Reasons for Reducing Sugarbeet Production Acreage

• High Yields (’06, ’07, and ‘08 largest in ACS History)

• Sugar Marketing Allocations

• Yield Potential For the Future
Reasons for Maximizing Sugarbeet Production

• Necessity
• Competition W/ Other commodity prices
• On-Farm Profits
• High Production Costs (nearly $900/acre)
  • $892 Total Input Cost **
  • $41 Beet Payment (Estimate)
  • = 21.8 ton Break-Even Yield **

** Average of 2007 ACS Grower Cost Benchmark Data factoring in a $100/a management cost and a $300/a land and stock cost
Effect of Wind On Seed Placement In the Field Study
(Norman Cattanach, 2008)
Effect of Wind On Seed Placement In the Field Study (Norman Cattanach, 2008)

- With Poncho-Beta Insecticide coming on-line this spring, growers would like to remove wind shields from planters
- Wind shields protect more than granular insecticide at planting
- Seed is expensive and getting more expensive
- Plant population is crucial for maximizing sugarbeet production (yield & quality)
- The Red River Valley isn’t exactly calm in the spring
- Should a grower keep planting in the wind??
A study was set-up to identify planting tendencies with the following treatments utilizing two seed sizes (small-sized seed and large-sized seed):

1. With the wind & against the wind
2. With wind shields & without wind shields
3. With seed tube windshield & without seed tube windshield
Planter Windshield Used in the Study
Seed Tube Shield Used in the Study
Effect of Wind On Seed Placement In the Field Study (Norman Cattanach, 2008)

Histogram for Treatment #1 — Plant w/Wind No/Wind Shield — Pro 50

- Doubles (<=2") = 27%
- Skips (> = 9") = 10%
- Target (3.5”–5.5”) = 56%

Histogram for Treatment #2 — Plant w/Wind No/Wind Shield — Pro 200

- Doubles (<=2") = 13%
- Skips (> = 9") = 8%
- Target (3.5”–5.5”) = 43%

Histogram for Treatment #3 — Plant Against/Wind No/Wind Shield — Pro 50

- Doubles (<=2") = 11%
- Skips (> = 9") = 7%
- Target (3.5”–5.5”) = 56%

Histogram for Treatment #4 — Plant Against/Wind No/Wind Shield — Pro 200

- Doubles (<=2") = 4%
- Skips (> = 9") = 6%
- Target (3.5”–5.5”) = 65%
Effect of Wind On Seed Placement In the Field Study (Norman Cattanach, 2008)

Histogram for Treatment #5 – Plant w/Wind w/Wind Shield – Pro 50

Doubles (<=2") = 10 %
Skips (> = 9") = 10 %
Target (3.5”–5.5”) = 56 %

Histogram for Treatment #6 – Plant w/Wind w/Wind Shield – Pro 200

Doubles (<=2") = 3 %
Skips (> = 9") = 6 %
Target (3.5”–5.5”) = 69 %

Histogram for Treatment #7 – Plant Against/Wind w/Wind Shield – Pro 50

Doubles (<=2") = 13 %
Skips (> = 9") = 10 %
Target (3.5”–5.5”) = 50 %

Histogram for Treatment #8 – Plant Against/Wind w/Wind Shield – Pro 200

Doubles (<=2") = 4 %
Skips (> = 9") = 7 %
Target (3.5”–5.5”) = 71 %
Effect of Wind On Seed Placement In the Field Study (Norman Cattanach, 2008)

Histogram for Treatment #9 — Plant w/Wind w/Seed Tube Shield — Pro 50

Doubles (<=2") = 19 %
Skips (> = 9") = 11 %
Target (3.5”–5.5”) = 41 %

Histogram for Treatment #10 — Plant w/Wind w/Seed Tube Shield — Pro 200

Doubles (<=2") = 7 %
Skips (> = 9") = 7 %
Target (3.5”–5.5”) = 60 %

Histogram for Treatment #11 — Plant Against/Wind w/Seed Tube Shield — Pro 50

Doubles (<=2") = 14 %
Skips (> = 9") = 12 %
Target (3.5”–5.5”) = 49 %

Histogram for Treatment #12 — Plant Against/Wind w/Seed Tube Shield — Pro 200

Doubles (<=2") = 5 %
Skips (> = 9") = 7 %
Target (3.5”–5.5”) = 67 %
Conclusions:

- Improved stand establishment with the large size seed resulted in a 2 t/a yield increase over small seed yield, and 573 lbs/a more recoverable sugar.

