

# Overview of Soybean Production

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Experiencing Technology in Ag  
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# Soybean Stats

- Ohio acres planted in 2017 = 5 million
  - Corn acres planted = 3.5 million
  - Wheat acres planted = 0.46 million
- Annual economic impact from soybean production in Ohio is \$5.3 billion
- 26,000 soybean farmers in Ohio

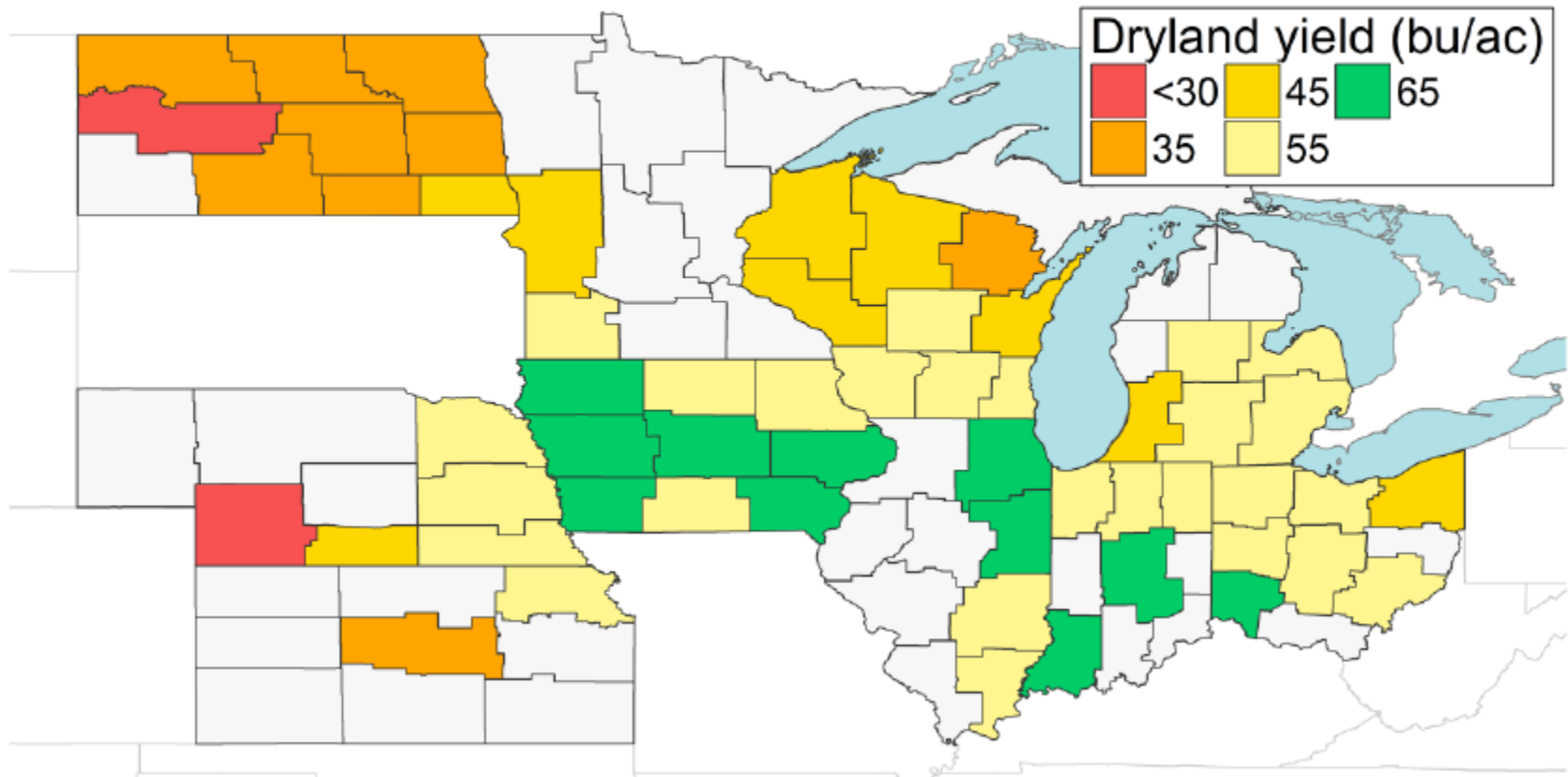


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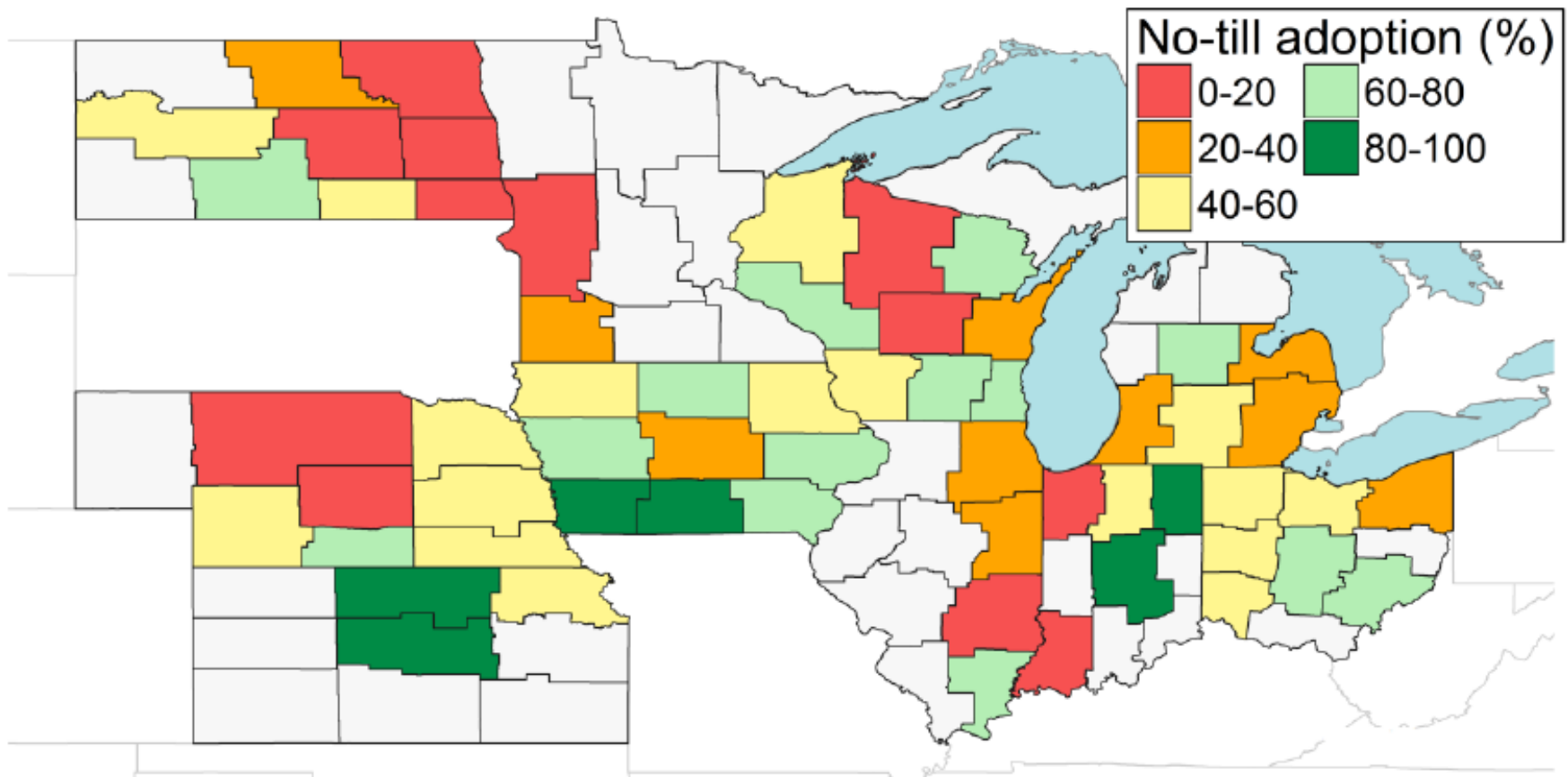
# Overview of Soybean Production, 2014-2015

Average dryland soybean yield (bu/ac)



