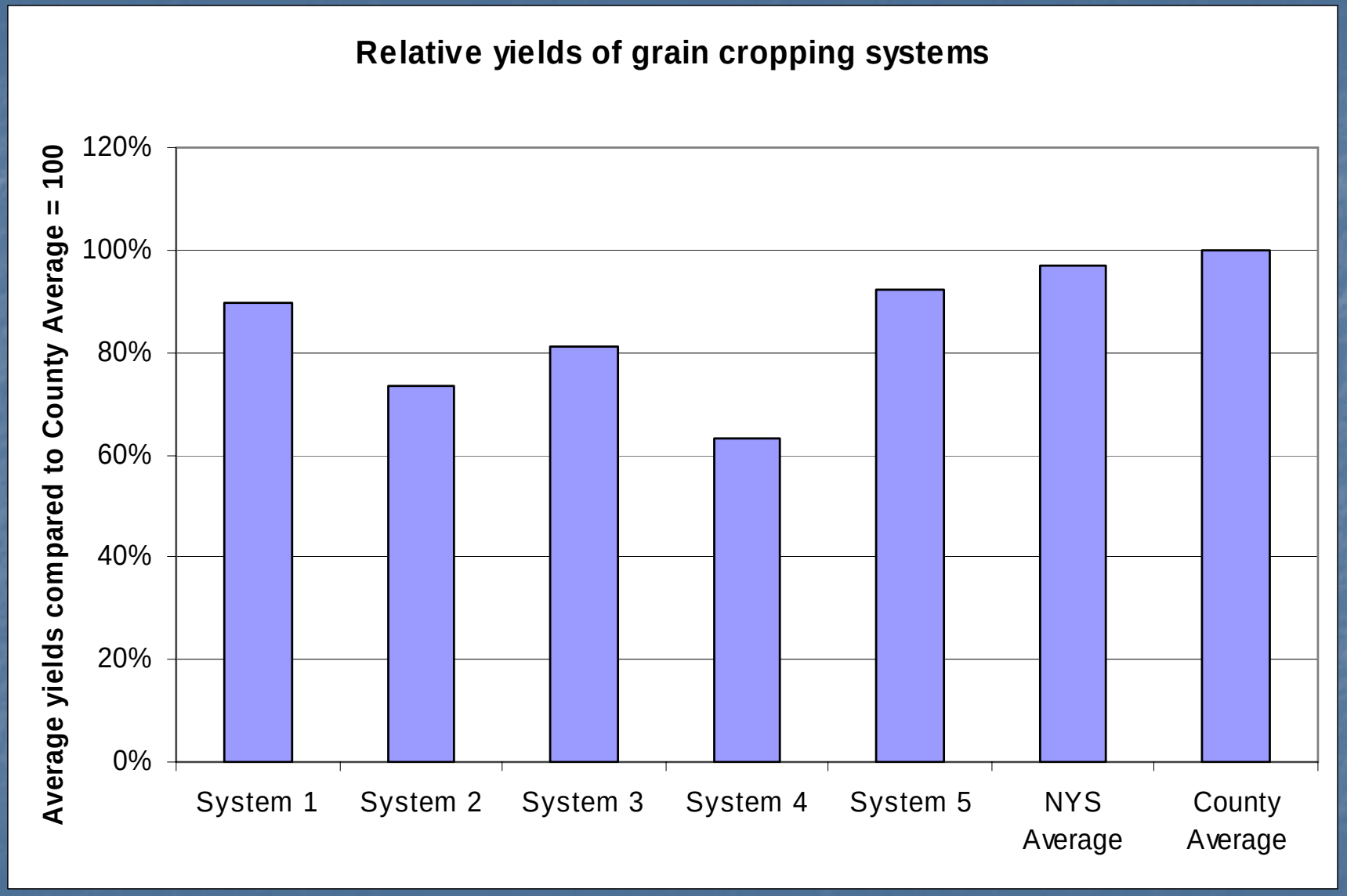

Organic Systems Trial
Advisory Group Meeting
2008

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

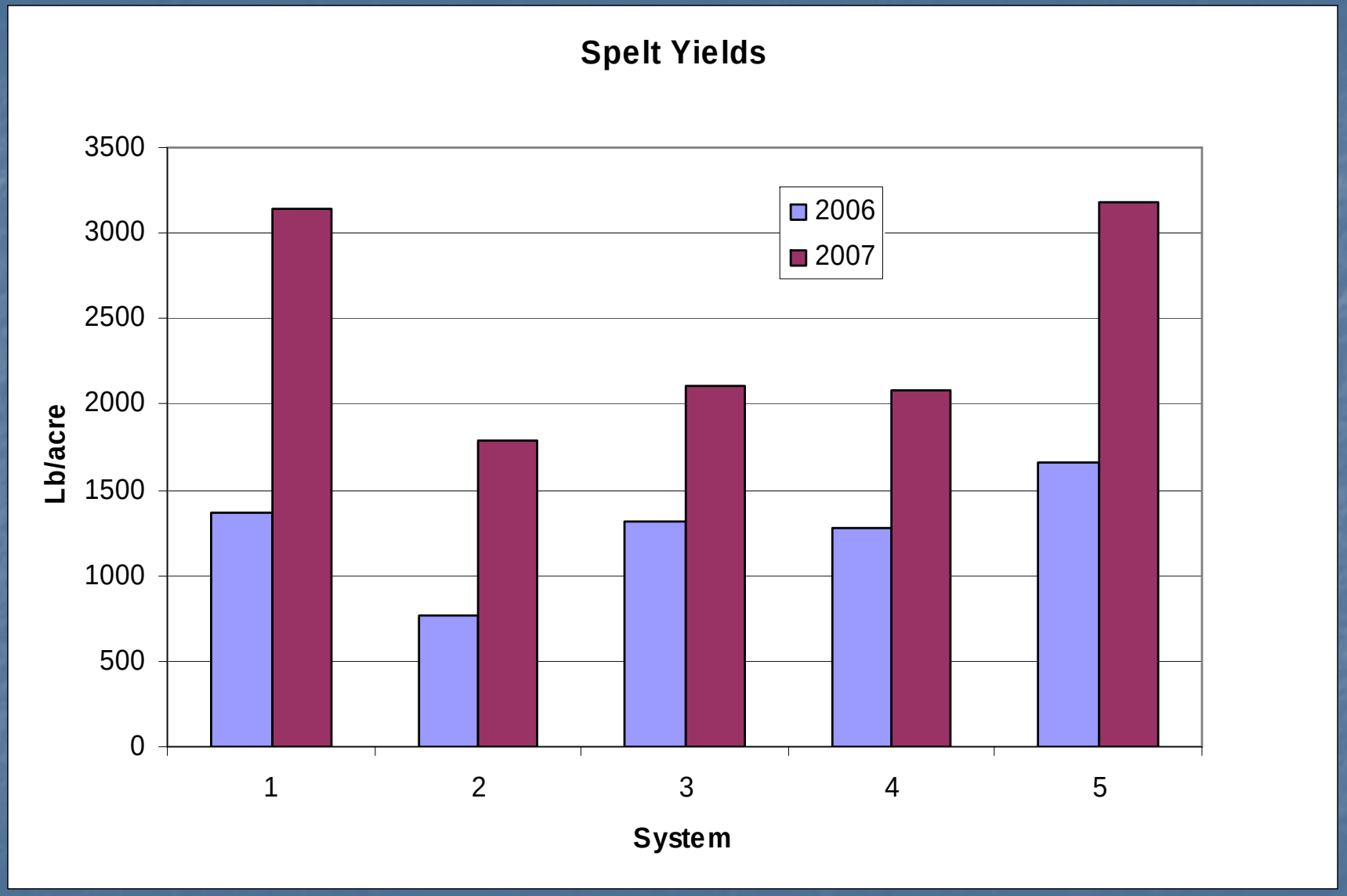
Systems:

- 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
120%
100%
80%
60%
40%
20%
0%
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
- Exceptions: System 5 corn in 2005, System 4 corn in 2007, system 4 and 5 soybeans in 2006


Spelt Yields
3500
3000
2500
2000
1500
1000
500
0
Lb/acre
2006
2007
1
2
3
4
5
System

