

## 2010 Organic Grain Systems Trial Results

The 2010 growing season was very good for most crops. New York State corn and soybean yields were at or near record levels. Winter wheat yields were somewhat better than average for the state.

The Organic Cropping Systems Project (OCS) includes four organically managed comparisons:

- (G1) High Fertility System, with relatively high soil fertility inputs;
- (G2) Low Fertility System, with no fertility inputs except for corn starter fertilizer;
- (G3) Enhanced Weed Management System, which is similar to the Low Fertility System except that extra measures are implemented to suppress weeds.
- (G4) Reduced tillage system which uses ridge and deep zone tillage

In addition, there is a Chemically Managed System (G5) using the same (non-GMO) seed varieties as the organic systems.

### *Entry Point 1: Main crop was corn*

Corn was seeded on May 20 and 21 at 30,000 seeds per acre. The variety was certified organic VK6710.

#### **1.1 System 1 (corn)**

<b>Corn</b>	<b>Yield (bu/acre)</b>	<b>Dry lb/acre</b>
VK6710	173	
Weed biomass		1372

Red clover was moldboard plowed on 5/11. We estimate that the clover contained about 127 lb/A of total nitrogen. On 5/17, Kreher's crumbles (4-5.2-2.4) were applied at 1930#/A (77-100-46), then disced in. After a final fitting with the roller harrow, plots were planted on 5/21. Starter applied at seeding was 294#/A of a mix of 17% K<sub>2</sub>SO<sub>4</sub> and 83% Krehers crumbles (10-13-31 applied). Plots were tinweeded on 6/2 and cultivated on 6/4, 6/15, and 6/24. Harvest was on 11/2.

#### **1.2 System 2 (corn)**

<b>Corn</b>	<b>Yield (bu/acre)</b>	<b>Dry lb/acre</b>
VK6710	160	
Weed biomass		277


Red clover was moldboard plowed on 5/11. We estimate that the clover contained about 92 lb/A of total nitrogen. On 5/17, the plots were disced. After a final fitting with the roller harrow, plots were planted on 5/21. Starter applied at seeding was 294#/A of a mix of 17% K<sub>2</sub>SO<sub>4</sub> and 83% Krehers crumbles (10-13-31 applied). Plots were tineweeded on 6/2 and cultivated on 6/4, 6/15, and 6/24. Harvest was on 11/2.

### **1.3 System 3 (corn)**

<b>Corn</b>	<b>Yield (bu/acre)</b>	<b>Dry lb/acre</b>
VK6710	148	
Weed biomass		382

Red clover was moldboard plowed on 5/11. We estimate that the clover contained about 109 lb/A of total nitrogen. On 5/17, the plots were disced. After a final fitting with the roller harrow, plots were planted on 5/21. Starter applied at seeding was 294#/A of a mix of 17% K<sub>2</sub>SO<sub>4</sub> and 83% Krehers crumbles (10-13-31 applied). Plots were tineweeded on 6/2 and cultivated on 6/4, 6/15, and 6/25. A belly-mounted cultivator was used on 6/25. Harvest was on 11/2.

### **1.4 System 4 (corn)**

<b>Corn</b>	<b>Yield (bu/acre)</b>	<b>Dry lb/acre</b>
VK6710	79	
Weeds		1933

Overwintering Austrian field peas were mowed on 5/10, then a zone builder was run about 18" deep where the corn rows would go. Plots were planted on 5/21, with Dawn row cleaners lowered to remove trash from the row. Starter applied at seeding was 294#/A of a mix of 17% K<sub>2</sub>SO<sub>4</sub> and 83% Krehers crumbles (10-13-31 applied). Plots were cultivated on 6/4, 6/15, and 6/25 with a Brillion high residue cultivator, going over twice in opposite directions the last time. Plots were sidedressed on 6/15 with 1250 lb/acre of 3.4-4.6-2.6 compost. Harvest was on 11/2.

### **1.5 System 5 (corn)**

<b>Corn</b>	<b>Yield (bu/acre)</b>	<b>Dry lb/acre</b>
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VK6710	176	
Weed biomass		475

Plots were moldboard plowed on 5/11 and disced on 5/17. After a final fitting with the roller harrow, plots were planted on 5/20. Starter applied at seeding was 241#/A of 10-20-20. Dual II Magnum (2.6 qt/A) and Atrazine 4L (2.6 pt/L) herbicides were applied on May 30. On 6/15, ammonium nitrate was applied at 95 lb/A of N. Harvest was on 11/2.

#### Discussion

Corn yields were very good in 2010. System 1 obtained the highest organic yield, even though it also had heavy weed pressure.

