SDS Fact Sheet – Outcome #04-2

A. Benefits of SDS – A Complete Natural Genetic Resistance to SDS.
1. Provides genetic resistance to all known isolates of *Fusarium solani* f.sp. *glycines*.
2. Provides a significant reduction in fungal spore population density. SDS root resistance reduced FSG spore count by 50% per year.
3. Provides for easier farm management of SDS, prevents a gradual spread and increase of the disease.
4. Helps preserve root and plant health, avoid drought stress and each full genetic potential.

B. Results with SDS.
1. When yield is off by 15-25% in a susceptible variety and 5-7% in a tradition resistant variety SDS is losing nothing significant (less than 3%).
2. Root infection sites are reduced by 50%.
3. The amount of fungus growing in the root is reduced by 87.5%.
4. Root infection is delayed from 7-14 days after planting a susceptible variety and 14-21 days when planting a tradition resistant variety to 21-45 days when using the SDS technology.

C. Development Facts.
1. SDS is a broad based SDS resistance Technology owned and patented by Southern Illinois University Research Foundation.
2. SDS was developed by SIUC with partial funding from the Illinois Soybean Board. Technology transfer was initiated with partial funding from the United Soybean Board.
3. SDS was developed using traditional plant breeding methodology (non GMO) supplemented with DNA marker selection.
4. SDS is available to be bred into elite Roundup Ready and conventional varieties.

D. Development Tools – Methods of Use
1. SDS is a stack of six genes each selected by DNA markers. Recovery of the six genes should be confirmed with marker selection. Use of SNPs or Satellites can provide low cost marker selection ($1-4 for all six genes per line)
2. SDS gene stack presence can be confirmed by a quick and cheap greenhouse assay. Low cost phenotypic selection ($10 per line)
3. Two of the six genes underlying SDS have been cloned. New lower cost selection
4. A greenhouse assay is available to confirm phenotypes (patented).

Contact: Dr. David A Lightfoot, Professor, Southern Illinois University, ga4082@siu.edu.
SIUC - SDS Biotechnology
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THE EFFECT OF SDS GENE PYRAMIDS SHOWING THE EXCLUSION OF DISEASE

Resistant sdX™

Ordinary Cultivar

SDS Provide Excellent Resistance

An Effective Greenhouse Assay (Patented)

E. Germplasm Available to Solve Your Problems

<table>
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<tr>
<th></th>
<th>Maturity</th>
<th>Growth</th>
<th>Yield</th>
<th>SDS</th>
<th>Leaf DX</th>
<th>SDS R</th>
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Losses to SDS are Doubling Every 5 years

- New disease in 1980’s
- Severity more than doubles each decade
- Fungus is well adapted to Northern US soils
- Normal control methods are not effective to date

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Patents


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Marker Loci Associations Claimed by patents 6,300,541 and 7,288,386

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<th>Linkage Group</th>
<th>Map Position (cM)</th>
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<tr>
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<td>15</td>
<td>Pyramid x Dougals</td>
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<tr>
<td>C</td>
<td>20</td>
<td>Flyer x Hartwig</td>
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<td>D</td>
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<td>Ripley x Spencer</td>
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<td>G</td>
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<td>Essex x Forrest in Argentina</td>
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Loci (QTL = q)

C1 91  Dt3/qRfs9  Sat_311
C2 146 Rfs4  Sat371
D2 97  qRfs7  Sat_001
F 42  qRfs12  Satt160
G 0  qRfs3  Satt163
F 42  Rfs1  Satt570
J 46  Rfs  Satt403
I 46  Dt2/qRfs11 Satt138
G 38  Rfs12  Satt353
H 140 qRfs5  Satt354
L 78  qRfs10  Satt183
N 45  Dt1/(qRfs8) Sat_99
Loci (QTL = q)

Primary Reference
Iqbal et al., 2001
Njiti et al., 2001
Farias et al., 2007
Sanichon et al., 2004
Njiti and Lightfoot, 2005
Iqbal et al., 2001
Njiti et al., 2001
Afari et al., 2007
Hashmi et al., unpublished
Kazi, 2005; et al., 2007

Secondary Reference
Njiti et al., unpublished
Prabhu et al., 1999
Abu-Thredelih et al., 2007
Hashmi et al., unpublished

Contact: Dr. David A Lightfoot, Professor, Southern Illinois University, ga4082@siu.edu.