Live in symbiosis with most plants
- Plants provide sugar for the fungi

Hyphae
- Become an extension of and supply nutrients to the plant roots
- Hold moisture
- Provide a protective zone around the roots
- Aggregate soil

Apply
- Close to where roots will grow

Endomycorrhizal (VAM) species:
- *Glomus mosseae*, *Glomus intraradices*, *Glomus fasciculatum*, *Glomus dussii*, *Glomus clarum*, *Glomus deserticola*, *Glomus microaggregatum*
Rhizosphere

• Zone surrounding the roots of plants
• Influenced by root secretions (rhizodeposition) and soil microbes (bacteria & fungi)
• Plant roots exude many compounds into soil:
  – Sugars/carbohydrates, amino acids, organic acids, polysaccharides, and enzymes
• Complex relationship between:
  – plant roots
  – Soil microbes
  – Soil
Benefits of Rhizosphere Microbes

- Make nutrients available to plants
  - N, P, Fe
- Produce growth-stimulating phytohormones
  - Indole acetic acid (IAA)
- Enhance the positive effects of symbionts
  - Increased nodulation and N content of plants
- Reduce the negative effects of pathogens
  - Produce antibiotics and enzymes that interfere with pathogens
  - Competition for resources
Microbes in AER products

• Mycorrhizae
  – Fungus
  – Symbiotic association with plant roots
  – Benefits to plant
    • Increases availability of nutrients
    • Increases water uptake
  – In return for making nutrients and water available to plant roots, mycorrhizae obtain food (sugar) from plant
  – Helps grow and sustain healthy crops
Microbial Seed Inoculation
3 weeks after planting

Inoculation of seeds
– Increased microbial activity
– Pushed nutrient cycling
– Increased nutrient availability
– Enhanced shoot & root growth

• Long Term Overall Effect
  – Greater impact on all soil life activity

- Soil inoculant
- No Soil inoculant
- Increased development of fine root hairs
Alfalfa

MST TREATED

UNTREATED
2005 W. Illinois U. Research

• Non-GMO Corn
  – Untreated 99.9 bu/a
  – Treated w/ MST 112.6 bu/a +12.7

• Organic Blue Corn
  – Untreated 97.9 bu/a
  – Treated w/ MST 108.5 bu/a +10.6

Allison Organic Research Farm 2005 Corn Production Trial Results
McDonough Co., IL
Effects of Myco Seed Treatment on Hybrid Corn Seed Yield (Bu/A)

Research conducted by the Tryon Group, Madison WI

Trial 07LF4C
Variety – 108 RM RoundUP
2007
MST in 2009
Corn in Bucyrus, OH

With Myco Seed Treat  163.88 Bu/A  +6.88 Bu/A
Without  157.00 Bu/A

109 day maturity hybrid
Trial harvested as part of a hybrid plot by third party participant

Grower observed weak emergence except where he used the MST

Grower observed visible improvement throughout the growing season
2006 W. Illinois U. Research
Myco Seed Treat

• Organic Soybeans – 2 varieties
  – Untreated 40.9 bu/a
  – Treated w/ MST 44.1 bu/a +3.2

4 replications of each variety
LSD: 2.6
3 Year Average Beck’s MST Plots - Soybeans

BECK'S Soybean Seed Treatment Study - 3 Year Averages

<table>
<thead>
<tr>
<th>Treatment</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>Average</th>
<th>Diff from Untreated</th>
<th>Diff from Sure Gro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sure Gro + MST</td>
<td>69.4</td>
<td>59.6</td>
<td>67.9</td>
<td>65.6</td>
<td>4.8</td>
<td>3.6</td>
</tr>
<tr>
<td>Sure Gro + Apex Pro</td>
<td>65.0</td>
<td>59.2</td>
<td>67.6</td>
<td>63.9</td>
<td>3.1</td>
<td>1.9</td>
</tr>
<tr>
<td>Sure Gro + Myconate</td>
<td>65.6</td>
<td>58.1</td>
<td>65.8</td>
<td>63.2</td>
<td>2.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Sure Gro + Cruiser</td>
<td>61.8</td>
<td>57.4</td>
<td>68.7</td>
<td>62.6</td>
<td>1.8</td>
<td>0.6</td>
</tr>
<tr>
<td>Sure Gro + America's Best</td>
<td>59.7</td>
<td>60.2</td>
<td>66.8</td>
<td>62.2</td>
<td>1.4</td>
<td>0.2</td>
</tr>
<tr>
<td>Sure Gro</td>
<td>63.3</td>
<td>56.3</td>
<td>66.5</td>
<td>62.0</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Trilex AL</td>
<td>57.3</td>
<td>57.1</td>
<td>65.4</td>
<td>59.9</td>
<td>-0.9</td>
<td>-2.1</td>
</tr>
<tr>
<td>Untreated</td>
<td>62.5</td>
<td>54.7</td>
<td>65.3</td>
<td>60.8</td>
<td></td>
<td>-1.2</td>
</tr>
</tbody>
</table>

Comparison includes only the treatments that were studied in all 3 years of trials.
MST Trial
Lena, IL 2013

Moisture %   Yield (bu/a)

• Control – no MST  12.4  62.30 bu/a
• With MST    12.4  66.85 bu/a  +4.55

• Soybeans: 30" rows, no till
• Myco Seed Treat (MST) applied on seed in planter box
HELP BOOST YIELD POTENTIAL
USE MST AND SP1 TO GET SEEDS OFF TO A GREAT START
AND AID IN CONTINUAL NUTRIENT CYCLING

4 DAYS AFTER PLANTING IN LAB @ ~68°F

Slowly waking up

Influenced by the microbial activity around them

Control

MST & SP1 treated