




Planting Soybean “into the green”: Summarizing 17 site-years of cover crop trials



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Thank you to the innovative farmers who introduced us to this management strategy and made this report possible.



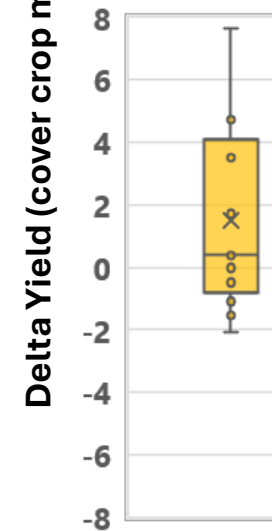
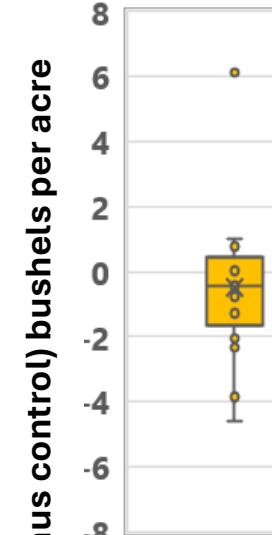
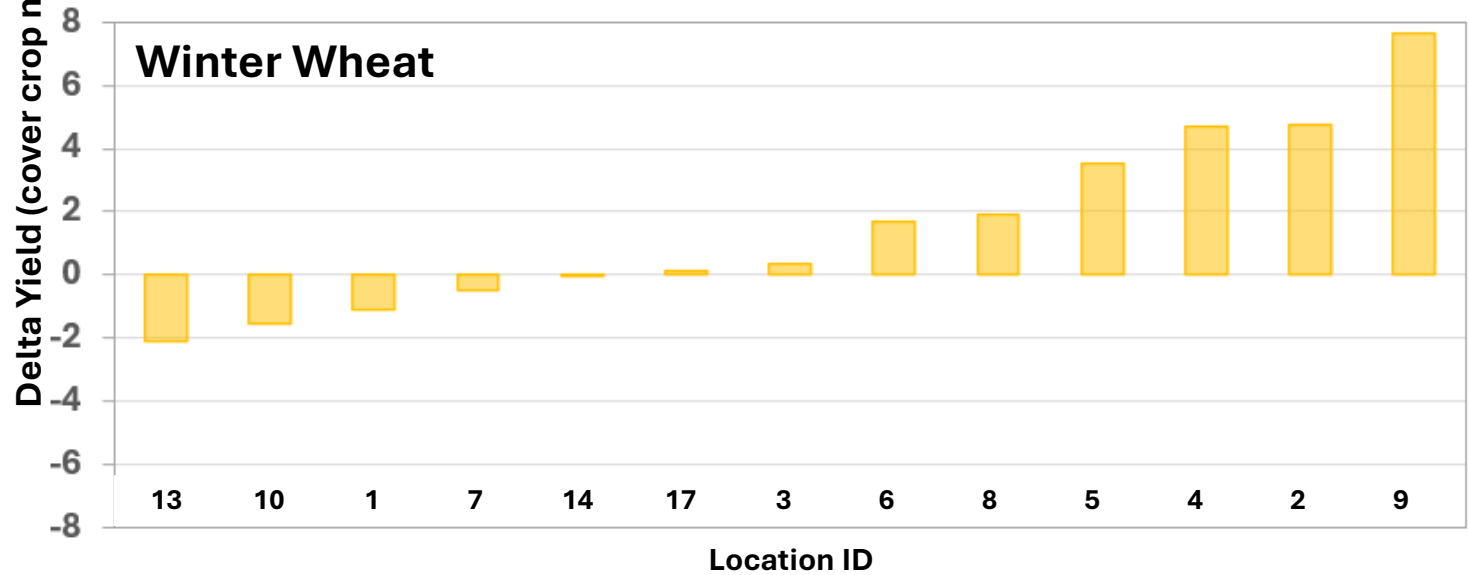
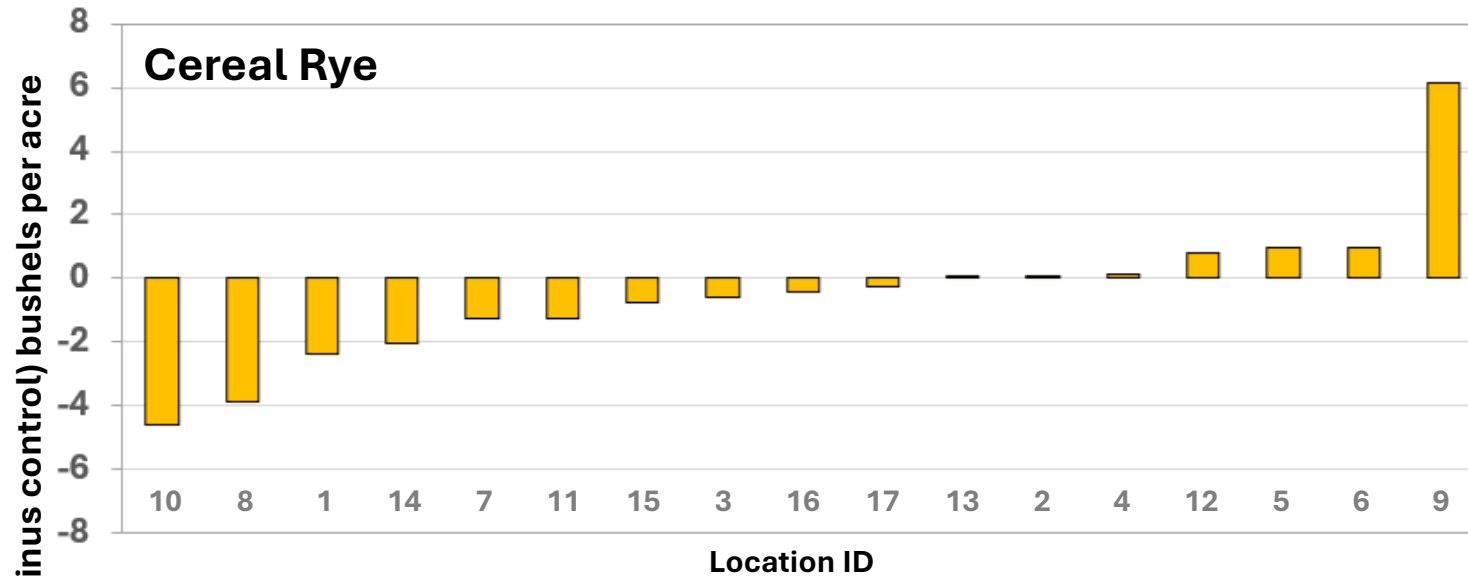
Planting soybean into fully headed winter wheat (cereal rye strips in background) in a Cooper County strip trial, May 11, 2016.

Soybean planted “into the green”

Graph ID	County	Site	Year	Tillage	Years in CC	Soybean planting date	Cover Crop Termination Date	DAPUT ¹	CR Delta Yield B/A	WW Delta Yield (B/A)	Notes
1	Cooper	1605	2016	No Till	0	5/11/16	5/11/16	0	-4.0	-1.1	CC headed
2	Holt	1804	2018	No Till	3	4/29/18	5/18/18	19	4.9	5.9	
3	Dade	1906	2019	No Till	2	7/2/19	7/2/19	0	1.0	3.2	
4	Lincoln	1907	2019	No Till	3	6/10/19	6/10/16	0	2.1	4.7	
5	Lincoln	C001	2019	No Till	4	5/17/19	5/17/19	0	1.9	3.9	
6	Lincoln	C002	2019	No Till	4	5/17/19	5/17/19	0	7.1	4.0	
7	Lincoln	C001	2021	No Till	6	5/14/21	5/21/21	7	-3.4	-1.0	Voles, heading
8	Lincoln	C002	2021	No Till	6	5/14/21	5/21/21	7	-0.3	4.3	Voles, heading
9	Scotland	C004	2021	No Till	6	4/27/21	4/30/21	3	10.7	6.4	CC boot
10	Scotland	C005	2021	No Till	6	4/27/21	4/30/21	3	-5.2	-0.4	CC boot
11	Lincoln	C101	2021	No Till	1	5/23/21	5/24/23	1	-3.3	-	Voles, heading
12	Lincoln	C102	2021	No Till	1	6/7/21	6/8/21	1	3.0	-	
13	Lincoln	C001	2023	No Till	8	4/26/23	4/26/23	0	-2.2	-2.6	CC headed
14	Lincoln	C002	2023	No Till	8	4/26/23	4/26/23	0	-1.1	0.4	CC headed
15	Lincoln	C101	2023	No Till	3	4/26/23	4/26/23	0	-2.0	-	CC headed
16	Shelby	C010	2023	No Till	8	4/29/23	4/27/23	-2	-1.1	-	
17	Boone	C004	2023	No Till	7	-	-	0	-0.3	-0.2	
Means					4			2			

¹TDAP= days after planting until termination; zero = planting and termination on same day; positive values mean termination after planting.

Soybean planted “into the green”



- Summary of 17 site-years of soybean planted into the green. Thirteen sites evaluated both cereal rye (top) and winter wheat (bottom).
- On left are location mean differences for soybean yield after cover crop minus soybean yield for the no-cover control ordered with maximum yield penalty on the left.
- On right are box plots of location mean differences.
- Cereal rye had a small negative impact on yield; mean effect was -0.5 B/A.
- Winter wheat positively affected soybean yield; mean effect was +1.3 B/A.

Soybean planted “into the green”: Summary

Cover Crop	n	Mean	90% credible interval
		<i>Soybean Yield (bushels per acre)</i>	
Cereal Rye	17	-0.5	-1.3 to 0.3
Winter Wheat	13	+1.3	0.3 to 2.0

- Missouri farmers planting soybean into a green winter wheat cover crop had a 90% probability of increasing soybean yield 0.3 to 2.0 B/A.
- Risk of yield loss is greater with cereal rye. Odds of losing more than 1 B/A are about 10% with the mean loss across all farms at -0.5 B/A.
- There was no relationship of years in cover crop or days after corn planting until cover crop termination with impacts of cover crop on soybean yield.

Conclusions:

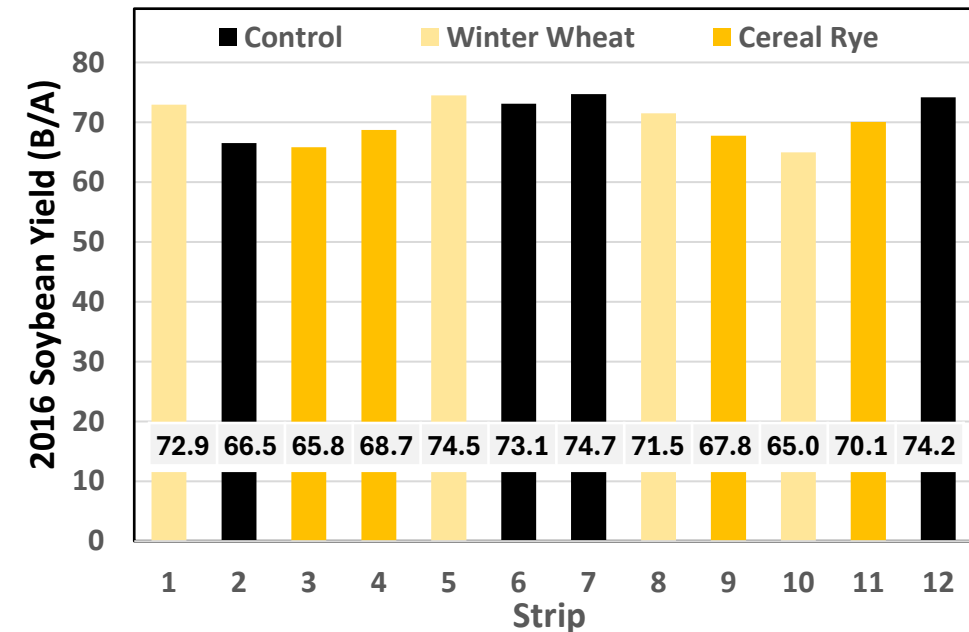
- Planting soybean into the green has potential to substantially increase biomass at termination.
- This added biomass across all the sampled farms increased yield for soybean following winter wheat and decreased yield for soybean following cereal rye.
- For cereal rye, 60% of the locations had less than a one-bushel/acre impact on soybean yield (either plus or minus).
- Using winter wheat resulted in over 60% of the tests having no impact or a positive impact on yield.

