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DIAGNOSTIC CENTER
Solving your plant health problems

Huanglongbing Citrus Greening

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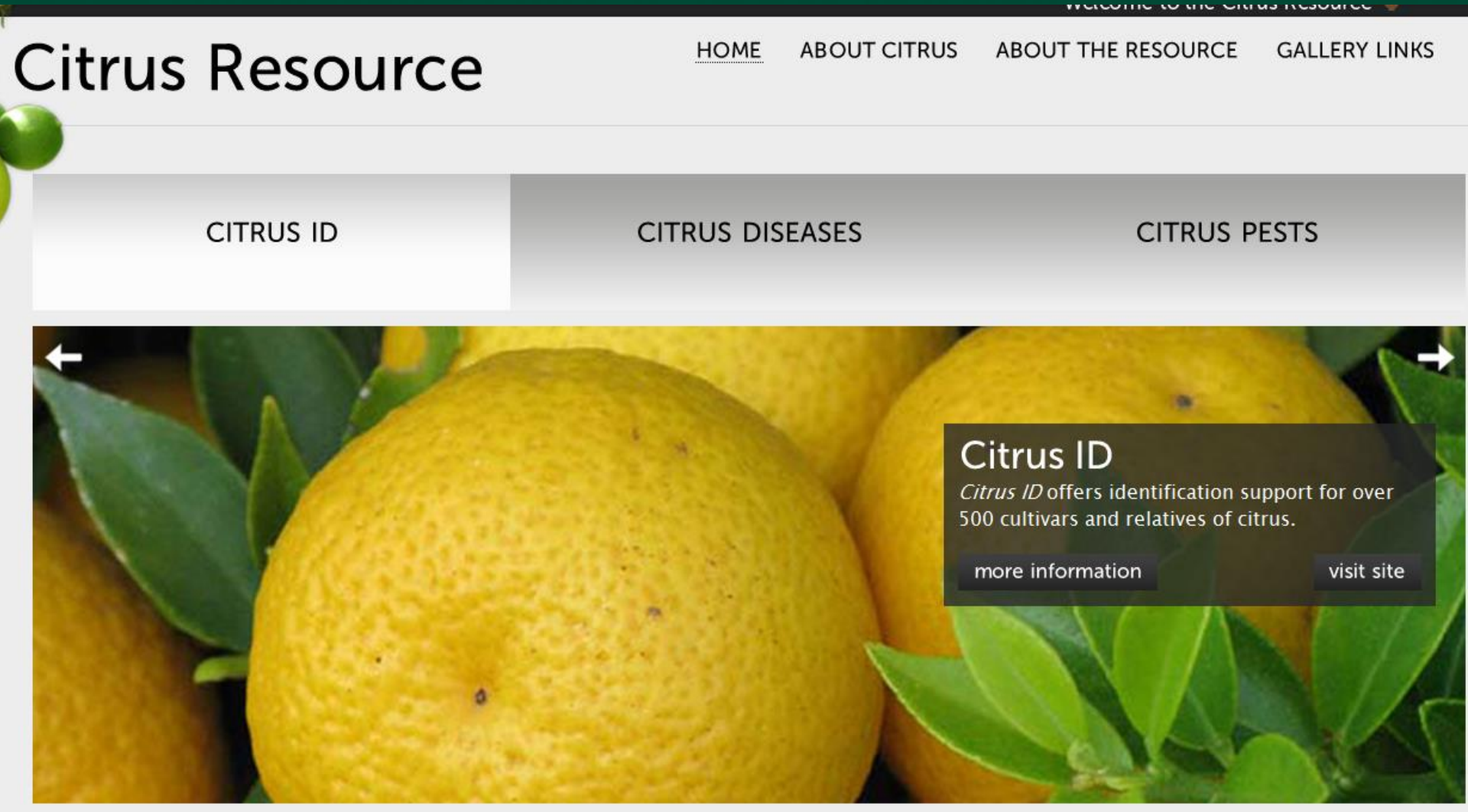
Citrus Resource