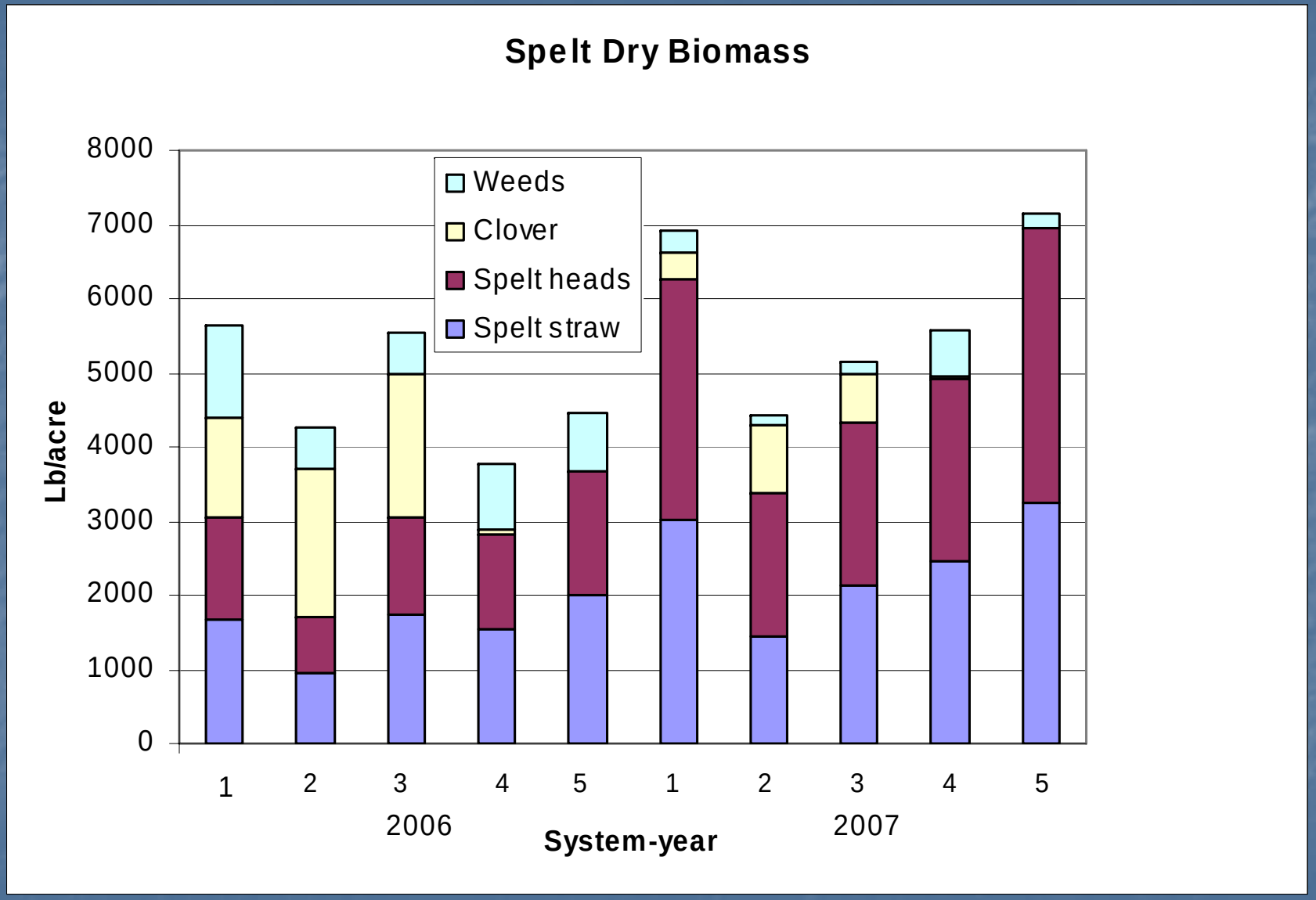
A Closer Look at 2007 Results

- 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 .2-.4 points in all systems from 2005-2007
- Up to nearly 8 in some systems
- Suggestions?

