

# Soybean Planting Date and Interaction with Cover Crop Termination Timing

Laura Lindsey  
Indiana CCA Conference  
December 14, 2022



THE OHIO STATE UNIVERSITY  
COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES

1

**CFAES**

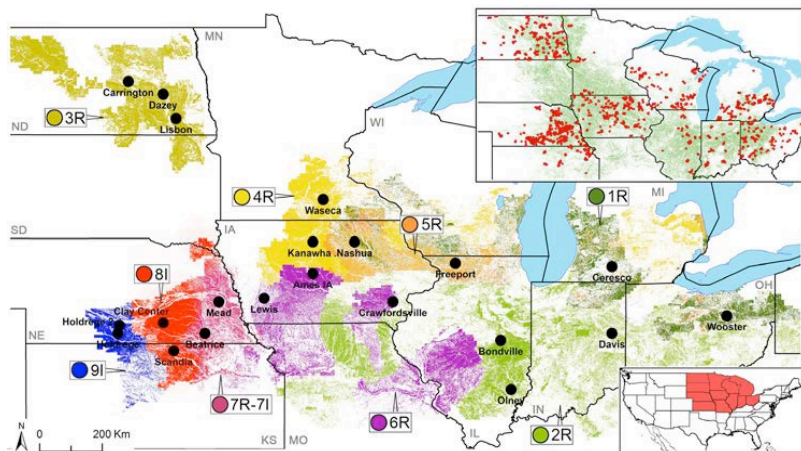
## NEW PROJECT FOR 2023

- What should you plant first? Corn or Soybean?

THE OHIO STATE UNIVERSITY COLLEGE OF FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

2

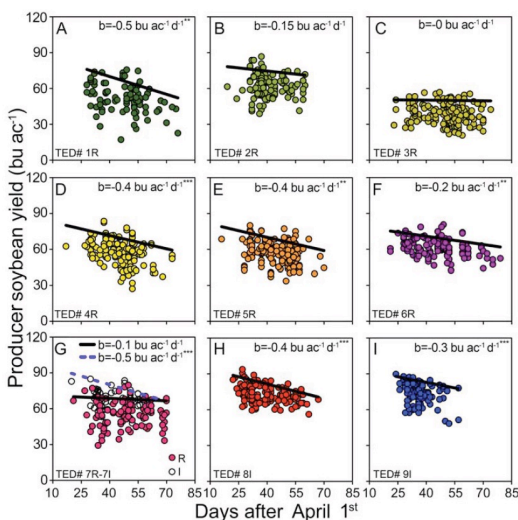
**[Redacted]** is #1 Management Factor that Influences Yield



Rattalino Edreira et al., 2017

3

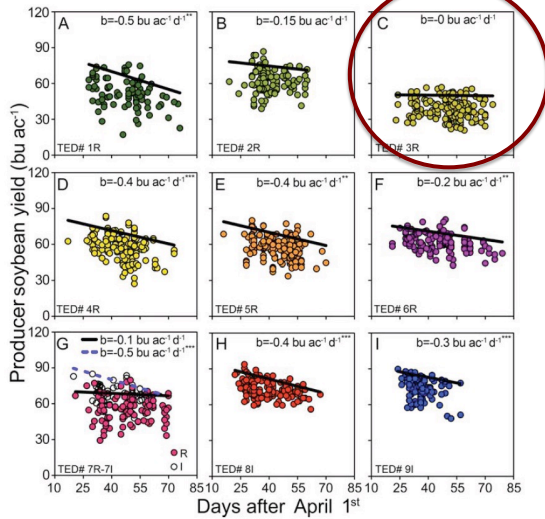
**Soybean Planting Date** is #1 Management Factor that Influences Yield



Rattalino Edreira et al., 2017

4

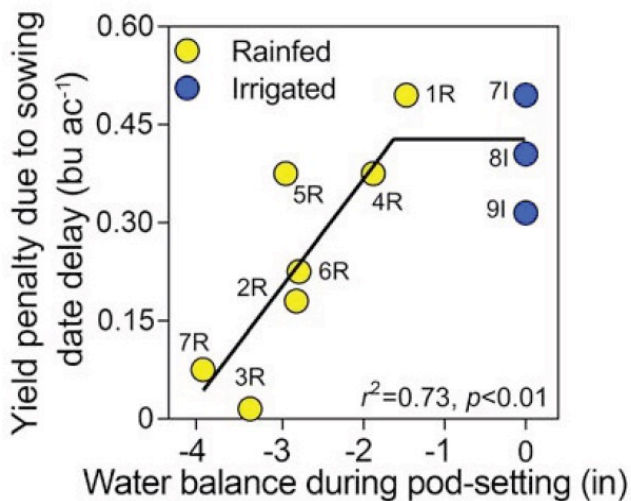
### Soybean Planting Date is #1 Management Factor that Influences Yield



Rattalino Edreira et al., 2017

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

5

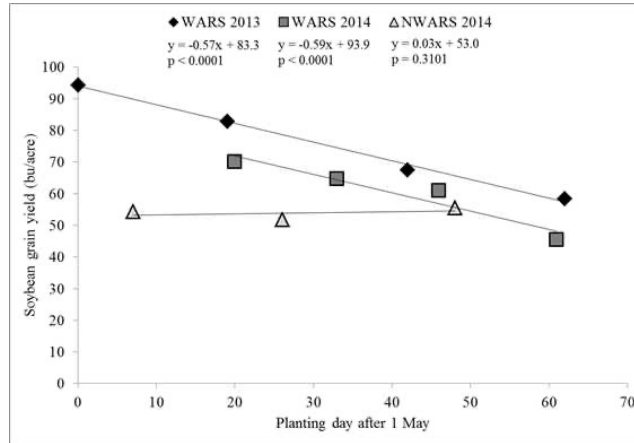


Rattalino Edreira et al., 2017

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

6

## Soybean Planting Date is #1 Management Factor that Influences Yield



Hankinson et al., 2015

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

7

## How early is too early?

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

8

# How early is too early?

...If I wait, will I be planting in June?



CFAES



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

11

CFAES



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

12

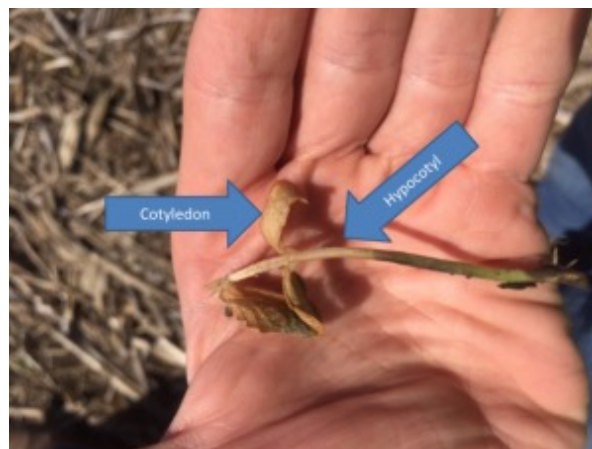


**CFAES****Imbibitional Chilling**

- Imbibition...First 'drink'
  - With adequate soil moisture, usually 24-48 hr after planting
- Water <50°F referred to as imbibitional chilling

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

13

**CFAES****Freeze Damage**

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

14

## CFAES

## 2021 & 2022 Planting Date x Cover Crop Study

- Target planting dates
  - Ultra Early: First week of April
  - Early: Last week of April
  - Normal: Mid-May

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

15

## CFAES

## Planting Date x Cover Crop Study

- Cover crop treatments
  - None
  - Rye terminated early (planting into a dead cover crop)
  - Rye terminated late ('planted green')



No cover crop present.



