Hybrid Response with Plant Performance™ Fungicides

2011 Syngenta Agronomy Research
Reasons to utilize Quilt Xcel™ Fungicide

Maximize yield on low disease risk fields
- Improved staygreen
- Water use efficiency
- CO₂ assimilation

Improve hybrid agronomics
- Stalk quality
- Reduced harvest loss
- Reduced harvest time

Protect yield potential on high disease risk fields
- Susceptible hybrids
- Continuous corn
- No-till
- Disease-prone fields
Impact of Corn Foliar Diseases

- Leaf desiccation
- Premature plant death
- Reduced kernel size and plumpness
- Increased incidence of stalk rot diseases
- Increased incidence of lodging
- **Reduced yield**

![Quilt® Fungicide Treated](image1)

![Untreated](image2)
The Quilt Xcel Advantage…

Quilt Xcel™ fungicide is an elite systemic fungicide containing the Power of Two™ active ingredients providing both curative and longer-lasting preventive disease control and Plant Performance™ to maximize harvest and profitability.

- **Broad-spectrum, longer lasting** control of the major foliar diseases

- **Application flexibility and improved plant protection** as both active ingredients move from the site of application through the plant, even to new growth

- **Plant Performance™ benefits** such as stronger stalks leading to bigger and more efficient harvests

- **Power of Two™** different modes of action provides:
  - preventive and curative disease control
  - longer residual activity
  - a resistance management tool
Syngenta Agronomy Research

- Research trials conducted to evaluate specific hybrid + fungicide combinations
- Multiple years of testing
  - 2006-2010
  - Averaging >24 reps of data per hybrid
- Various cropping systems
  - Crop rotation and continuous corn
  - Conventional and reduced tillage
  - Dryland and irrigated production
  - Majority of locations had *low disease pressure*
Syngenta Agronomy Research

- Foliar fungicides applied at green silk crop stage (R1)
- Hybrid response measured versus an untreated check
- **Natural** disease pressure varied in severity from very light to moderate across all trial locations
- Hybrid yield and Plant Performance responses were measured to quantify the effects of Quilt or Quilt Xcel fungicide
Hybrid Yield Responses to Quilt or Quilt Xcel Fungicide

- Yield response 74% of the time
- **Minimal disease** present in untreated checks
- Similar yield response observed in all yield environments
- Yield response varied across locations and years
- Disease susceptible and tolerant hybrids responded
- Certain hybrids responded more frequently than others
Hybrid Response to Quilt or Quilt Xcel Fungicide

- Individual hybrid response evaluated:
  - Calculated yield response to Quilt Xcel fungicide
  - Various commodity grain prices:
    - $3.50, $4.50 and $5.50 per bushel

- Hybrid response rating determined using the potential for a positive economic return* and consistency across site years

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Hybrid Response Ratings

★ = Best opportunity to achieve an economic return at given commodity price ($/Bu).
● = Hybrid has potential to achieve an economic return from a fungicide application.
▼ = Economic return not likely from fungicide application unless disease is present.
× = Not likely to respond to a foliar fungicide unless disease is present.

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* Economic return assumes fungicide and application cost of $26 per acre
Classification: PUBLIC
## Utilizing Hybrid Response Ratings to Maximize ROI

*Yield Response and Economic Return by Hybrid Rating Category Using Quilt or Quilt Xcel Fungicide*

40 site years of data; 2006-2010

<table>
<thead>
<tr>
<th>Hybrid Response Rating</th>
<th>Number of Comparisons</th>
<th>Yield Response (% of time)</th>
<th>Average Yield Increase (Bu/A)</th>
<th>Positive Economic Return** (% of time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>★</td>
<td>104</td>
<td>83%</td>
<td>10.0</td>
<td>77%</td>
</tr>
<tr>
<td>•</td>
<td>151</td>
<td>80%</td>
<td>8.9</td>
<td>60%</td>
</tr>
<tr>
<td>▼</td>
<td>170</td>
<td>74%</td>
<td>4.0</td>
<td>42%</td>
</tr>
<tr>
<td>×</td>
<td>81</td>
<td>52%</td>
<td>0.2</td>
<td>17%</td>
</tr>
<tr>
<td><strong>All Data</strong></td>
<td>506</td>
<td>74%</td>
<td>6.1</td>
<td>51%</td>
</tr>
</tbody>
</table>

*Data across multiple environments and locations where disease pressure was none to moderate.

**Economic Return on Investment (ROI) based on $26/A fungicide + application cost and $4.50/Bu corn price.
### Consistency of Hybrid Fungicide Response

<table>
<thead>
<tr>
<th>Location</th>
<th>N72D</th>
<th>N78N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowden, IL '08</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Cowden, IL '09</td>
<td>19.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Seneca, KS '08</td>
<td>14.8</td>
<td>14.5</td>
</tr>
<tr>
<td>Seneca, KS '09</td>
<td>17.4</td>
<td>0.0</td>
</tr>
<tr>
<td>Washington, IA '08</td>
<td>30.0</td>
<td>15.1</td>
</tr>
<tr>
<td>Washington, IA '09</td>
<td>38.4</td>
<td>31.5</td>
</tr>
<tr>
<td>% time &gt; 5.8 Bu increase</td>
<td>83%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Understanding which hybrids will have a consistent yield response is important.