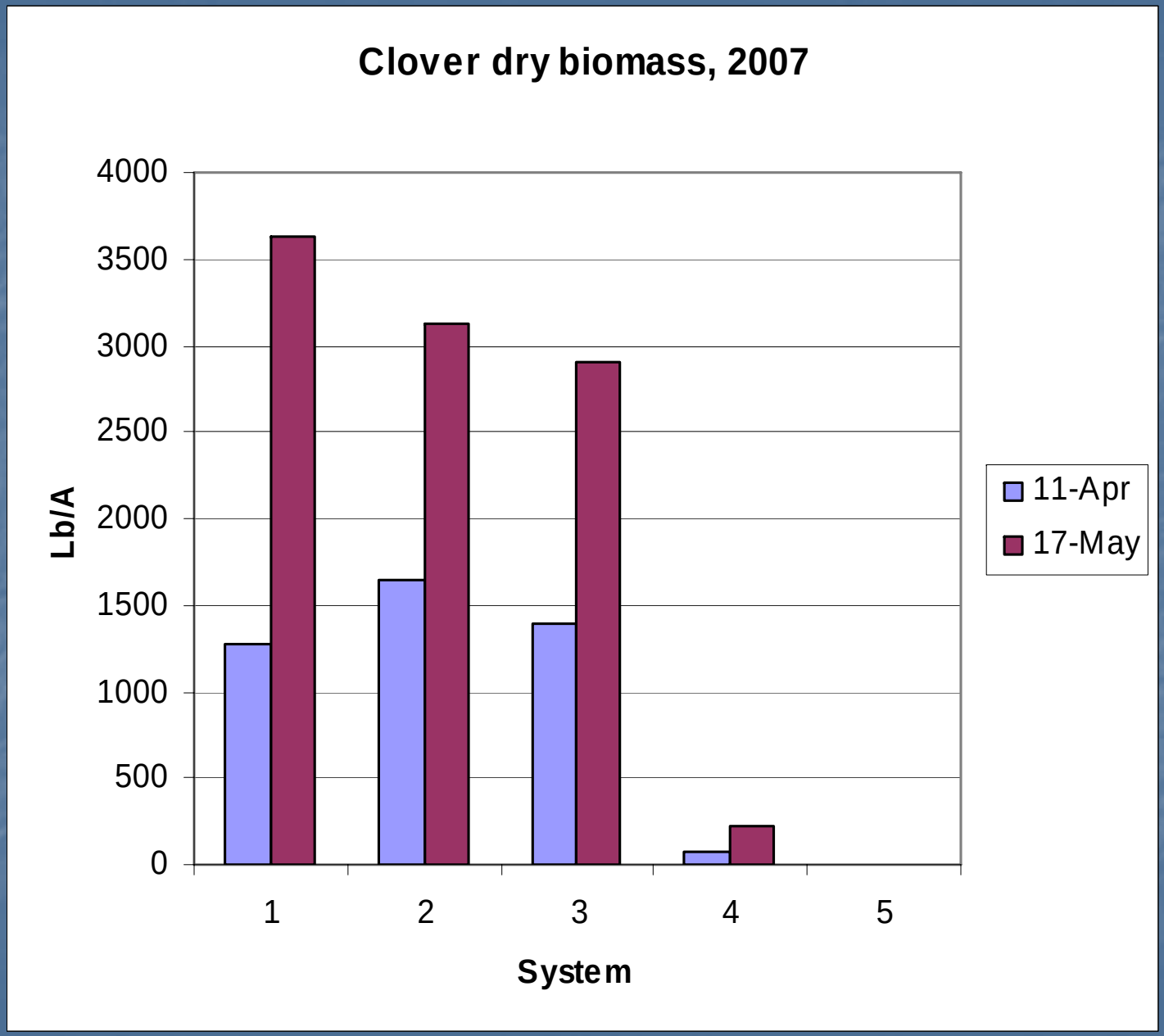

Spelt


Spelt Dry Biomass
8000
7000
6000
5000
4000
3000
2000
1000
0
Lb/acre
Weeds
Clover
Spelt heads
Spelt straw
1
2
3
4
5
1
2
3
4
5
2006
2007
System-year


Clover

Clover

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


Clover dry biomass, 2007
4000
3500
3000
2500
2000
1500
1000
500
0
Lb/A
1
2
3
4
5
System
11-Apr
17-May