- http://idtools.org/id/citrus/resource



Citrus Greening

- Aka Huanglongbing, yellow shoot or yellow dragon
- Bacterial disease
- It is a phloem limited systemic disease
- Latent period from 3 months to several years

Citrus Greening

- Asian citrus psyllid
- Can be graft transmitted
- Seed transmission is not known yet
- All citrus cultivars and hybrids are susceptible
- Once the tree is infected, it remains infectious for rest of its life

Asian Citrus Psyllid

- Vector of citrus greening disease
- May complete up to 30 generations per year under favorable conditions
- Adults lay eggs in the crevices of growing tips. Single female may lay 800 to 1000 eggs over her life span
- Nymphs feed on new flush and have 5 instars

Asian Citrus Psyllid

- 4th or 5th instar acquire bacteria
- Nymphs produce waxy exudates
- Stays infectious for rest of life
- Both adults and nymphs can transmit disease
- Adults feed on lower side of the leaves at an angle of 45 degree

Asian Citrus Psyllid Eggs

Asian Citrus Psyllid Nymphs

Asian Citrus Psyllid Adult

Yellow Shoot

Irregular Blotchy Mottling

Thickened and Cork Veins

Lop-sided Fruit

Lop-sided Fruit

Uneven Ripening of Fruit

Credit: **Tim R. Gottwald and Steve M. Garnsey - USDA, ARS, U.S. Horticultural Research Laboratory**

Twig Dieback

Zinc Deficiency

Iron Chlorosis

Iron Chlorosis

Magnesium Deficiency

Greening Management

- Budwood disease free certification programs
- Regular scouting and inspection
- Removal of HLB infected trees
- Insect proof screen houses
- Asian Citrus Psyllid management

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Citrus Canker

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Citrus Canker

- All citrus varieties are susceptible
- Some are more susceptible than others
- Grapefruit, trifoliate oranges, Mexican/Key limes, navel oranges, sour oranges, sweet oranges, lemons, satsuma oranges, tangerines, Mandarin oranges, king oranges and kumquats

Canker Epidemiology

- Bacteria survive in old cankers
- It enters through natural openings and wounds
- Infection requires free water on the tissue surface
- Lesions may appear in 10-14 days at 68-86^{0}F but can stay active at wider range

Canker Epidemiology

- Under optimal conditions bacteria ooze from the older cankers
- Short distance spread via wind borne rain, splashed water, overhead irrigation, lawn equipment, pruning tools, human clothes and hands etc
- Long distance dispersal via storms and human movement of infected or exposed citrus material

Canker Epidemiology

- Citrus canker is not vectored by insects or other organisms
- Injury caused on tissue by citrus leafminer, thorns, blowing sand, pruning or birds provide entry sites for bacteria
- Young expanding tissue is highly susceptible and as the tissue matures and hardens off, it becomes less susceptible to infection