Hybrid ratings assume $4.50/bu grain price and $26 /A fungicide+ application cost. Hybrids evaluated in low disease risk environments.

Source: Syngenta Agronomy Research

Classification: PUBLIC
Foliar Corn Fungicides… More Than Yield

- Pinched corn stalks at 2nd internode above the brace roots
- Over 2000 individual stalks rated
- Weakened stalks represent potential future lodged stalks
Foliar Corn Fungicides… More Than Yield

- 15% more stalks with improved strength
- Reduced stalk lodging risk
- Decreased harvest losses
- Reduced harvest time

Influence of Quilt or Quilt Xcel on Late Season Stalk Integrity

4 site years, 13 hybrids

LSD (0.01) = 6.6%

% Firm stalks at harvest

- Untreated: 56.8%
- Quilt or Quilt Xcel: 72.0%

Source: Syngenta Agronomy Research
How does lodged corn impact harvest costs?

Assuming:

- 4.5 mph for Quilt Xcel with < 3% lodged stalks
- 2.8 mph for Untreated with ~ 25% lodged stalks
- 8 row combine @ $135.37 per operator hour

Reduction in Harvest speed of 1.7 MPH = ~$9.50/Acre in increased Harvest Costs.

Harvest cost based on Michigan State “2011 Machine Custom & Work Rate Estimates”
Grain loss value from lodged corn not factored into these calculations

Classification: PUBLIC
Influence of Quilt Xcel on Corn Silage Yield and Quality*
Low Disease Environments, 2009-2010

<table>
<thead>
<tr>
<th></th>
<th>Yield @ 70% Moisture (Ton/A)</th>
<th>Milk (lbs/ton)</th>
<th>Milk (lbs/A)</th>
<th>Beef (lbs/ton)</th>
<th>Beef (lbs/A)</th>
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</thead>
<tbody>
<tr>
<td>Quilt Xcel</td>
<td>34.4</td>
<td>3374</td>
<td>34822</td>
<td>241.3</td>
<td>2490</td>
</tr>
<tr>
<td>Untreated</td>
<td>33.1</td>
<td>3296</td>
<td>32720</td>
<td>237.8</td>
<td>2361</td>
</tr>
<tr>
<td>LSD(0.10)</td>
<td>0.5</td>
<td>41</td>
<td>674</td>
<td>1.7</td>
<td>41</td>
</tr>
<tr>
<td>Quilt Xcel Increase</td>
<td>1.3</td>
<td>78</td>
<td>2102</td>
<td>3.5</td>
<td>130</td>
</tr>
<tr>
<td>% Quilt Xcel Increase</td>
<td>3.9%</td>
<td>2.4%</td>
<td>6.4%</td>
<td>5.9%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

* Milk and Beef production estimates were generated from University of Wisconsin equations that used digestibility values based on NIR and in-vitro digestibility analysis of samples from Syngenta silage trials.
Hybrid Selection and Management Guidelines

- Select locally adapted high yielding hybrids that fit your environment

- ⬜ or ★ rated hybrids → likely to achieve ROI with properly applied fungicide at R1 growth stage (green silk)

- ▼ or ✗ rated hybrids → a foliar fungicide may not be warranted with low to moderate disease pressure

- Consider using a foliar fungicide with any hybrid under **severe disease pressure**
Foliar Fungicide Management

Considerations for corn fungicides:

- Manage each farm/field according to relative risk associated:
  - Continuous Corn
  - Hybrid susceptibility
  - No-till

- Follow fungicide label rates with adequate carrier volumes (10-15 gpa ground, 2-5 gpa aerial)

- Minimize likelihood of resistance occurring by using a fungicide, such as Quilt or Quilt Xcel, with dual modes of action
Quadris® Fungicide at V5 Corn Growth Stage

- Benefits of V5 fungicide applications
  - Provides broad-spectrum residual disease control and Plant Performance™ while the corn plant is determining leaf and ear shoots
  - Offers application flexibility and early-season preventative disease control and Plant Performance
  - Tank mix with herbicide to maximize application efficiency
  - Provides plant protection with the excellent xylem-mobile, systemic activity of the Quadris X-Factor™
Quadris Fungicide at V5 Corn Growth Stage

- Multiple hybrids evaluated in 2010
- Positive yield response occurred for several hybrid series
- Unclear if hybrid interactions exist at V5 timing
- More testing in 2011 to better understand response

Yield Response of Quadris Fungicide at V5 Application
4 Locations; 2010

LSD (0.05) = NS
Questions???
Important: Always read and follow bag tag or label instructions before buying or using Syngenta products. The instructions contain important conditions of sale, including limitations of warranty and remedy.

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