1: Cooper County Cover Crop Comparison

1605

2016
Soybean Yield

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	70.4 (3.6)	-
No Cover Crop	72.1 (3.8)	-
Cereal Rye	68.1 (1.8)	-4.0
Winter Wheat	71.0 (4.2)	-1.1



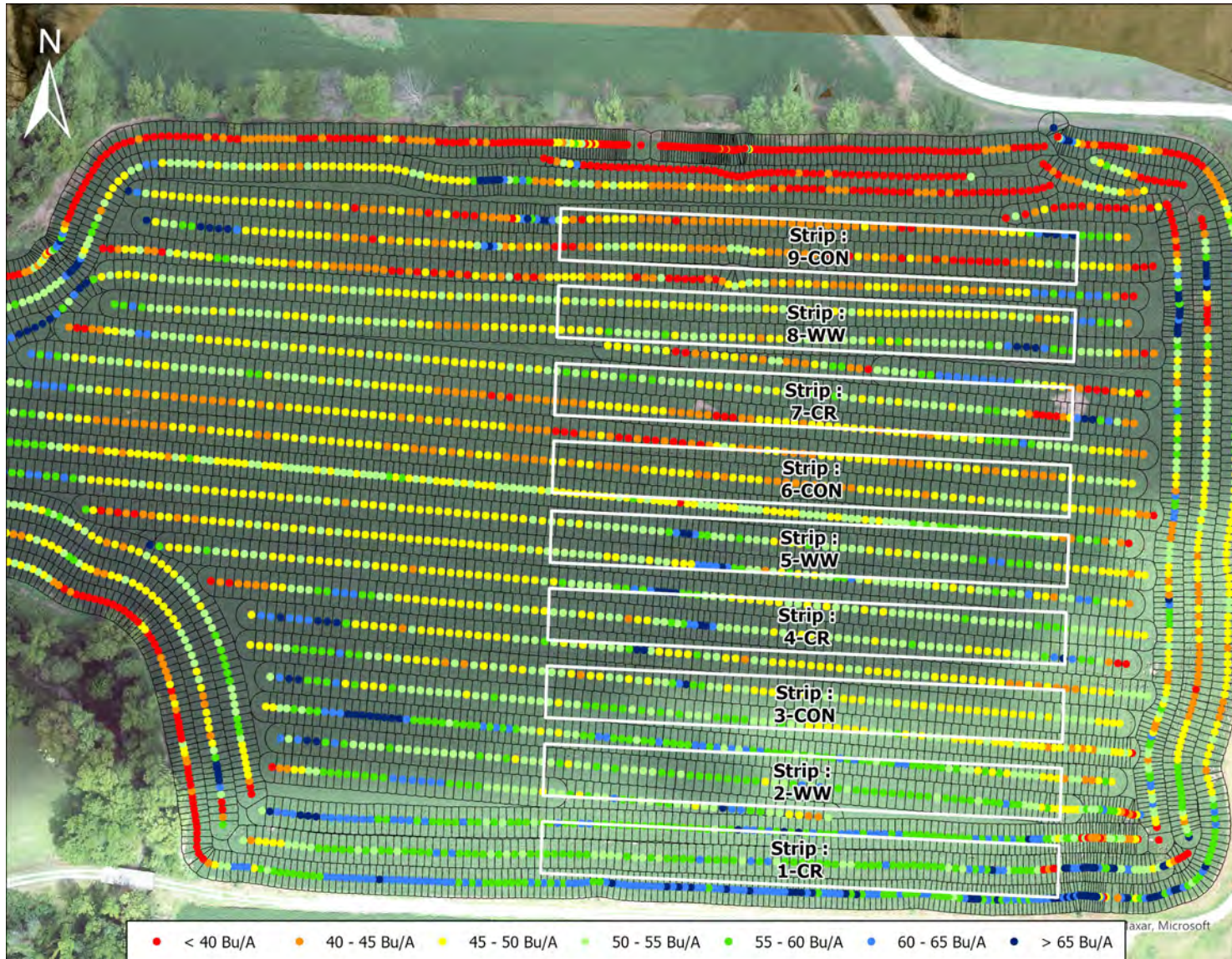
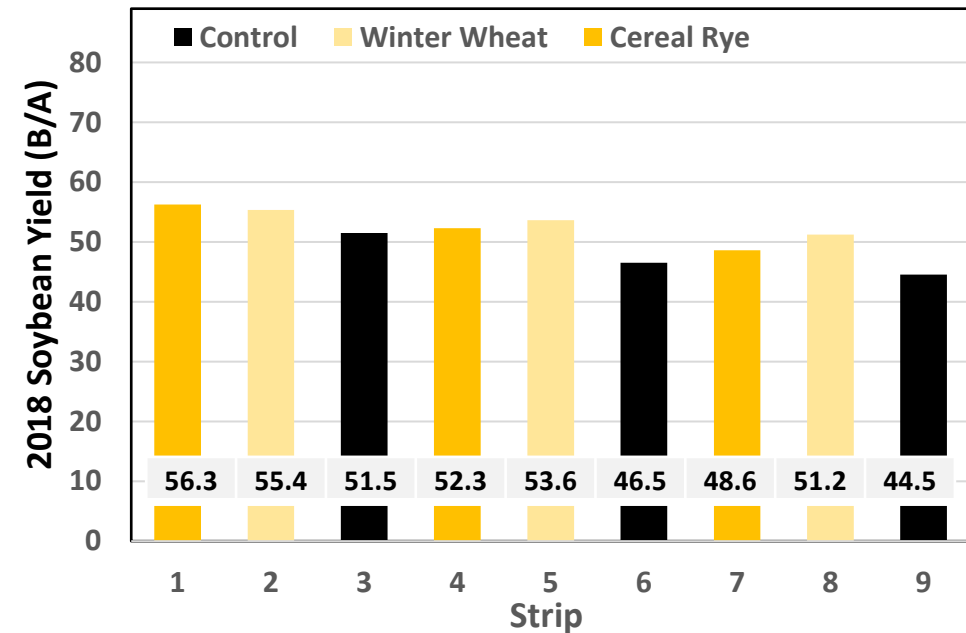
Yield for soybean in 2016. Imagery from 100 meters on July 22, 2016. Field harvested 10/31/2016.

2: Holt County Cover Crop Comparison

1804

2018 Soybean Yield

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	51.1 (3.9)	-
No Cover Crop	47.5 (3.6)	-
Cereal Rye	52.4 (3.9)	4.9
Winter Wheat	53.4 (2.1)	5.9



Yield for soybean in 2016. Imagery from 100 meters on July 22, 2016. Field harvested 10/28/2018.

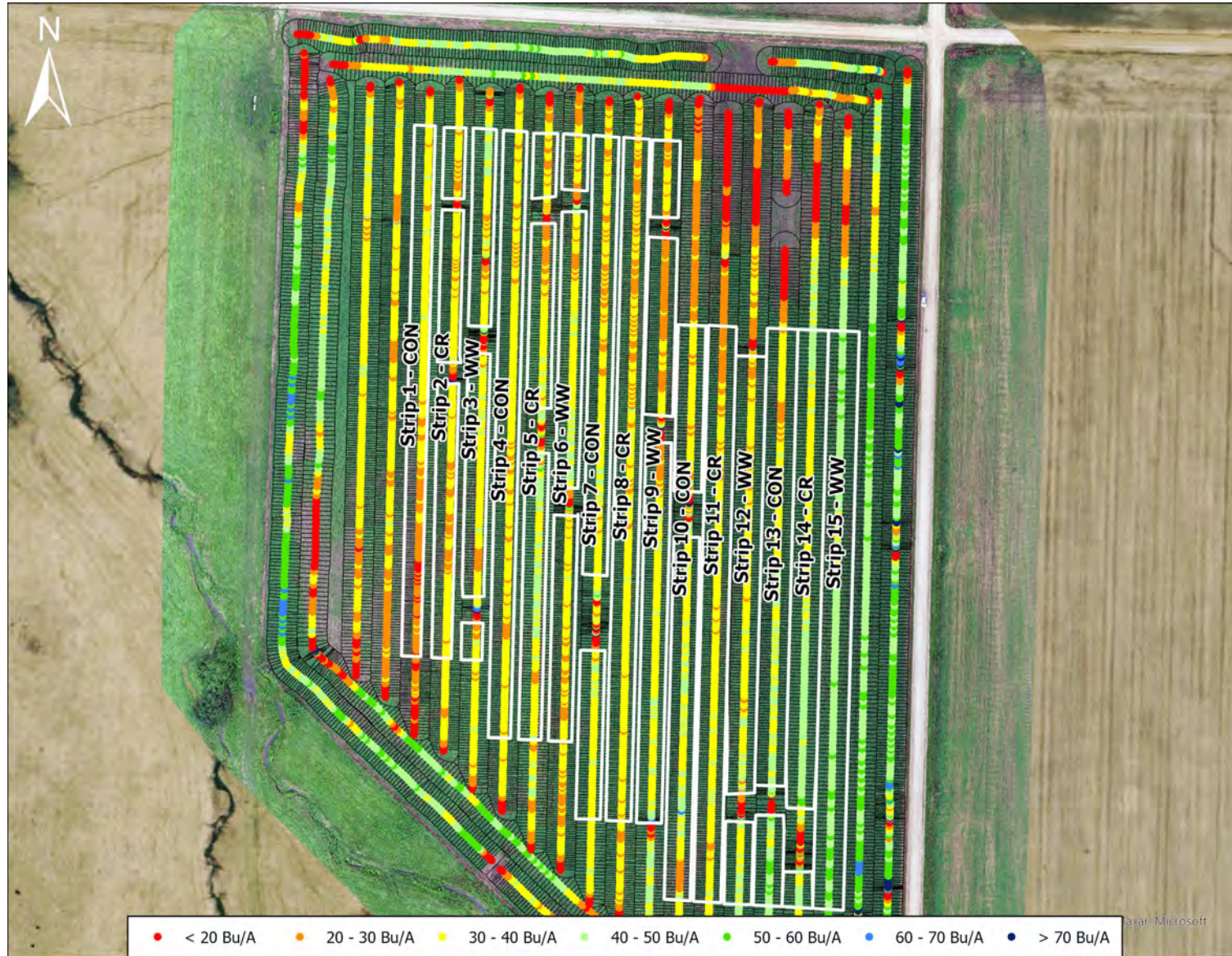
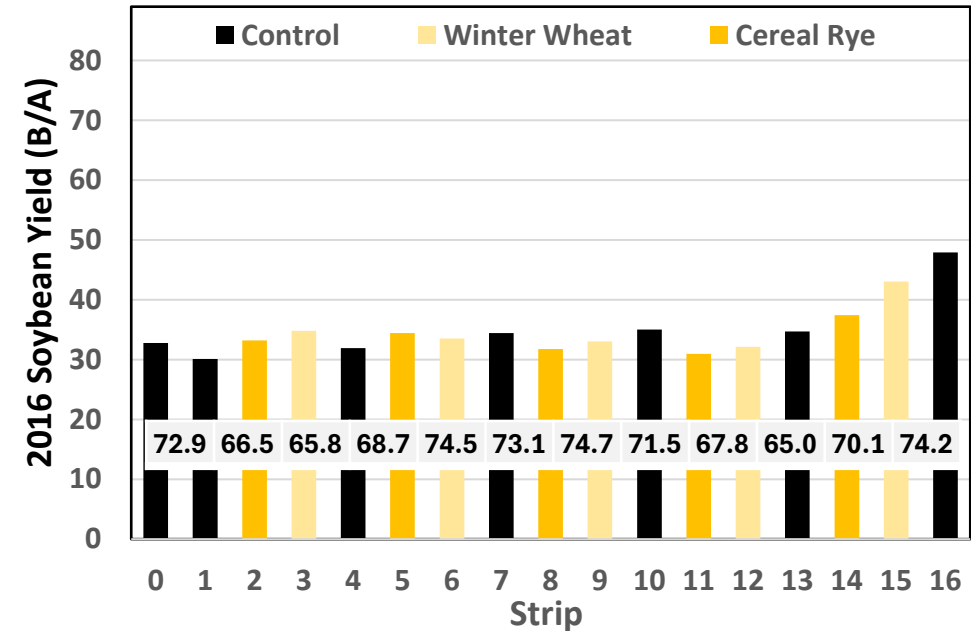
3: Dade County

Cover Crop Comparison

1906

2019
Soybean Yield

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	37.4 (4.5)	-
No Cover Crop	32.6 (2.5)	-
Cereal Rye	33.6 (2.5)	1.0
Winter Wheat	35.8 (4.4)	3.2



Yield for corn in 2019. Imagery from 100 meters on August 7th, 2019. Field harvested November 5th, 2019.