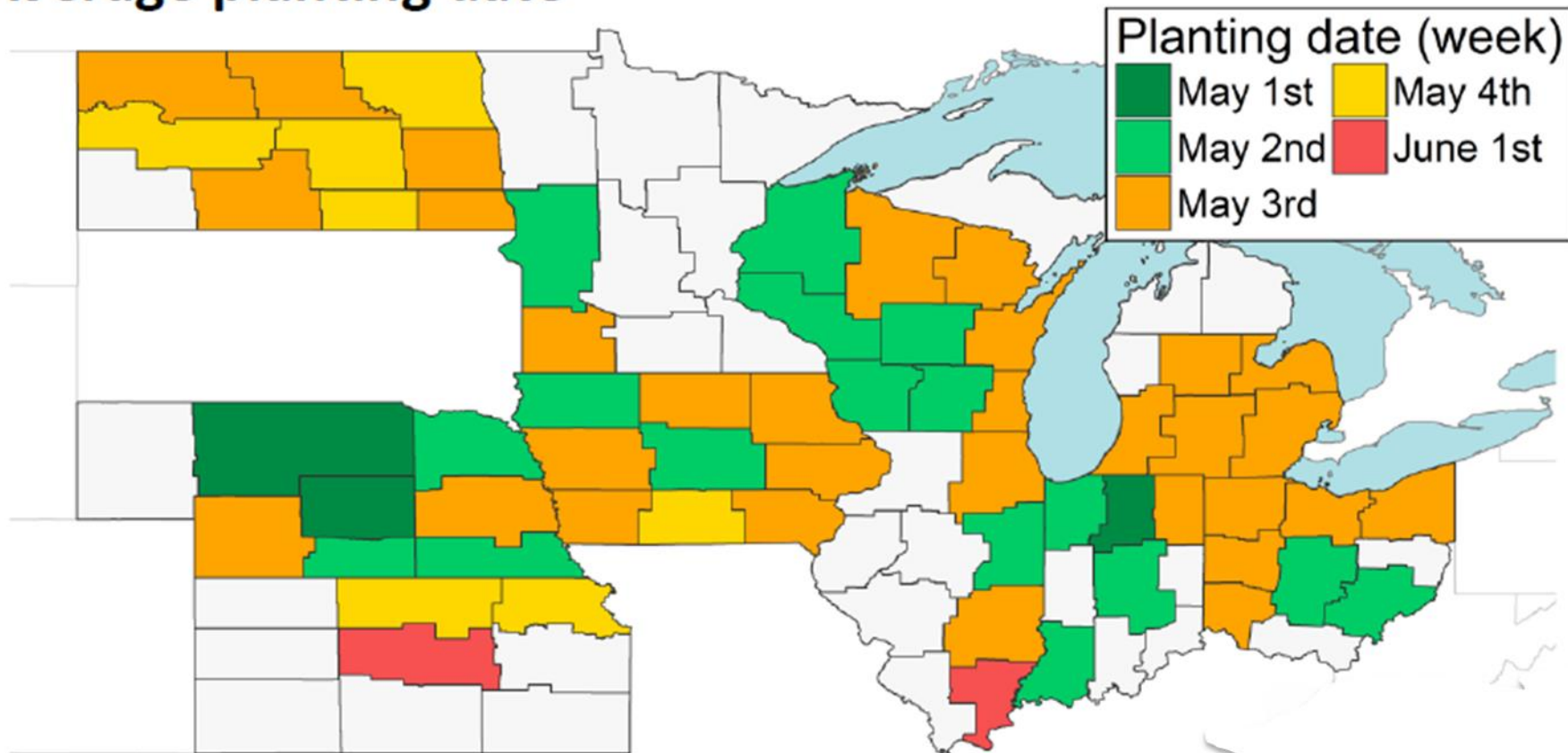
# Overview of Soybean Production, 2014-2015

% of no-tilled fields



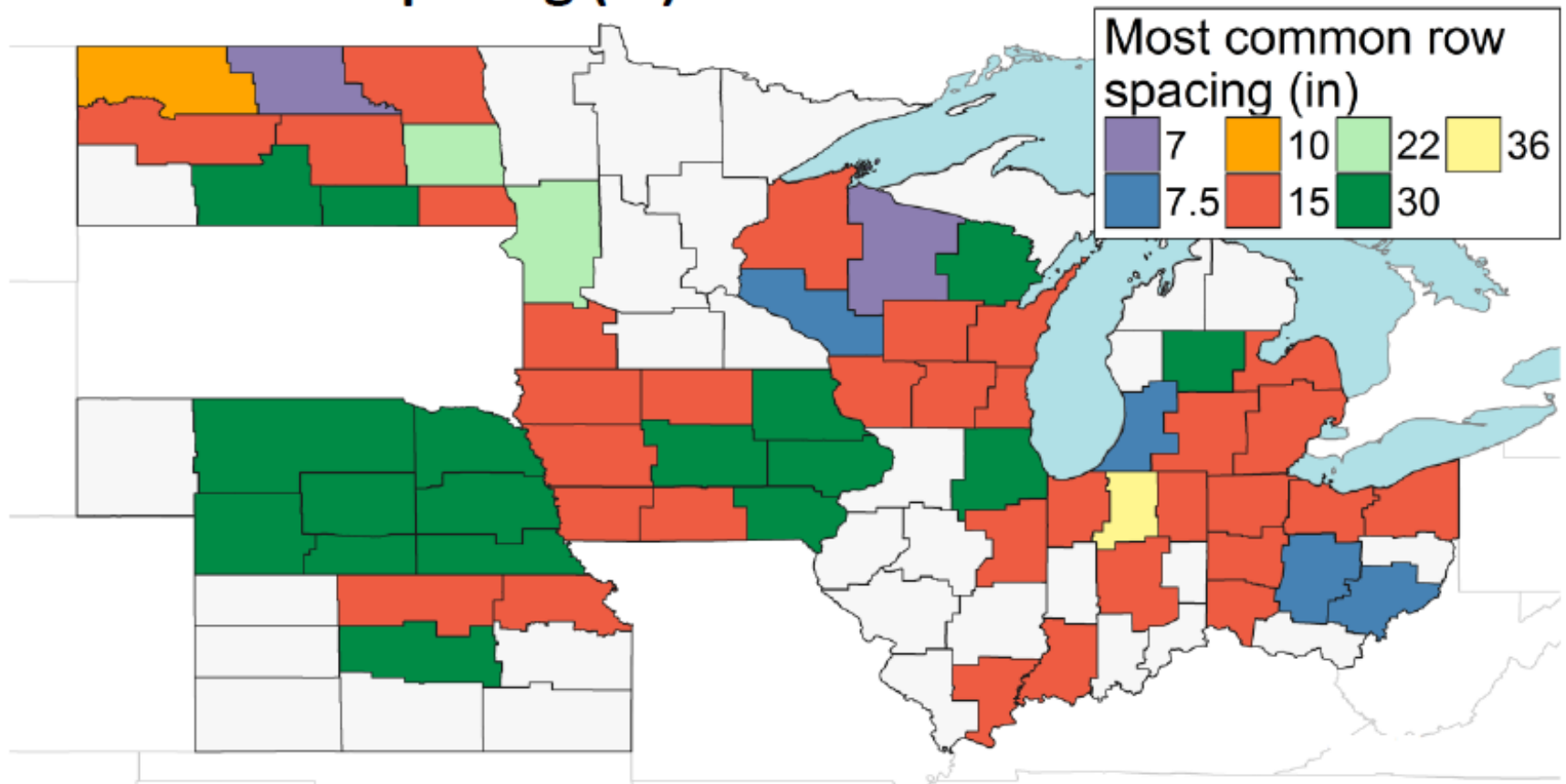
# Overview of Soybean Production, 2014-2015

## Average planting date



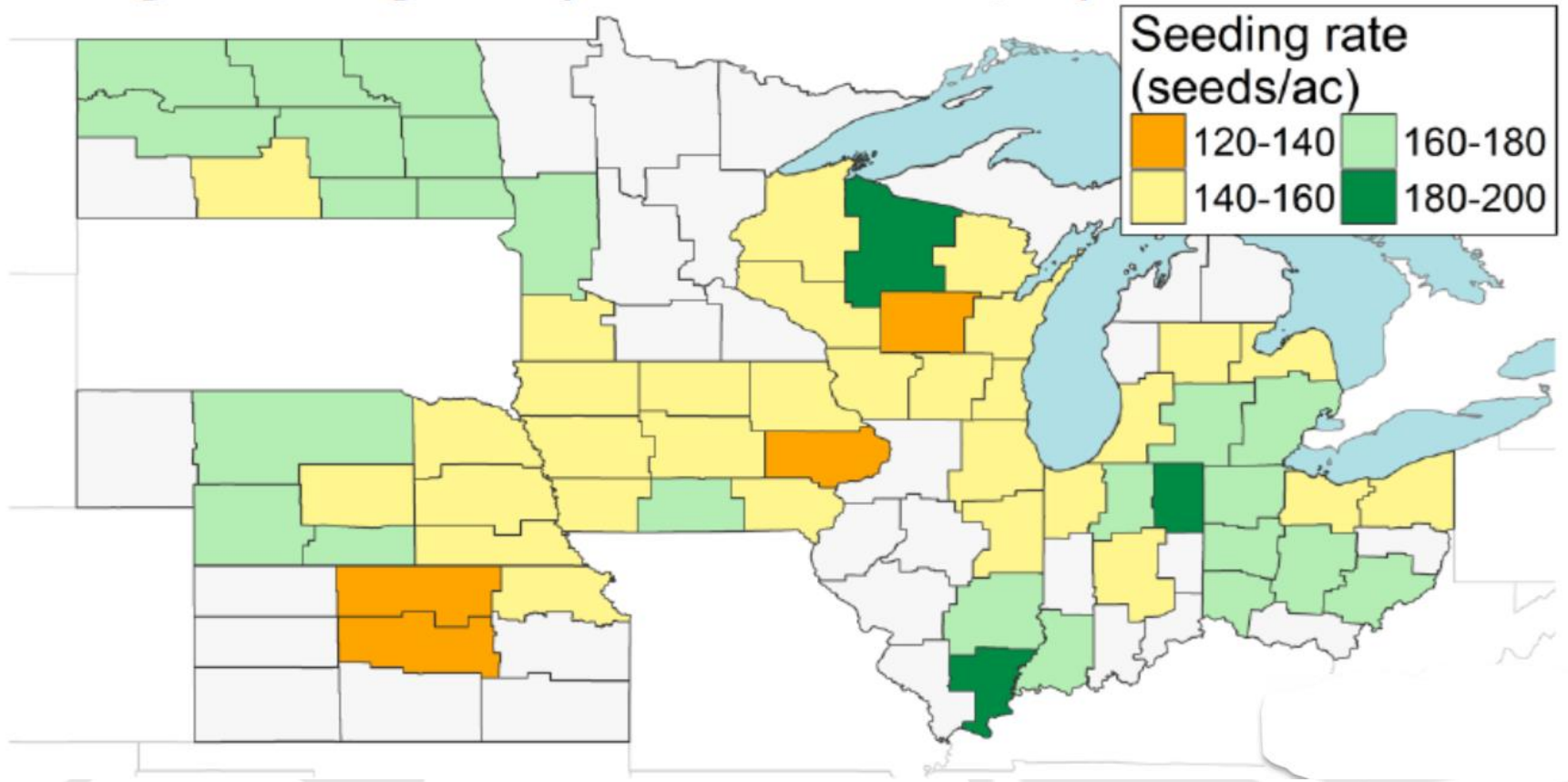
# Overview of Soybean Production, 2014-2015

## Prevalent row spacing (in)



# Overview of Soybean Production, 2014-2015

Average seeding rate (thousand seeds/ac)





# Research Focus

- What is limiting soybean yield in Ohio?