Rye cover crop terminated early.



Soybeans planted green into a living rye cover crop.

OOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

16



**CFAES**

## Planting Date x Cover Crop Study

The map shows the state of Ohio divided into its 88 counties. Two red arrows originate from the left side of the map. One arrow points to the location of Wooster, which is situated in the northwestern part of the state, near the border of Lucas, Sandusky, and Seneca counties. The other arrow points to the location of South Charleston, which is in the southwestern part of the state, near the border of Adams, Scioto, and Lawrence counties.

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

17

**CFAES**

	2021		2022	
Planting date	Wooster	South Charleston	Wooster	South Charleston
Cover crop	Oct. 14	Oct. 15	Oct. 14	Oct. 14
Ultra early	April 6	April 5	April 5	Mar 30
Early	April 28	April 28	April 30	April 25
Normal	May 26	May 27	May 31	May 31

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

18

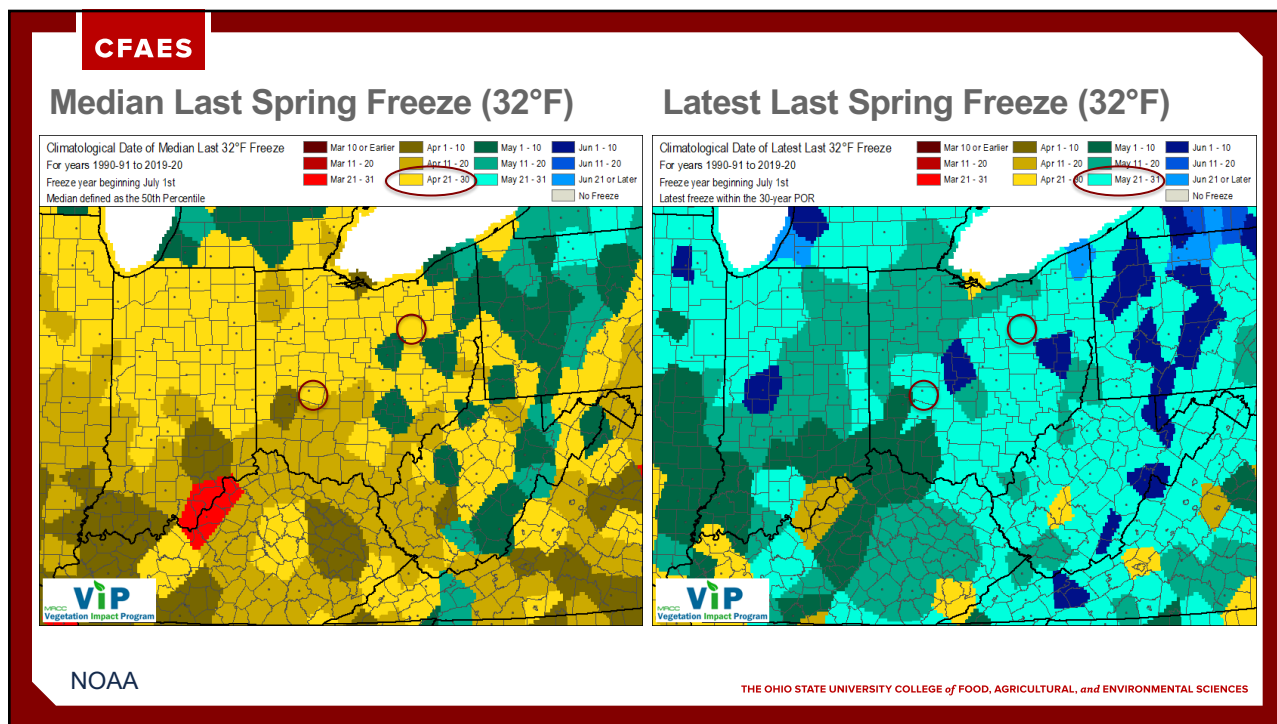
**CFAES**

	2021		2022	
Planting date	Wooster	South Charleston	Wooster	South Charleston
Cover crop	Oct. 14	Oct. 15	Oct. 14	Oct. 14
Ultra early	April 6	April 5	April 5	Mar 30
Early	April 28	April 28	April 30	April 25
Normal	May 26	May 27	May 31	May 31

Wooster- Earliest planting date: April 24  
 South Charleston- Earliest planting date: April 20

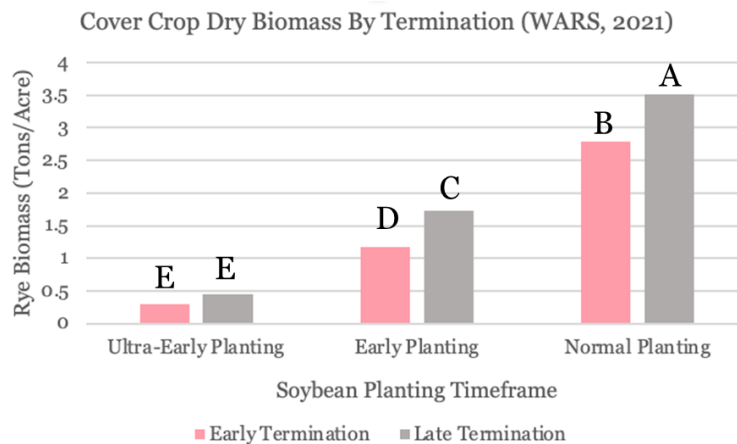
THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

