Results from Industry Efficacy Trials

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Source of Data

- Data presented in this presentation came from agricultural chemical companies having products possessing sect. 3 or 18 registrations for the use on soybean to control soybean rust.

- Therefore, data presented in this presentation was data submitted by each company to the EPA for registration.
Companies Providing Data

- BASF The Chemical Company
- DuPont Chemical Company
- Sipcam Agro USA Inc.
- Syngenta Crop Protection
- Valent U.S.A. Corporation
BASF

Data provided by Ted Bardinelli
% Severity of ASR

Sao Paulo, Brazil
Soybean Var. CD 202

Appl Dates: 3/23/06 (R2), 4/12/06 (R4)
Nozzles – XR8001VS, 2 bar pressure, 150 l/ha volume
% Defoliation

Sao Paulo, Brazil
Soybean Var. CD 202

Appl Dates: 3/23/06 (R2), 4/12/06 (R4)
Yield (g/3.78m²)

Yield

Check

Headline + metconazole (0.32 + 0.42 l/ha)

Headline + metconazole (0.25 + 0.33 l/ha)

Headline SBR (0.43 l/ha)

Sao Paulo, Brazil

Soybean Var. CD 202

Appl Dates: 3/23/06 (R2), 4/12/06 (R4)
% Severity of ASR

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**51 DALA**

- **Check**
- **Headline 6.1 oz/A + NIS**
- **Headline 9.2 oz/A + NIS**
- **Headline + Caramba (4.5 + 7.7 oz/A) + NIS**
- **Caramba 9.6 oz/A + NIS**
- **Headline SBR 5.9 oz/A + NIS**

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**Appl Dates:** 7/18/05 (R1), 8/01/05 (R3)

**Nozzles** – hollowcones, 62-65 PSI, 20 gpa

**Georgia, USA**

**Soybean Var. H7242RR**
% Defoliation

Georgia, USA
Soybean Var. H7242RR
Appl Dates: 7/18/05 (R1), 8/01/05 (R3)
Yield (bu/A)

Georgia, USA
Soybean Var. H7242RR

Appl Dates: 7/18/05 (R1), 8/01/05 (R3)
% Severity of ASR

Alabama, USA
Soybean Var. H7242RR
Appl Dates: 8/18/05 (R1), 9/09/05 (R3)
Nozzle – XR8002, 30 PSI, 22 GPA
% Defoliation

25 DALA

Alabama, USA
Soybean Var. H7242RR
Appl Dates: 8/18/05 (R1), 9/09/05 (R3)
Yield (bu/A)

Alabama, USA
Soybean Var. H7242RR
Appl Dates: 8/18/05 (R1), 9/09/05 (R3)
Conclusions

- Headline + metconazole provided effective control of ASR in all three trials.
- The level of control from the Headline + metconazole treatment(s) was statistically comparable to the standard of Headline SBR.
- Caramba and Folicur did not provide equal control of ASR when compared to Headline + metconazole and Headline SBR.
Bayer CropScience

Efficacy Data to Support BCS Fungicides for the Management of Asian Soybean Rust
BCS Fungicides for Asian Soybean Rust (ASR) Control

Bayer CropScience has submitted four fungicides to EPA for Sec. 18 Quarantine Exemption registration

- Folicur = tebuconazole (triazole)
- Stratego = Propiconazole + Trifloxystrobin (triazole/strobilurin)
- Absolute = tebuconazole + trifloxystrobin (triazole/strobilurin)
- Proline = Prothioconazole (triazole)

EPA Registration granted

EPA Registration granted

EPA Registration pending

EPA Registration pending
Folicur (4 fl oz/a) and Stratego (10 fl oz/a) offer safe, effective control of ASR (Asian soybean rust) as a preventative to early post infection (early curative) spray application. Addition of induce adjuvant with Folicur increased disease control but caused a slight increase in visual crop response.

Activity/selectivity of Folicur and Stratego was greater than or equal to all other competitive fungicides registered for control of ASR.

= Core use rates of BCS fungicides
Bayer CropScience Asian Soybean Rust Trials in Brazil- 2006
Reg./Sec.18 Fungicides (3 Trials, FD06NARBLD)

Ave ASR Control (3 Trials)  Ave CI (3 Trials)

# Applications: 3 appl. (1st app at 1 to 2.5% ASR sev.)
Spray Interval: 15-22 days
ASR Eval. Date: 7-14 days after last appl.