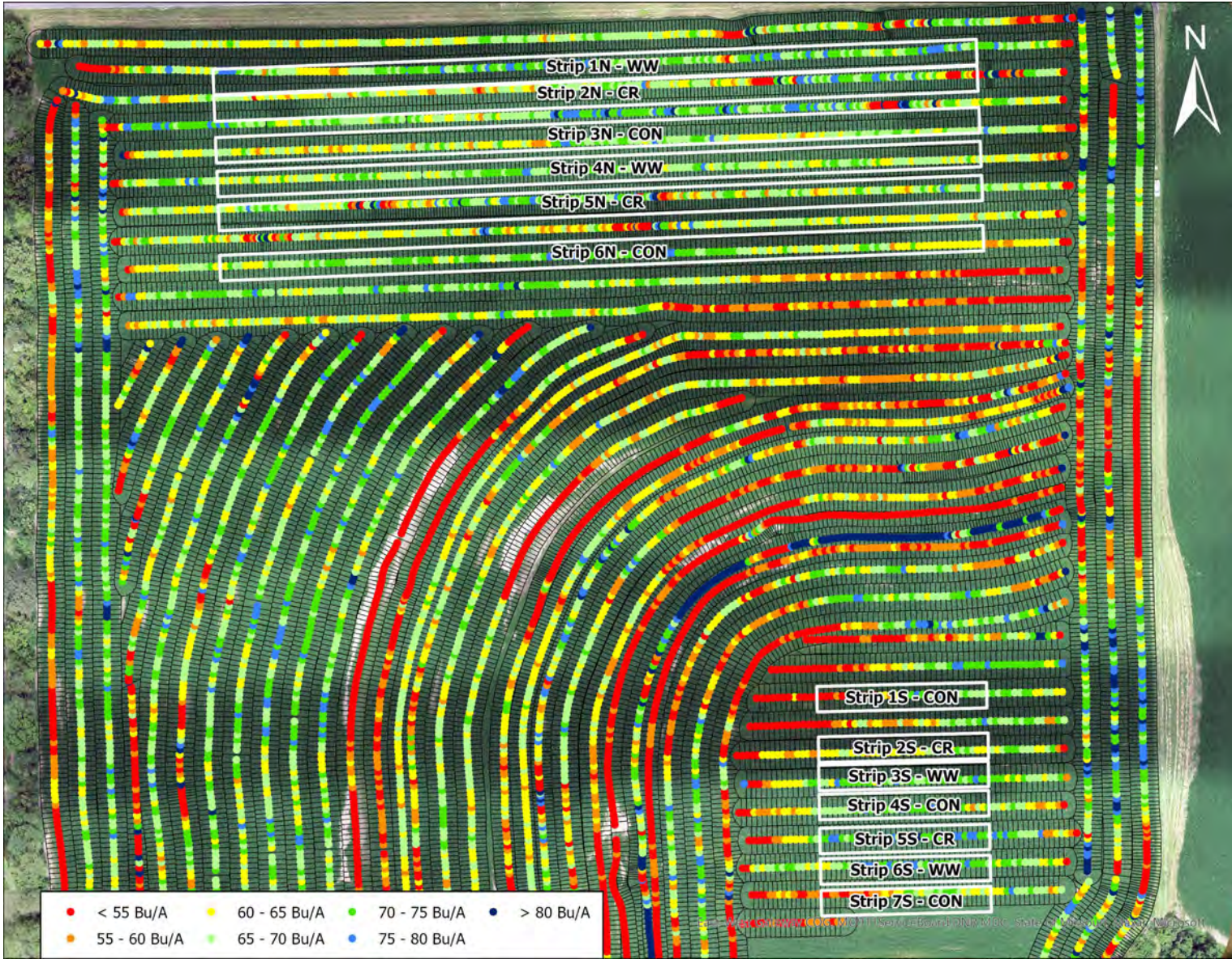
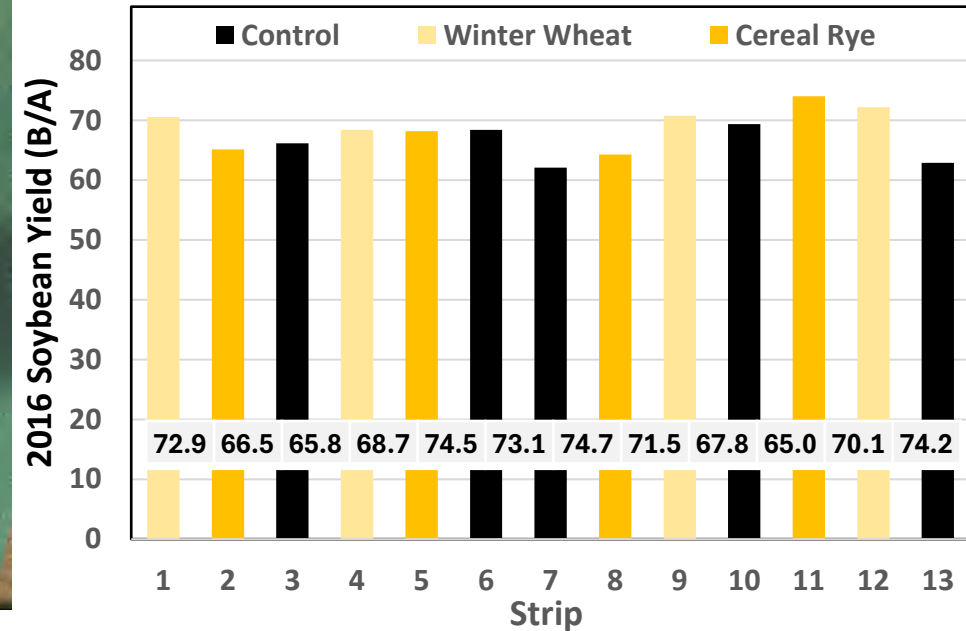
4: Lincoln County Cover Crop Comparison

1907

2019

Soybean Yield

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	67.9 (3.6)	-
No Cover Crop	65.8 (3.2)	-
Cereal Rye	67.9 (4.4)	2.1
Winter Wheat	70.5 (1.6)	4.7



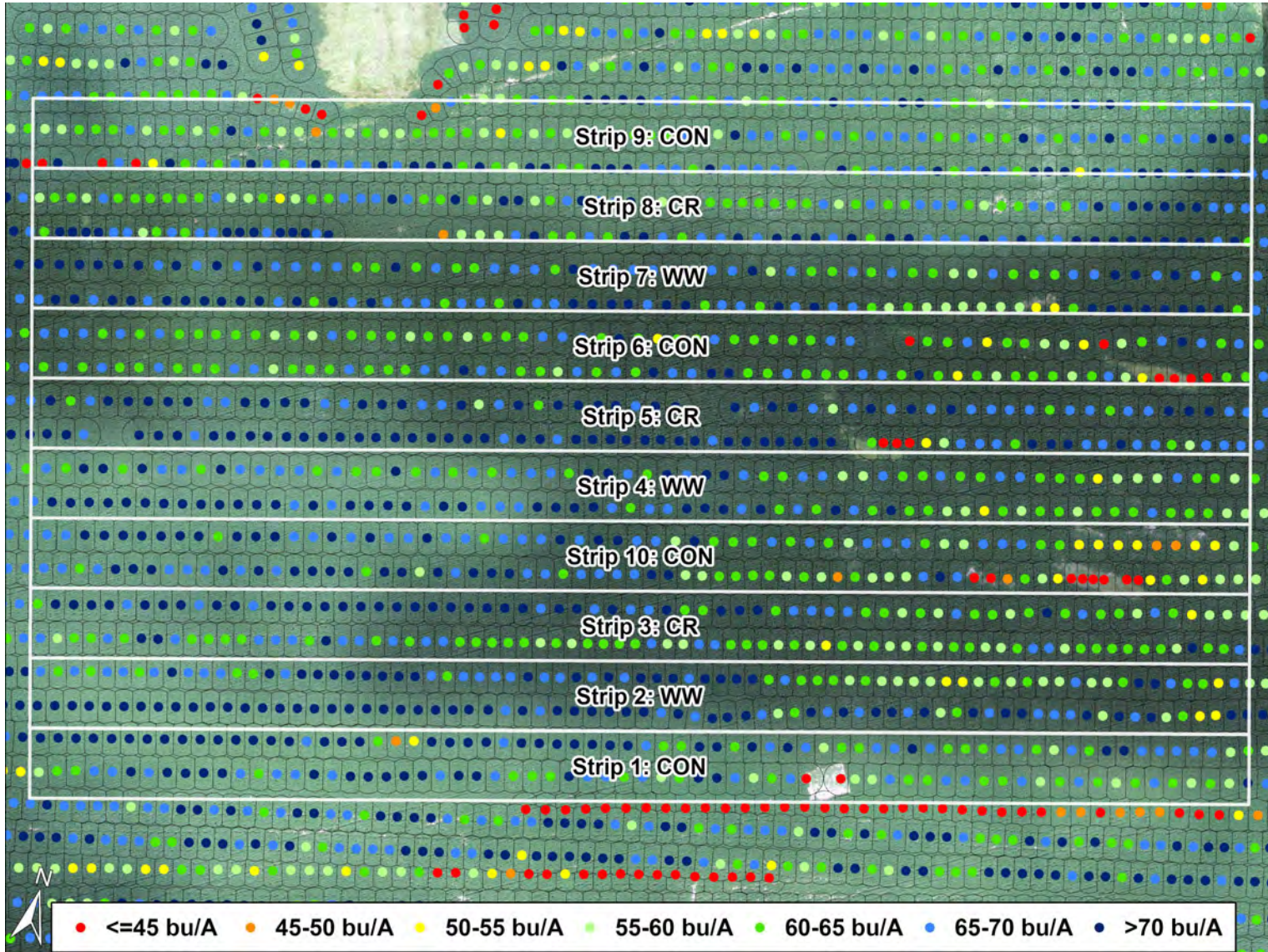
Yield for soybean in 2019. Imagery from 100 meters on August 19th, 2019. Field harvested 10/20/2019.

5: Lincoln County

Cover Crop Comparison

C001

Year 4 (2019)
Soybean Yield



Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	65.7 (2.6)	--
No Cover Crop	63.7 (2.3)	--
Cereal Rye	65.6 (2.5)	1.9
Winter Wheat	67.6 (1.3)	3.9

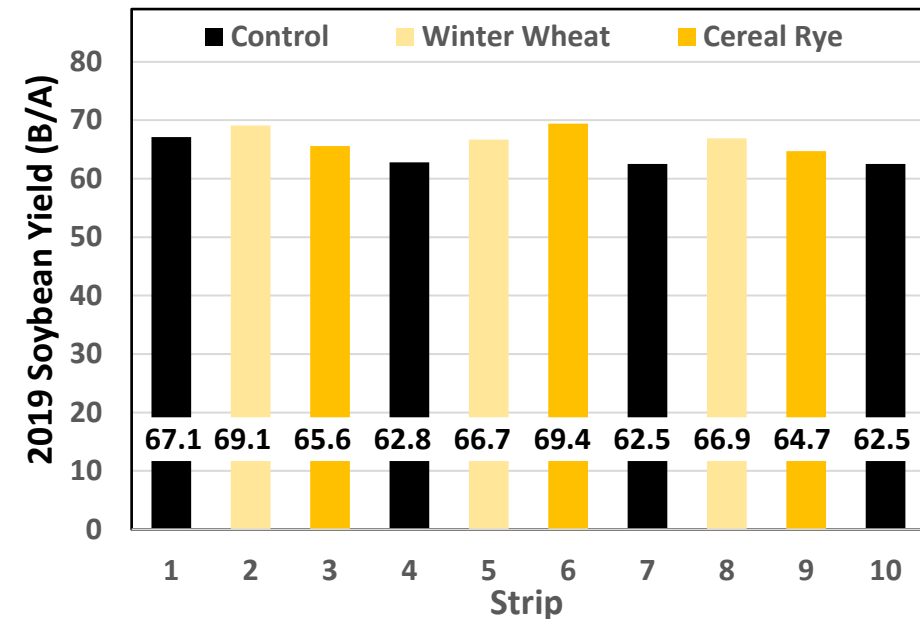


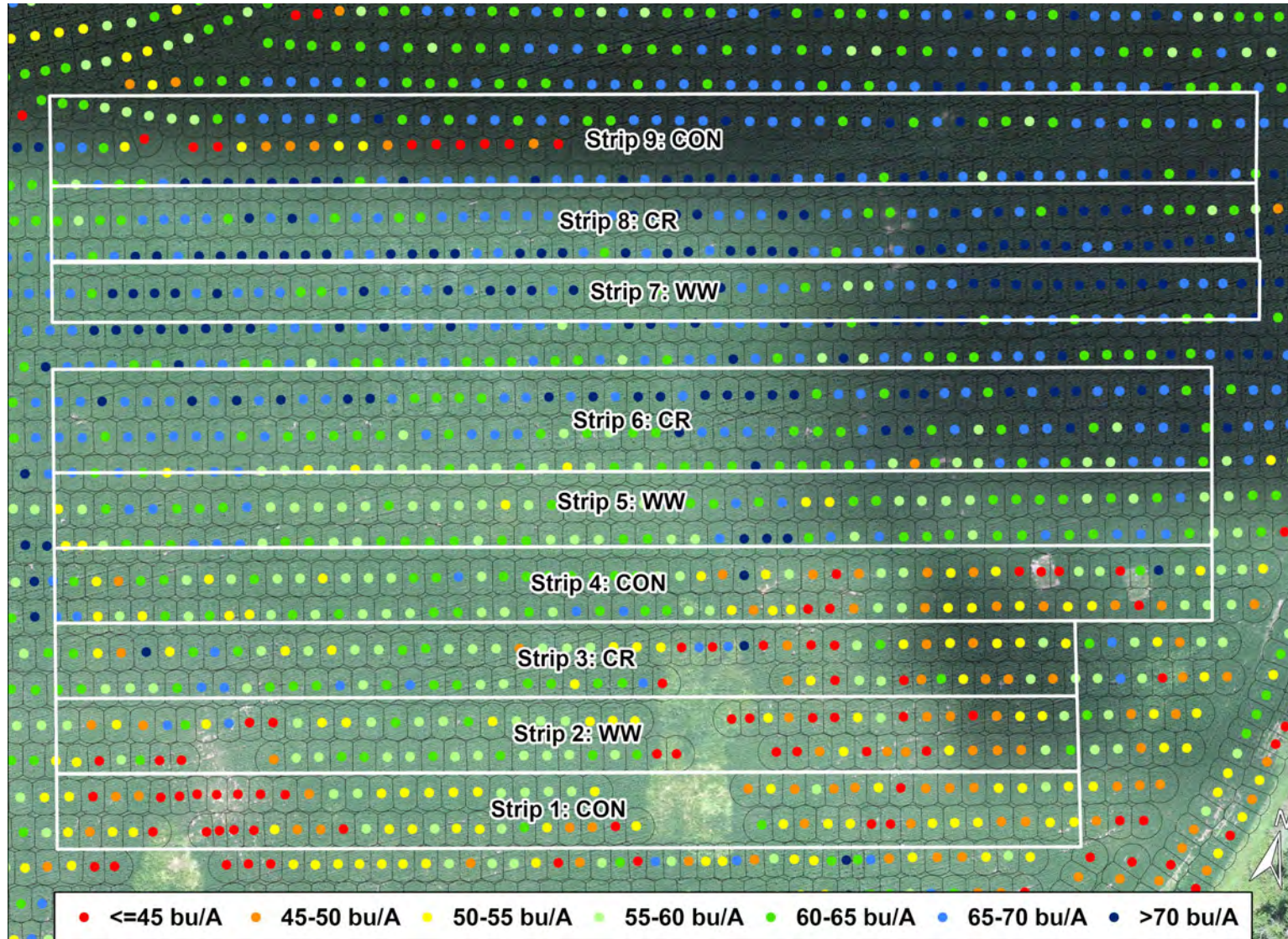
Figure 1b. Yield for soybeans in 2019. Data from passes fully in treatment strips. Imagery from 100 meters on August 13, 2019.