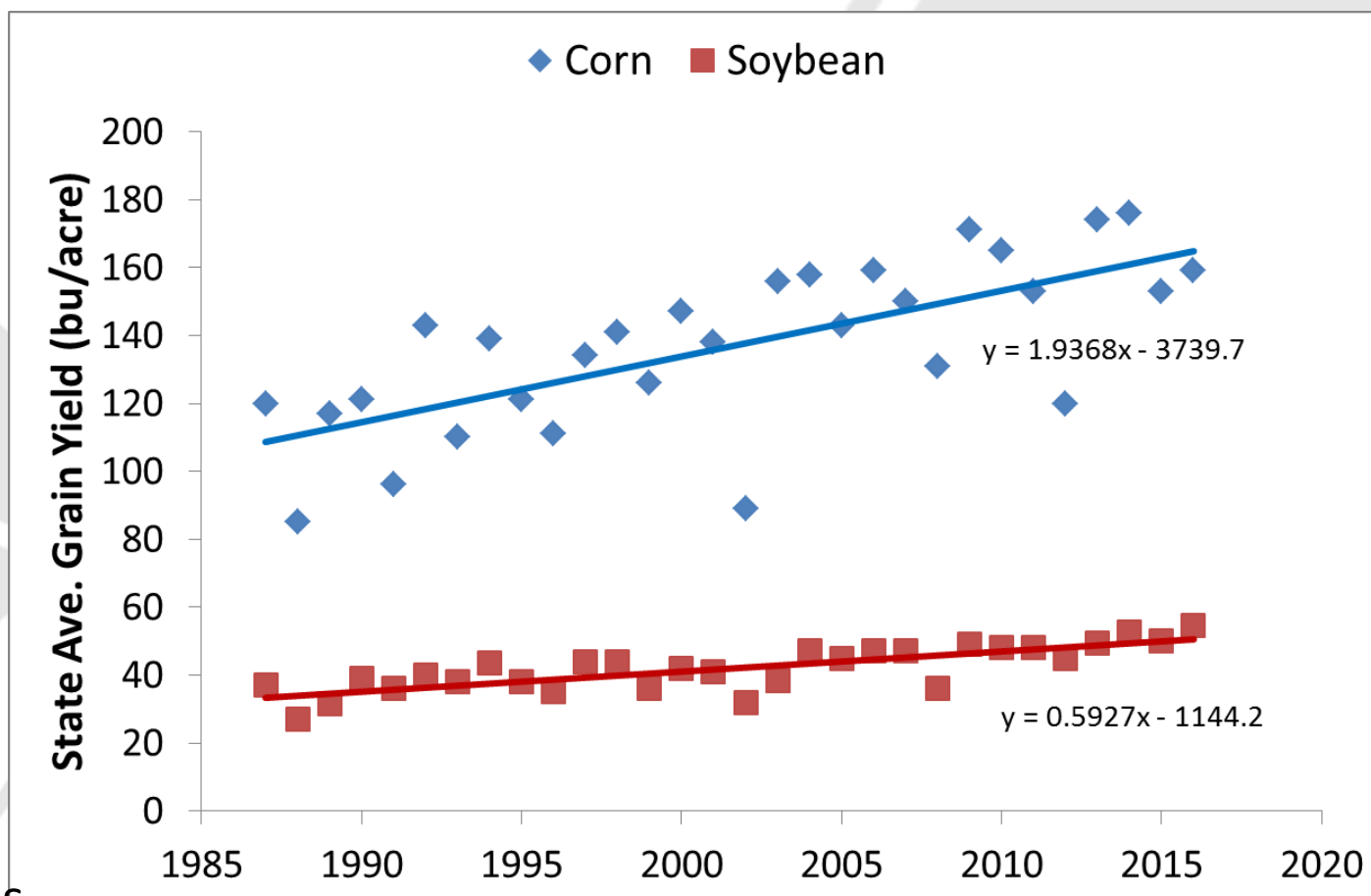
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# Research Focus

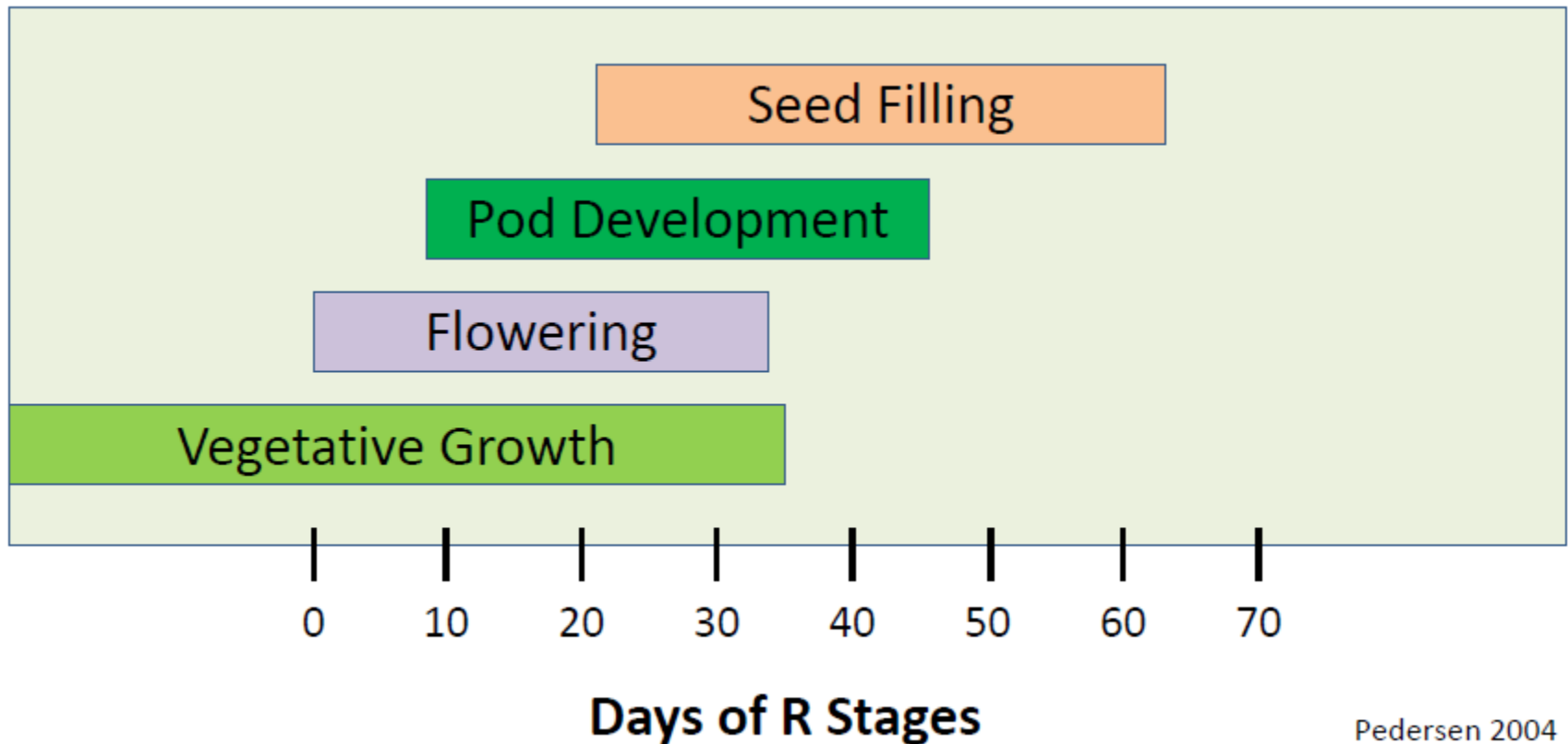
- What is limiting soybean yield in Ohio?



