Ceratocystis fimbriata – a new fungal pathogen of kiwifruit in Brazil

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Background – *Ceratocystis fimbriata*

- Fungus first recorded in 1890
- Postharvest rot of *Ipomoea batatas* (kumara, sweet potato)
- Broad host range
- Rots of storage roots and corms
- Wilt and cankers on many woody plants
Geographic distribution

CABI - http://www.cabi.org/isc/datasheet/12143
Identification

*Ceratocystis fimbriata* perithecia
Ceratocystis fimbriata: A) Perithecial beak, B) ascospores, C) conidia, D) chlamydospores
First report on kiwifruit
» Visit affected orchards

» Meet with Prof. Acelino Alfenas and staff at Viçosa University who are testing Brazilian isolates on kiwifruit cultivars in Brazil

» Align methods of testing

» Take part in a workshop on *Ceratocystis* diseases

» Meet international experts on *Ceratocystis*, including Professor Tom Harrington (Iowa State University)
Disease symptoms

Leaf wilt and curl
Disease symptoms

Shrivelled canes
Disease symptoms

Darkened xylem tissues
Observations in Brazil

- Kiwifruit was one of the most profitable crops in Brazil
- Reduces the number of harvestable fruit
- Most affected vines eventually die
Means of spread

Natural spread is limited:

» Soilborne fungus
» Root grafts
» Potentially some movement by wood-boring beetles

Human-assisted spread:

» Propagative material
» Pruning tools
» Other equipment
Brazils response to the threat

- Focus on hygiene
- Resistance testing
- Strain identification
Brazils response to the threat
New Zealand situation

» *Ceratocystis fimbriata* has been known in New Zealand since 1907

» Never recorded on kiwifruit

» Recorded on kumara

» Many different strains/clades of *Ceratocystis fimbriata* are known worldwide

» Host specific?

» Geographic isolation?
Pathogenicity testing - cultivars

<table>
<thead>
<tr>
<th>Actinidia species</th>
<th>Cultivar</th>
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<tbody>
<tr>
<td>A. deliciosa</td>
<td>‘Hayward’</td>
</tr>
<tr>
<td>A. chinensis</td>
<td>G3</td>
</tr>
<tr>
<td>A. deliciosa x</td>
<td>G14</td>
</tr>
<tr>
<td>A. macrosperma</td>
<td>‘Bounty’</td>
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</tbody>
</table>
Pathogenicity testing - isolates

<table>
<thead>
<tr>
<th>Accession Number</th>
<th>Collection date</th>
<th>Location</th>
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<tbody>
<tr>
<td>ICMP 894</td>
<td>Dec. 1961</td>
<td>Auckland, Mt Albert</td>
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<tr>
<td>ICMP 1731</td>
<td>Jul. 1966</td>
<td>Auckland</td>
</tr>
<tr>
<td>ICMP 2085</td>
<td>Oct. 1967</td>
<td>Northland, Ruawai</td>
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<td>ICMP 13575</td>
<td>May 1998</td>
<td>Northland</td>
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<tr>
<td>ICMP 13968</td>
<td>Jul. 1999</td>
<td>Northland, Ruawai</td>
</tr>
</tbody>
</table>
Inoculation

» Five cultivars
» Five *Ceratocystis* isolates + water control
» Five plants (replicates) for each treatment
28 days
Effect of kiwifruit cultivar on lesion length

![Bar chart showing the effect of different kiwifruit cultivars on lesion length.]

- 'Hayward': a
- Gold3: ab
- Green14: b
- 'Bounty': ab

Lesion length (mm) vs. kiwifruit cultivar.
Effect of *Ceratocystis* isolate on lesion length
Brazil pathogenicity tests
New Zealand pathogenicity tests
Conclusions

» New Zealand *Ceratocystis fimbriata* strain not pathogenic on kiwifruit

» Host specific

» Geographic isolation
Conclusions

» No action needs to be taken to mitigate the threat of the New Zealand kumara strain moving into kiwifruit orchards.

» The New Zealand kiwifruit industry does need to be vigilant in monitoring for new *Ceratocystis fimbriata* strains.

» Growers should be alert for symptoms similar to those described from Brazil orchards.