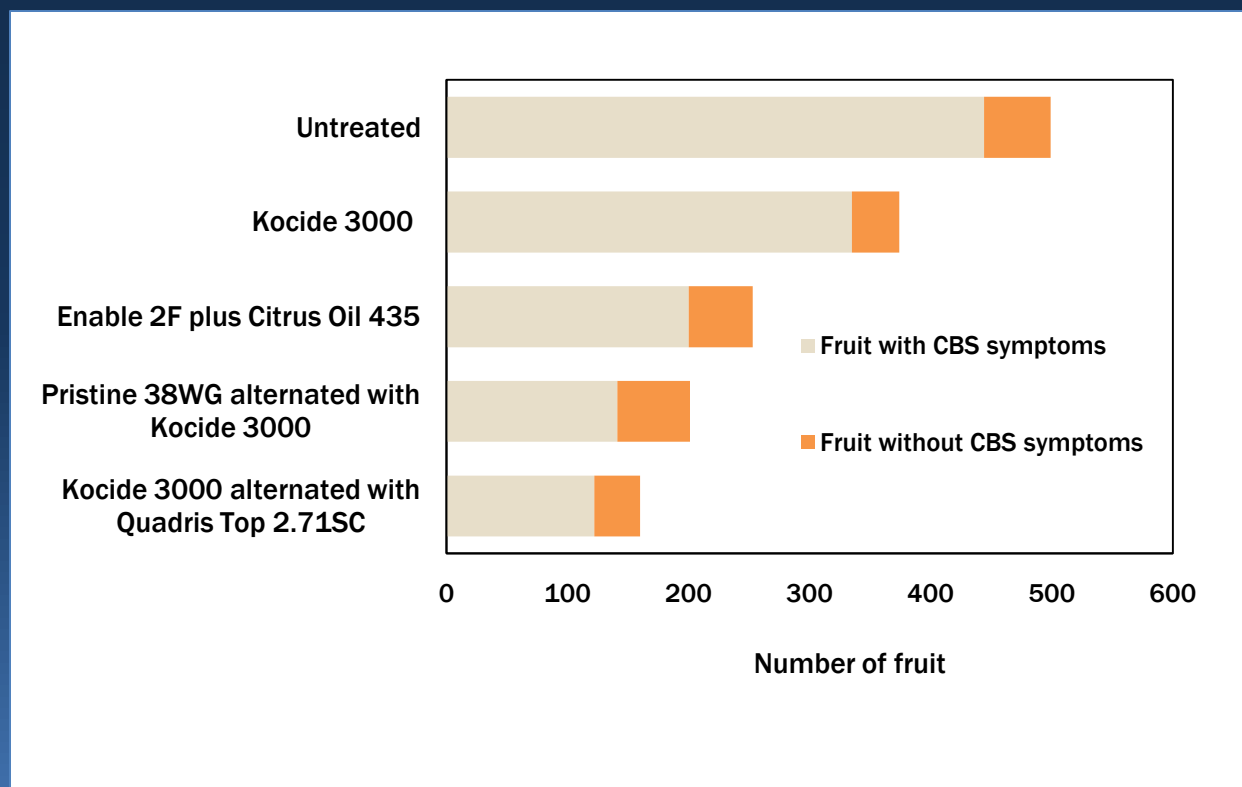
Percent Symptomatic Fruit per Meter Square – March 20, 2013