19



20

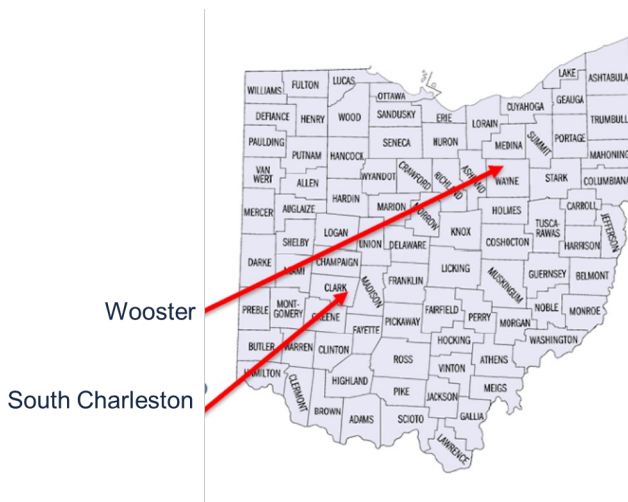
### Cover Crop Biomass



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

21

### Northeast Ohio Results....



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

22

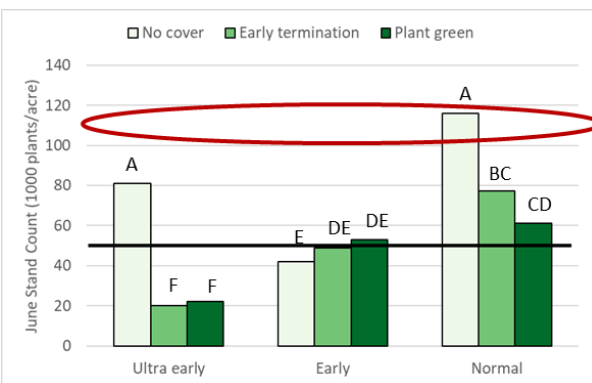
### Early-Season Check-In: 2021 Wooster OH



Photo taken on May 13 of soybeans planted on April 6 in Wooster.