Canker Survival

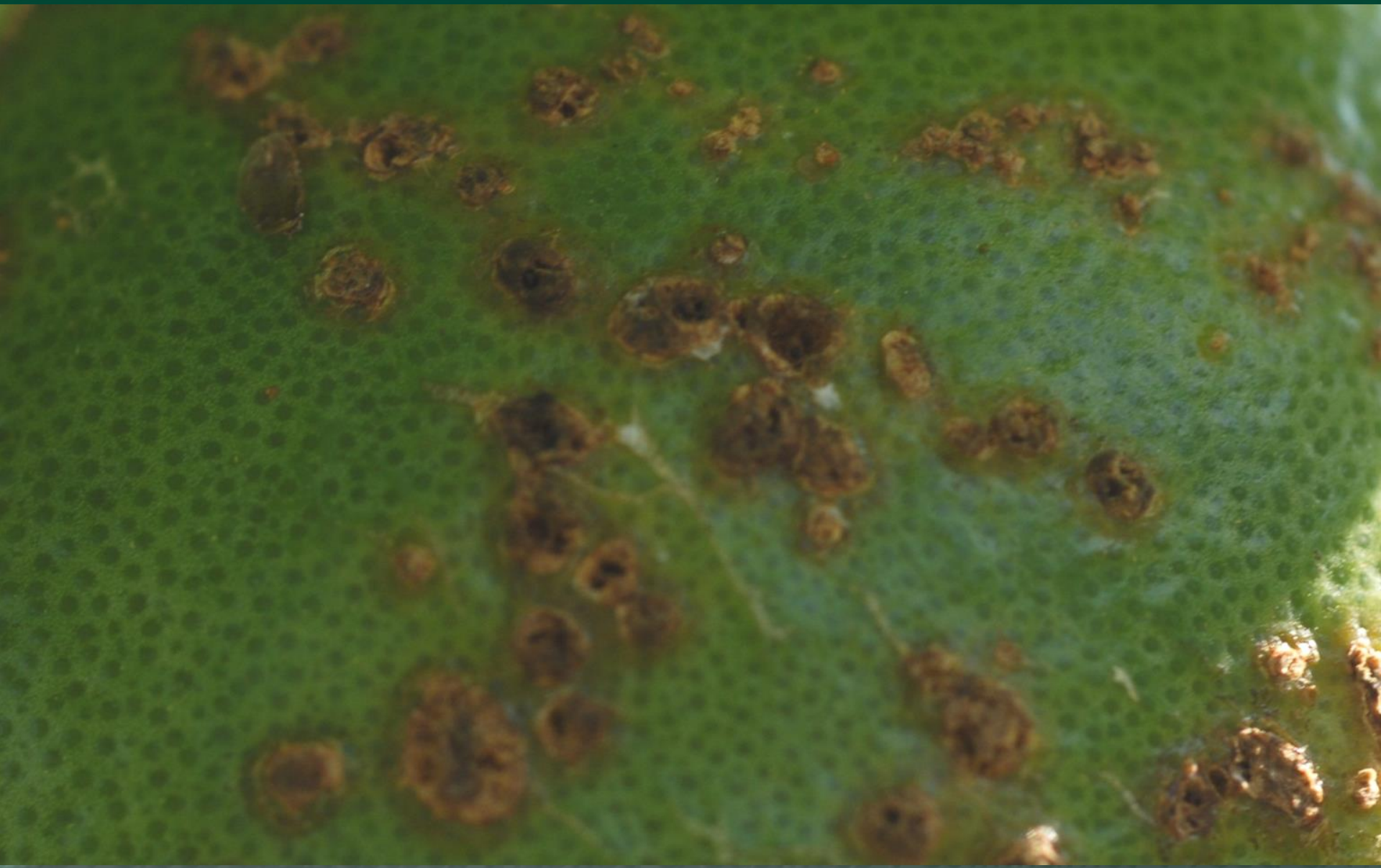
- Bacteria survive in old cankers on leaves, fruits and twigs
- It can also survive on weeds growing under the infected citrus trees
- Waiting period to plant another citrus is 2 years

Canker lesions on the leaf

Canker lesions on the leaf (Lower surface)

Canker lesions on fruit

Canker lesions on fruit (Close up)