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# Soybean Plants Can Compensate



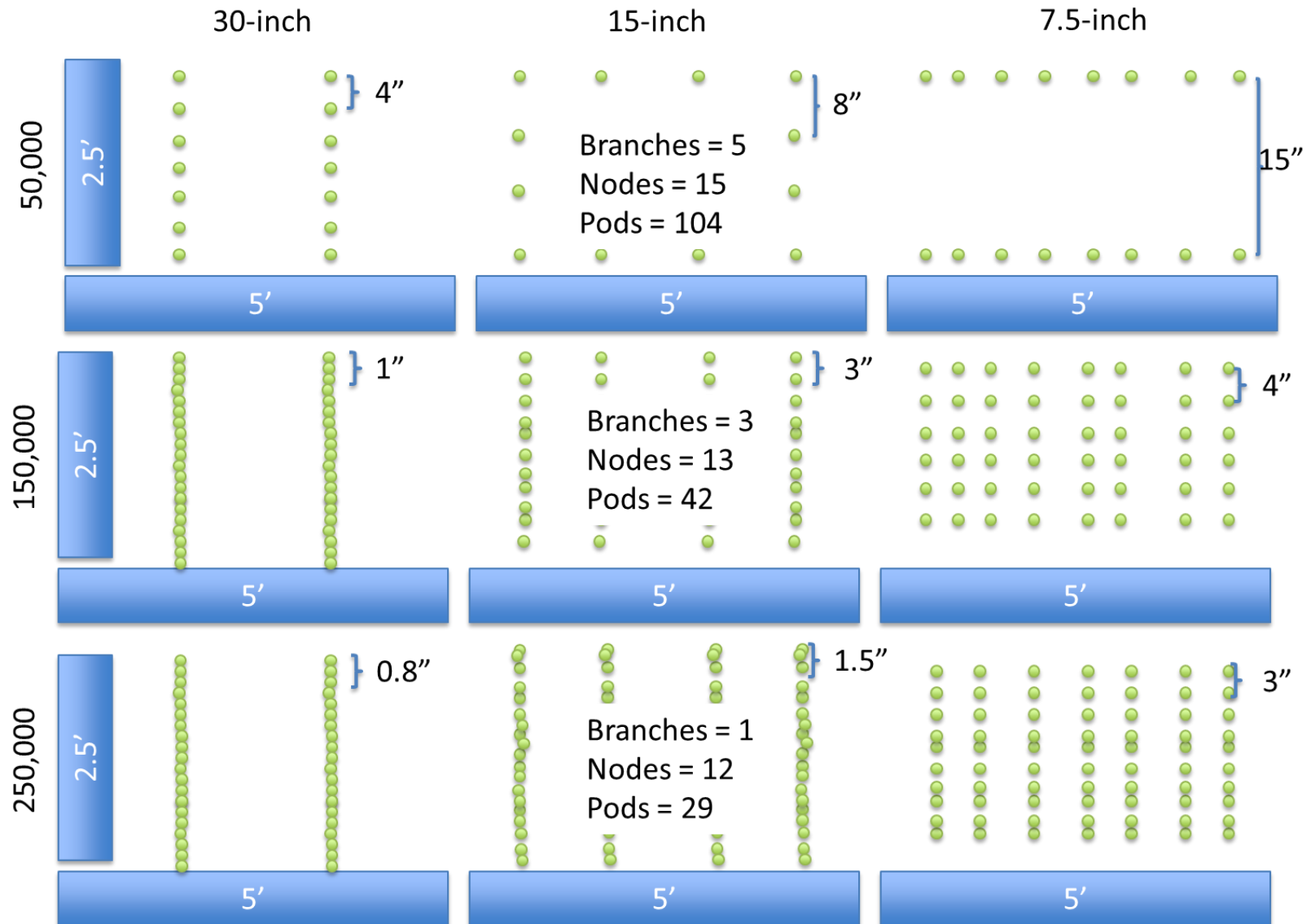
Pedersen 2004



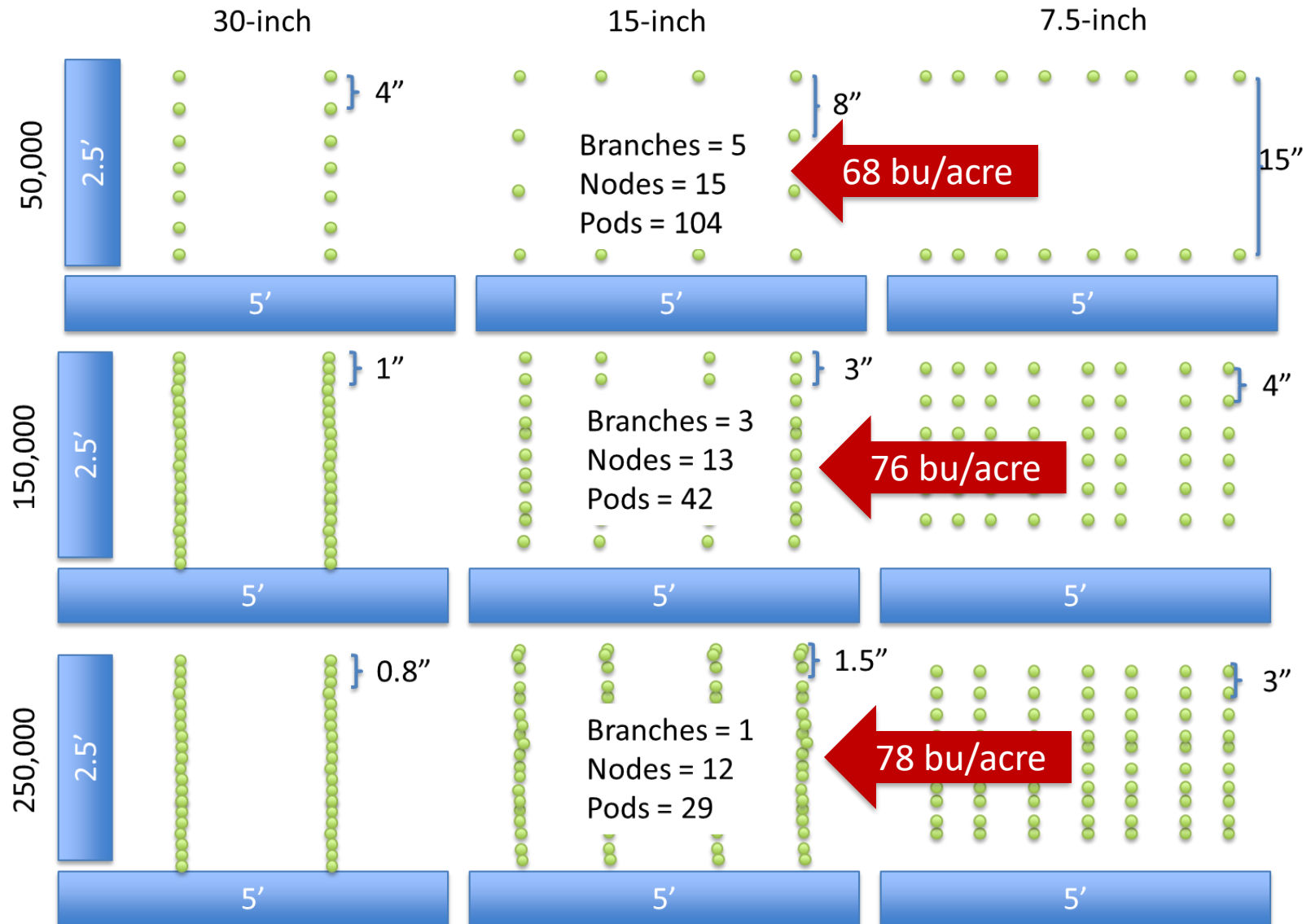
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# Soybean Plants Can Compensate