- Use of wind shields significantly increased the percentage of seed in the target zone.

- The traditional wind shield improved stand establishment more than the tube shield.

- The traditional wind shield resulted in 140 lbs/a more recoverable sugar than no shield and about 40 lbs/a more than the tube shield.
Conclusions (Cont.):

• Wind shields reduced skips and doubles, especially with the traditional type shield

• It might have been expected that improvements in plant uniformity and reductions in skips and doubles should have improved defoliation and harvestability of the crop

• Growers choosing to plant when wind speeds are high should consider using larger size seed and wind shields in combination to achieve better stand establishment

• For the 2009 study this year...another treatment of planting on a calm day as soon as possible after planting on a windy day will be added
ACSC Precision Farming Team Variable Rate Planting Study
Lynn Dusek, and Agriculturist Moorhead & Moorhead Ag Staff Cooperator: Tang Farms

• ACS Project to Monitor benefits of VRS

• Can Productive Zones Support Higher Populations

• Results / Observations…let’s take a look
## ACS Variable Rate Seeding Project
### Stand Counts- Tang Farms, 2008

<table>
<thead>
<tr>
<th></th>
<th>Zone 1</th>
<th>Zone 2</th>
<th>Zone 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green</strong></td>
<td>169</td>
<td>144</td>
<td>142</td>
</tr>
<tr>
<td><strong>5.5&quot; spacing</strong></td>
<td>196</td>
<td>202</td>
<td>174</td>
</tr>
<tr>
<td><strong>4.5&quot; spacing</strong></td>
<td>252</td>
<td>218</td>
<td>207</td>
</tr>
</tbody>
</table>

**For the 5.5 inch spacing all zones had less than our 170-210 target pop.**
## ACS Variable Rate Seeding Project Trial Data Tang Farms, 2008

<table>
<thead>
<tr>
<th>Treatment (spacing in inches)</th>
<th>RST</th>
<th>RSA</th>
<th>Revenue / ton</th>
<th>Revenue / acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5”</td>
<td>276</td>
<td>6,556</td>
<td>$31.37</td>
<td>$744</td>
</tr>
<tr>
<td>4.5”</td>
<td>287</td>
<td>6,711</td>
<td>$33.94</td>
<td>$794</td>
</tr>
<tr>
<td>** 5.5”</td>
<td>297</td>
<td>6,901</td>
<td>$36.42</td>
<td>$847</td>
</tr>
<tr>
<td>3.5”</td>
<td>294</td>
<td>6,678</td>
<td>$35.77</td>
<td>$812</td>
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<tr>
<td>4.5”</td>
<td>299</td>
<td>6,883</td>
<td>$37.06</td>
<td>$852</td>
</tr>
<tr>
<td>** 5.5”</td>
<td>305</td>
<td>6,558</td>
<td>$38.45</td>
<td>$827</td>
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<tr>
<td>3.5”</td>
<td>305</td>
<td>6,671</td>
<td>$38.35</td>
<td>$840</td>
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<tr>
<td>4.5”</td>
<td>287</td>
<td>6,380</td>
<td>$34.09</td>
<td>$757</td>
</tr>
<tr>
<td>** 5.5”</td>
<td>308</td>
<td>6,310</td>
<td>$39.14</td>
<td>$802</td>
</tr>
</tbody>
</table>