6: Lincoln County

Cover Crop Comparison

C002

Year 4 (2019)
Soybean Yield



Cover Crop	Yield (SD)	Delta No Cover
	<i>bushels per acre</i>	
All strips	60.2 (7.6)	--
No Cover Control	56.5 (8.9)	--
Cereal Rye	63.6 (6.3)	7.1
Winter Wheat	60.5 (6.3)	4.0

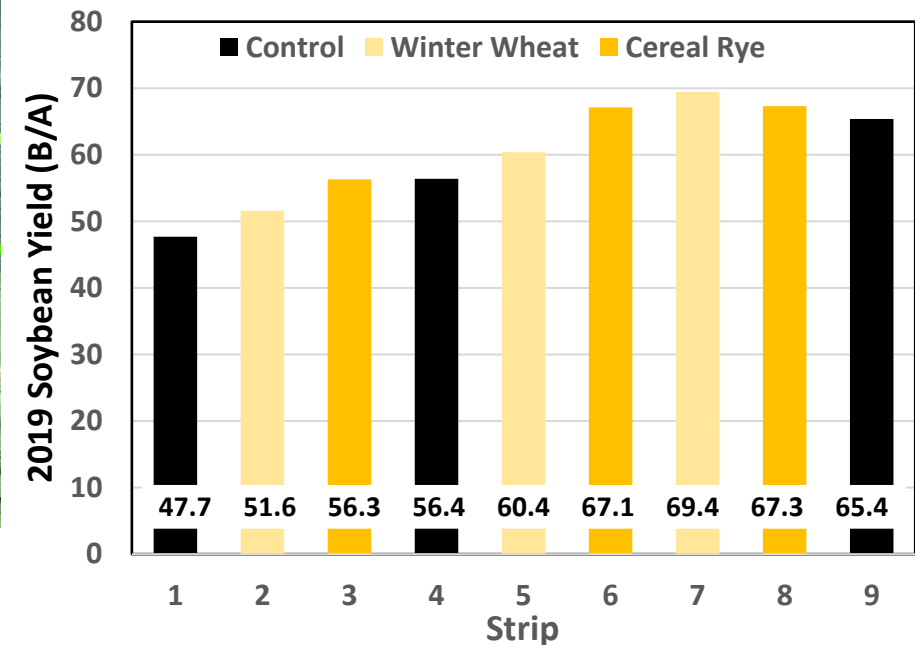


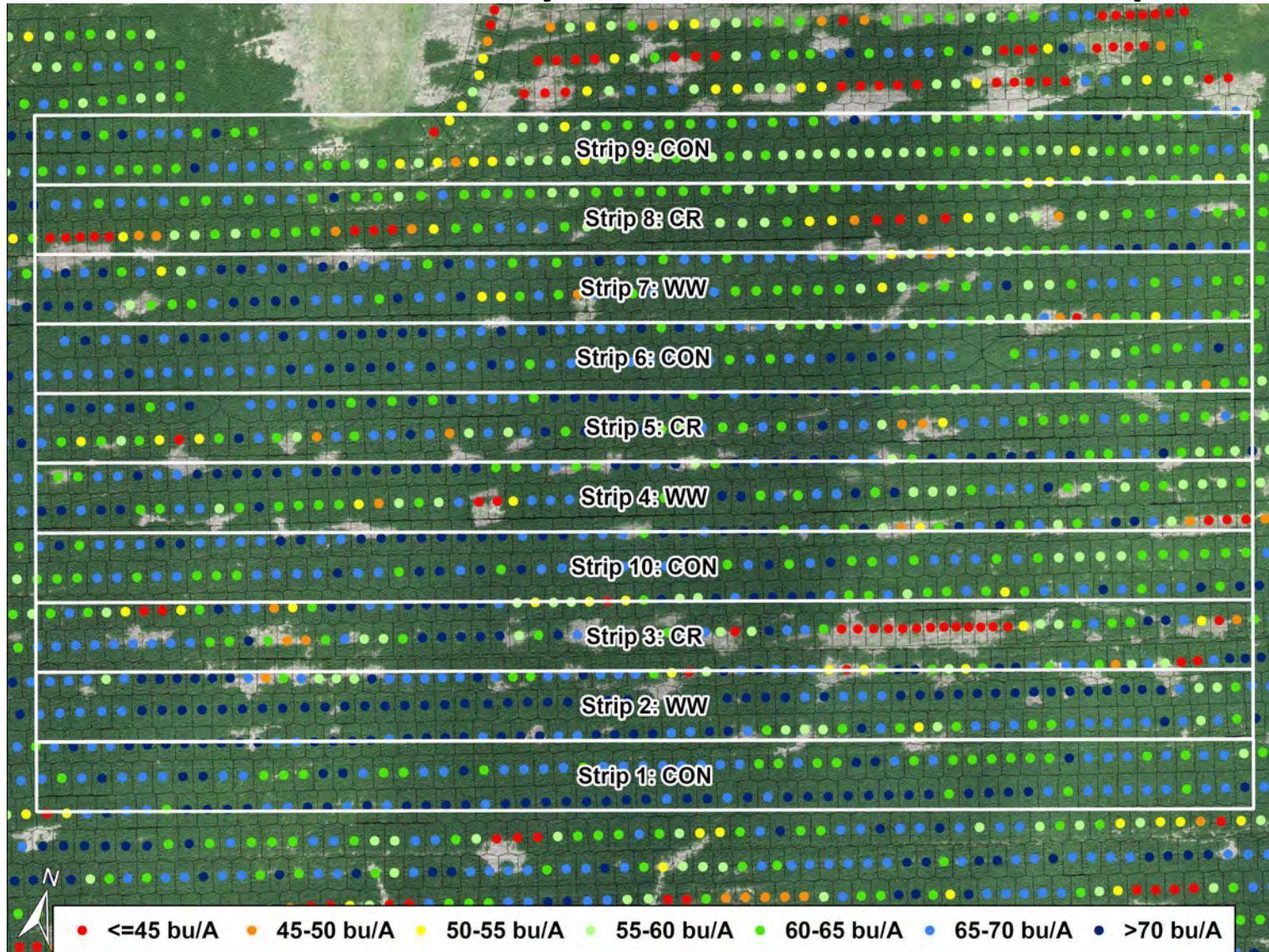
Figure 1. Yield for soybeans in 2019. Data from passes fully in treatment strips. Imagery from 100 meters on August 13, 2019.

7: Lincoln County

Cover Crop Comparison

C001

Year 6 (2021)
Soybean Yield



Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	63.8 (6.6)	--
No Cover Crop	65.1 (1.4)	--
Cereal Rye	61.7 (5.9)	-3.4
Winter Wheat	64.1 (12.2)	-1.0

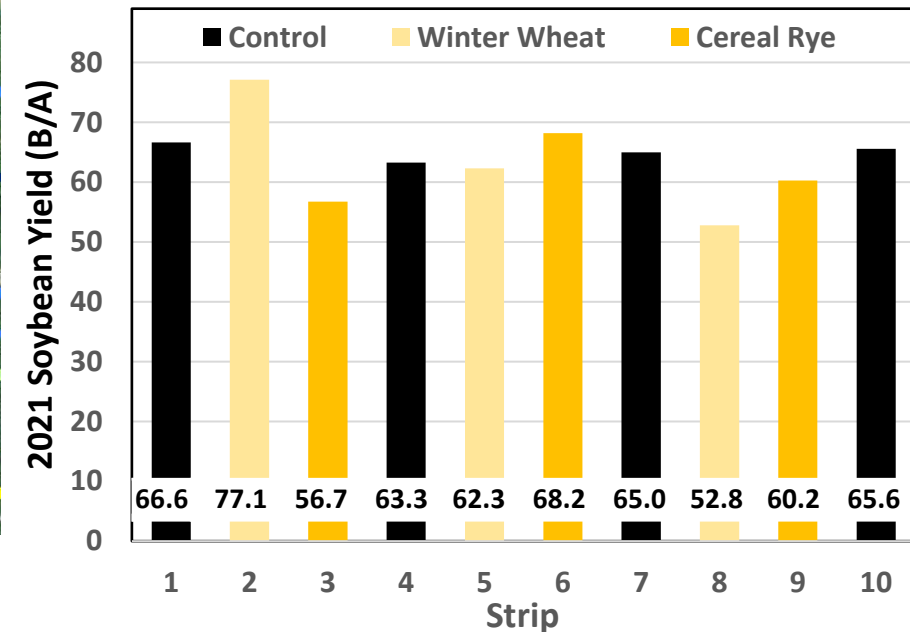


Figure 1b. Yield for soybeans in 2021. Data from passes fully in treatment strips. Imagery from 100 meters on August 5, 2021.

8: Lincoln County

Cover Crop Comparison

C002

Year 6 (2021)
Soybeans Yield

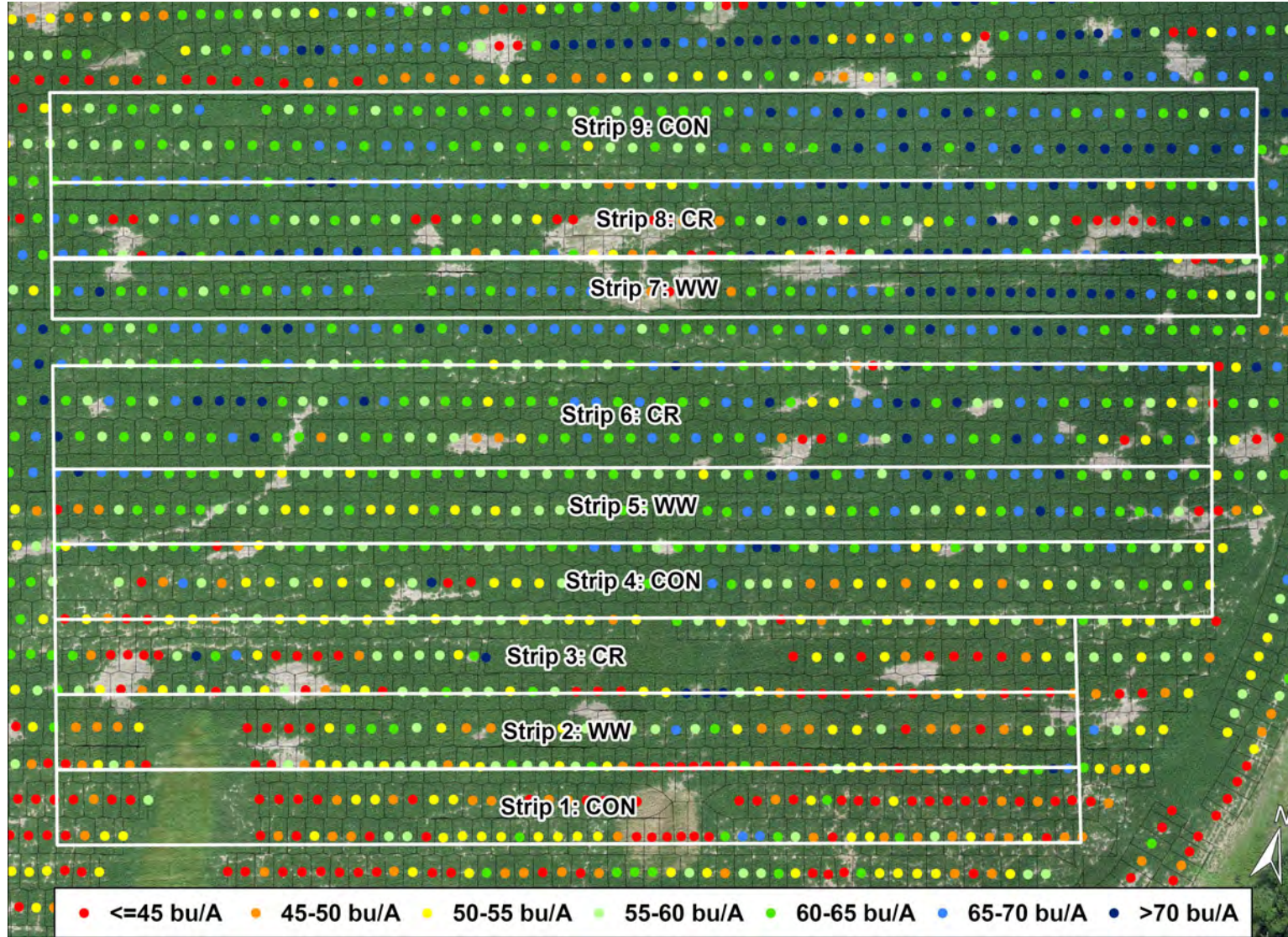
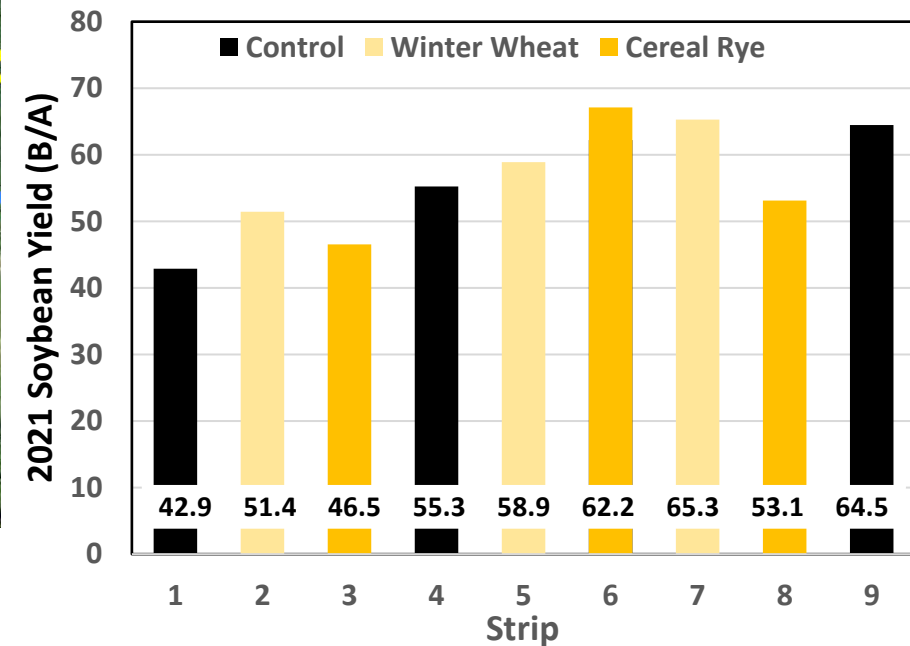