#### ***Entry Point 2: Main crop was spelt***

Oberkulmer spelt was planted on 10/22/09 and frost seeded with medium red clover @ 10 lb/acre on 3/26/10 except for systems G4 (reduced tillage) and G5 (chemical input comparison). The spelt was harvested on 7/30/10. Yields were only fair compared to past years and the typical state average organic yield of about 1 ton (65 bu) per acre.

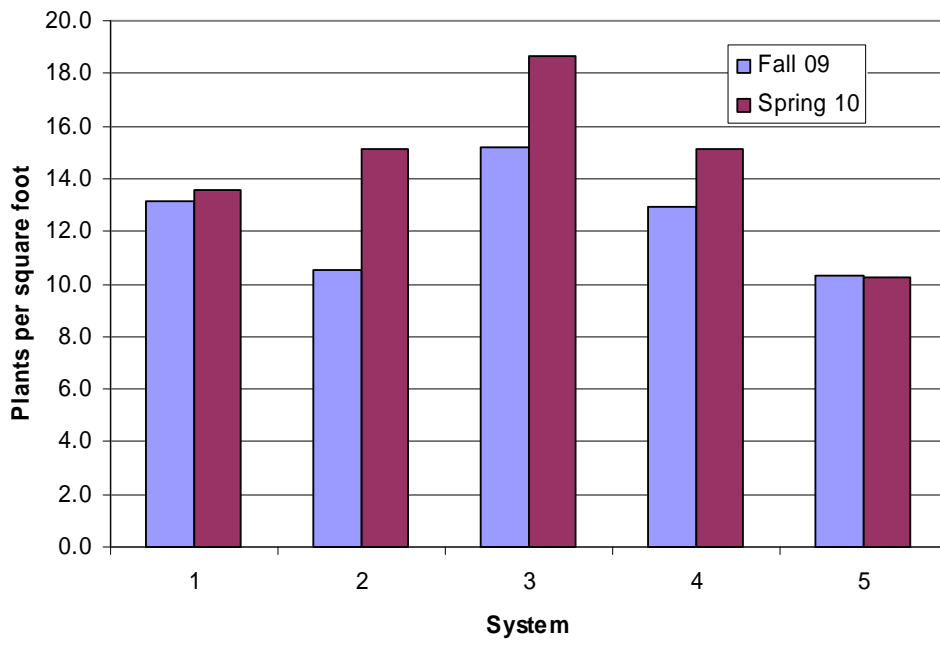
G5 received 200#/acre of 10-20-20 at planting and G1, 757#/acre of 5.5-4.2-2.7 before planting. In the spring, G5 received a topdressing of 159#/acre of 34-0-0. Total additions of NPK in lb/acre were 74-40-40 to G5 and 42-32-20 to G1.