Canker lesions on twigs

Canker lesions on leaf petiole

Citrus canker look alike

Paul Chaloux, USDA

Citrus canker and Citrus Leafminer

Citrus Tristeza Virus

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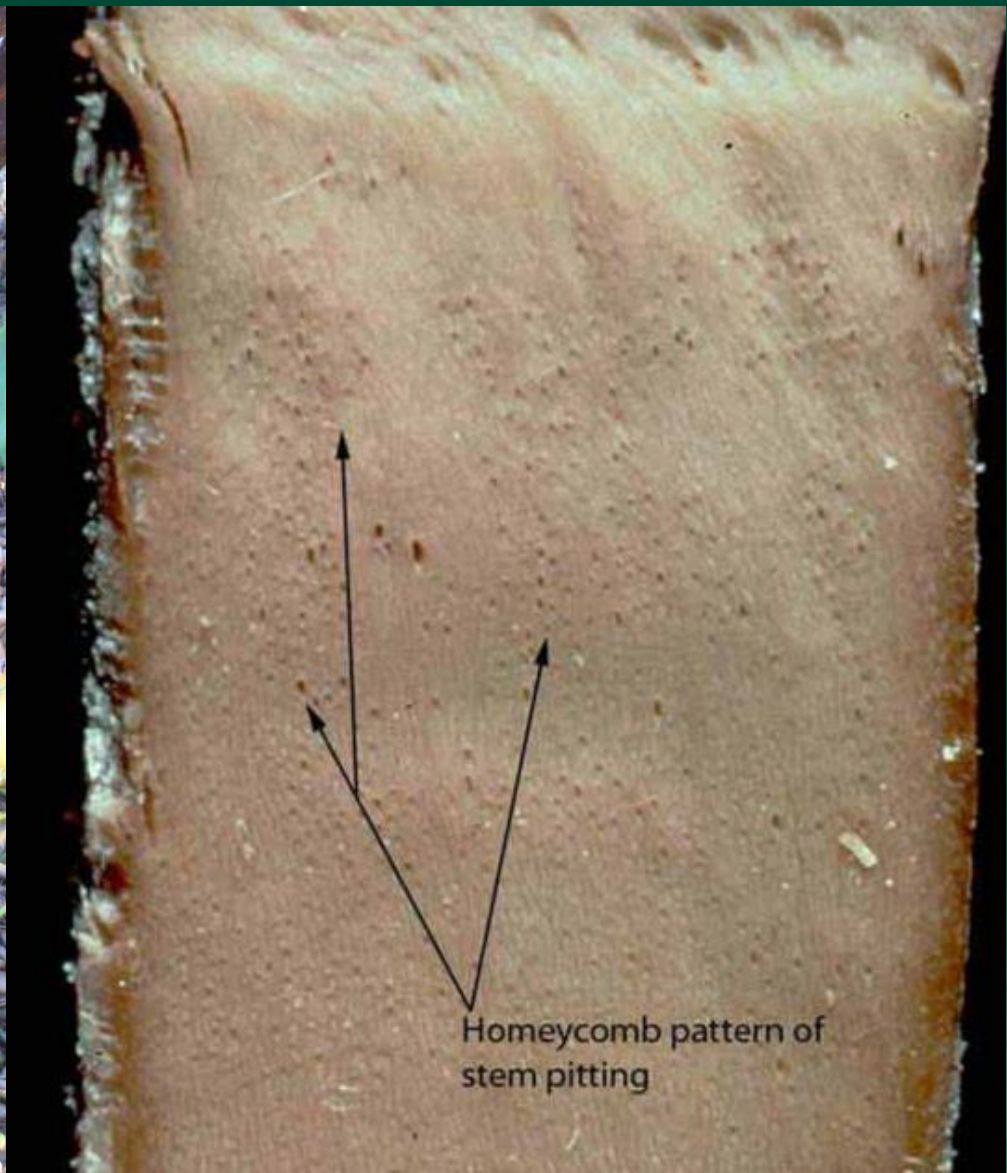
CTV

- Brown citrus aphid is the most efficient vector
- Also graft-transmitted, but not transmitted through seed
- Phloem limited virus
- Quick decline
- Stem pitting
- Seedling yellow

Quick Decline

Stem Pitting



Foot/Root Rot/Gummosis

- Oomycetes- Not a true fungus
- *Phytophthora* spp.
- Soil-borne & likes compacted poor drained soils
- Can cause root rot, foot rot and gummosis
- Leaves wilt, turn yellow and drop
- Root rot complex with Diaprepes root weevil

Citrus tree infected with Foot Rot

Gummosis at the base of the tree

Diaprepes root weevil (Adult)

Diaprepes root weevil (Grubs)

Plant Diagnostic Center

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