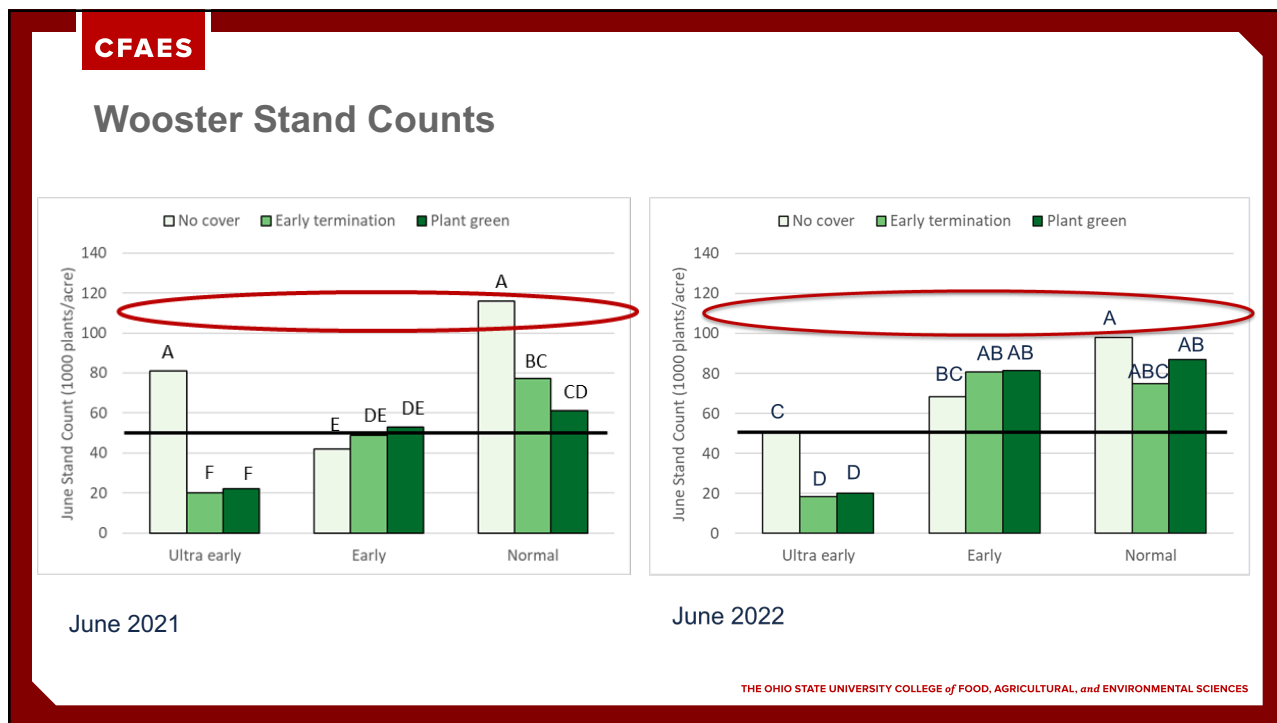
23

### Wooster Stand Counts

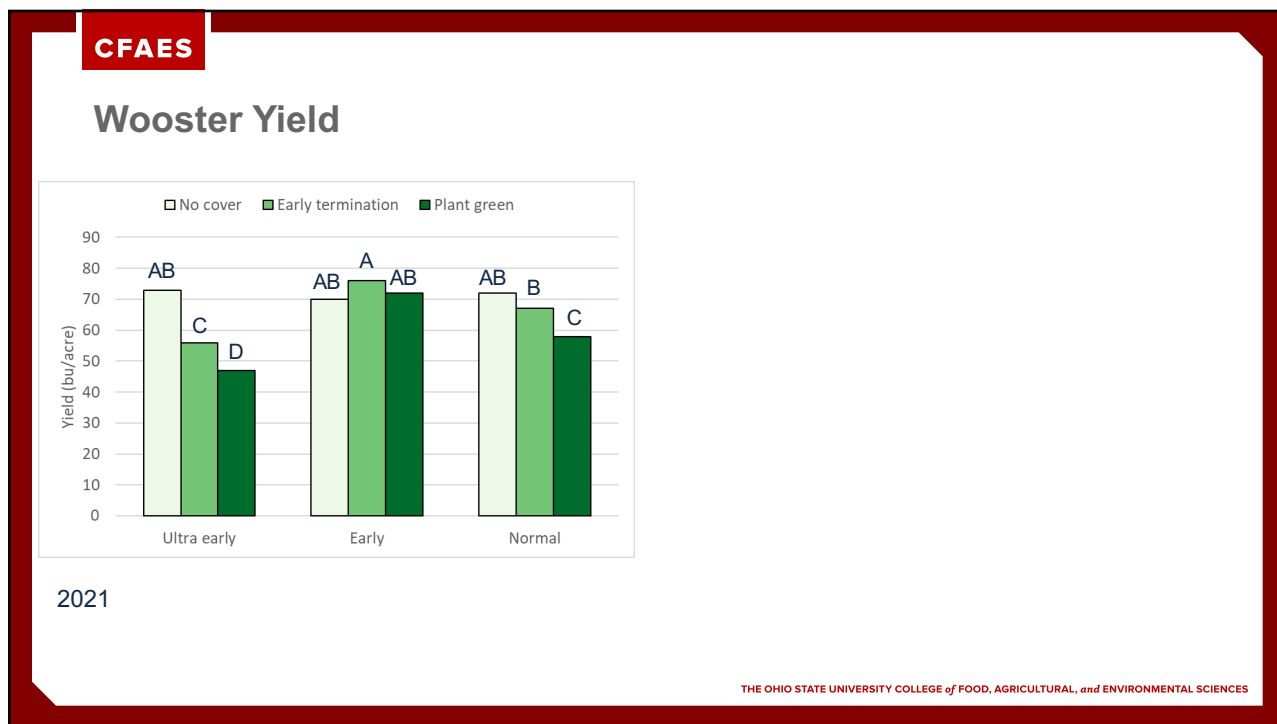


June 2021

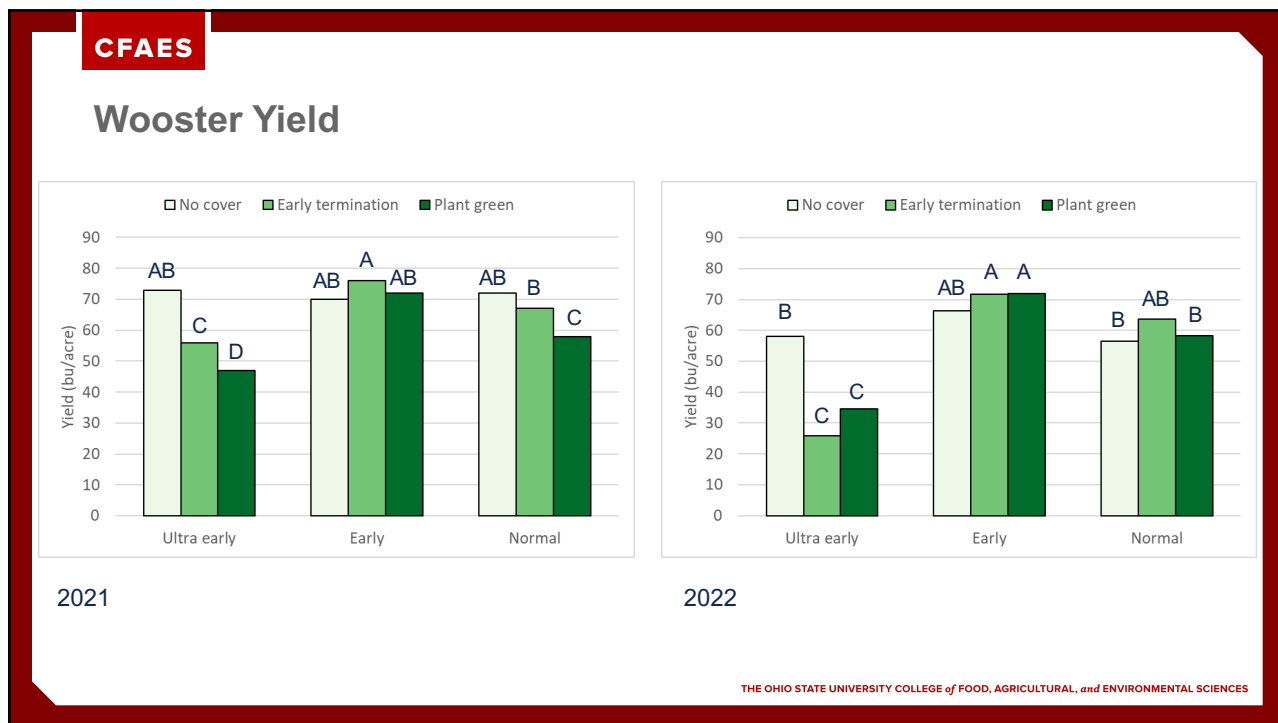
24



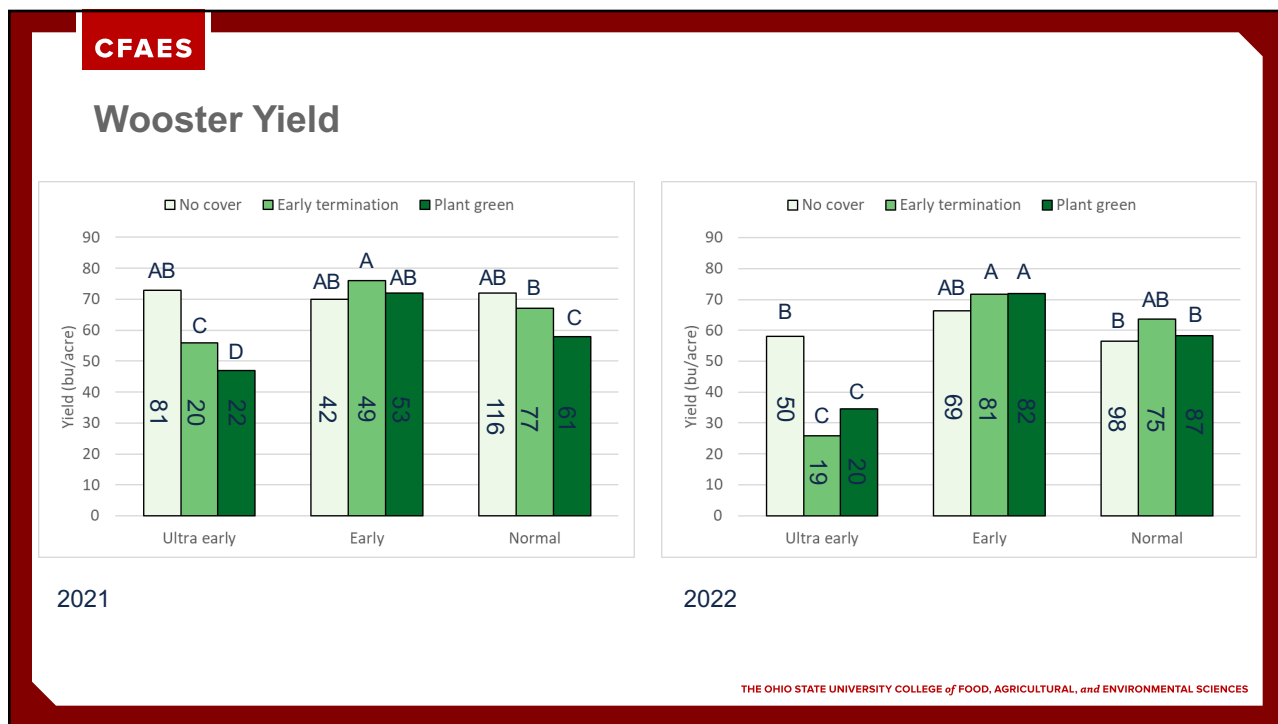
25



26



27



28



### West Central Ohio Results....



### South Charleston July Check-In- 2021



**CFAES**

## South Charleston September Check-In- 2021

Prior to Harvest (September 9<sup>th</sup>, 2021)

	No Cover Crop	Early Termination	Planted Green
Ultra-Early Planting (April 7 <sup>th</sup> )			
Normal Planting (May 27 <sup>th</sup> )			