* Revenue based on 2008 crop November payment forecast

** For the 5.5 inch spacing all zones had less than our 170-210 target pop
## Harvest Loss Measurement

<table>
<thead>
<tr>
<th>Treatment (spacing in inches)</th>
<th>Harvest Loss/acre (tpa)</th>
<th>Value of Tons Left in Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5”</td>
<td>1.48</td>
<td>$46.42</td>
</tr>
<tr>
<td>4.5”</td>
<td>1.52</td>
<td>$51.59</td>
</tr>
<tr>
<td>5.5”</td>
<td>0.70</td>
<td>$25.49</td>
</tr>
<tr>
<td>3.5”</td>
<td>1.09</td>
<td>$38.99</td>
</tr>
<tr>
<td>4.5”</td>
<td>0.70</td>
<td>$25.94</td>
</tr>
<tr>
<td>5.5”</td>
<td>0.82</td>
<td>$31.53</td>
</tr>
<tr>
<td>3.5”</td>
<td>1.75</td>
<td>$67.11</td>
</tr>
<tr>
<td>4.5”</td>
<td>0.78</td>
<td>$26.59</td>
</tr>
<tr>
<td>5.5”</td>
<td>0.46</td>
<td>$18.00</td>
</tr>
</tbody>
</table>
ACS Variable Rate Seeding Project – Yield Data by Treatment - Tang Farms, 2008

Tons per Acre

Yield

Tons per Acre

Treatment - Spacing (inches)

18.0 19.0 20.0 21.0 22.0 23.0 24.0

3.5 3.5 3.5 4.5 4.5 4.5 5.5 5.5 5.5

ACS Variable Rate Seeding Project – Yield Data by Treatment - Tang Farms, 2008
ACS Variable Rate Seeding Project – % Sugar Data by Treatment - Tang Farms, 2008

Sugar %

Treatment Spacing (inches)
Recoverable Sugar per Acre

Treatment Spacing (inches)

RSA

3.5 3.5 3.5 4.5 4.5 4.5 5.5 5.5 5.5

6000 6100 6200 6300 6400 6500 6600 6700 6800 6900 7000

ACS Variable Rate Seeding Project – RSA Data by Treatment - Tang Farms, 2008
ACS Variable Rate Seeding Project – Revenue per Acre Data by Treatment - Tang Farms, 2008
ACS Variable Rate Seeding Project – Harvest Loss Data by Treatment - Tang Farms, 2008

Harvest Loss Assessment

- **Treatment Spacing (inches)**: 3.5, 3.5, 3.5, 4.5, 4.5, 4.5, 5.5, 5.5, 5.5
- **Harvest Loss (tpa)**: 0.00, 1.00, 1.40, 0.80, 0.60, 0.40, 0.20, 0.00
- **Value of Tons Left in Field**: $0.00, $10.00, $20.00, $30.00, $40.00, $50.00, $60.00, $70.00, $80.00

Legend:
- HLA (tpa)
- Value of tons left in field
ACS Variable Rate Seeding Project - Trial Conclusions

- Data seems to correlate with imagery
- In field visual confirmation between zones
- Probably little to no seed savings
- Tough field conditions: Wet, tough to get pesticide applications on timely
- More data needed
- Also, ACSC will work with some Planter-Row Shutoff planters this year
Planter Row Control

- Expensive Seed Costs...
- Planter Row Shut-Off

SeedCommand™ – Precision Planting

Courtesy Butler Machinery/Ag Leader
Plant Pattern Spacing Study
(Norman Cattanach, 2008)
Plant Pattern Spacing Study  
(Norman Cattanach, 2008)

- Stand Establishment crucial to high production potential (yield & quality)

- Pop. Of 40,000 to 50,000 (170 to 210 beets / 100’ of row) is recommended

- Uniform spacing is ideal for maximizing water, nutrients, and sunlight uptake
Plant Pattern Spacing Study
(Norman Cattanach, 2008)

- Corn industry indicates diamond-pattern planting maximizes nutrient, water, and sunlight uptake

- A study was established to compare current plant-to-stand process with a uniform in-row spacing, and to a diamond-pattern plant spacing...precision stand establishment
The conventional plant-to-stand beets were planted and left at a 4.5” plant spacing.

Uniform spaced beets were planted and later thinned to get each of the stand count targets (150, 200, & 250 beets/100 ft of row).