Folicur (4 fl oz/a) and Absolute (5 fl oz/a) offer safe, effective control of ASR (Asian soybean rust) as a preventative/early post infection (early curative) spray application. Stratego (10 oz/a) + Induce provided less ASR control than either Folicur or Absolute since most trials were applied early curative. Stratego is registered only for preventative application.

Activity/selectivity of Folicur and Absolute is greater than or equal to all other competitive fungicides registered for control of ASR.

= Core use rates of BCS fungicides
Absolute improved ASR (Asian soybean rust) control and provided higher soybean yields as compared to Folicur and Stratego in 14 side-by-side comparison trials conducted in Brazil from 2004-2006. Applications were made both preventative and early curative.
Proline 480SC (Prothioconazole) improved Asian soybean rust (ASR) control as compared to Folicur. Applications were made both preventative and early curative.

Proline use rates on the proposed label are 2.5 to 3.0 oz/a.
Bayer CropScience has four fungicide options for Asian soybean rust management/control

- Folicur and Stratego have EPA approved Sec. 18 Quarantine Emergency registration
- Absolute and Proline are awaiting EPA Sec. 18 Quarantine Emergency registration approval
- Folicur, Absolute and Proline provide preventative and early curative control of Asian soybean rust
- Stratego offers preventative control of Asian soybean rust
DuPont
2006 National Soybean Rust Symposium
Results from independent trials & preventive / curative studies against ASR with Flusilazole

St. Louis, Missouri-USA
November 29-December 1, 2006

A. Marçon, Ph.D. & A. Selley, MSc.

prepared for Session Coord. B. Kemerait/Gary Cloud
Yield comparisons of flusilazole versus azoxystrobin in independent identical timing trials in the USA in 2005 under no/low disease pressures

Conclusion: Under 12 field trials conducted in the USA, flusilazole provided 6.4 bu/A over untreated plots and 1.8 bu/A over azoxystrobin under no/low disease pressure.


* Flusilazole spray provided statistically higher yield from untreated
Yield comparisons of flusilazole versus tebuconazole in independent identical timing trials in the USA in 2005 under no/low disease pressures

Conclusion: Under 27 field trials conducted in the USA, flusilazole provided 5.16 bu/A over untreated plots and 1.06 bu/A over tebuconazole under no/low disease pressure.


* Flusilazole spray provided statistically higher yield from untreated
Preventive and post-infection control of ASR with fungicides

Untreated Azoxystrobin 6.2oz Flusilazole 3oz

Fungicides sprayed 4 days before inoculation

Fungicides sprayed 7 days before inoculation

Fungicides sprayed 2 days after inoculation

Fungicides sprayed 6 days after inoculation

Prevventive spray

Post-infection spray

Conclusion: flusilazole demonstrated excellent preventive and post-infection control of ASR. With post-infection applications, however, only flusilazole controlled ASR while azoxystrobin was inactive.

Five-wk old plants sprayed (3 oz of Punch®, a 400EC containing flusilazole and with 6.2 oz of Quadris®, a 250 SC containing azoxystrobin), at 4 and 7 days before inoculation or 2 and 6 days after inoculation. Plants inoculated with 5 x 10⁴ uredospores/ml and were placed in a high humidity chamber for 24 h, then transferred to GC (24°C, 12 h photoperiod) for 7 d before visual evaluation.
Sipcam

Data provided by Dr. John French
Materials and Methods

- Planting Date – 12/9/05
- Timing of Fungicides – V5, R3
- Rating System – 1-3 to denote position on plant (low, mid, upper) and 1-4 to denote severity
- Ratings were taken every 5 days from 50 to 110 DAP

Research conducted 2005-06 by Dr. Clive Levy, Commercial Farmers Union, Zimbabwe
Vertical Displacement of ASR

- From vertical displacement (VD) ratings – all fungicide treatments had significantly lower ASR than the UTC.