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

31

**CFAES**

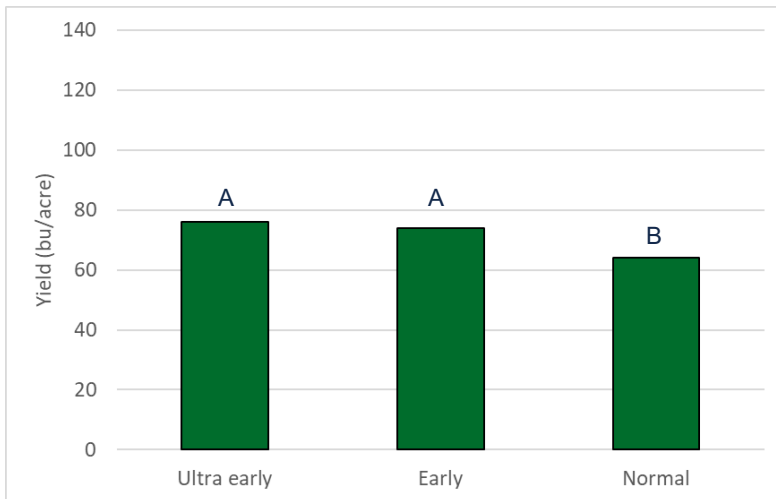
## South Charleston Stand Counts- 2021

Treatment	Stand Count (1000 plants/acre)	Significance Group
Ultra early	~75	B
Early	~65	B
Normal	~105	A
No cover	~90	A
Early termination	~70	B
Planted green	~85	AB

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

32

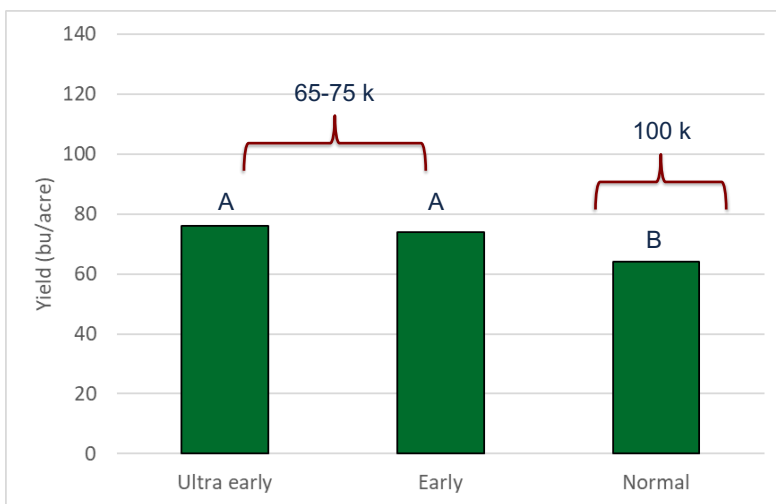
### Yield in South Charleston- Planting Date Effect- 2021



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

33

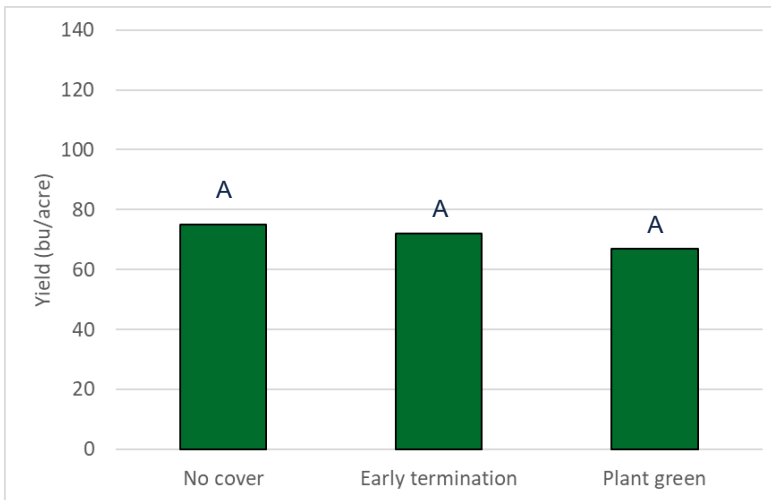
### Yield in South Charleston- Planting Date Effect- 2021



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

34

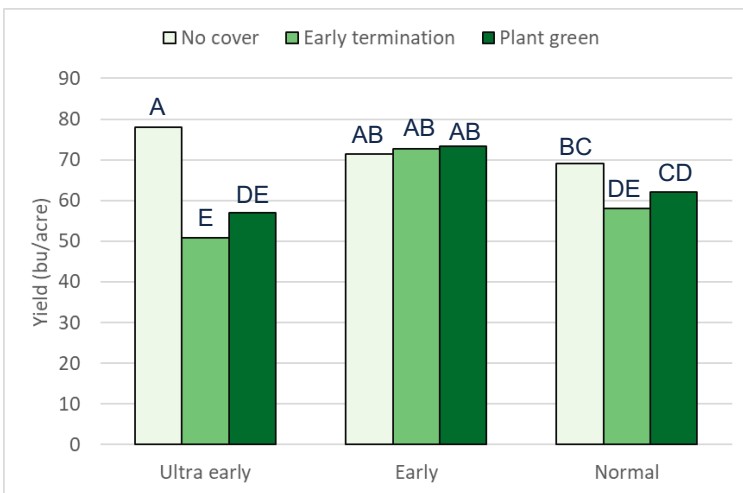
### Yield in South Charleston- Cover Crop Effect- 2021



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

35

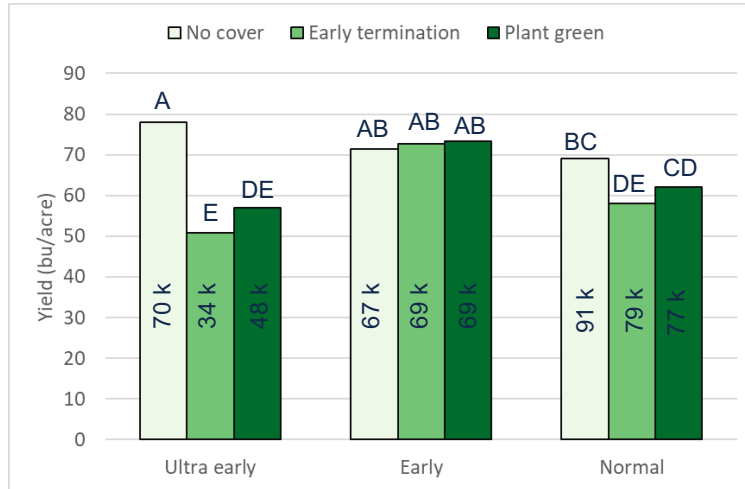
### Yield in South Charleston- 2022



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

36

### Yield in South Charleston- 2022



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

37

### Key Take-Aways...

Soybean stand will likely be lower for ultra early planting, especially with a cover crop.

- 50-70 k without cover crop
- 20-48 k with cover crop

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

38

## CFAES

**Key Take-Aways...**

## Northern Ohio

- Least risky planting date to maximize yield = end of April

## West Central Ohio

- Early April (with no cover crop) or late April ok

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

39

## CFAES

**Key Take-Aways...**

Soybean plants are very good at compensating for low plant population.



Soybean plant with many branches  
at low plant population in Wooster.

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

40



CFAES



Graduate Student: Seth Kannberg

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

41

CFAES

### NEW PROJECT FOR 2023

- What should you plant first? Corn or Soybean?