Diamond pattern beets were planted and later thinned to get each of the stand count targets (150, 200, & 250 beets/100 ft of row), however, each row was offset to alternate plants from one row to the next to achieve a offset, staggered, or diamond pattern.
Plant Pattern Spacing Study
(Norman Cattanach, 2008)

• Diamond Pattern Example:

22” Rows
# Plant Pattern Spacing Study
*(Norman Cattanach, 2008)*

<table>
<thead>
<tr>
<th>Plant spacing</th>
<th>Target Pop. / 100’ row</th>
<th>Harvest. Beets / 100’ row</th>
<th>Yield (Ton/A)</th>
<th>Sugar %</th>
<th>LTM %</th>
<th>RST (lbs)</th>
<th>RSA (lbs)</th>
<th>Rev/T $</th>
<th>Rev/A $</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniform</td>
<td>150</td>
<td>130</td>
<td>30.7</td>
<td>15.0</td>
<td>1.33</td>
<td>272</td>
<td>8406</td>
<td>29.33</td>
<td>910</td>
</tr>
<tr>
<td>Uniform</td>
<td>200</td>
<td>150</td>
<td>30.3</td>
<td>15.8</td>
<td>1.25</td>
<td>289</td>
<td>8834</td>
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<td>Uniform</td>
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<td></td>
<td>14</td>
<td>NS</td>
<td>.715</td>
<td>.180</td>
<td>NS</td>
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## Plant Pattern Spacing Study
*(Norman Cattanach, 2008)*

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<td>.180</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

Notes: Target Pop. = Target population; Harvest. Beets = Harvested beets; Yield = Yield; Sugar % = Sugar percentage; LTM % = LTM percentage; RST (lbs) = RST in pounds; RSA (lbs) = RSA in pounds; Rev/T $ = Revenue per ton; Rev/A $ = Revenue per acre; NS = Not significant.
Plant Pattern Spacing Study
(Norman Cattanach, 2008)

Conclusions:

- Plant population responses appeared to follow normal expectations in the uniformly spaced beets.

- Revenue per acre was maximized at the expected 200 uniformly spaced beets but maximized at 150 beets in a diamond pattern.

- New equipment technologies will be available in the future for growers to alter planting patterns if they can be justified.

- Another year of evaluations of planting patterns may be justified to verify results and conclusions from the 2008 growing season.
ACSC Precision Farming Team
Strip-Till Study
Curt Meyer Agriculturist
Moorhead District
Cooperator: David Watt Farm
Strip Tillage Trial Glyndon, David Watt Farm

- Planted May 9th @ 4.5” Seed Spacing
- Crystal RR539 with X-Beet
- 8lbs of Counter
- 3 gallons of 6-24-6
- 2 year rotation, Wheat 07, Soybeans 06
- 2 Applications of Roundup
- Proline on July 26th & Headline August 28
- Harvested late and wet
Strip Tillage Trial Glyndon, David Watt Farm

May 9th Planting
Comments
Strip Tillage Trial Glyndon, David Watt

- Perennial weeds will become more of a problem
- Defoliator tracking can be a problem under wet conditions
- Harvester trash, no place for leaf material to go
- Plant population
- Soil Temps
- Trash Cleaners are needed at planting
Strip Tillage Trial Results
Glyndon, David Watt Farm

<table>
<thead>
<tr>
<th></th>
<th>Conventional</th>
<th>Strip Cat</th>
<th>Will Rich</th>
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</thead>
<tbody>
<tr>
<td>High 119 lbs</td>
<td>9311</td>
<td>9110</td>
<td>9511</td>
</tr>
<tr>
<td>Med High 104 lbs</td>
<td>8090</td>
<td>8497</td>
<td>10356</td>
</tr>
<tr>
<td>Med Low 89 lbs</td>
<td>8493</td>
<td>8524</td>
<td>9592</td>
</tr>
<tr>
<td>Low 74 lbs</td>
<td>9808</td>
<td>10155</td>
<td>8338</td>
</tr>
</tbody>
</table>
Average By Tillage Tool
Strip Tillage Trial Glyndon, David Watt Farm