Figure 1. Yield for soybeans in 2021. Data from passes fully in treatment strips. Imagery from 100 meters on August 5, 2021.

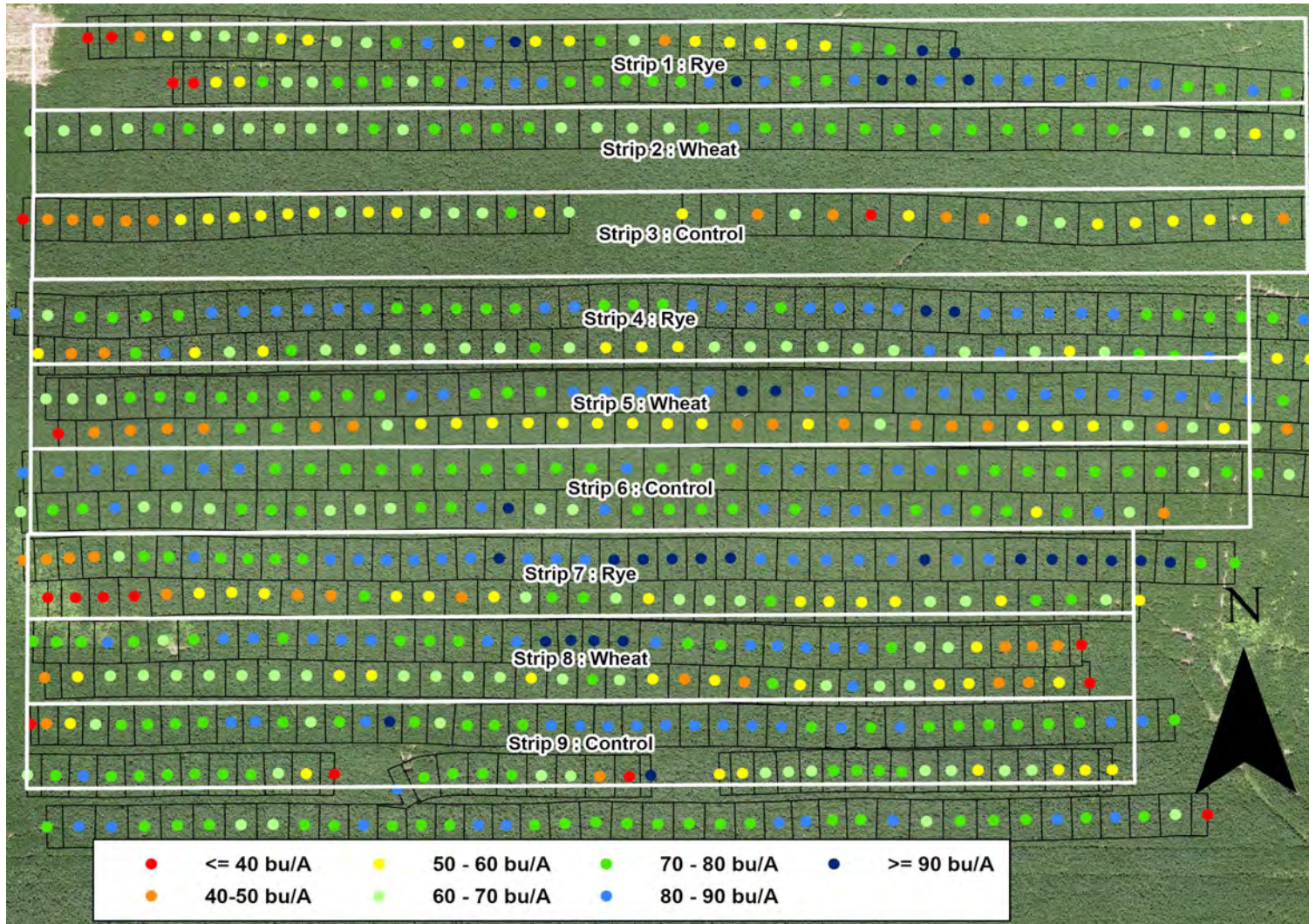
Cover Crop	Yield (SD)	Delta No Cover
	<i>bushels per acre</i>	
All strips	55.6 (7.9)	--
No Cover Control	54.2 (10.8)	--
Cereal Rye	53.9 (7.8)	-0.3
Winter Wheat	58.5 (7.0)	4.3



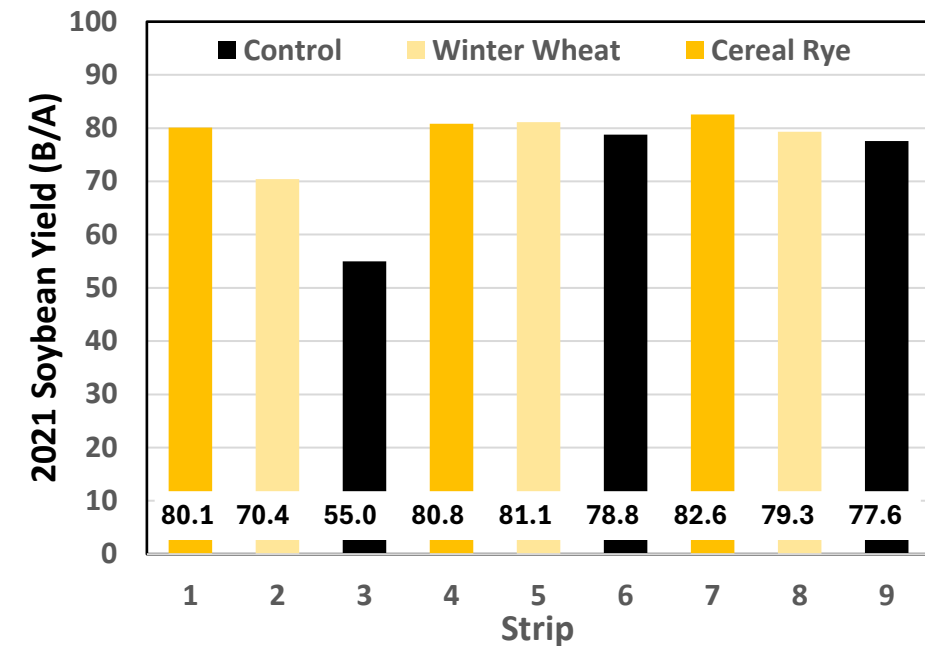
9: Scotland County Cover Crop Comparison

C004

Year 5 (2021)
Soybean Yield



Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	76.2 (8.7)	-
No Cover Crop	70.5 (13.5)	-
Cereal Rye	81.2 (1.3)	10.7
Winter Wheat	76.9 (5.7)	6.4



Yield for soybean in 2021. Imagery from 100 meters on August 13th , 2021.

10: Scotland County

Cover Crop Comparison

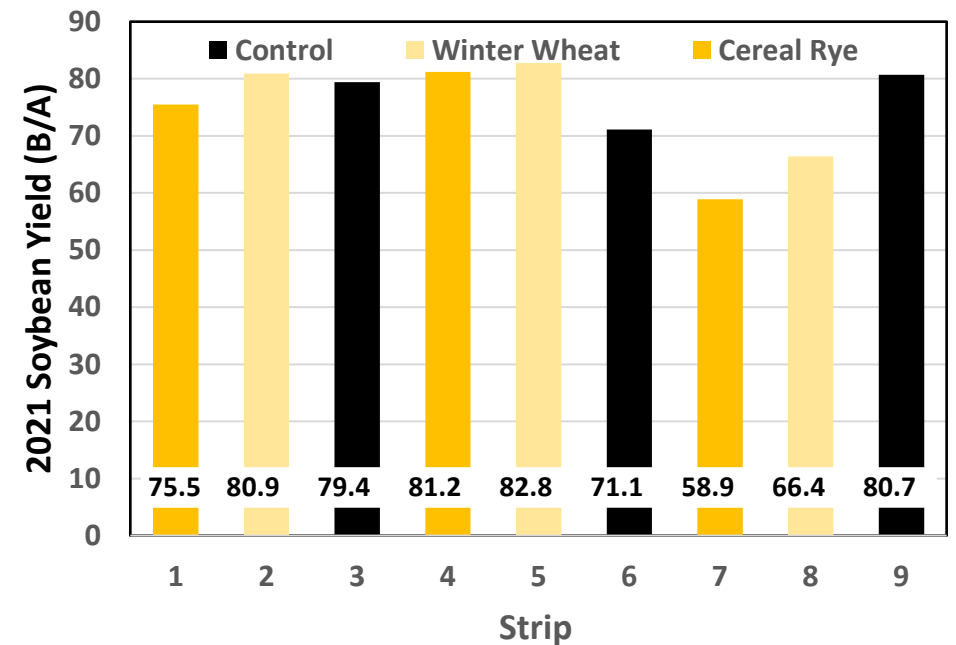
C005

Year 5 (2021)
Soybean Yield

Yield for soybean in 2021. Data from passes fully in treatment strips. Imagery from 100 meters on August 13th, 2021.



Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	75.2 (8.2)	-
No Cover Crop	77.1 (5.2)	-
Cereal Rye	71.9 (11.6)	-5.2
Winter Wheat	76.7 (9.0)	-0.4

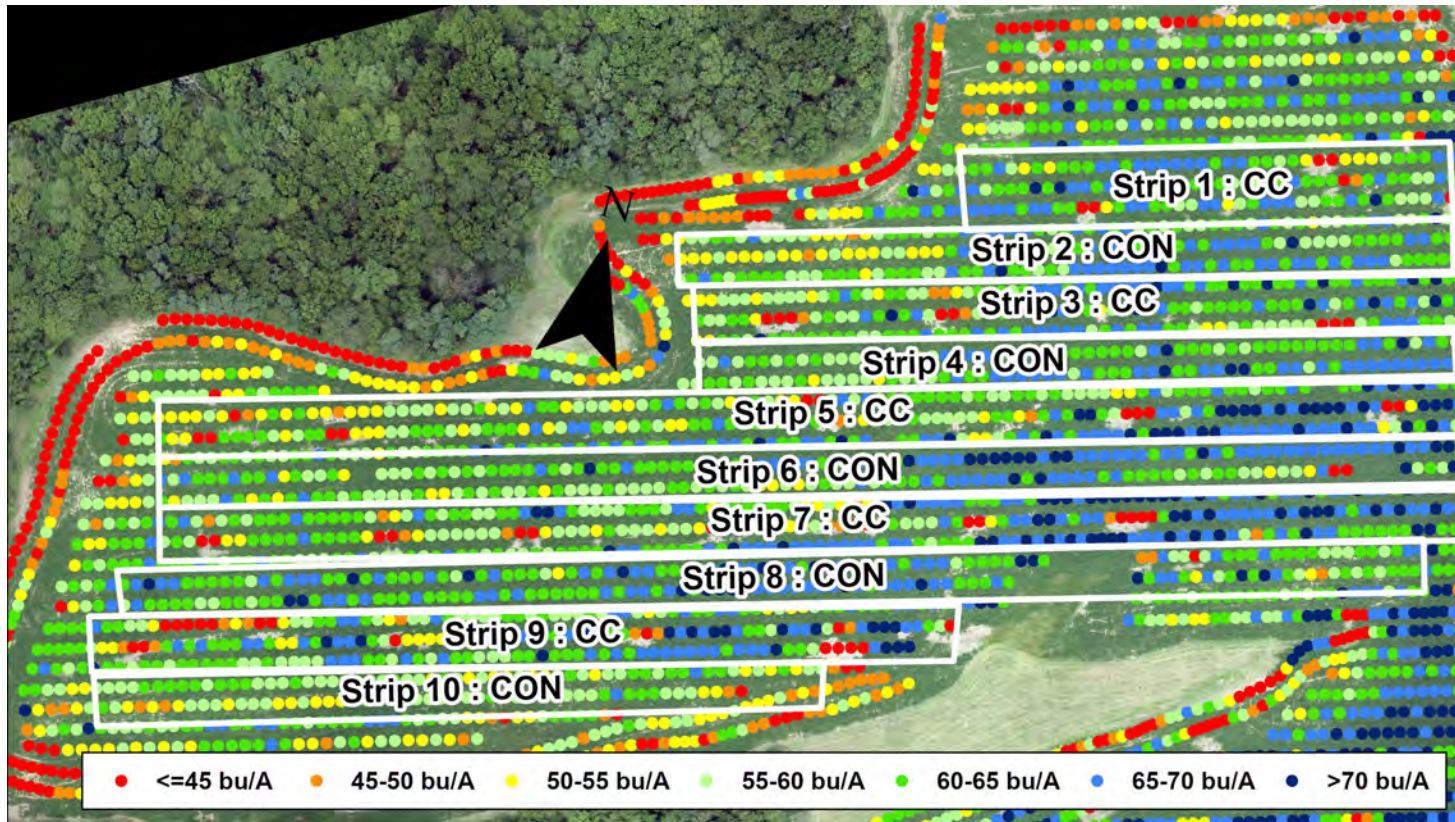


11: Lincoln County

Cover Crop Comparison

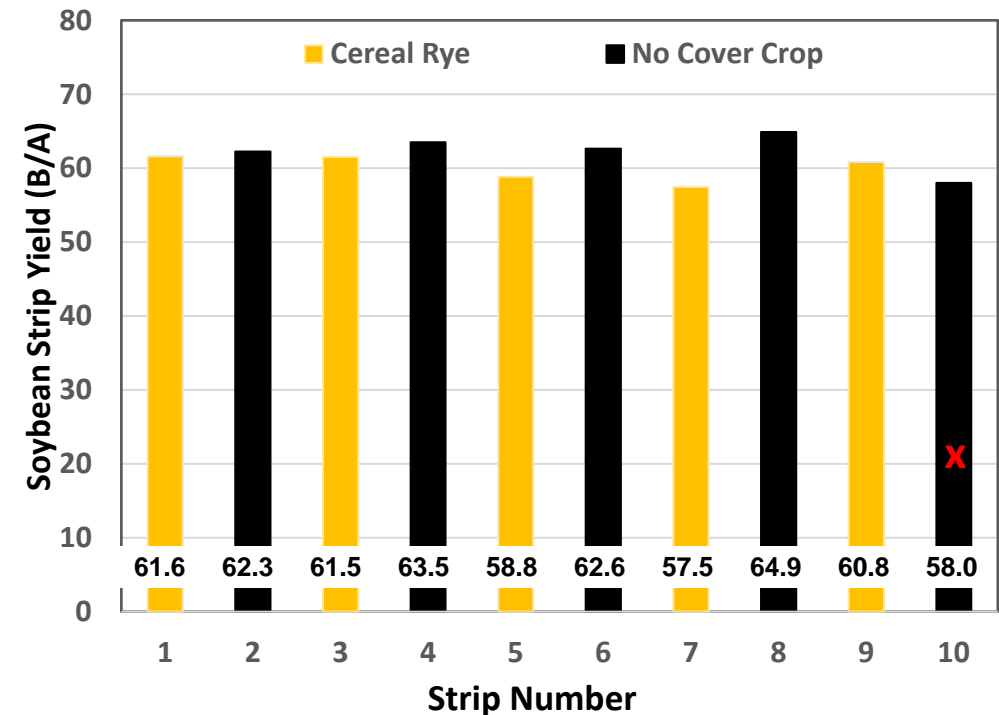
C101

Year 1 (2021)
Soybean Yield



Soybean yield map and areas used for yield determination. Field harvested October 21, 2021. Aerial image was taken at 100 meters on August 5, 2021.

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
All strips	61.2 (2.4)	-
No Cover Crop	62.3 (2.6)	-
Cereal Rye	60.0 (1.8)	-3.3

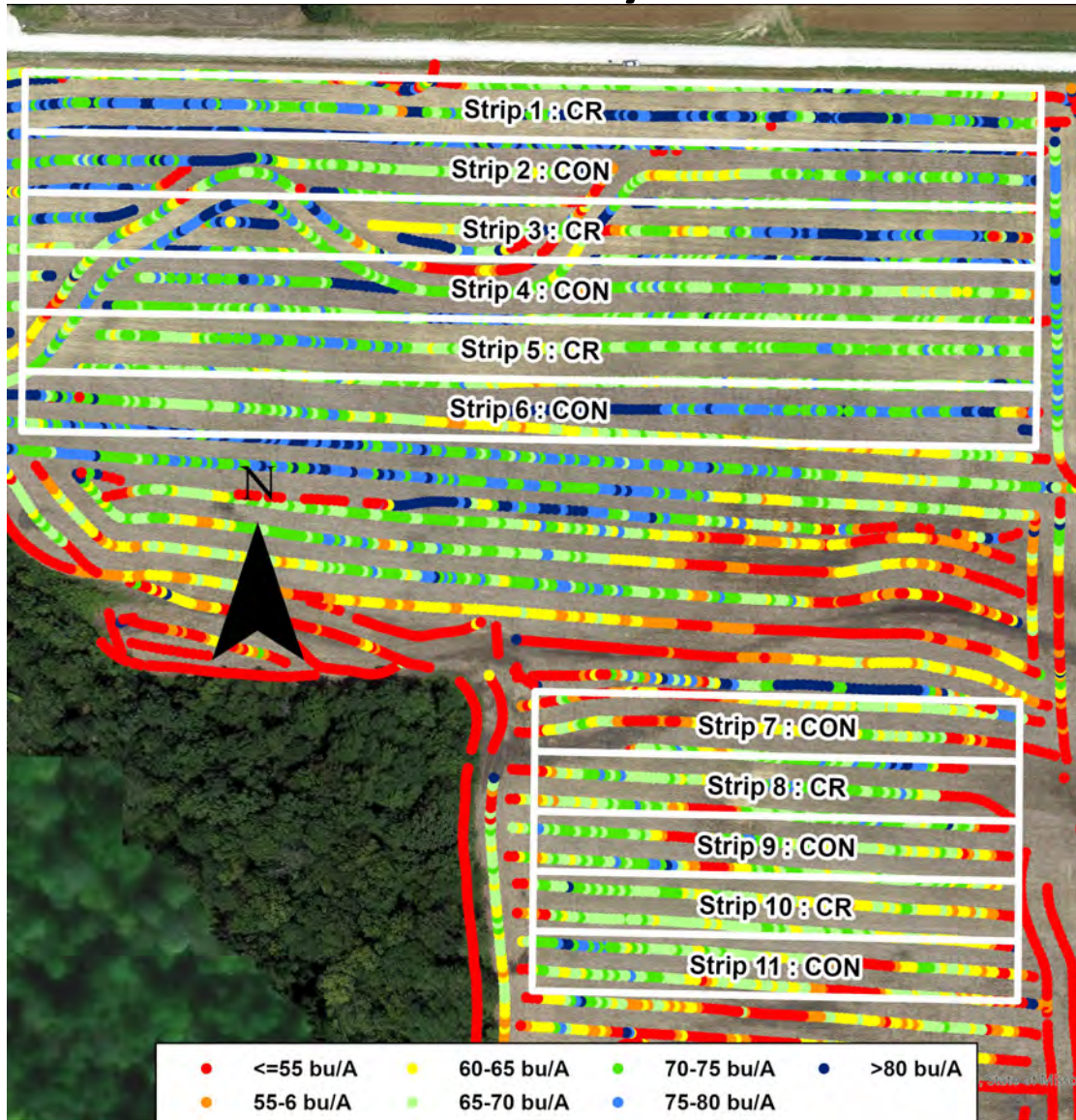


12: Lincoln County

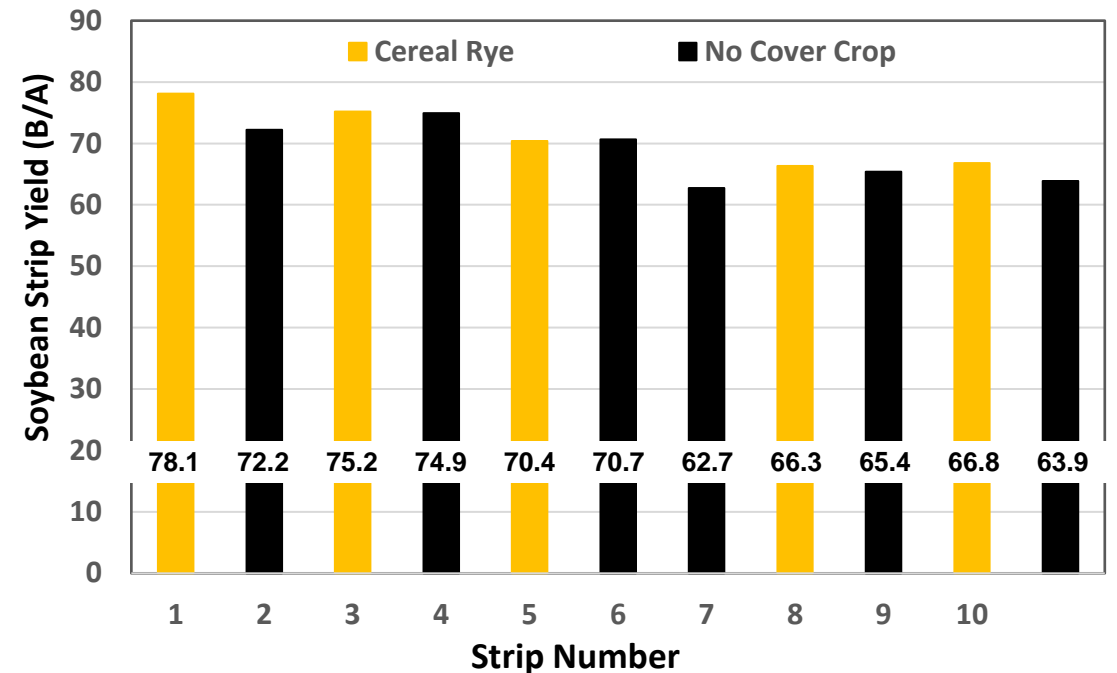
Cover Crop Comparison

C102

Year 1 (2021)
Soybean Yield



Cover Crop	Site 1	
	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
All strips	69.7 (5.1)	-
No Cover Crop	68.3 (5.0)	-
Cereal Rye	71.3 (5.2)	3.0



Soybean yield map and areas used for yield determination. Field harvested September 30th, 2021. Aerial image was taken at 100 meters on June 22nd, 2021.

