Observations from Brazil on Soybean Rust Management

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Soybean Rust Detections in the United States

EUA: 11/11 - LA, MI
Louisiana: 11/10/04
Mississippi: 11/17/04
Florida: 11/18/04
Georgia: 11/20/04
Alabama: 11/21/04
Arkansas: 11/22/04
Missouri: 11/30/04
South Carolina and Tennessee: 12/01/04

Source: Fabiano Sequeiri, MT Foundation
Pioneer/DuPont Soybean Rust Tour to Brazil

All phytosanitary precautions used by each participant
Soybean in Brazil:
2003/04 growing season

Production: ............... 50 millions of tons
Yield ....................... 2.800 kg.ha⁻¹  (41.6 bu/acre)
Acreage: ..................... 21 millions ha
Price: US$  176.00/t.
Production cost: ........ US$ 270.00 /ha

Source: Conab (2004).

Slide courtesy of Dr. Erlei Reis, Passo Fundo University
Soybean Rust Presence
November 29, 2004

Note: Some sources also add Laos, Bangladesh, and Burma in Asia and Zaire, Malawi, Tanzania, Sudan, and Ethiopia in Africa, but these have not been verified.

SOURCE: APHIS, USDA
North Central Pest Management Center
Market READS

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November 2004
Expansion of soybean rust in South America.
Left figure shows the yearly expansion borders of the rust since it was introduced in 2001. Right figure shows the actual regions in Brazil affected by soybean rust in 2002 (red) and 2003 (green).
Brazilian Farmers’ Reactions

• The First Year = Confusion
  – Mistrust of chemical companies and retailers
  – Lack of information
  – Lack of trained people
  – Lack of application equipment
  – Lack of sufficient products
  – Confusing recommendations

• Management of soybean rust continues to be a learning process
  – Limited number of years experience
  – Every year is different
Soybean Rust’s Biggest Challenge

The Need for **Frequent** Scouting

Source: Alberto Piccinin, Agro Amazonia, Campo Verde, MT
Scouting

- Start at first trifoliate leaves
- Divide fields into 100-200 ha subunits
- Sample 2-3 times per week
- 20-100 leaflets per field from the lower canopy (some recommend sampling multiple layers)
- Much patience and energy is required

Source: Fabiano Sequeiri, MT Foundation
Identifying Lesions Very Early

Initial lesions

Source: Alberto Piccinin, Agro Amazonia, Campo Verde, MT

Incubate samples

Source: Jose Tadashi Yorinori
Magnification Is Essential

40-100X Stereo

Source: Dr. Erlei Reis, Passo Fundo University
Scouting

- Scout earliest-planted fields most aggressively
- Monitor incidence, not severity
- No good remote sensing techniques available
- Pay attention to findings in surrounding regions

Source: Fabiano Sequeri, MT Foundation
Yield Loss Expectations

• difficult to get true SXS comparisons of treated versus untreated
• yields may actually go up if rust is controlled
• 80-100% yield loss if untreated (worst-case scenario)
• cost of late spraying: 1 Sc/ha per day
• cost of missed spray: 25-40%

Source: Alberto Piccinin, Agro Amazonia, Campo Verde, MT
Comparison of the Average Yields for the 2000/01 and 2001/02 crops in Chapadão do Sul - MS, in the presence of ASR

<table>
<thead>
<tr>
<th>Grower</th>
<th>Farm</th>
<th>Sacks/ha</th>
<th>% Loss</th>
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<tr>
<td>Armando Bianchessi</td>
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<td>58</td>
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<td>Ademar Nunes</td>
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<td>Valdir dos Santos</td>
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<td>Hugo Liber Lopes</td>
<td>São Roque</td>
<td>47</td>
<td>42</td>
</tr>
</tbody>
</table>

Fonte: Fundação MT

Média 50,6 38,5 24,4
Fungicide Resistance

• no confirmed resistance in Brazil after 4 years
• no one recommends more than 2 applications of the leading fungicide per year
• some growers think they may be seeing resistance. Why? need for more sprays and/or higher rates of fungicides
• may be seeing a new, more aggressive strain of ASR
• the IRM strategies that chemical companies promote depend on the products they sell

Source: Fabiano Sequeri, MT Foundation
Rust Management Strategies

• The foundation for a rust management program is based upon three “pillars”
  ➢ Correct fungicide application timing
    - dependent on scouting and identification
  ➢ Product efficacy
  ➢ Application quality

• All of the “pillars” are equally important
Fungicide Application Principles

• The first applications are the most important.
Cost of One Missed Spray

Defoliation of Lower Canopy

Poor Pod Set

Estimated Yield Loss = 25-40%
Effect of Timing on Application Frequency

Time (days) vs. % severity graph with data points marked at specific intervals.
Fungicide Application Principles

• The first applications are the most important.

• Since rust starts in the lower part of the canopy, it is essential that the spray reach that target area.
AVERAGE SIZE DROPLETS

(Dados de Fernando Adegas, EMATER/PR)
FINE DROPLETS

(Dados de Fernando Adegas, EMATER/PR)
CONE NOZZLE

(Dados de Fernando Adegas, EMATER/PR)
Fungicide Application Principles

• The first applications are the most important.

• Since the rust starts in the lower part of the canopy, it is essential that the spray reach that target area.

• Coverage is key.
Fungicide Application Principles

• Application Methods:
  – Predominantly ground applied
  – Aerial applied is perceived to be just as effective.

• Application Volumes:
  – 15-30 GPA by ground
  – 4-5 GPA by air
  – Some ultra-low volume applications
Fungicide Application Principles

• Nozzle Types:
  – Conical or double flat fan

• Adjuvants:
  – As recommended

• Avoid applications when:
  – The temperature is >30°C (86°F)
  – The relative humidity is <50%
  – Days that are calm or with high winds.
Fungicide Choices in Brazil

- **Triazoles**
  - Comprise most of the fungicide market
  - Are both preventative and curative

- **Strobilurins**
  - Preventative only
  - Mostly applied in combination with triazoles

- **Chloronitriles**
  - Preventative only
  - Small portion of the market
Using Cultural Practices to Manage Soybean Rust

- eliminate alternate hosts, such as volunteer SB
- adhere to the planting window for your area
- avoid a prolonged planting season
- very few are changing row width, variety, population
- use up to 20% earlier-maturing varieties
- no resistant varieties yet on market
- no effect of tillage (not residue-borne)
- worse with over-head irrigation
- rotate fungicides if more than one application needed

Source: Fabiano Sequeri, MT Foundation
Brazil vs. USA: Other Considerations

• **Different climatic conditions**
  – Brazil is a more tropical environment which may be more suitable for rust

• **Overwintering of inoculum**
  – Inoculum may be present year-round in Brazil

• **Fungicide performance**
  – No data under U.S. conditions

• **Soybean Growth Habits**
  – Determinate soybeans in Brazil (7 to 9 RM)
Muito Obrigado!

Source: Fabiano Sequeri, MT Foundation