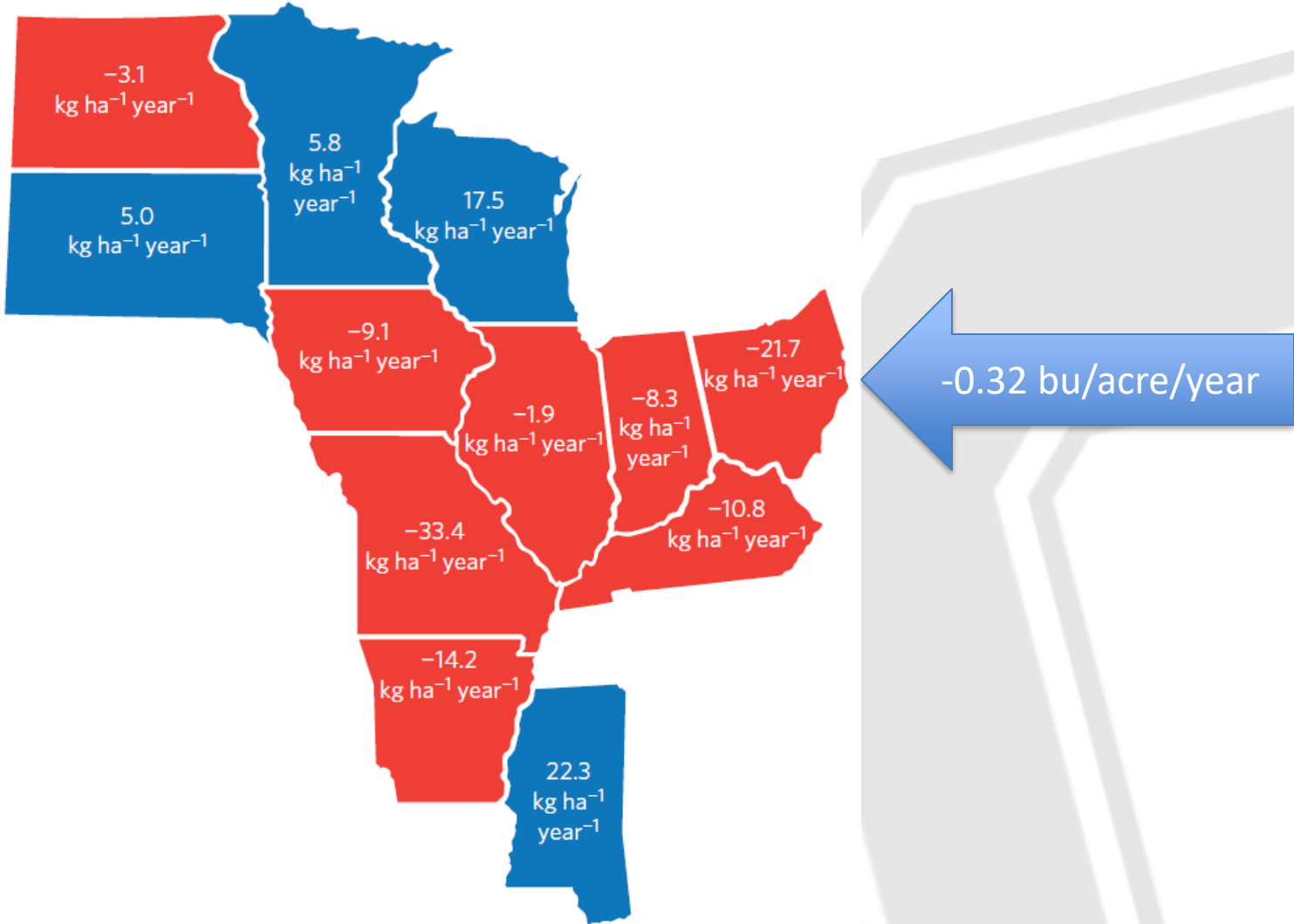
# Soybean Plants Can Compensate



# Weather- The Factor We Can't Control

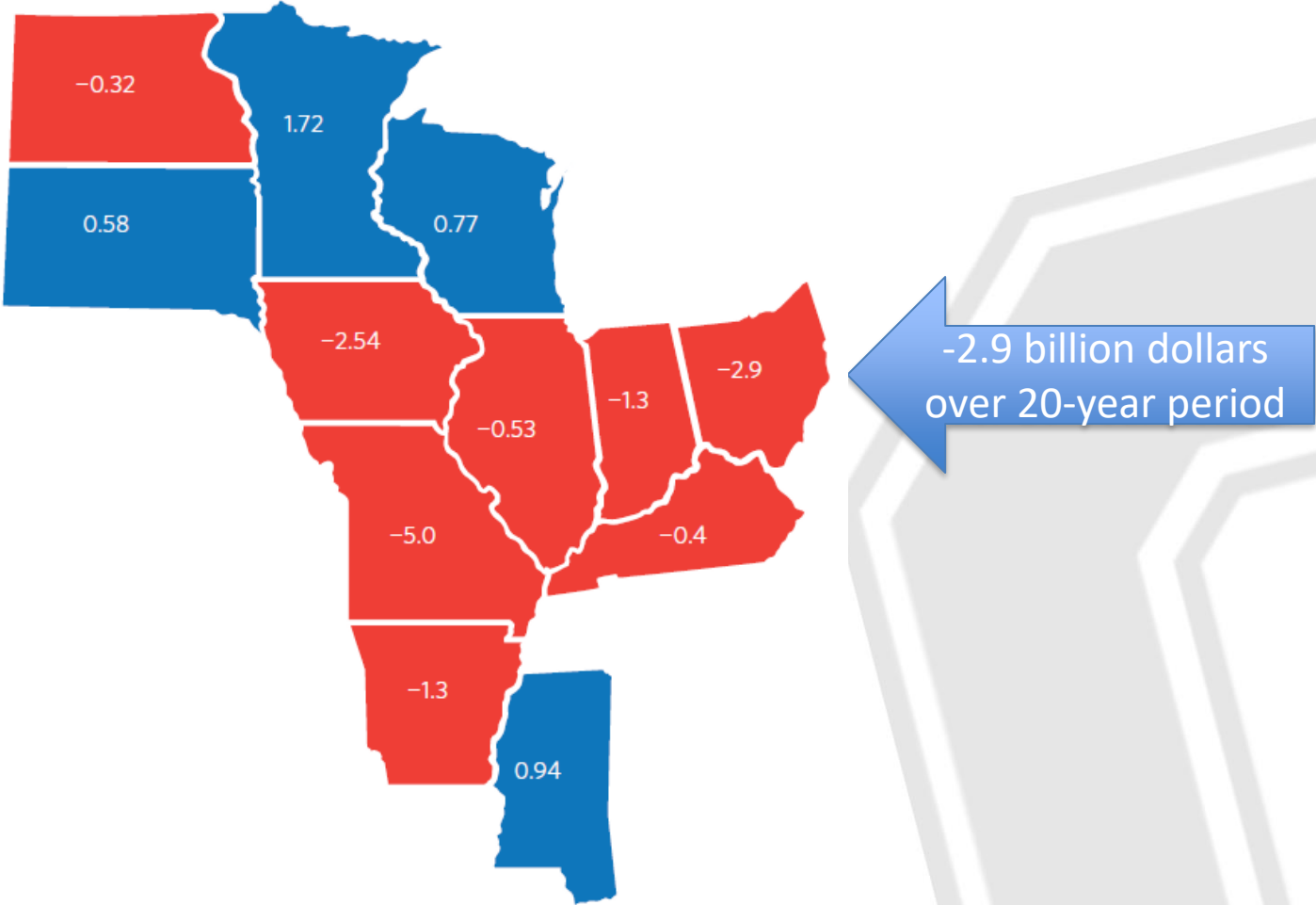
- Objective- Assess the effect of in-season weather trends on soybean yields in the US between 1994-2013
- Method- Use state variety trial data





**Figure 1 | Annualized yield impacts of climate-driven changes in precipitation and temperature during the past 20 years (1994-2013).**

Mourtzinis et al., 2014



**Figure 2 | Monetary impacts associated with the annualized effects of changes in monthly precipitation and temperature on state-specific soybean yield trends.** The values are inflation-adjusted estimates of the dollar value (in billions of 2013 USD) and reflect the impacts over the 20-year period 1994 to 2013.





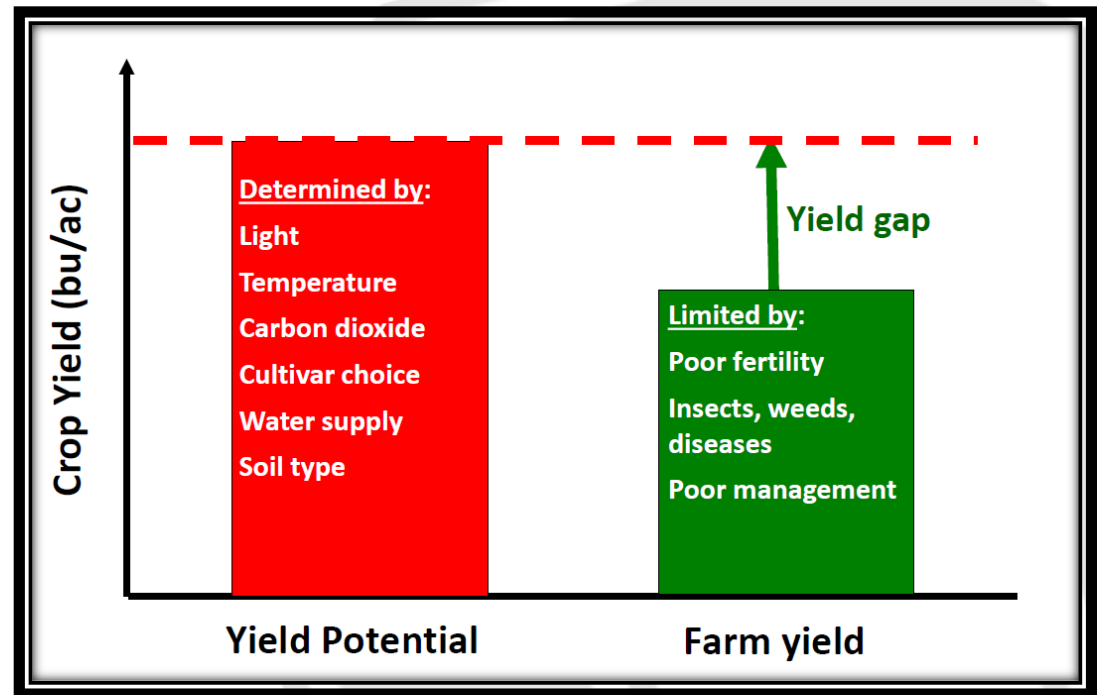
# Impact of Weather on Soybean Yield

- In-season temperature trends had a greater impact on soybean yields than in-season precipitation trends.
- Yields fell 2.4% for every 1°C rise in growing season temperature. Largest impact of temperature in July.



