Citrus Black Spot: Effect on the Processing Industry
History:

Citrus Black Spot  CBS  Guignardia citricarpa

(G. mangiferae -- saprophyte)

First detected in Collier Co., early March 2010

Grower request for survey, FDACS-DPI inspectors

Survey completed out to 7-mile radius by mid-April as well as all Lemon groves in state
Citrus Black Spot: Effect on Processing Industry

Location of Citrus Black Spot Known to Date

Date: 05/26/2010
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Location of Citrus Black Spot and Certified Citrus Nurseries

Survey Status for Citrus Black Spot in Florida (05/04/2010)

Legend:
- Sample Locations Negative for Citrus Black Spot (53)
- Certified Citrus Nurseries (50)
- Citrus Processing Plants Monitored for Citrus Black Spot (17)
- Citrus Blocks Positive for Citrus Black Spot (13)
- Citrus Blocks Negative for Citrus Black Spot (33)
- Commercial Citrus Production Areas (58,418)
- County Boundaries

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International Citrus & Beverage Conference 2010 Clearwater Beach, FL W. N. Dixon, FDACS
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Survey Arcs at 1, 2, 3, 5, 7 - miles around detection sites
History:

11 Multi-blocks positive

EANs to growers Collier and Hendry as well as to processors

Regulating 20 Sections in Collier, 6 in Hendry
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10, 25, 50-Mile Survey
Early’s: Now
Mid’s: November
Late’s: March - April
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Corridor Survey

Intended Survey for CBS along major transport lines:

Highways 609, 70, 29, 27 corridors
**Biology:**

A fungal disease marked by dark, speckled spots or blotches on the rinds of fruit. Lesions are 1-5 mm in diameter and irregularly distributed on the fruit peel.

Citrus black spot is an economically significant citrus disease:
- Early fruit drop
- Reduces crop yield
- Renders the highly blemished fruit unmarketable

While all commercial citrus cultivars are susceptible the most vulnerable are lemon, grapefruit, mandarins and late-maturing citrus varieties like Valencia.
Early Symptoms of Citrus Black Spot on Sweet Orange
**Biology:**

Although disease symptoms are expressed clearest on the rinds of fruit, risk of this disease spreading through fruit movement is minimal.

The greatest risk of disease transmission is associated with the spores released from fallen, decomposing citrus leaves.

**Unusual to see lesions on leaves on trees**
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**Biology:**

Primary source of infection is ascospores (sexual spores) produced on dead leaves on the ground.

Ascospores are forcibly ejected during rains or irrigation onto fruit and infection occurs mostly in late spring and summer.

Fruit are susceptible for 4-5 months after petal fall. Although infection occurs when fruit are young, the fungus undergoes a long period of latency and symptoms may not appear until the fruit become mature.
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Biology:

Infection

Spores from leaves main risk
Essential to tarp and clean as much as possible to minimize risk of long-distance spread

Fruit lesions/spores carry very little risk
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Distribution:
The disease has been found in:
- Argentina
- Coastal areas of Australia
- Brazil
- China (mainland and Hong Kong)
- Indonesia
- Japan
- Kenya
- Mozambique
- Philippines
- Areas of South Africa with summer rainfall
- Swaziland
- Taiwan
- Uruguay
- Venezuela
- Zimbabwe
- Nigeria
Grove Treatments:
Timely applications of protectant and systemic fungicides can reduce fruit damage considerably

Protective treatments using copper or strobilurin fungicides must be properly timed, and up to 5 sprays may be required during the period of susceptibility: May – September

Sanitation by removal of leaves, twigs, fruit enhances control
Regulatory Strategies:

Pre-harvest inspection
Recent sweet orange observations change window- 45 days instead of 30 possible

Tarping – absolutely essential –
Leafs are principle long distance spread mechanism

1-mile radius arc for quarantine/regulated area
Blocks within or touching arc –
Collier and Hendry Counties
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Groves:

Grove Multiblocks in Citrus Black Spot Regulated Areas:

TRS 47-29-15, mb7
TRS 47-29-14, mb4
TRS 47-29-22, mb1, mb2, mb3, mb4
TRS 47-29-23, mb1, mb2, mb3, mb4, mb5
TRS 47-29-24, mb2, mb3, mb4
TRS 47-29-25, mb1, mb2
TRS 47-29-27, mb1, mb2, mb3, mb4
TRS 47-29-26, mb1, mb2, mb3, mb4
TRS 47-29-28, mb3
TRS 47-29-34, mb1, mb2, mb3, mb4, mb5, mb6, mb7, mb8, mb9, mb10
TRS 47-29-35, mb1, mb5, mb6, mb7

TRS 48-29-03, mb1, mb2, mb3, mb4, mb5, mb6, mb7, mb8
TRS 48-29-02, mb11
TRS 48-29-01, multi-blocks 1 to 24
TRS 48-30-06, mb1, mb2, mb3
TRS 48-29-10, mb1, mb2, mb3, mb4, mb5, mb6, mb7, mb8, mb9, mb10, mb11
TRS 48-29-11, mb1, mb3, mb4, mbIMM001, mbIMM002
TRS 48-29-12, mb1, mb2, mb3, mb4, mb5, mb6
TRS 48-29-13, mb9
TRS 48-29-15, mb6
TRS 46-31-35, mb3, mb4, mb6
TRS 46-31-36, mb1, mb2, mb3, mb4
TRS 47-31-01, mb1, mb2, mb3, mb4
TRS 47-31-02, mb1, mb2, mb3
TRS 47-31-12, mb1
TRS 47-32-06, mb1, mb2
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Packing House:

Grading, culling

Sanitization:
- Quaternary ammonium compounds
- Peroxyacetic acid – Peracetic acid

Ship to non-citrus producing states on limited permit

EU and Japan are still works in progress
Requirements for Movement of Citrus Fruit from Regulated Areas:

All vehicles with an open trailer or cargo area transporting Florida citrus that originates in a regulated citrus black spot area are required to transport and cover the load in a manner to preclude the loss of citrus fruit, stems, leaves.