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

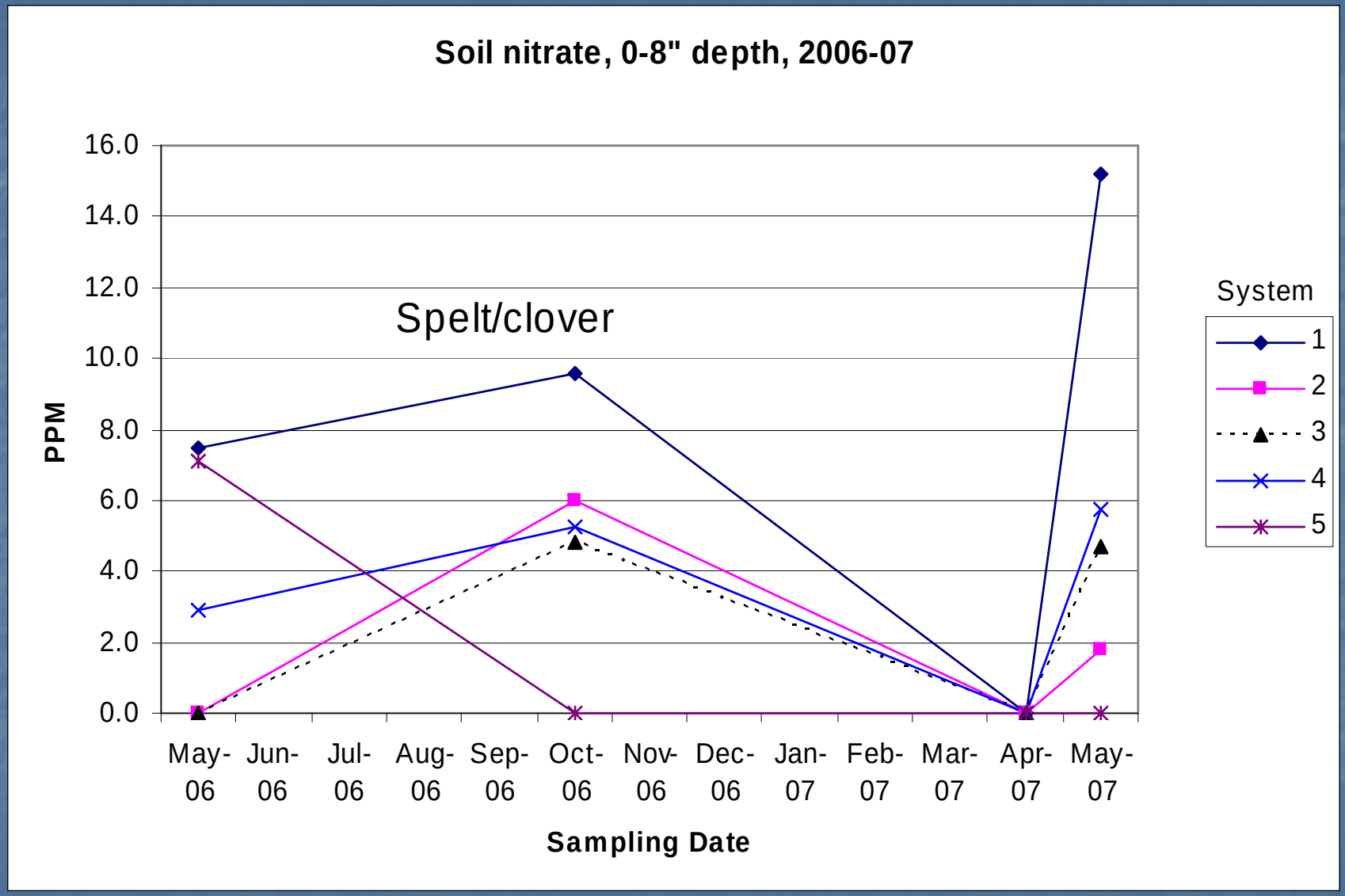
- Before tillage: System 1: Kreher's, lower rate (76-99-46)
- Before tillage: System 4: Kreher's, high rate (131-170-78)
- At planting: systems 1-4 received 2-4-2 starter @ 379 lb/acre (7.5-15-7.5)