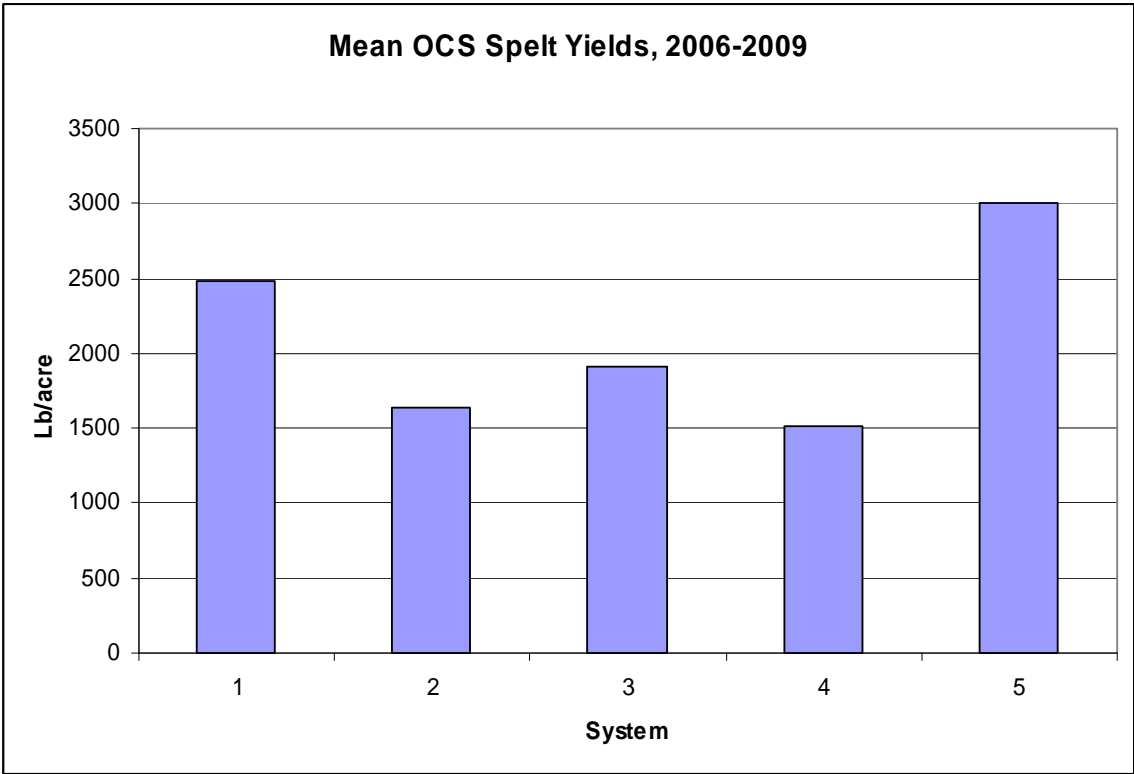
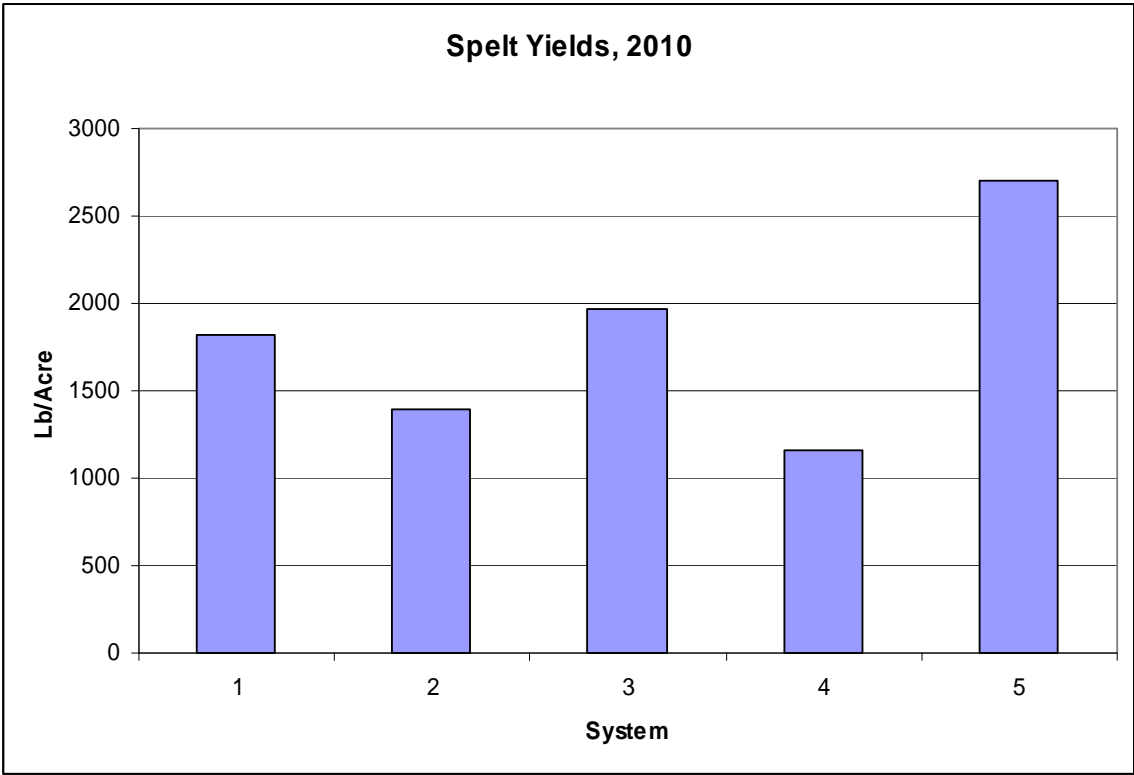
G3 differed from G1 and G2 by having a 50% higher seeding rate, 180 lb/acre of hulled seed compared to 120 lb/acre. This was to increase crop competition against weeds.

Before planting in 2009, an effort was made to reduce perennial weeds in the organic systems, using a springtooth harrow to bring roots to the surface. While this was somewhat successful, it led to a rough surface for planting and lower than normal spelt stand counts. In Wisconsin, a wheat stand count below 15/square foot is considered poor, with a less than 70% yield potential.