<table>
<thead>
<tr>
<th>Sugar per Acre</th>
<th>High</th>
<th>Med High</th>
<th>Med Low</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Strip Tillage</td>
<td>9,311</td>
<td>9,427</td>
<td>9,058</td>
<td>9,247</td>
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<tr>
<td>Average Conventional</td>
<td>9,311</td>
<td>8,090</td>
<td>8,943</td>
<td>9,808</td>
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</table>
Tillage Type Average by Nitrogen Application Strip Tillage Trial
Glyndon, David Watt Farm

Sugar Per Acre

Strip Till Average

Conventional Tillage
Strip Tillage Trial by Nitrogen Rate Glyndon, David Watt Farm RSA Map
Strip Tillage Trial by Nitrogen Rate
Glyndon, David Watt Farm

Yield Map

Beet Yield 2008 CLEANED Trial (Tons/Acre)
## Results - Multi-Crop Strip Till
(Courtesy Dr. Overstreet NDSU)

<table>
<thead>
<tr>
<th>Location – Tillage Treatment</th>
<th>Average Yield SOYBEAN (bu/a)</th>
<th>Average Yield CORN (bu/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosper – Strip Till</td>
<td>53.25 a</td>
<td>230 b</td>
</tr>
<tr>
<td>Prosper - Conventional</td>
<td>55.61 a</td>
<td>205 a</td>
</tr>
<tr>
<td>Moorhead – Strip Till</td>
<td>44.23 b</td>
<td>197a</td>
</tr>
<tr>
<td>Moorhead - Conventional</td>
<td>36.46 c</td>
<td>163 c</td>
</tr>
</tbody>
</table>
### Results - Multi-Crop Strip Till
(Courtesy Dr. Overstreet NDSU)

<table>
<thead>
<tr>
<th>Location/ Tillage Treatment</th>
<th>Root Yield (Tons/ a)</th>
<th>Net Sugar (% )</th>
<th>RSA (lb/ a)</th>
<th>RST (lb/ ton)</th>
<th>Stand (Beets / 100 ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prosper - Strip Till</td>
<td>29.3a</td>
<td>13.6a</td>
<td>7947a</td>
<td>272a</td>
<td>97a</td>
</tr>
<tr>
<td>Prosper Conventional</td>
<td>32.1a</td>
<td>14.3ab</td>
<td>9190a</td>
<td>286ab</td>
<td>122a</td>
</tr>
<tr>
<td>Moorhead - Strip Till</td>
<td>25.5a</td>
<td>14.8 b</td>
<td>7551a</td>
<td>296 b</td>
<td>178 b</td>
</tr>
<tr>
<td>Moorhead Conventional</td>
<td>26.0a</td>
<td>15.2 b</td>
<td>7913a</td>
<td>304 b</td>
<td>168 b</td>
</tr>
</tbody>
</table>
Multi-Crop Strip Till: Conclusions
(Courtesy Dr. Overstreet NDSU)

- Prosper - Soybean yields very good for both tillage treatments; corn yields exceptional for both tillage treatments
- Moorhead - Soybean yields above average; corn yields very good for both tillage treatments at the Moorhead location.
- Sugarbeet - No s.d. between tillage types for yield or RSA. Lower stand for ST at Prosper, but slightly higher stand for ST at Moorhead, so...???
- Overall - Strip tillage is a viable alternative to conventional tillage for all crops tested
A Need for Larger Planters
A Need for Larger Planters

5-7-06
RSA 9,126 #/A

5-23-06
RSA 6,584 #/A

2,542 # RSA Difference = $47,000
Take Home Messages...

- Consider the wind conditions you are planting in
- Variable Rate Seeding is increasing in popularity
- Consider planter Row shut-off to offset high seed costs and to improve yield & quality
- Planting patterns and spacing are being looked at...maybe more to come
- Consider a larger planter for your operation...time is of the essence in the RRV
Thank You For Your Time

Questions?