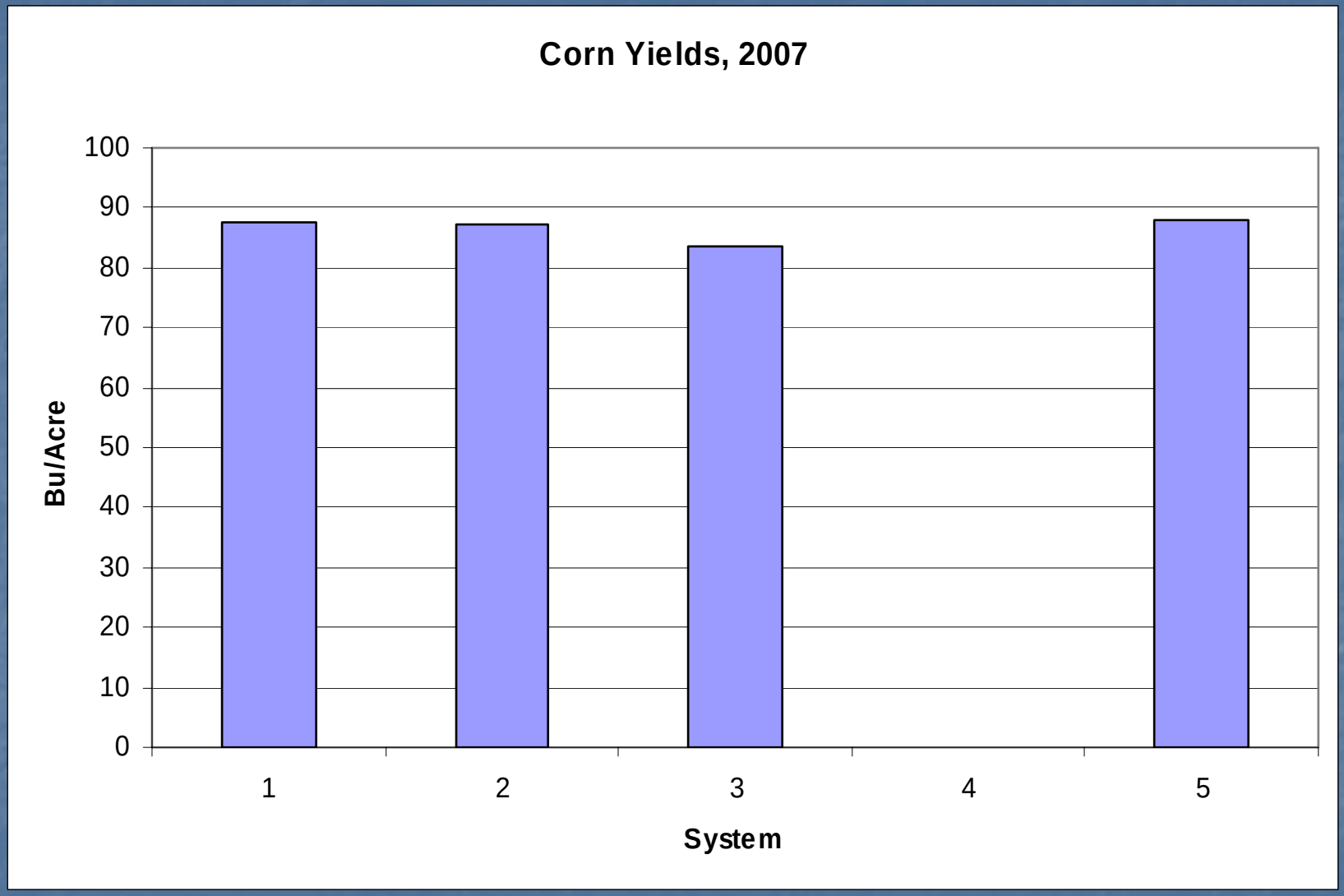
Corn fertility additions

- 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

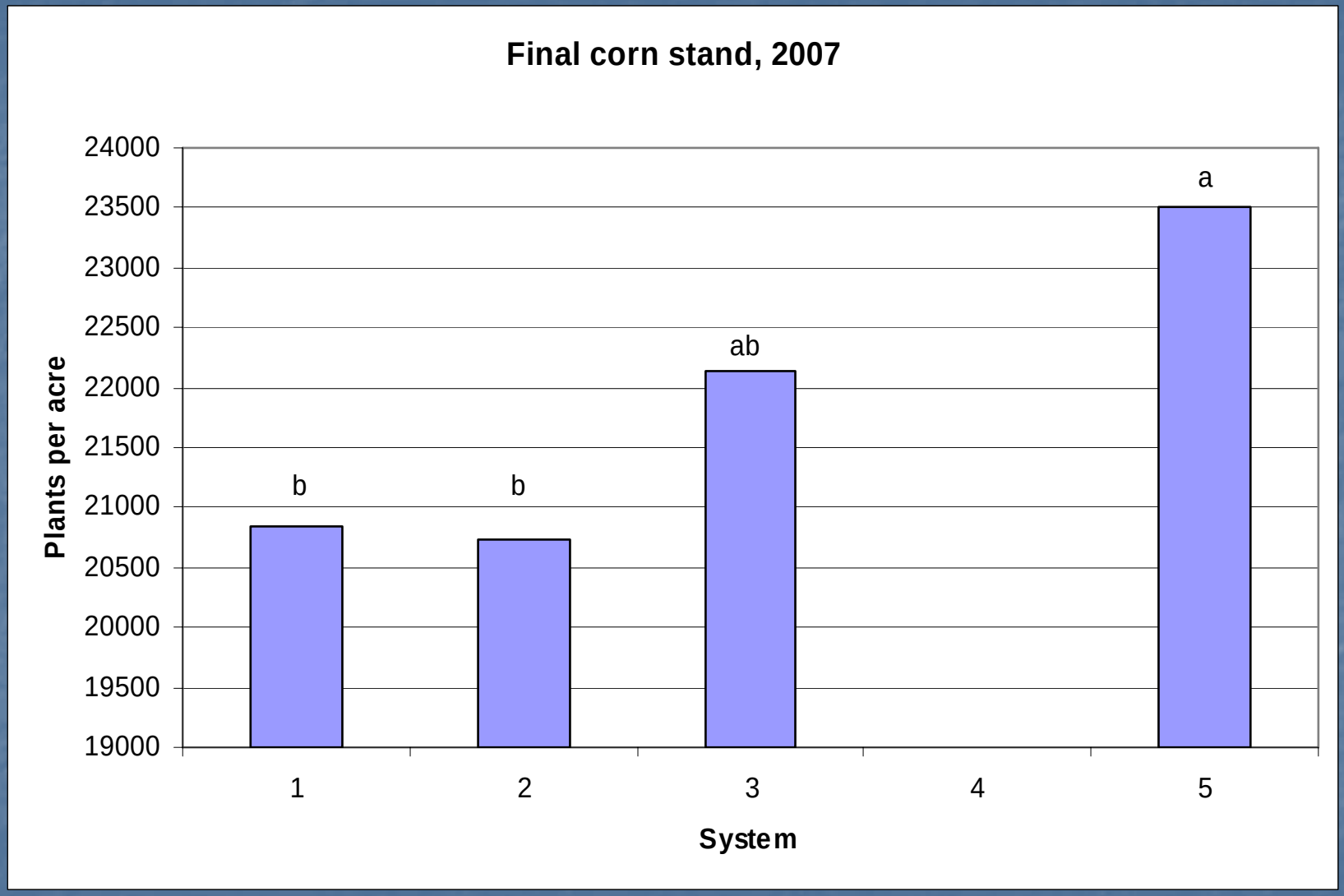
- System 1: 84-114-54 (plus 135# N from clover)
- Systems 2, 3: clover N only: 125#, 116#
- System 4: 139-185-86 (+ 9# from clover)
- System 5: 114-48-48 (no clover)


Soil nitrate, 0-8" depth, 2006-07
Spelt/clover
PPM
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Oct-06
Nov-06
Dec-06
Jan-07
Feb-07
Mar-07
Apr-07
May-07
Sampling Date
System
1
2
3
4
5


Corn Yields, 2007
Bu/Acre
100
90
80
70
60
50
40
30
20
10
0
1
2
3
4
5
System

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?


Final corn stand, 2007
Plants per acre
24000
23500
23000
22500
22000
21500
21000
20500
20000
19500
19000
b
b
ab
a
1
2
3
4
5
System

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
RYDER
TRUCK


Systems comparisons

Net profits substituting equivalent wheat yield for spelt

Entry Point 1

	System 1	System 2	System 3	System 4	System 5
Soybeans	$197	$219	$211	$192	$224
Wheat	$8	-$48	$49	$75	$90
Corn*	$407	$495	$416	-$549	$33
3 Year Average	$204	$222	$225	-$87	$116

* Systems 1-4 @ organic corn prices

Net profits substituting equivalent wheat yield for spelt, system 5 only

Entry Point 2

	System 1	System 2	System 3	System 4	"Optimistic" System 5
Corn	-	-	-	-	-
Soybeans	$256	$281	$241	$190	$404
Spelt*	$289	$138	$156	$186	$452
2 Year Average	$273	$210	$199	$188	$428

* 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

Organic System Report Card

System	Soil Quality	Yield	Economics	Weeds
1	100	90	96	92
2	86	73	90	96
3	91	81	89	96
4	66	63	10	90

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)