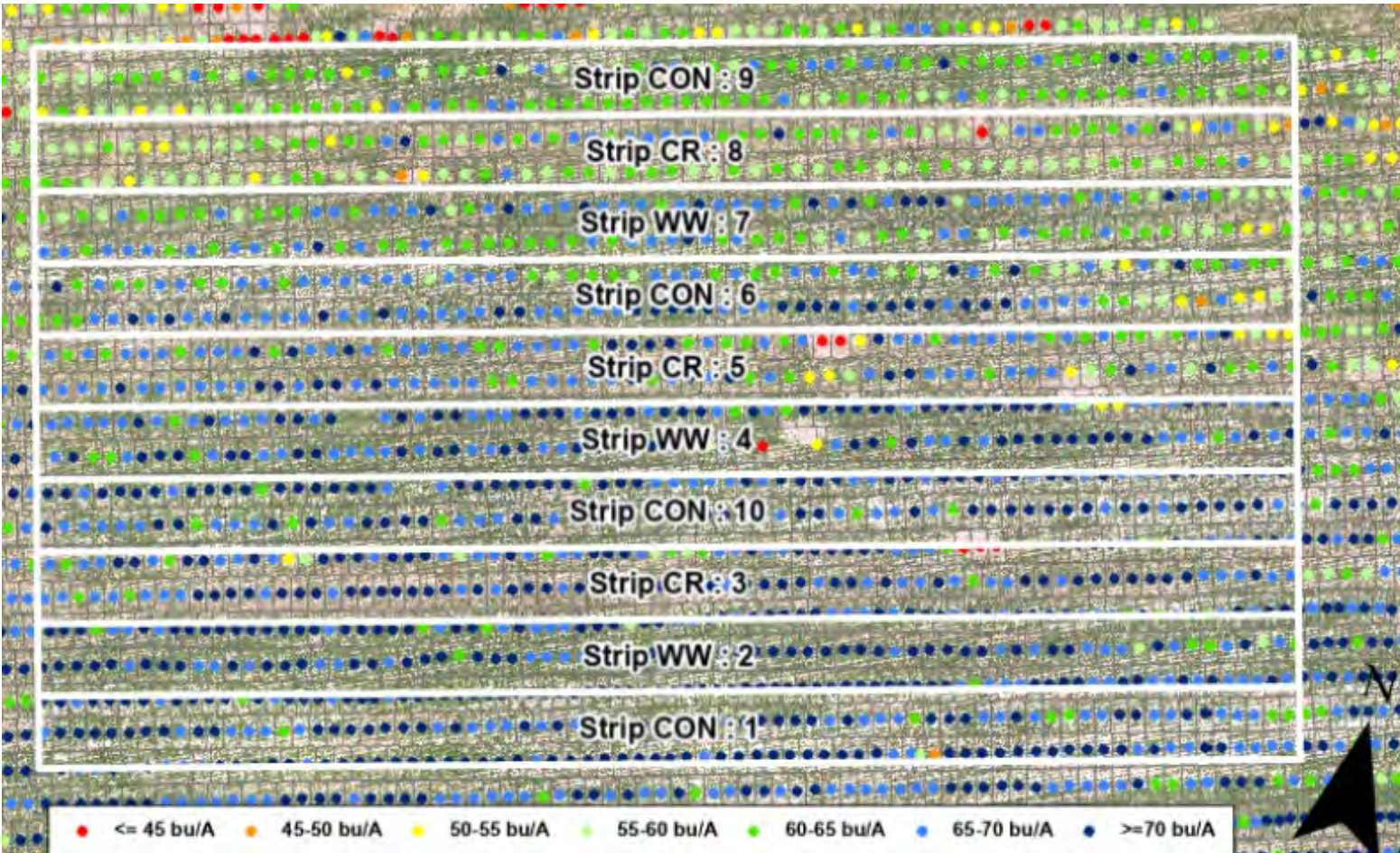
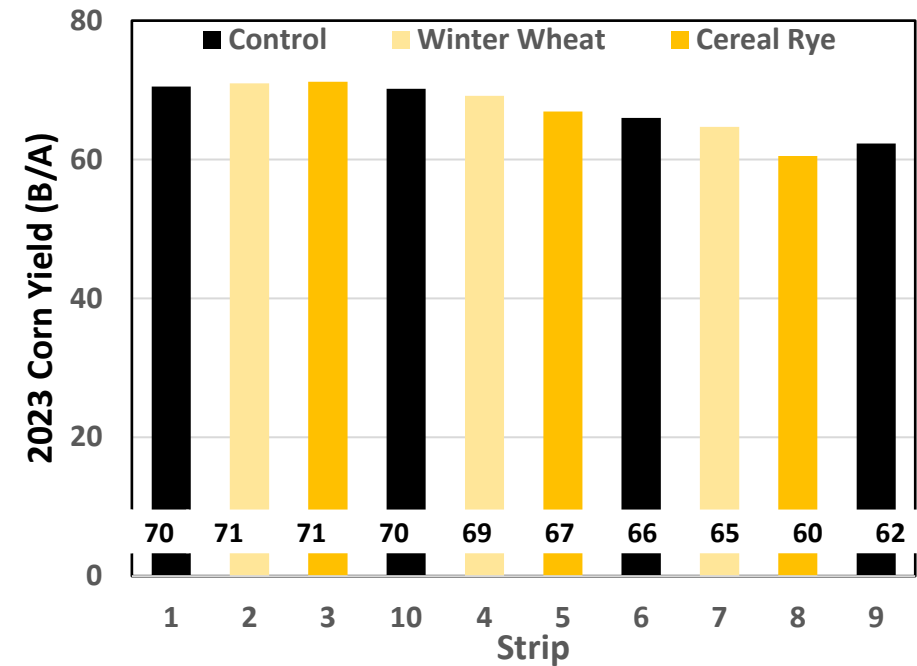
13: Lincoln County

Cover Crop Comparison

C001

Year 8 (2023)
Soybean Yield

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	67.3 (3.8)	-
No Cover Crop	68.7 (2.7)	-
Cereal Rye	66.5 (4.5)	-2.2
Winter Wheat	66.1 (5.2)	-2.6



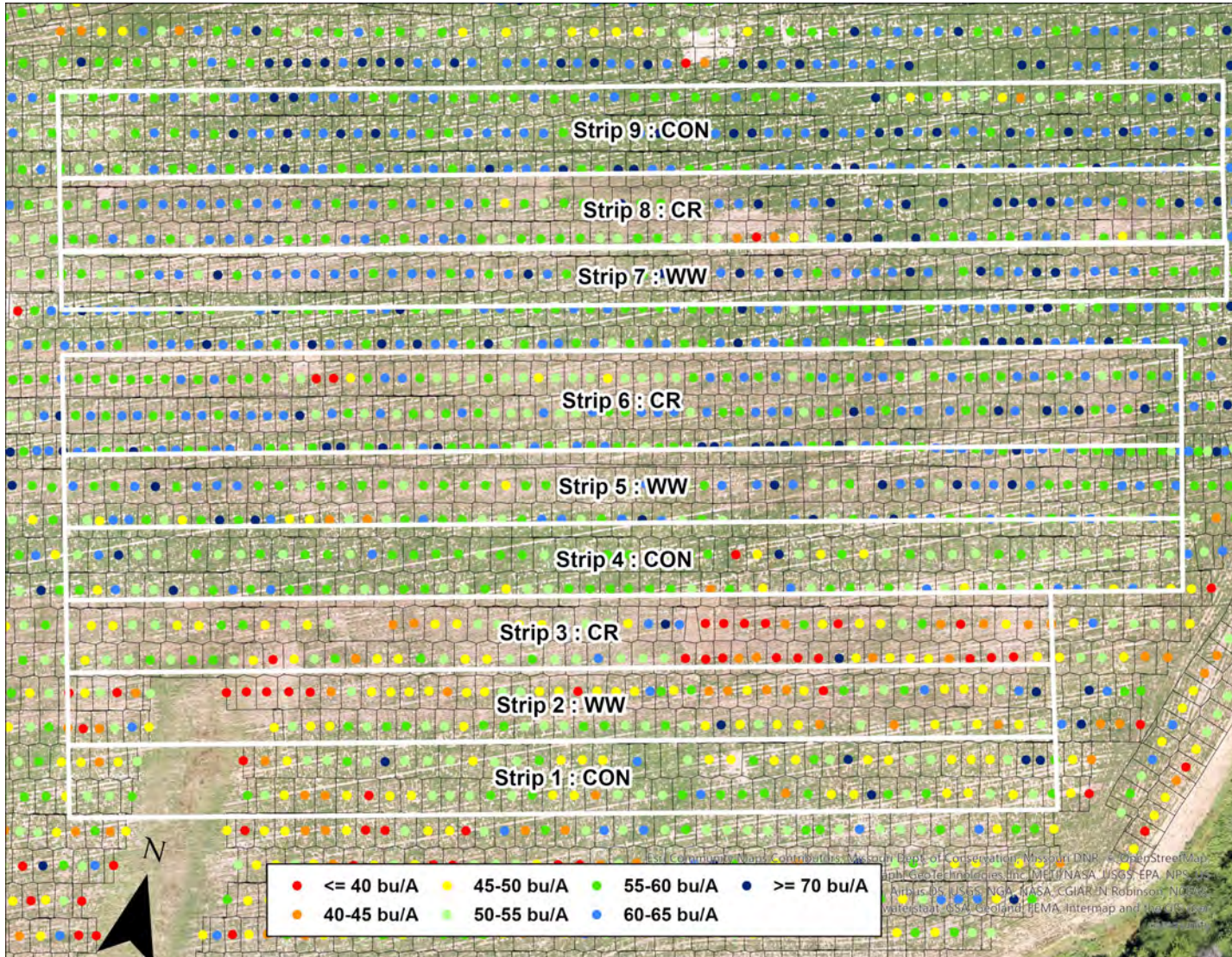
Yield for soybean in 2023. Data from passes fully in treatment strips. Imagery from 100 meters on July 17, 2023.

14: Lincoln County

Cover Crop Comparison

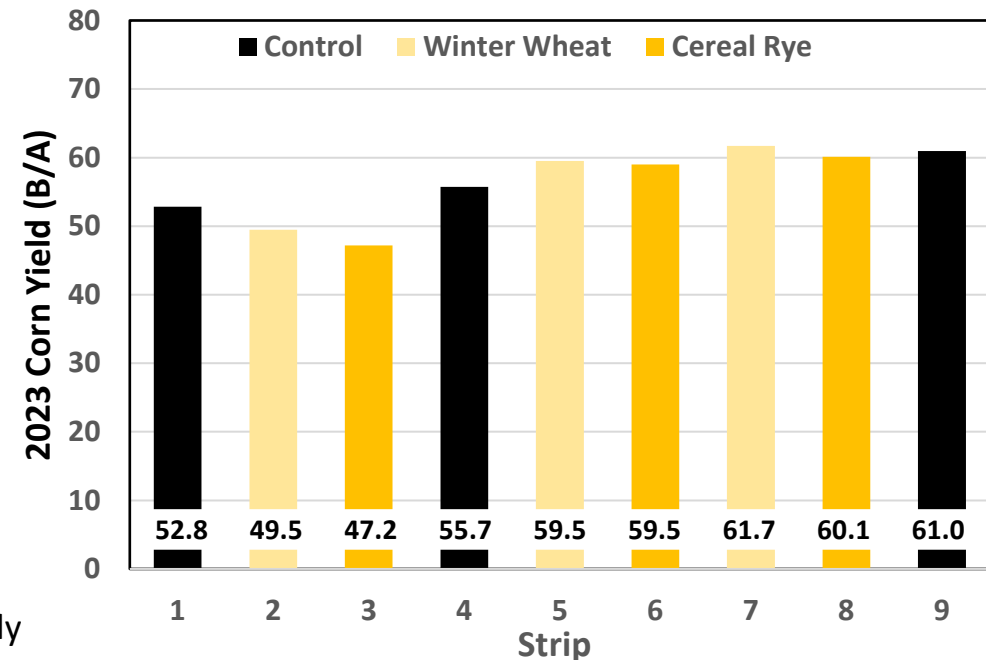
C002

Year 8 (2023)
Soybean Yield



Yield for corn in 2023. Data from passes fully in treatment strips. Imagery from 100 meters on July 17, 2023.

Cover Crop	Yield (SD)	Delta No Cover
	<i>bushels per acre</i>	
All strips	56.3 (5.3)	--
No Cover Control	56.5 (4.2)	--
Cereal Rye	55.4 (7.2)	-1.1
Winter Wheat	56.9 (6.5)	0.4

