Evaluation of a Comprehensive “Points” Variety Approval System

ASSBT 2011

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Michigan Sugar Company
Sugarbeet Yield and Quality Trends in Michigan

% of Check


RWST  RWSA
Why Have Quality Improvements Been Slow?

Breeding focus has been on

- Rhizomania
- Rhizoctonia
- Cercospora
- Tons
- Roundup Ready
Major Goal of Michigan Sugar is to Improve Sugarbeet Quality

- Increase sugar from 18 to 19 percent by 2015

- “The Road to 19”
“The Road to 19”
How Do We Get There?

- Plant early
- Narrow rows
- Good populations
- Starter nitrogen 2x2
“The Road to 19”
How Do We Get There?

- Control Cercospora leaf spot
- Control Rhizoctonia root rot
- Manage nematodes
“The Road to 19”
How Do We Get There?

We need higher quality varieties
Variety Mix in Michigan
% of Check

<table>
<thead>
<tr>
<th></th>
<th>High Yield/Quality</th>
<th>Approved/Good Disease Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor Disease</td>
<td></td>
</tr>
<tr>
<td>RWSA</td>
<td>110</td>
<td></td>
</tr>
<tr>
<td>RWST</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>RWST</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>RWSA</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>RWST</td>
<td>90</td>
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</table>
Cercospora Varietal Differences

- Tolerant Variety
- Moderately Susceptible
- Highly Susceptible
Rhizoctonia Varietal Differences

Tolerant

Moderately Susceptible

Highly Susceptible
Nematode Tolerant Varieties

- 25% of acres with nematode problems
- Varieties don’t pass approval
New Approval System

- Quality (3X premium)
- Cercospora level relaxed
## Compare Approval Systems

<table>
<thead>
<tr>
<th>Old System</th>
<th>New System</th>
</tr>
</thead>
<tbody>
<tr>
<td>RWSA</td>
<td>RWSA</td>
</tr>
<tr>
<td>RWST</td>
<td>RWST</td>
</tr>
<tr>
<td>Cercospora</td>
<td>Cercospora</td>
</tr>
<tr>
<td>Storage RWST</td>
<td>Rhizoctonia</td>
</tr>
<tr>
<td></td>
<td>Root Aphid</td>
</tr>
<tr>
<td></td>
<td>Rhizomania</td>
</tr>
<tr>
<td></td>
<td>Emergence</td>
</tr>
<tr>
<td></td>
<td>Storage RWST</td>
</tr>
</tbody>
</table>
## Comparing Approval Levels: Old vs New “Points” System

<table>
<thead>
<tr>
<th>Year</th>
<th>RWSA</th>
<th>RWST</th>
<th>Cerc</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>99.4</td>
<td>99.7</td>
<td>113.7</td>
<td>na</td>
</tr>
<tr>
<td>2010</td>
<td>105.0</td>
<td>101.0</td>
<td>140.0</td>
<td>105</td>
</tr>
<tr>
<td>2015</td>
<td>110.0</td>
<td>104.0</td>
<td>125.0</td>
<td>105</td>
</tr>
</tbody>
</table>

All Values % of Check
How “Points” System Works

Starting Point is RWSA

- RWSA for variety (X) is 113.9 % of check

- Points = 113.9
How “Points” System Works

RWST level for variety (X) is 109.7 % of check

Variance from 100 = 9.7 x 3

Points = 29.1
How “Points” System Works

Variety (X) Cercospora level is 124.1 % of check (-18 to 10 points range)

- From conversion table
  124.1 = -18 points
How “Points” System Works

Variety (X) Rhizoctonia level is 109.3% of check (0 to 10 points range)

- From conversion table
  109.3 = 2 points
How “Points” System Works

Variety (X) Rhizomania level is 5.0 (0 to 3 points range)

- From conversion table
  5.0 = 2 points
How “Points” System Works

Variety (X) Root Aphid level is 2.1 (0 to 5 points range)

- From conversion table
  2.1 = 3 points
How “Points” System Works

Variety (X) emergence level is 63.1 % of check (-5 to 5 points range)

- From conversion table
  63.1 = 0 points
How “Points” System Works

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RWSA:</td>
<td>109.7</td>
<td>Variety X</td>
</tr>
<tr>
<td>RWST:</td>
<td>29.1</td>
<td>very high yield</td>
</tr>
<tr>
<td>Cercospora:</td>
<td>-18</td>
<td>very high quality</td>
</tr>
<tr>
<td>Rhizoctonia:</td>
<td>2</td>
<td>poor disease</td>
</tr>
<tr>
<td>Rhizomania:</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Root Aphid:</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Emergence:</td>
<td>0</td>
<td>need 105%</td>
</tr>
<tr>
<td>Total:</td>
<td>127.8</td>
<td>= 120.2% of check</td>
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</table>
## How “Points” System Works

<table>
<thead>
<tr>
<th>Measure</th>
<th>Score</th>
<th>Trait Description</th>
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</thead>
<tbody>
<tr>
<td>RWSA</td>
<td>95.2</td>
<td>Variety Y</td>
</tr>
<tr>
<td>RWST</td>
<td>9.8</td>
<td>moderate yield</td>
</tr>
<tr>
<td>Cercospora</td>
<td>7</td>
<td>medium to high quality</td>
</tr>
<tr>
<td>Rhizoctonia</td>
<td>6</td>
<td>good disease</td>
</tr>
<tr>
<td>Rhizomania</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Root Aphid</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Emergence</td>
<td>1</td>
<td>need 105%</td>
</tr>
</tbody>
</table>

**Total:** 124.0 = 114.6% of check
Plans to Manage Cercospora and Rhizoctonia with Susceptible Varieties

Research and grower experience has shown that diseases can be controlled
Plans to Manage Cercospora with Susceptible Varieties

Required Spray Dates
- Red Zone: 45/45/45
- Green Zone: 65 or 1\textsuperscript{st} spot /55
BeetCast Risk Management Zones
Plans to Manage Rhizoctonia with Susceptible Varieties

Field Selection is Critical

25-30% of area not suitable for highly susceptible varieties
Plans to Manage Rhizoctonia with Susceptible Varieties

Required to Apply Quadris

- 1 or 2 applications depending upon situation
Goal to increase sugar content by 1 percentage point by 2015

“The Road to 19”
New Approval System will allow approval of higher quality varieties

Will increase income to growers and the Co-op
Summary

Must manage diseases

- Cercospora
- Rhizoctonia