Organic Systems Trial
Advisory Group Meeting
2008
Grain Crop Rotation

- Crop 1: Soybeans/ Spelt
- Crop 2: Spelt/Red Clover
- Crop 3: Corn
- Repeat
- Entry Point 1 starts with soybeans; EP 2 starts with corn
Systems:

- System 1—high fertility
- System 2—bare bones
- System 3—enhanced weed management
- System 4—ridge tillage system
- System 5—conventional
Relative yields of grain cropping systems

Average yields compared to County Average = 100

- System 1
- System 2
- System 3
- System 4
- System 5
- NYS Average
- County Average
Grain Yield Differences

- Due mostly to spelt yields
- Corn and soybean yields pretty similar between systems
A Closer Look at 2007 Results

- Crops this year were spelt/clover and corn
- Growing conditions were dry for most of the season
- Pre-season soil quality samples showed pronounced treatment effects for the first time (after 2 seasons of management in this trial)
Soils
For unknown reasons, pH has risen 0.2-0.4 points in all systems from 2005-2007.

Up to nearly 8 in some systems.

Suggestions?
Spelt
Clover

- Estimated total N in clover tops at plowdown:
  - System 1: 145 lb/acre
  - System 2: 125
  - System 3: 116
  - System 4: 9
Corn
Planting

- Moldboard plowed on 5/21
- Disced and cultimulched on 5/22
- Corn planted on 5/23 (System 4, 5/24)
- 29,900 seeds per acre
- American Organic Seed Co. Hybrid B38
Corn fertility additions

- Before tillage: System 1: Kreher’s, lower rate (76-99-46)
- Before tillage: System 4: Kreher’s, high rate (131-170-78)
- At planting: systems 1-4 received 2-4-2 starter @ 379 lb/acre (7.5-15-7.5)
Corn fertility additions

- **At planting:**
  - System 5: 10-20-20 @ 241 lb/acre (24-48-48)

- **Sidedress:**
  - System 5: 34-0-0 @ 265 lb/acre on 6/22 (90-0-0)
Total nutrient additions

- System 1: 84-114-54 (plus 135# N from clover)
- Systems 2, 3: clover N only: 125#, 116#
- System 4: 139-185-86 (+ 9# from clover)
- System 5: 114-48-48 (no clover)
Soil nitrate, 0-8" depth, 2006-07

Sampling Date

Spelt/clover

System

<table>
<thead>
<tr>
<th>System</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
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</table>
Reasons for low yield

- Drought, but nearby corn yielded about 125 bu/acre
- Planted when soil was very dry, uneven emergence--low stand of good plants
- 90 day variety—too short?
Corn crop failure in system 4 due to several factors:

- Volunteer spelt should have been mowed before ridge-till corn planting
- Spelt removed extra moisture from the soil
- Planter did not track ridges well, making accurate cultivation impossible
- Re-ridged to kill weeds and volunteer spelt and cover any surviving corn, 7/3
- Scraped ridges 7/11, seeded buckwheat 7/12
Where’s the corn?
It worked in 2006, but not 2007
Systems comparisons
Net profits substituting equivalent wheat yield for spelt

Entry Point 1

<table>
<thead>
<tr>
<th></th>
<th>System 1</th>
<th>System 2</th>
<th>System 3</th>
<th>System 4</th>
<th>System 5</th>
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<tbody>
<tr>
<td>Soybeans</td>
<td>$197</td>
<td>$219</td>
<td>$211</td>
<td>$192</td>
<td>$224</td>
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<tr>
<td>Wheat</td>
<td>$8</td>
<td>-$48</td>
<td>$49</td>
<td>$75</td>
<td>$90</td>
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<td>Corn*</td>
<td>$407</td>
<td>$495</td>
<td>$416</td>
<td>-$549</td>
<td>$33</td>
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<tr>
<td>3 Year Average</td>
<td>$204</td>
<td>$222</td>
<td>$225</td>
<td>-$87</td>
<td>$116</td>
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</table>

* Systems 1-4 @ organic corn prices
Net profits substituting equivalent wheat yield for spelt, system 5 only

<table>
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<tr>
<th>Entry Point 2</th>
<th>System 1</th>
<th>System 2</th>
<th>System 3</th>
<th>System 4</th>
<th>“Optimistic” System 5</th>
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<tbody>
<tr>
<td><strong>Corn</strong></td>
<td>-</td>
<td>-</td>
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<tr>
<td><strong>Soybeans</strong></td>
<td>$256</td>
<td>$281</td>
<td>$241</td>
<td>$190</td>
<td>$404</td>
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<td><strong>Spelt</strong></td>
<td>$289</td>
<td>$138</td>
<td>$156</td>
<td>$186</td>
<td>$452</td>
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<td><strong>2 Year Average</strong></td>
<td>$273</td>
<td>$210</td>
<td>$199</td>
<td>$188</td>
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* Systems 1-4 @ organic spelt prices, system 5 wheat equivalent
Organic System Comparisons

- Economics (preliminary, using current prices for all years)
  - “Optimistic” System 5 = 100
- System 1: 96 (-$10/A/yr)
- System 2: 90 (-$24)
- System 3: 89 (-$26)
- System 4: 10 (-$218)
Organic System Comparisons

- Soil Quality (aggregate stability change since 2005 only)
  - System 1: 100
  - System 2: 86
  - System 3: 91
  - System 4: 66
Organic System Comparisons

- Yields (Average of 6 crops)
- County average = 100
- System 1: 90
- System 2: 73
- System 3: 81
- System 4: 63
Organic System Comparisons

- Weed Control (Average of 5 crops)
  - System 1: 92
  - System 2: 96
  - System 3: 96
  - System 4: 90
Organic System Comparisons

- Nutrient Balance
- Pest Damage
- Data not analyzed in this way yet
<table>
<thead>
<tr>
<th>System</th>
<th>Soil Quality</th>
<th>Yield</th>
<th>Economics</th>
<th>Weeds</th>
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<td>10</td>
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Tentative Findings After 3 Years

- Organic practices appear to improve soil health measures after only 2 years.
- It pays to fertilize winter grains well.
- With plowdown of a good clover stand, no additional fertilizer was needed for corn in our trial. However, this was a drought year.
- Organic ridge tillage has a steep learning curve! (we can go through it so you won’t have to)