# Weather aside...

- Statewide soybean yield-limitation study
- NCSRP Benchmarking soybean yield study

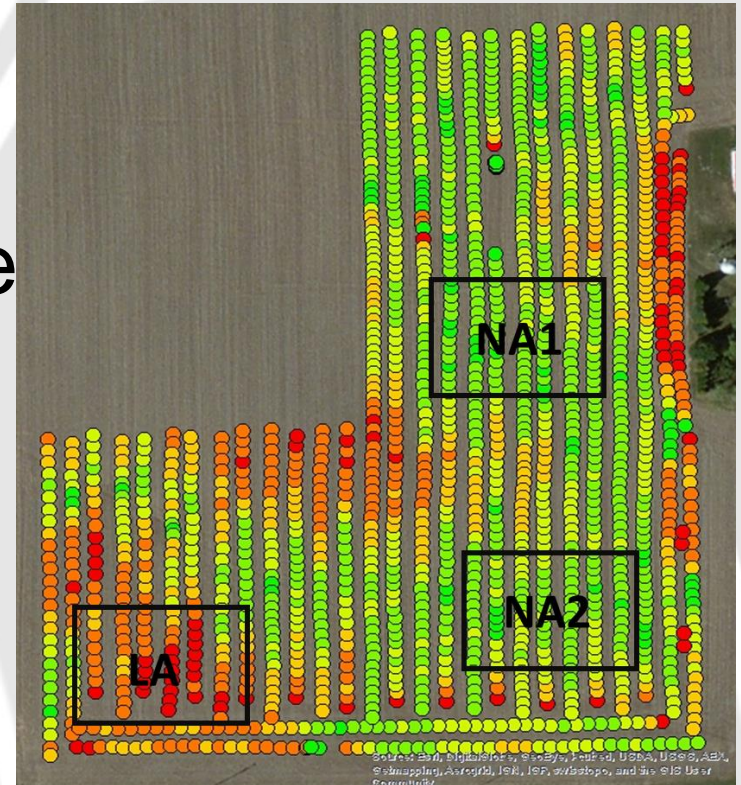


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# How to manage for greater yield potential?

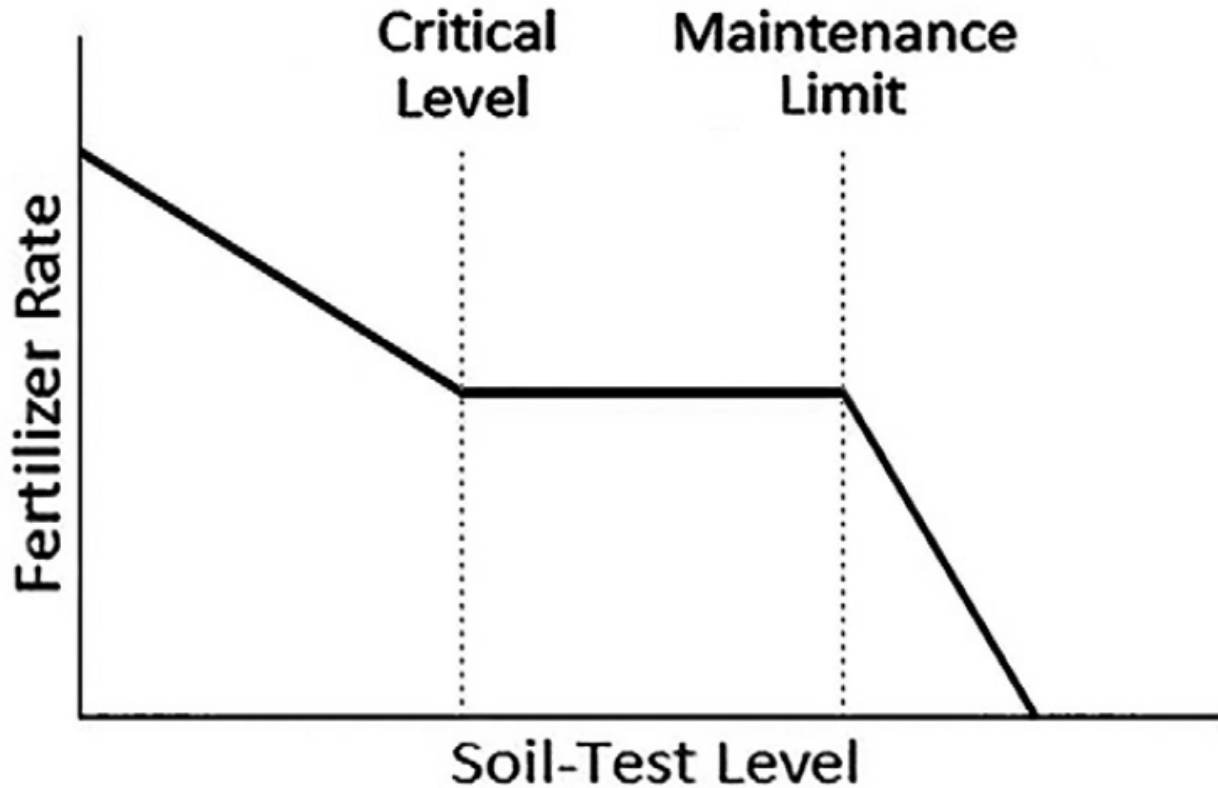
1. Soil fertility
2. Soybean cyst nematode
3. Planting date



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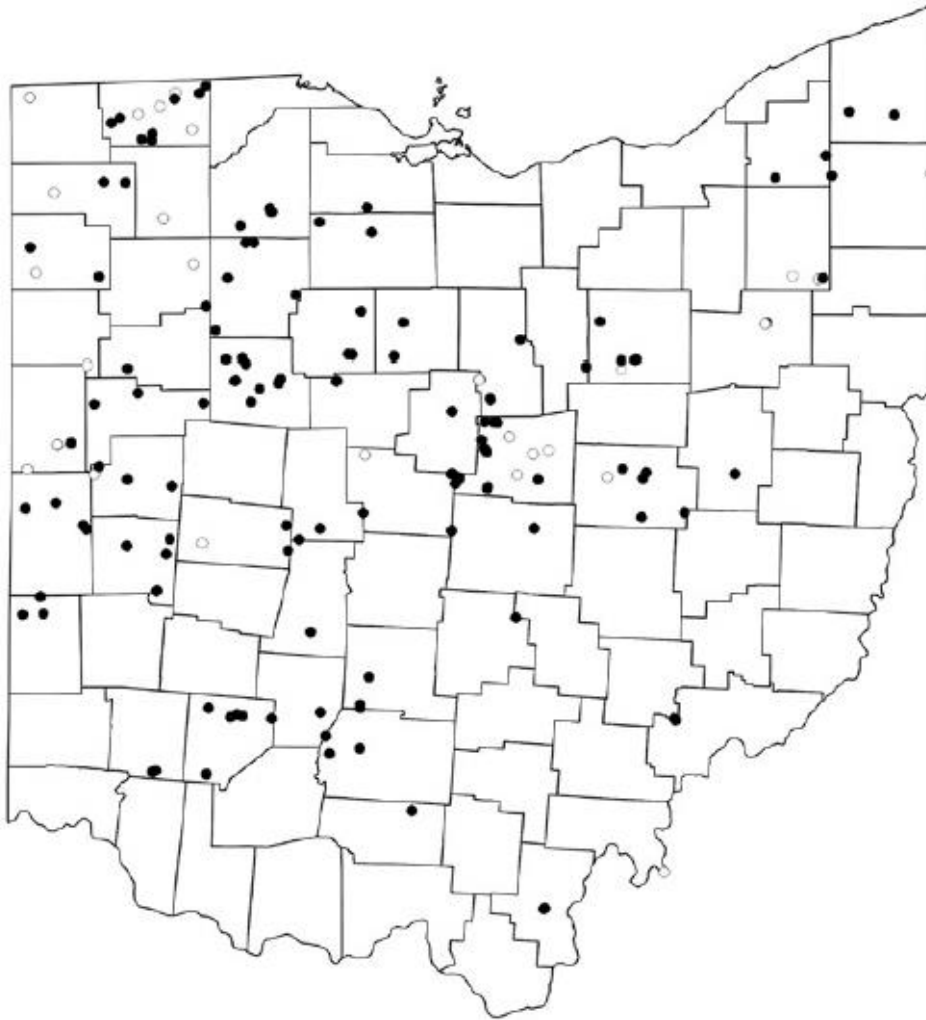
# Soil Fertility



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# Soil Phosphorus in Ohio



Closed circles = Field where P fertilizer is recommended

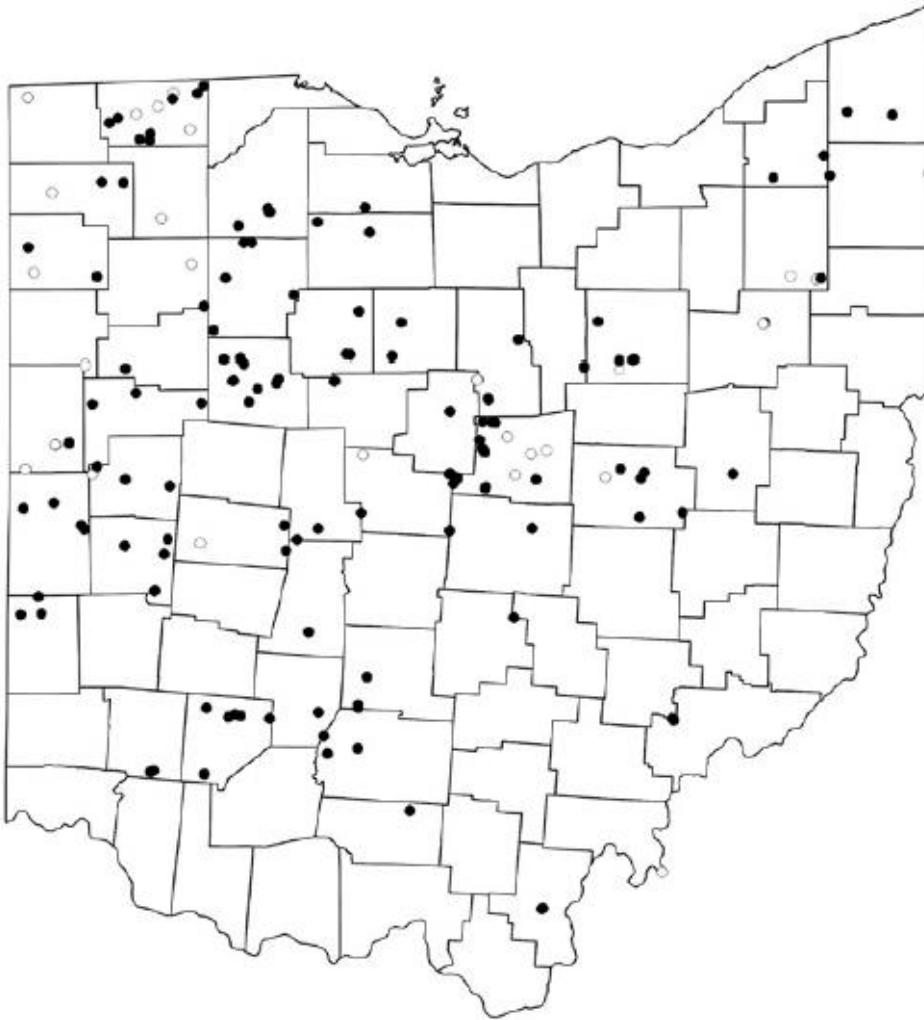
Open circles = Field where no P fertilizer is recommended