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

42

CFAES



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

43

CFAES



Subscribe to OSU Extension's Crop Observation and Recommendation Network (CORN) Newsletter



Subscribe to OSU Extension's Ohio State Agronomy YouTube channel



Follow Laura Lindsey (@stepupsoy) and Osler Ortez (@OrtezCornCrops) on Twitter!

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

44

**Percent Soybean Acres Planted- Ohio**

	2022	2021	2019
April	2%	8%	1%
May	54%	76%	10%
June	40%	16%	70%

USDA NASS

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

45

**Percent Soybean Acres Planted in 2022- OH, PA, DE, MD**

	OH	PA	DE	MD
April	2%	1%	3%	1%
May	54%	48%	33%	59%
June	40%	39%	56%	32%

How do you adjust?

USDA NASS

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

46

### What does our 2020 & 2021 small plot data show?

- Wood County and Clark County

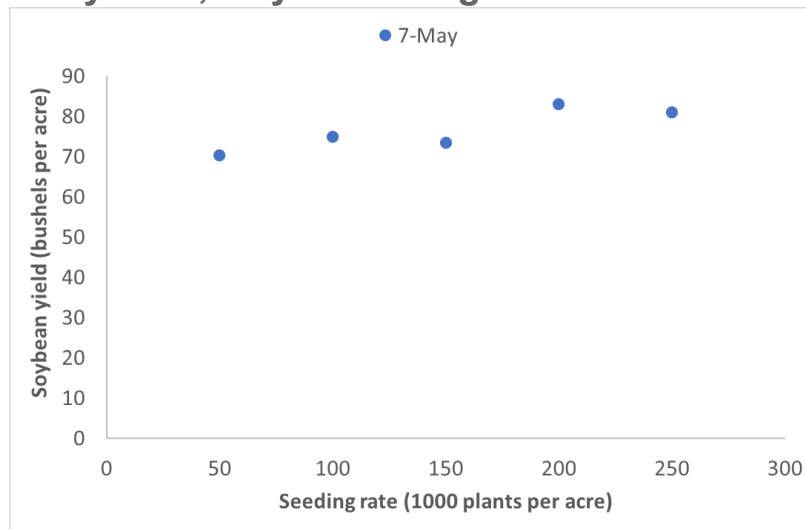
- Four planting dates

Planting Dates	2020		2021	
	Wood	Clark	Wood	Clark
1	April 27	May 7	April 27	April 27
2	May 27	May 22	May 18	May 14
3	June 8	June 12	June 1	June 1
4	June 22	June 22	June 24	June 17

- Five seeding rates  
– 50 k to 250 k

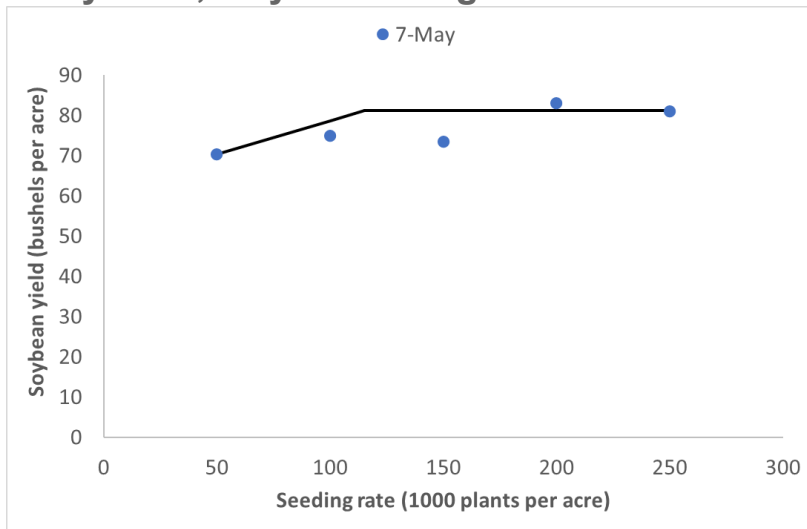
47

### Clark County 2020, May 7 Planting Date



48

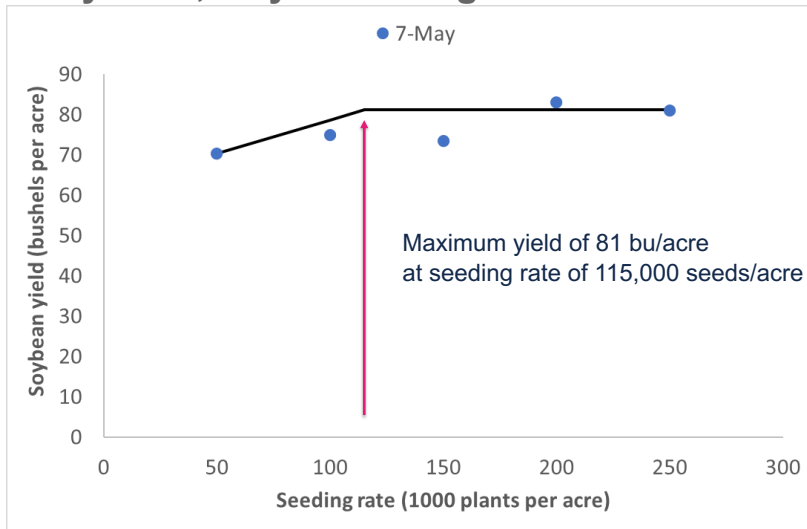
### Clark County 2020, May 7 Planting Date



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

49

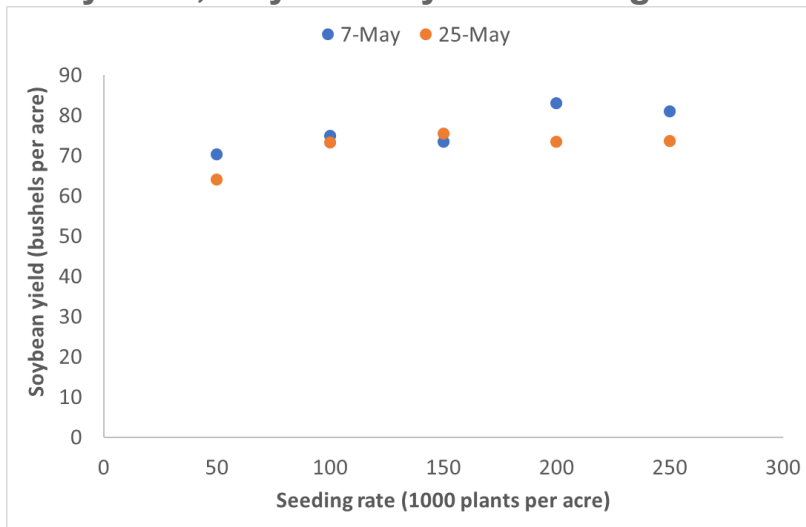
### Clark County 2020, May 7 Planting Date