- Solid wall construction on sides and rear of the cargo area - tarp on open top

- Side and rear wall construction of wire mesh screen or expanded metal greater than 3/4 x 1-11/16 inch must have the cargo area covered completely.

- Pallet boxes, field boxes, must have the cargo area covered in a manner that does not allow any openings greater than ½ inch exposing the fruit.

- Covers or tarpaulins may be constructed of any fabric that has a weave of less than ½ inch.
Groves: EAN and Compliance Agreements

Requirements for Movement of Citrus Fruit from Regulated Areas:

When plant material comes directly in contact with the vehicle, the vehicle must be decontaminated following movement.

Upon departing any citrus grove, all personnel and equipment must be cleaned free of fruit, limbs, leaves, soil and debris prior to chemical decontamination.

Identity of each load of fruit must be maintained by issuing an individually numbered trip ticket.
Packing House:

Requirements for Processors that Receive Fruit from Regulated Area:

Processors receiving fruit from the Citrus Black Spot regulated area will be under an Emergency Action Notification (EAN).

Shipments of fruit originating from an EAN-regulated citrus black spot area are subject to regulation, and all activities must be reported to PPQ prior to the fruit dump process and the handling of regulated debris. This includes the assurance of tarped trucks upon arrival and USDA, PPQ supervision of the removal and handling of plant debris and trailer decontamination.
Packing House:

Requirements for Processors Receiving Fruit from Regulated Area:

After shipments are emptied at the processing plant, trailers, tarps, field boxes, and field bins must be cleaned of all leaves and other plant debris:
- Heat treated to at least 180 degrees F for a period of at least 1 hour or
- Incinerated or
- Buried at a landfill to a depth of at least six feet

After being emptied at the processing plant and cleaned of plant debris, trailers, field boxes or bins must be disinfected using:
- Quaternary Ammonia at label rates; or
- Sodium Hypochlorite at 200 parts per million with a pH of 6.0 to 7.5; or
- Peroxyacetic Acid (PAA) at label rates
Packing House:

PPQ will only inspect at fresh packing houses with fruit destined for Japan or EU if fruit is from CBS-regulated area.

PPQ inspections will be number of fruit from X number of pack boxes per lot.
Packing House:

Japan
CBS is a quarantine pest of significance
Will destroy received shipment with lesions
Work still in progress of what interstate requirements reflective of California--may have to be sealed. (16\textsuperscript{th} meeting)
Can go to WA, OR or eastern port
No reconditioning at this point in time if PPQ finds CBS lesions
Packing House:

European Union
This has taken an convoluted path of development. Originally 4 declarations which were redeveloped into another 4 declarations

Country absence of CBS except FL; if FL then area of freedom; if grove in CBS-regulated and no CBS if grove in CBS-R and with CBS then subject to controls and packinghouse inspection
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Packing House:

<table>
<thead>
<tr>
<th>County</th>
<th>PPQ Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polk</td>
<td>John Hadman, 863-421-4131</td>
</tr>
<tr>
<td>Broward</td>
<td>David Petendree, 954-797-6943</td>
</tr>
<tr>
<td>Indian River</td>
<td>Buddy Cheslock, 772-562-9014 X409</td>
</tr>
<tr>
<td>Martin</td>
<td>Carl Lightfoot, 772-429-2045</td>
</tr>
<tr>
<td>St. Lucie</td>
<td>Carl Lightfoot, 772-429-2045</td>
</tr>
<tr>
<td>Desoto</td>
<td>Steve Bonstedt, 941-358-6409 X16</td>
</tr>
<tr>
<td>Hendry</td>
<td>Stephanie Burgess, 239-278-7520</td>
</tr>
<tr>
<td>Lee</td>
<td>Stephanie Burgess, 239-278-7520</td>
</tr>
<tr>
<td>Manatee</td>
<td>Steve Bonstedt, 941-358-6409 X16</td>
</tr>
</tbody>
</table>
Until we better control the entry of plant materials with hitchhikers into the U.S., we are forever on the path of chasing new exotic pests on the back 40 and engaging in costly eradication or suppression programs.
Thank You for Your Time and Attention
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Citrus black spot fruit lesions can be somewhat variable in appearance depending on age and host, but most lesions are 1-5 mm in diameter and irregularly distributed on the fruit peel (Figs.1 -2). A dark reddish-brown raised border encloses a light brown imbedded necrotic lesion which can contain black fruiting bodies, which are pycnidia of the anamorph, *Phyllosticta citricarpa*. This is known as the “hard spot” lesion; it is distinctive enough to serve for field identification after some training. Conidia from these pycnidia are water-splash dispersed. The pathogen can cause a smaller raised superficial lesion known as “freckle spot” or “false melanose” (Fig. 3), and also a larger, more diffuse and confluent necrotic lesion called “virulent spot” (Fig. 4). So far, mostly hard spot lesions and the less conspicuous freckle spot lesions have been observed in Florida. Leaf symptoms while on the tree are absent to relatively minor with this disease, but as quiescently infected leaves abscise and decay on the orchard floor, they provide much of the inoculum in the form of air-borne ascospore for new infections (McOnie 1967). Twigs and old peduncles can support the pathogen too, though direct damage to these parts is not a major component of this disease. Ascospores from perithecia in the decaying leaves are discharged into the air during the onset of warm, wet weather, mostly during late spring and summer.