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# Soil Phosphorus in Ohio



- 21 % of total soil samples within P build-up range
- 44% of total samples within the maintenance range
- 35% of total samples within the drawdown range

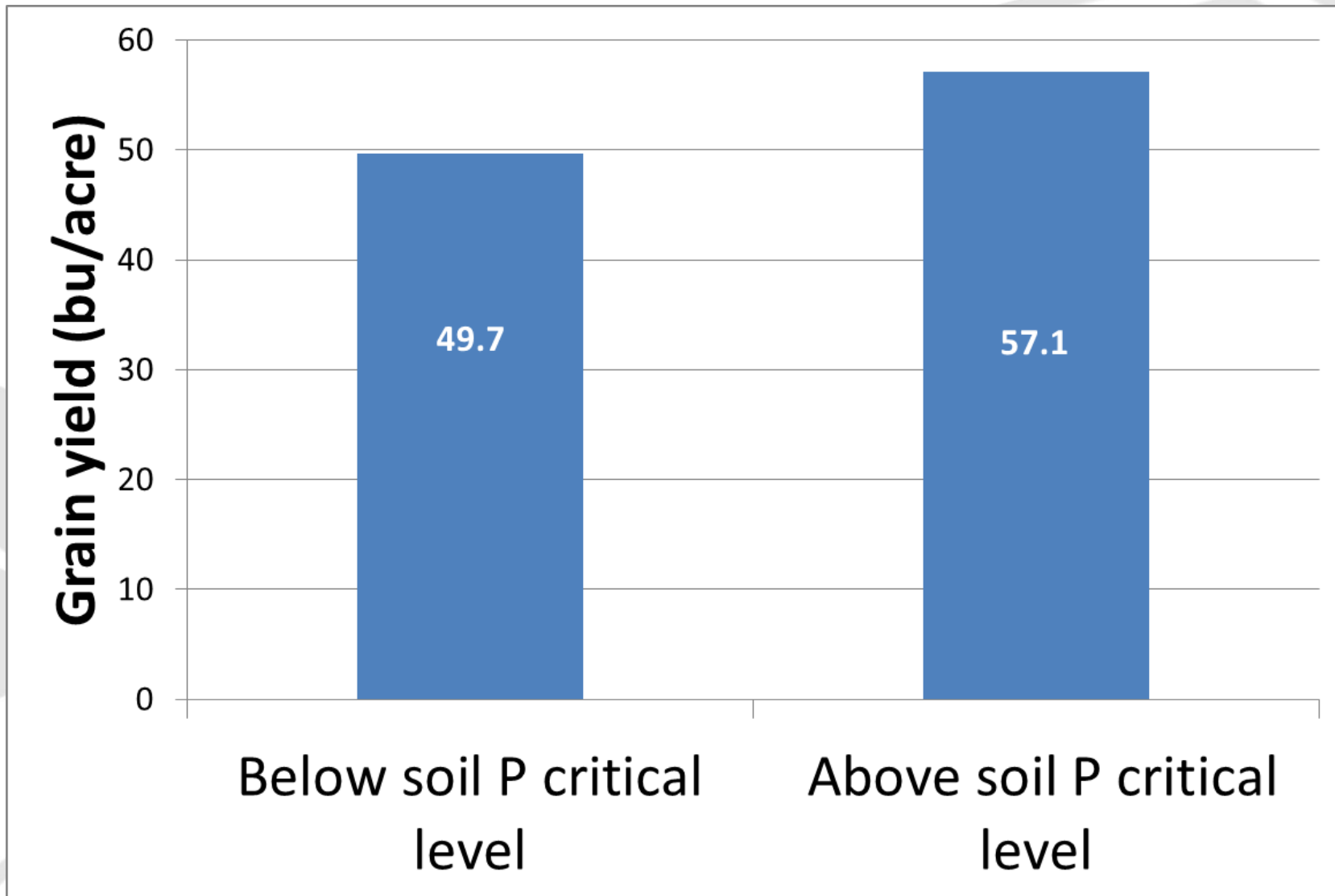


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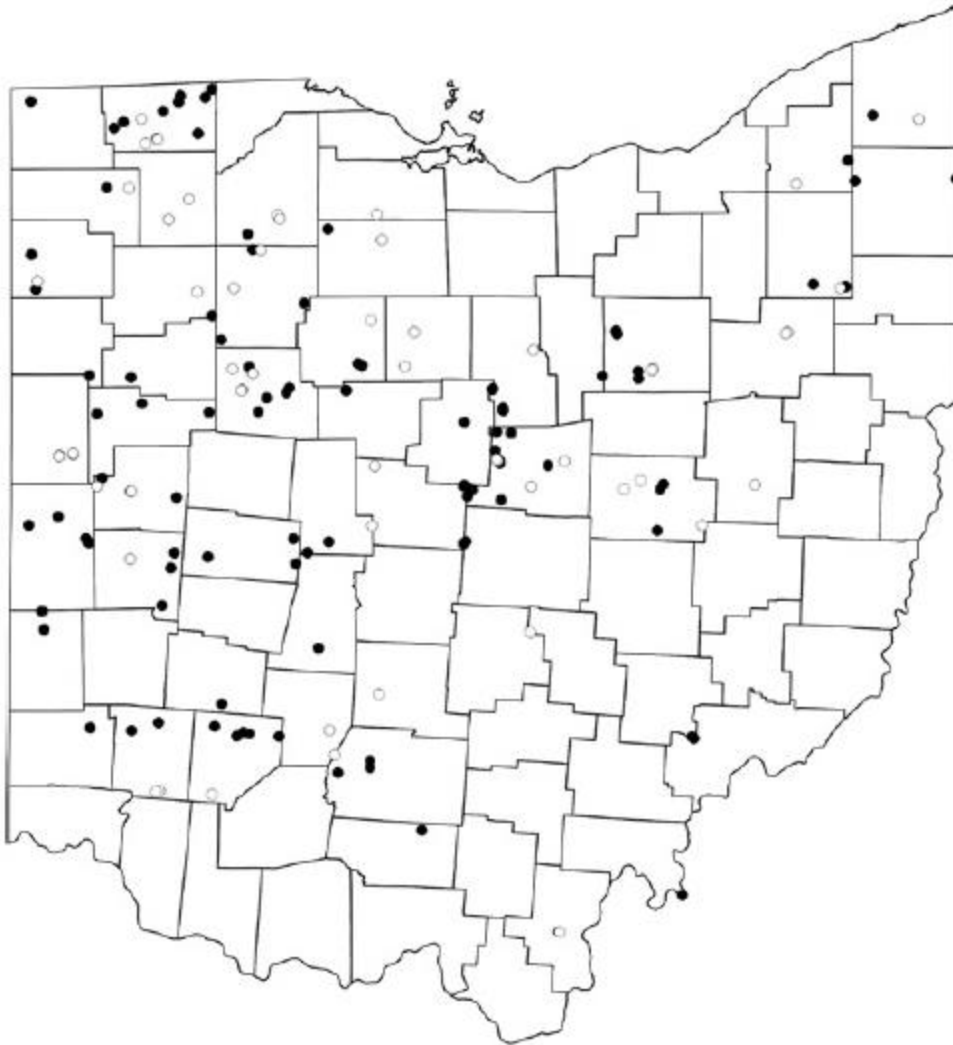