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

50

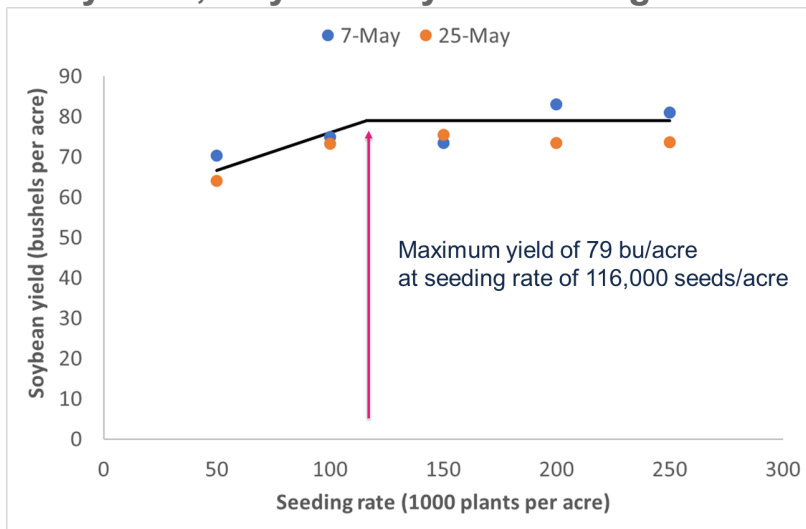
### Clark County 2020, May 7 & May 25 Planting Dates



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

51

### Clark County 2020, May 7 & May 25 Planting Dates



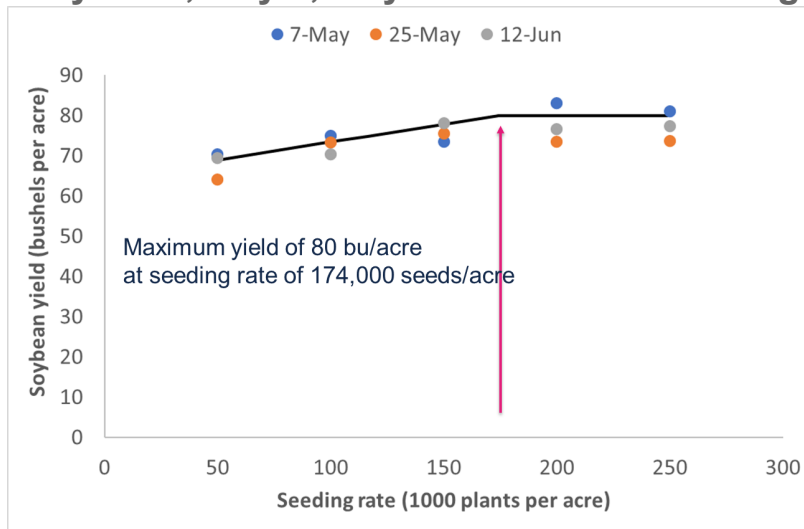
THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

52



CFAES

### Clark County 2020, May 7, May 25 & June 12 Planting Dates

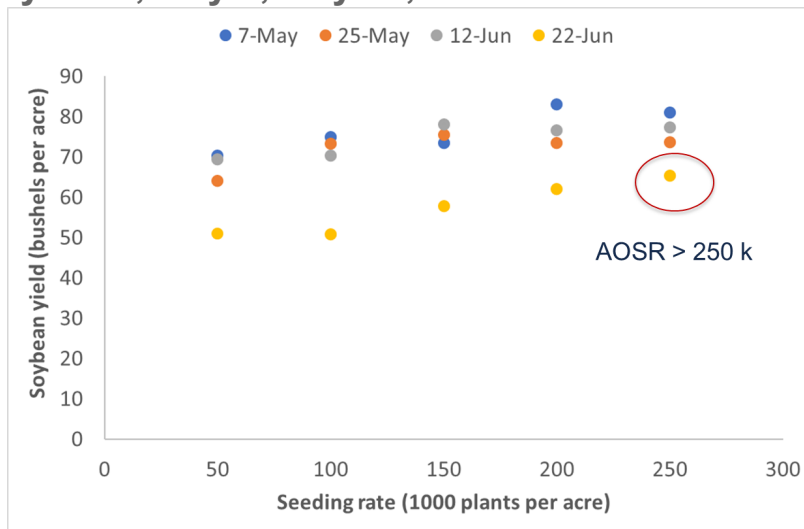


THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

53

CFAES

### Clark County 2020, May 7, May 25, June 12 & June 22 Planting Dates



THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

54

### Conclusion- Clark County 2020

- Maximum yield was similar among the three planting dates, BUT optimum seeding rate was greater in June.

Planting date	Maximum yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
May 7	81	115
May 22	79	116
June 12	80	174

34% more seed when planting in June to get the SAME yield as May planting dates.

### Conclusion- Clark County 2020

Planting date	Maximum yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
May 7	81	115
May 22	79	116
June 12	80	174
June 22	65	250

Increase seeing rate as soybean is planted later.

### Conclusion- Wood County 2020

Planting date	Average yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
April 27		
May 27		
June 8		
June 22		

Which planting date had the greatest yield?

57

### Conclusion- Wood County 2020

Planting date	Average yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
April 27		
May 27		
June 8	53 a	97
June 22		

Which planting date had the greatest yield?

58

CFAES

## Conclusion- Wood County 2020

Planting date	Average yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
April 27		
May 27		
June 8	53 a	97
June 22	49 b	161

Which planting date had the greatest yield?

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

59

CFAES

## Conclusion- Wood County 2020

Planting date	Average yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
April 27	46 c	126
May 27		
June 8	53 a	97
June 22	49 b	161

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

60

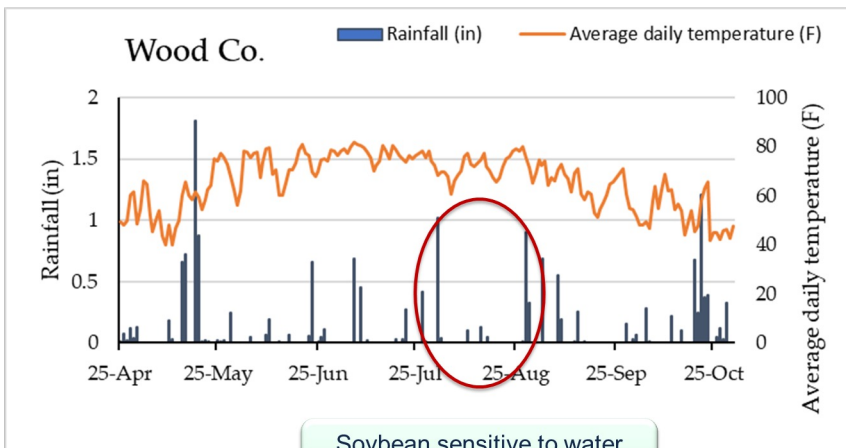
### Conclusion- Wood County 2020

Planting date	Average yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
April 27	46 c	126
May 27	43 d	122
June 8	53 a	97
June 22	49 b	161

So...What happened here????