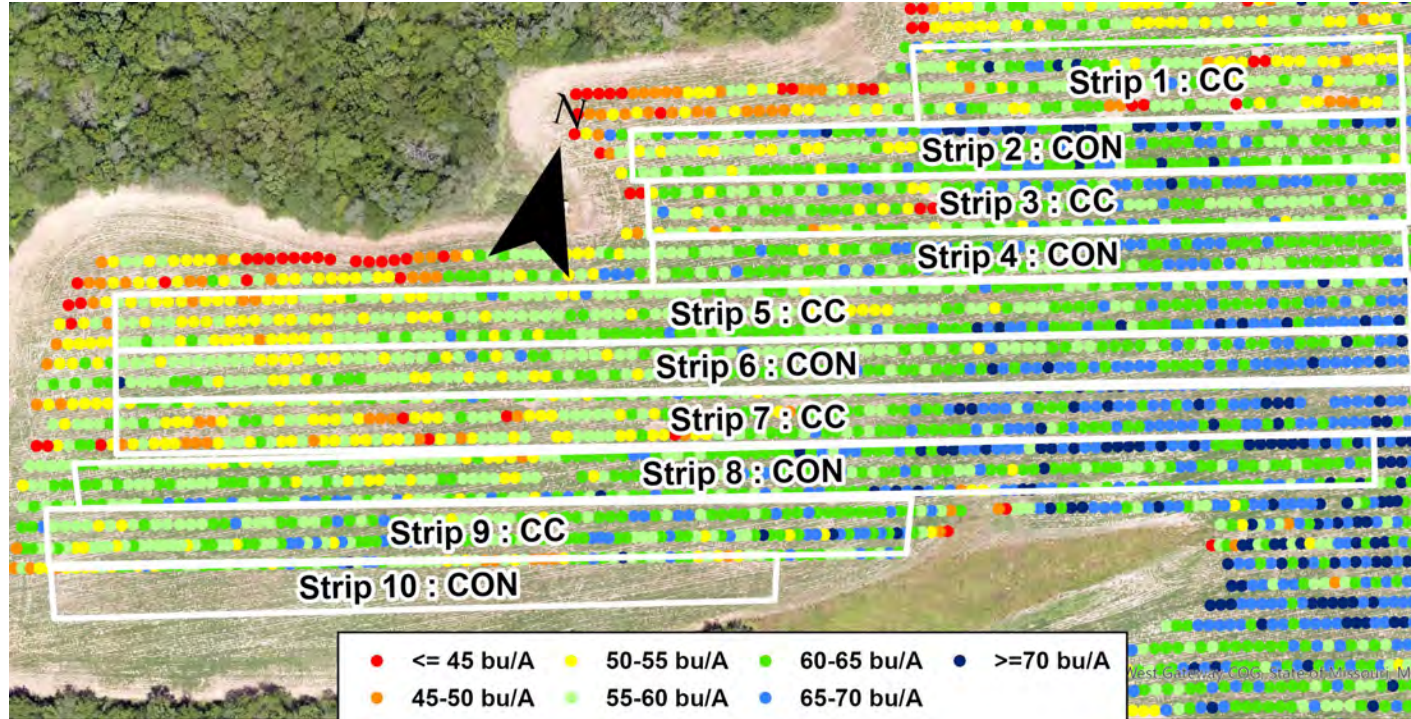


15: Lincoln County

Cover Crop Comparison

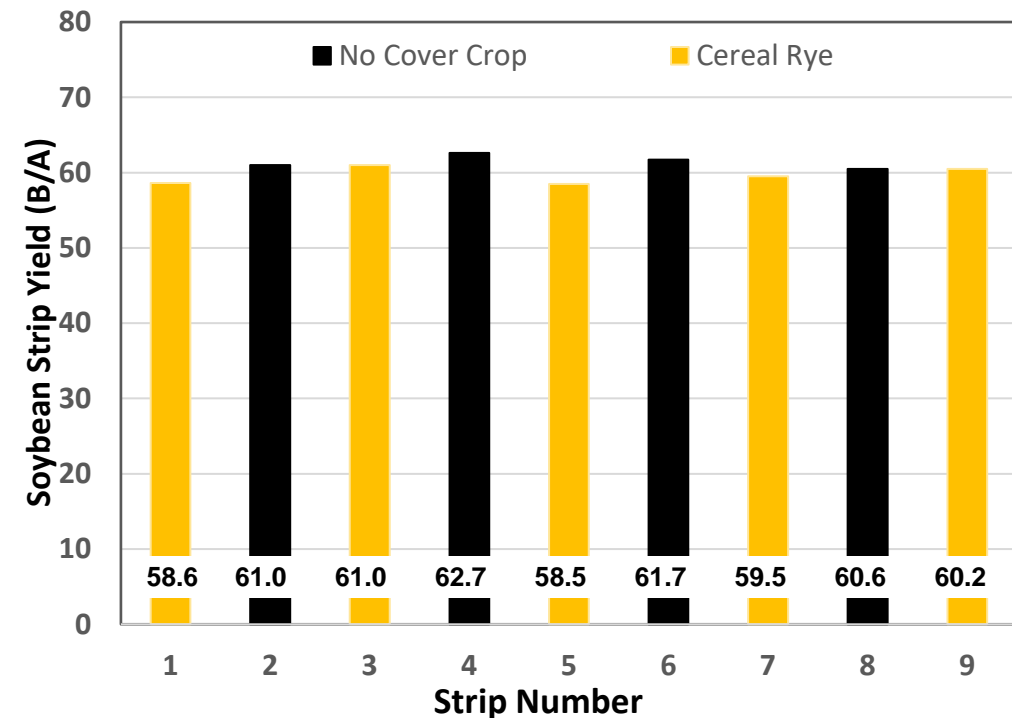
C101

Year 3 (2023)
Soybean Yield

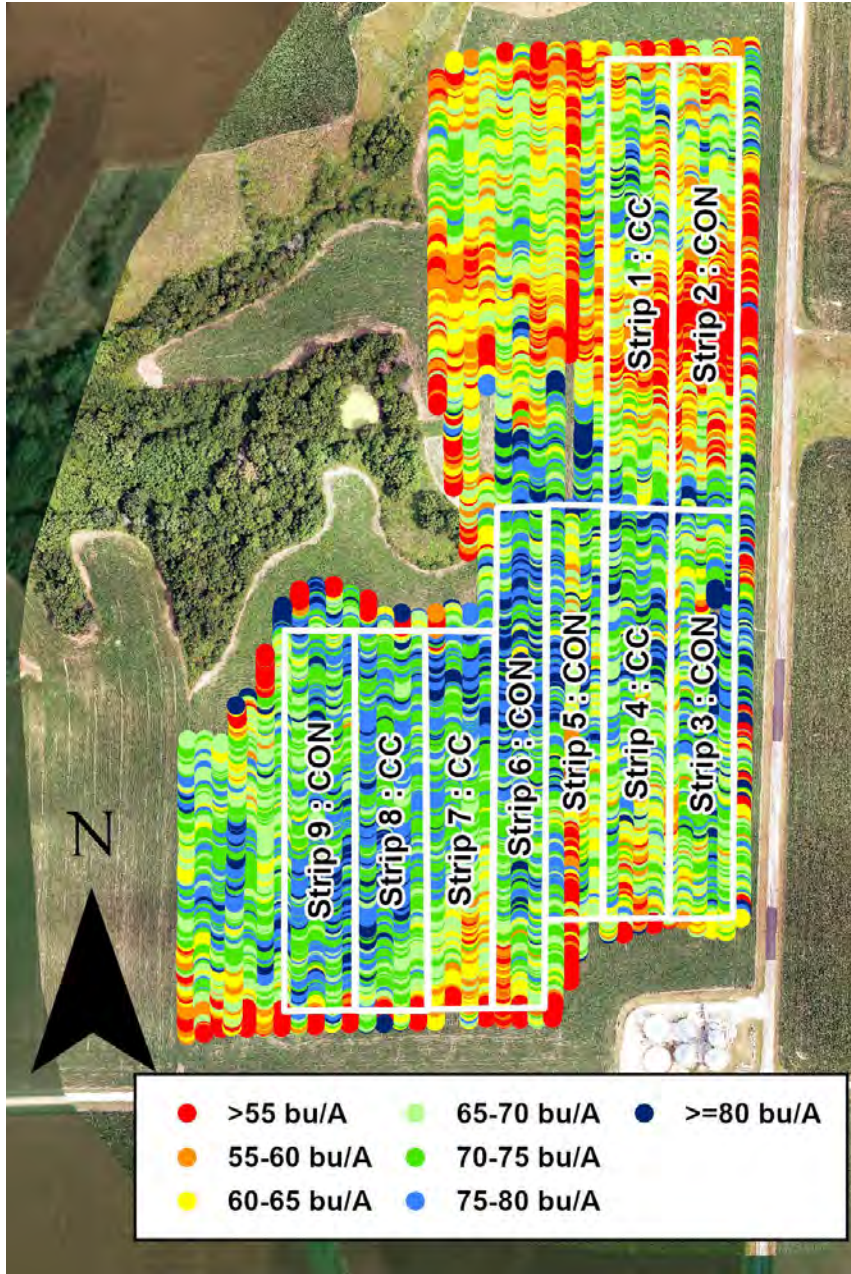


Soybean yield map and areas used for yield determination. Field harvested October 12, 2023. Aerial image was taken at 100 meters on July 17, 2023.

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
All strips	60.4 (1.4)	-
No Cover Crop	61.5 (0.9)	-
Cover Crop	59.5 (1.0)	-2.0



16: Shelby County



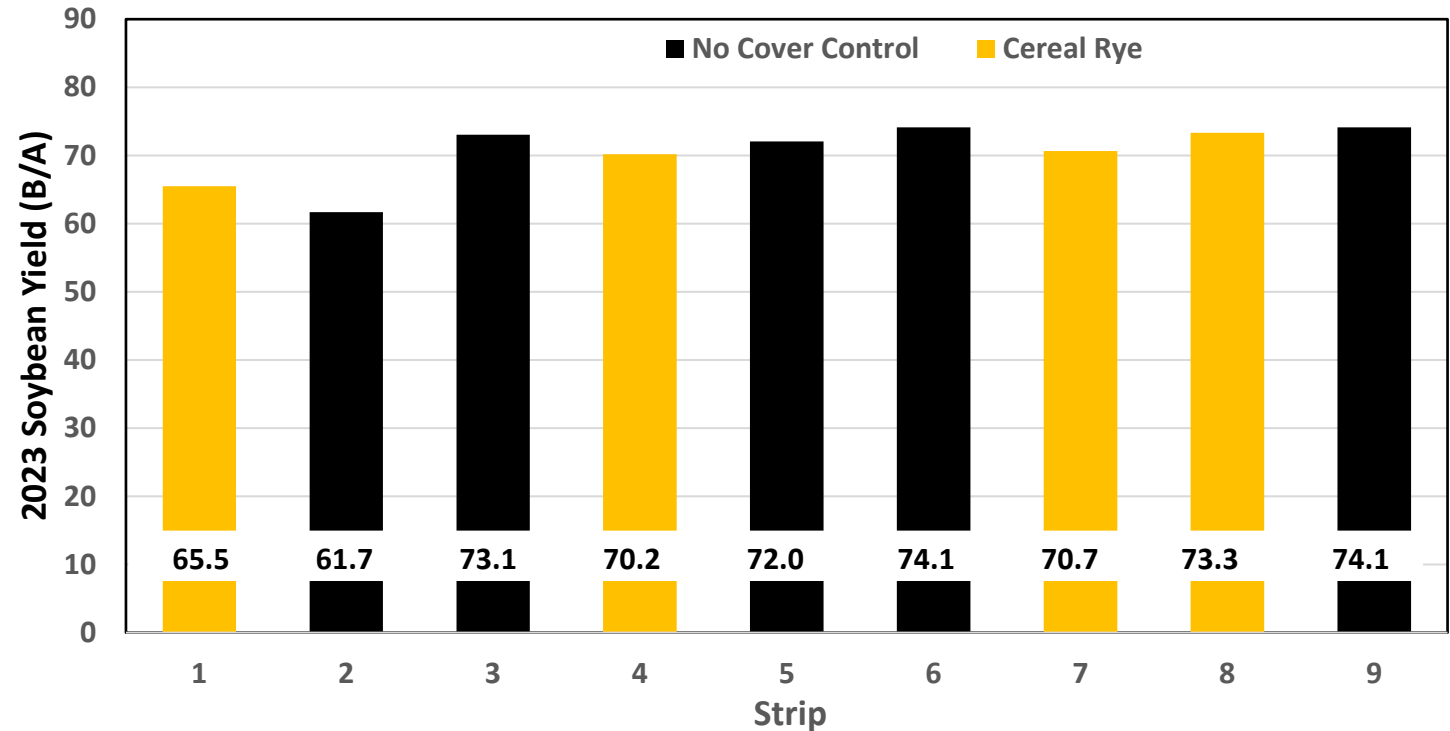
Yield for soybean in 2023. Imagery from 100 meters on July 6th, 2023.

Cover Crop Comparison

C010

Year 8 (2023)
Soybean Yield

Cover Crop	Yield (STD)	Delta No Cover
	<i>bushels per acre</i>	
Site mean	70.5 (4.3)	-
No Cover Crop	71.0 (5.3)	-
Cover Crop	69.9 (3.2)	-1.1



17: Boone County

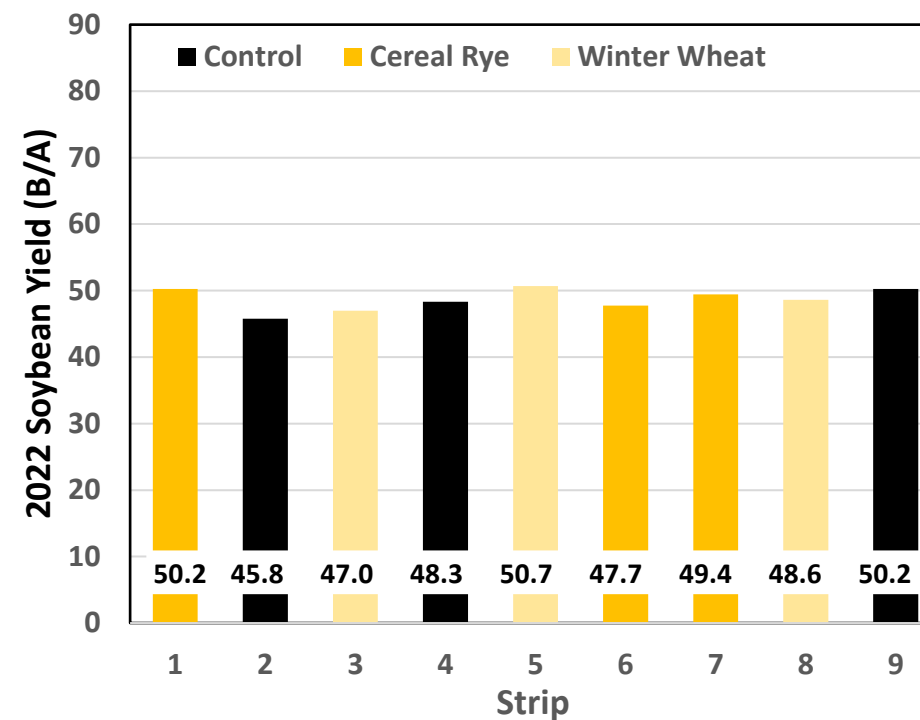
Cover Crop Comparison

C008

Year 8 (2023)
Soybean Yield



Cover Crop	bushels per acre	
Site mean	48.7 (1.6)	-
No Cover Crop	48.8 (1.2)	-
Cereal Rye	48.5 (1.6)	-0.3
Winter Wheat	48.6 (2.5)	-0.2



Yield for corn from weigh wagon in 2023. Data from passes fully in treatment strips. Imagery from 100 meters on July 25th, 2023 .