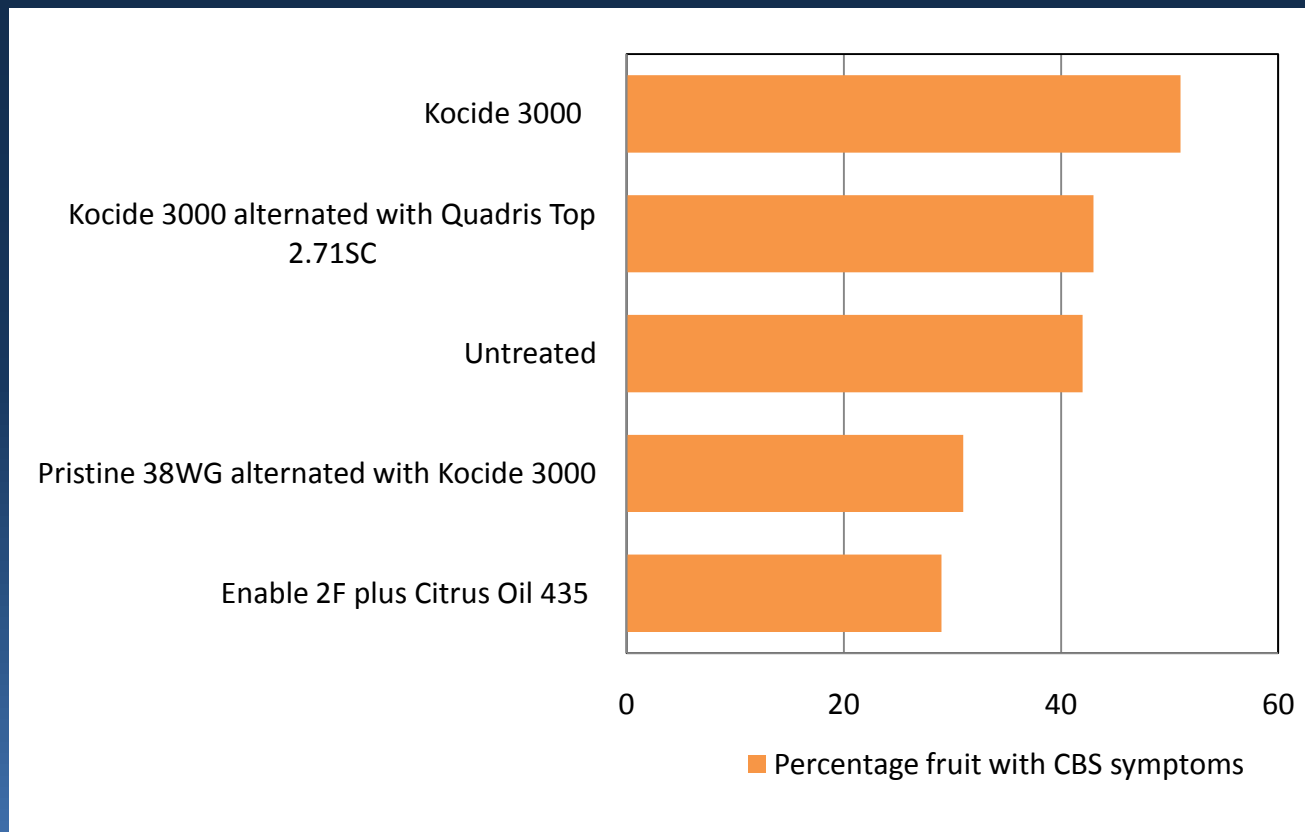
Symptomatic and Asymptomatic Fruit - March 20, 2013



Symptomatic and Asymptomatic Fruit on Ground - March, 2014



Symptomatic Fruit per meter square - March, 2014



Recommendations

- Limitations of spread in US
 - Host has limited distribution within continental US
 - Precipitation / humidity levels – Texas and Louisiana could be threatened
 - Cold climate
- Keep nursery stock clean
 - Use protected structures to keep trees dry
 - Discourage use of overhead watering

Recommendations cont.

- Pathogen spreads through movement of leaf litter and propagation materials
 - Need to continue restrictions on movement of plant materials
 - Important to keep controls on leaf debris at collection points
 - Tarping of trucks leaving quarantine areas prudent
 - Fruit unlikely disease dissemination pathway
 - Pathogen is mainly asymptomatic in leaves but is able to reproduce

Recommendations cont.

- Continue to have growers in quarantine areas to apply monthly fungicide applications between April and September
- Continue educational/extension efforts in Florida
- Continue field trials for greater options for fungicide control
- Encourage use of cultural controls like leaf litter decomposition
- Continue research to determine the complete disease cycle/epidemiology in Florida