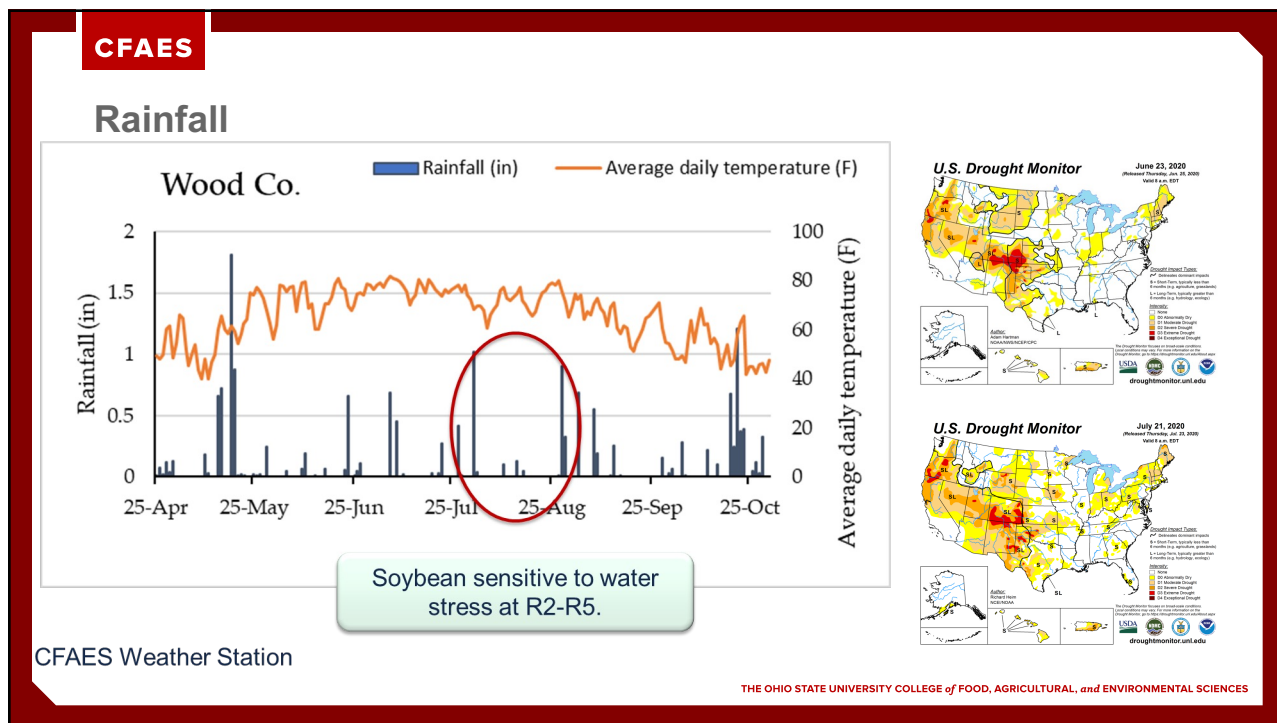
61

### Rainfall

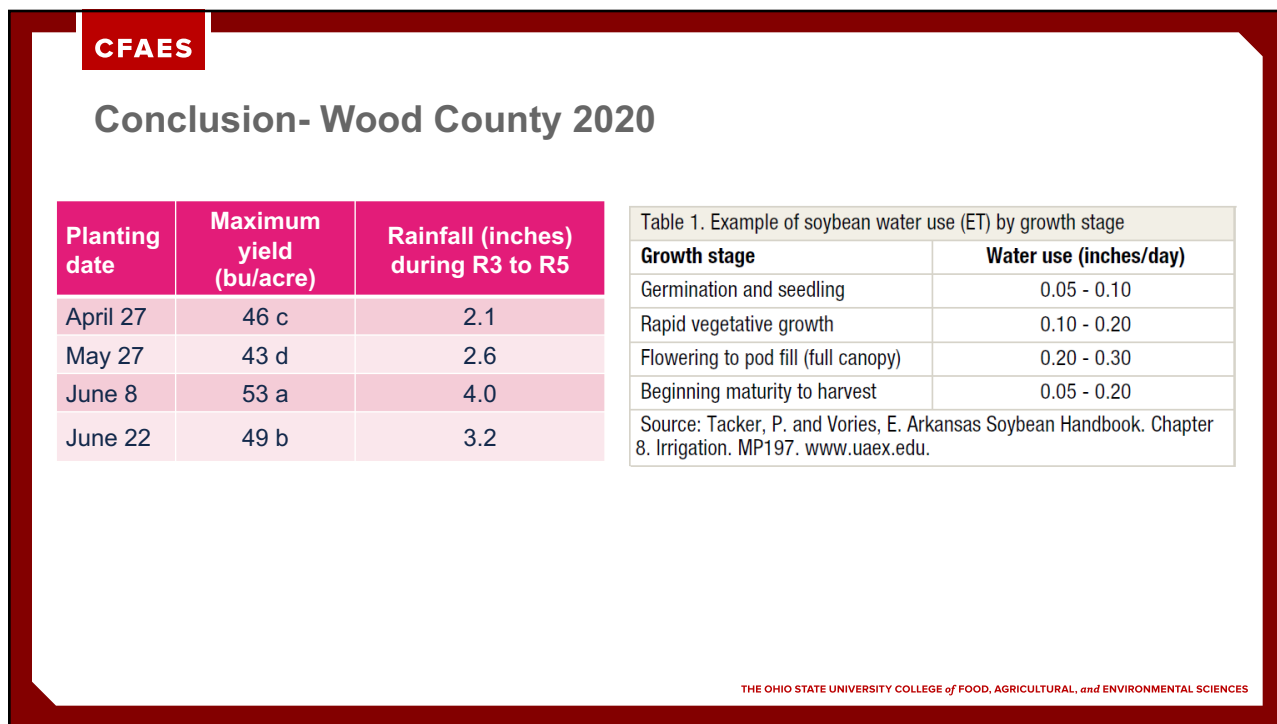


Soybean sensitive to water stress at R2-R5.

62



63



64

**CFAES****What about 2021?**

## Clark County

Planting date	Maximum yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
April 27	79	118
May 14	75	100
June 1	74	110
June 17	73	104

## Wood County

Planting date	Maximum yield (bu/acre)	Optimum seeding rate (1000 seeds/acre)
April 27	81	104
May 18	78	100
June 1	78	179
June 24	66	182

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

65

**CFAES****Planting Date x Seeding Rate Conclusion**

- For May planting dates, seed 120,000 to 140,000 seeds per acre.
  - Want 100,000 – 120,000 plants per acre as final stand.
- For June planting dates, plant to 150,000 to 170,000 seeds per acre
  - Want 130,000 – 150,000 plants per acre as final stand.

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES

66

CFAES



Graduate Student: Fabiano Colet

THE OHIO STATE UNIVERSITY COLLEGE of FOOD, AGRICULTURAL, and ENVIRONMENTAL SCIENCES