Orange Rust of Sugarcane: Its Importance and Control

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Sugarcane Rusts

Brown Rust

Orange Rust
Comparison of Sugarcane Rusts

*Brown Rust*

Uredinia (Pustules)
- Reddish-brown
- Elongate

*Orange Rust*

Uredinia (Pustules)
- Orange-brown
- More oval
Comparison of Sugarcane Rust Spores

Brown
Orange
Comparison of Sugarcane Rust Spores

Pictures by Lisa Castlebury

Brown rust spores
- Wall 1.5 μ thick

Orange rust spores
- Thickened at apex
Sugarcane Rusts

Orange and brown rusts are favored by different temperatures, which affects the time of the season during which they predominate.

Brown rust (moderate temperatures) is favored in the spring, mostly March-May.

Orange rust (warm temperatures) is favored in early summer through fall (June-November).
Orange Rust in Florida
A brief history
(2007)

- First observed in June 2007
- Infections observed on CP80-1743, CL85-1040 and CP72-2086
- Epidemic lasted through summer, into harvest
- Rust severities in Sept. of 24%
- Initial fungicide efficacy trials demonstrated promise
- Commercial yield losses suspected
Orange Rust in Florida
A brief history
(2008)

- Infections observed in early May
- Infections observed on CP80-1743, CL85-1040, CP72-2086, and eventually CP89-2143
- Epidemic lasted from early summer through harvest
- Rust severities ranging as high as 30-40%
- Pyraclostrobin and metconazole approved for use
- Commercial yield losses confirmed
# Orange Rust in the Americas

<table>
<thead>
<tr>
<th>Location</th>
<th>Detected</th>
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<tbody>
<tr>
<td>United States (Florida)</td>
<td>2007 (June)</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>2007 (August)</td>
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<tr>
<td>Guatemala</td>
<td>2007 (September)</td>
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<tr>
<td>Nicaragua</td>
<td>2007 (September)</td>
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<tr>
<td>Cuba</td>
<td>2008</td>
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<tr>
<td>Mexico</td>
<td>2008 (July)</td>
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<tr>
<td>Panama</td>
<td>2008 (February)</td>
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<tr>
<td>El Salvador</td>
<td>2008 (February)</td>
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<tr>
<td>Jamaica</td>
<td>2008</td>
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<tr>
<td>Belize</td>
<td>2009</td>
</tr>
<tr>
<td>Brazil</td>
<td>2009 (December)</td>
</tr>
</tbody>
</table>
Orange Rust Severities
2008 vs 2009

May | June | July | August | Sept
---|---|---|---|---
2008 | 2009 | 2008 | 2009 | 2008 | 2009

0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40
Host Plant Resistance
## Host Plant Resistance

<table>
<thead>
<tr>
<th>Year</th>
<th>Commercial Varieties With Pustules</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>CP80-1743, CP72-2086, CL85-1040</td>
</tr>
<tr>
<td>2008</td>
<td>CP80-1743, CP72-2086, CL85-1040, CP83-2143, CP78-1628</td>
</tr>
<tr>
<td>2009</td>
<td>CP80-1743, CP72-2086, CL85-1040, CP83-2143, CP78-1628, CP88-1672</td>
</tr>
</tbody>
</table>
Cultivar Susceptibility 2007

% of Hectarage

- Susceptible: 34%
- Resistant: 66%
Cultivar Susceptibility 2008

% of Hectarage

Resistant 48%
Susceptible 52%
Cultivar Susceptibility 2009

% of Hectarage

- Resistant 29%
- Susceptible 71%
Orange Rust Yield Loss Trial
EREC - 2008
Yield component comparisons between the untreated check and the 7-day spray interval on CL85-1040, an orange rust susceptible variety.
Orange Rust Fungicides
2008 Commercial Trials

CP80-1743 on June 11
Two pyraclostrobin applications
(10 oz on May 10, 12 oz on June 6)

Photo courtesy of J. Shine and Wedgworth Farms
Influence of fungicide initiation on orange rust severity in CL85-1040 during 2009

% Rust Severity (upper half canopy)
Influence of fungicide initiation on sugar yield of CL85-1040 during 2009

Lbs of sugar per acre

July
Aug
Sept
Untreated
Due to its long-distance spread capabilities, orange rust will likely spread to all sugarcane growing countries within the Americas.

Host plant resistance is available but may not be stable due to the presence of rust variants.

Given favorable conditions, orange rust is capable of causing yield losses in excess of 50%.
Sugarcane Orange Rust

Conclusions

- Controlled temperature studies show OR to be favored by temperatures of 20-25 C.
- These studies will prove valuable in defining “risk zones” for potential management.
- Fungicides, particularly strobilurins and triazoles, have demonstrated efficacy.
- However, chemical control should be viewed as only one tool in a multi-pronged management program.
Acknowledgments

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THANK YOU!