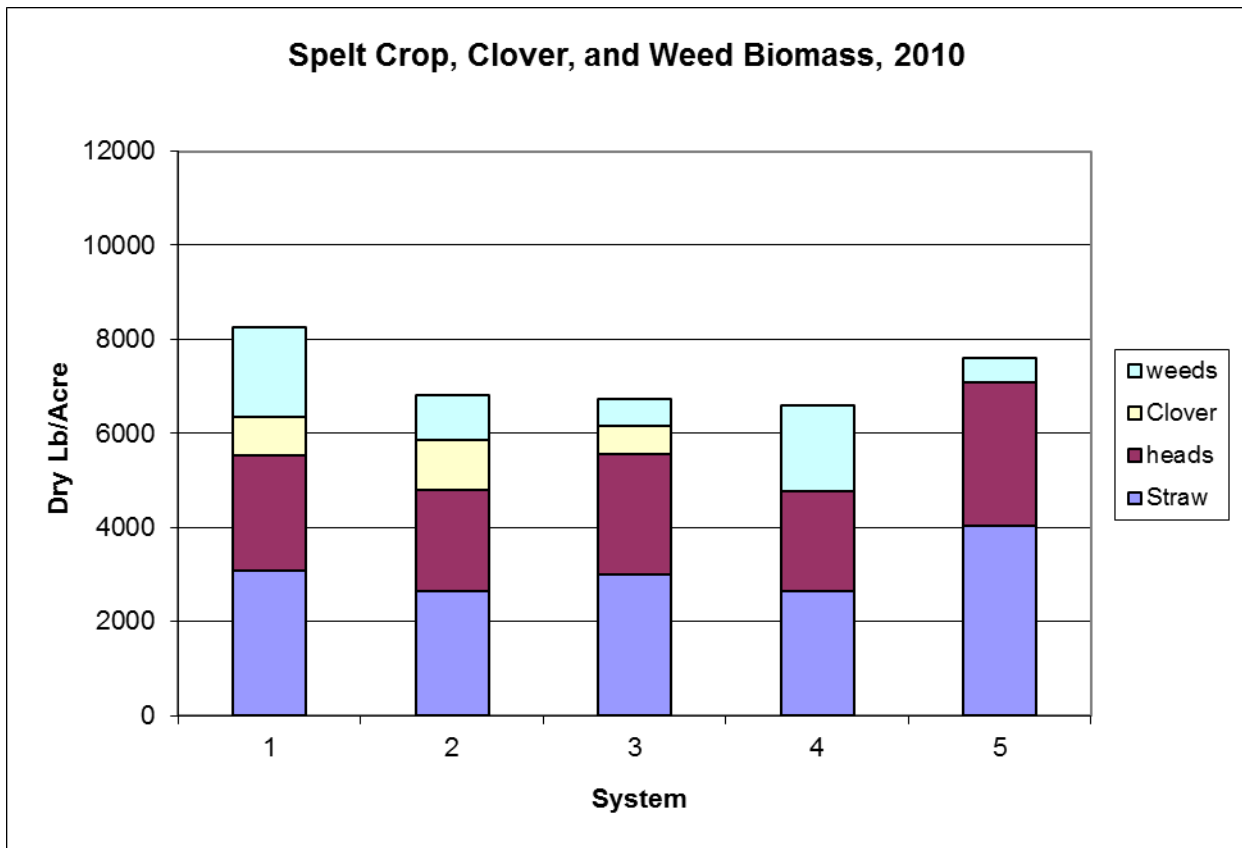
<http://www.uwex.edu/ces/crops/WWheatEval09.htm>

### Spelt stand





Weed presence was high in 2010, and yields were probably reduced competition. Over the four OCS spelt crop years, trends have been consistent. Comparing G1 and G2, it is clear that added fertility results in a yield increase. G4 and G2 have been similar in yield, so reduced tillage has performed relatively well with this winter grain. While it also has no added fertility inputs, G3 has benefited from a 30-50% higher seeding rate (implemented to enhance weed suppression) which makes one wonder if our standard rate of 2 bu. (120 lb) per acre of hulled seed is perhaps too low. G5 yields have consistently been higher than G1, perhaps responding to higher fertility additions.



In general, weed pressure in spelt was high in 2010, after only fair control in the preceding soybeans. In contrast to 2009, spelt weed biomass was larger in G2 than G3.

Spelt plots were mowed with a rotary mower on 8/9, to reduce ragweed seed production and general weed growth. Plots were mowed at about a 3-4" height. Subsequent clover growth was excellent. Oats (75#/A) and inoculated Austrian winter peas (175 #/A) were seeded on 9/3 in G4 after two passes with a Perfecta field cultivator at a depth of about 4".

Bushel weight, however, was relatively low (26.5 lb/bu), indicating poor quality of the grain.