A value of 65.0 represents no symptoms recorded

Muscle is a trademark of Sipcam Agro USA, Inc.
Folicur is a registered trademark of Bayer CropScience
Severity of ASR

- From severity ratings – only the two applications of Muscle or Folicur and Echo 720 (V5) fb Muscle (R3) had significantly lower AUDPC values than the UTC.
Yield (Metric Tons/ha)

MT/ha

Check
Echo 720 V5 fb R3
Echo 720 V5 fb Muscle R3
Echo 90DF V5 fb Muscle R3
Echo 720 V5 fb Folicur R3
Echo 90DF V5 fb Folicur R3
Folicur V5 fb R3
Muscle V5 fb R3
100-Seed Weight (g)
Conclusions

- Echo 720 or Echo 90DF (V5) fb Muscle (R3) and Echo 90DF (V5) fb Folicur (R3) gave the highest yields.
- The highest seed weights were obtained from Echo 720 (V5) or Echo 90DF (V5) fb Muscle (R3), Echo 90DF (V5) fb Folicur (R3) or 2 applications of either Muscle or Folicur.
Syngenta Crop Protection
Fungicides for the control of ASR

Provided by Phil Brune, David Black, and Allison Tally - SCP
Objectives of 2006 trials

- **Brazil Trials**
  - Test Section 18 rates vs Sec 3 rates
  - Evaluate with and without adjuvants

- **US Trials**
  - Evaluate on ASR if occurs
  - Evaluate new products on other diseases (data not presented)
Rate Comparison Results/Brazil

- Section 18 vs Section 3
  - Alto 4 vs 5.5
  - Quadris Xtra 4 vs 5.5
- All treatments provided significant ASR control.
- There were no differences in efficacy between the two rates of either Quadris Xtra or Alto.
- The current recommendation of Quadris + Alto also was effective.
Rate Comparison Results/Brazil

- All fungicide treatments delayed premature soybean defoliation.
- The higher rates reduced defoliation slightly more than the lower rates.
- Quadris + Alto also decreased defoliation.
Rate Comparison Results/Brazil

- All fungicides improved soybean yield compared to the untreated.
- Higher rates of azoxystrobin in Quad Xtra- 6.8oz and Quadris 5.5 oz improved yields over ccz alone.
Max control = Quadris + Alto starting at R1 followed by Quadris on a 7 day interval

Control was comparable with or without NIS

All treatments significantly different from check, but not each other.
Adjuvant Results/Brazil – F004

- Control was equivalent with or without NIS or COC.
- Defoliation for treatments = 5% vs 99% in untreated.
- There was no phyto even at 2X rate.
Example of correlation

- As demonstrated previously, good foliar disease control reduces defoliation thereby increasing yields.
- Even the ‘weaker’ treatment protected some of the yield.
Conclusions

- SCP portfolio with cyproconazole or (propiconazole) + azoxystrobin will provide outstanding efficacy against ASR and other foliar pathogens

- For best control:
  - ASR – need a triazole
  - COC/adjuvant improves control slightly
  - Other diseases – need azoxystrobin
Valent

Data provided by Dr. John Altom
Materials and Methods

- Spray Systems Used
  Nozzles – Twin Fan (TJ60 8001)
  PSI – 50 – 63
  GPA - 15

- Fungicide Application Dates
  A – 8/9/06 (R2)
  B – 8/21/06 (R3)
  C – 9/1/06 (R5)
% Incidence of ASR

Timing A (8/9/06) R2

- From a % incidence and severity standpoint, all Domark applications, Folicur, Headline + Folicur and Laredo treatments provided the greatest level of control.

- The solo Headline applications and the V-10116 treatments resulted in statistically higher ASR ratings

Timing A
% Severity of ASR

- All fungicide treatments were statistically comparable to one another
- All fungicide treatments were statistically different from the UTC treatment

Timing A

64 DAT
% Incidence of ASR

Timing B (8/21/06) R3

- In terms of % incidence and severity, all fungicide treatments provided statistically similar and very effective control of ASR.

- Quadris was the only treatment which resulted in statistically higher ASR levels in both incidence and severity.
% Severity of ASR

- All fungicide treatments were statistically comparable except Quadris + COC.
- Quadris + COC was statistical comparable to the UTC treatment
% Incidence of ASR

Timing C (9/01/06) R5

- All fungicide treatments provided statistically similar and very effective control of ASR when considering the incidence and severity ratings.

Timing C
% Severity of ASR

- All fungicide treatments were statistically comparable.
- All fungicide treatments were statistically different from the UTC treatment.

**Timing C**