# Soil Phosphorus





# Soil Potassium in Ohio



Closed circles = Field where K fertilizer is recommended

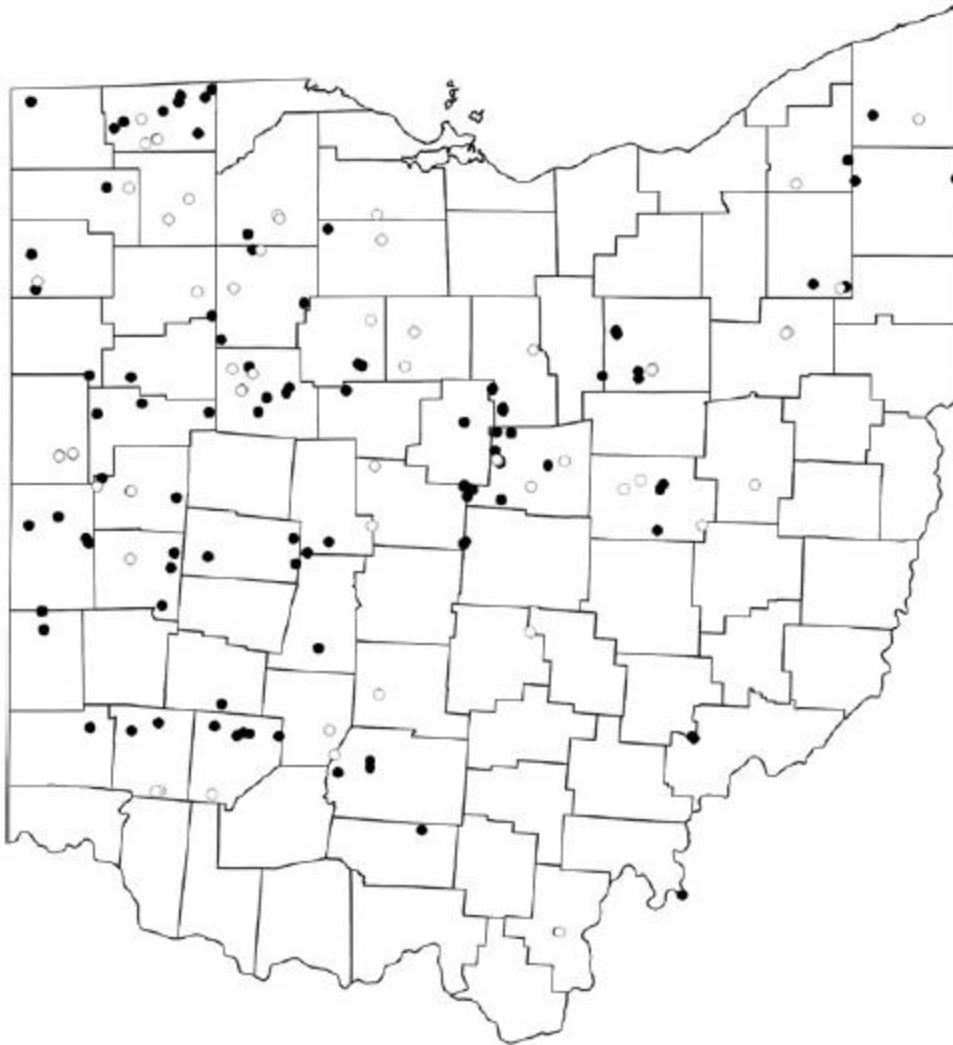
Open circles = Field where no K fertilizer is recommended



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# Soil Potassium in Ohio



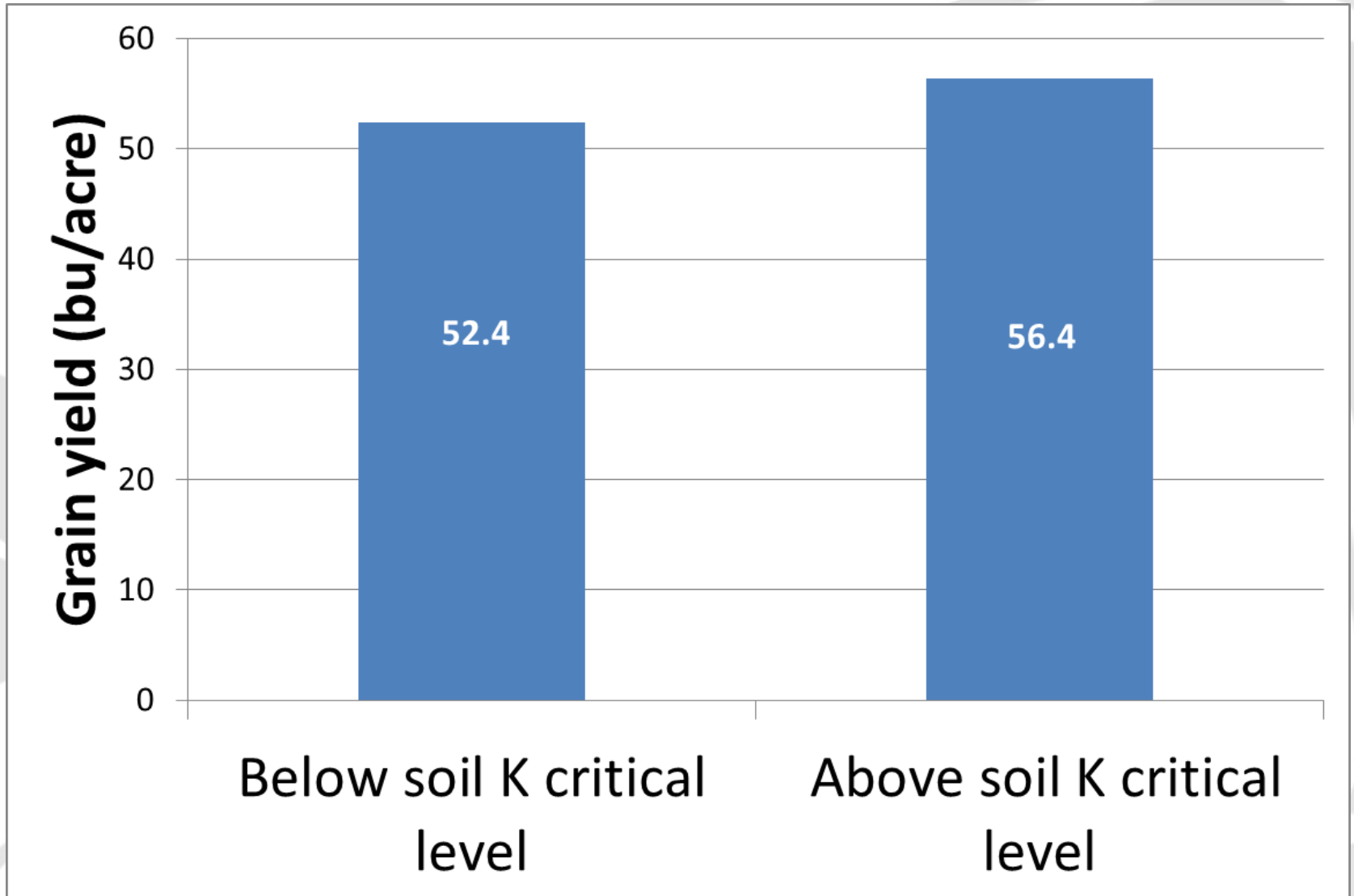
- 23% of total soil samples within K build-up range
- 35% of total samples within the maintenance range
- 44% of total samples within the drawdown range



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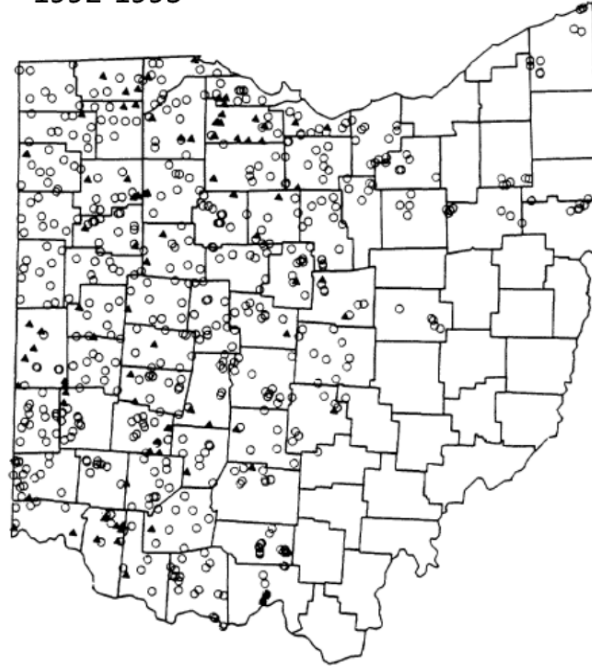
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# Soil Potassium

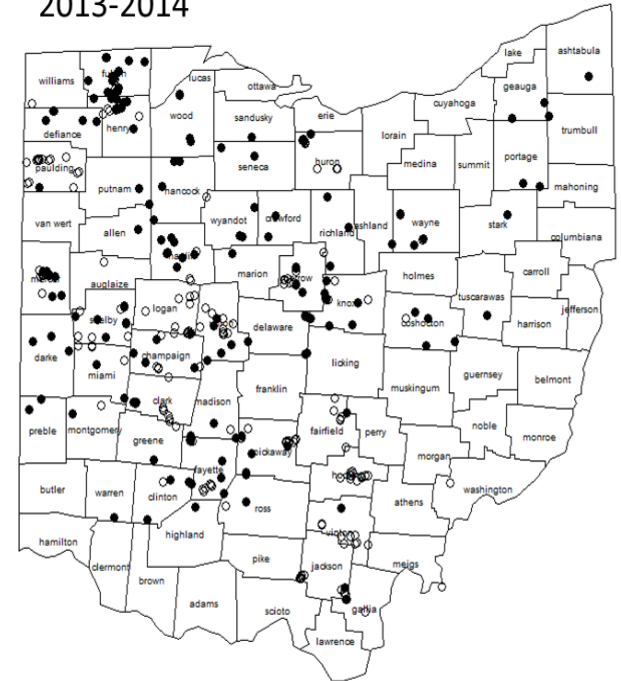


# Soybean Cyst Nematode

1992-1995



2013-2014



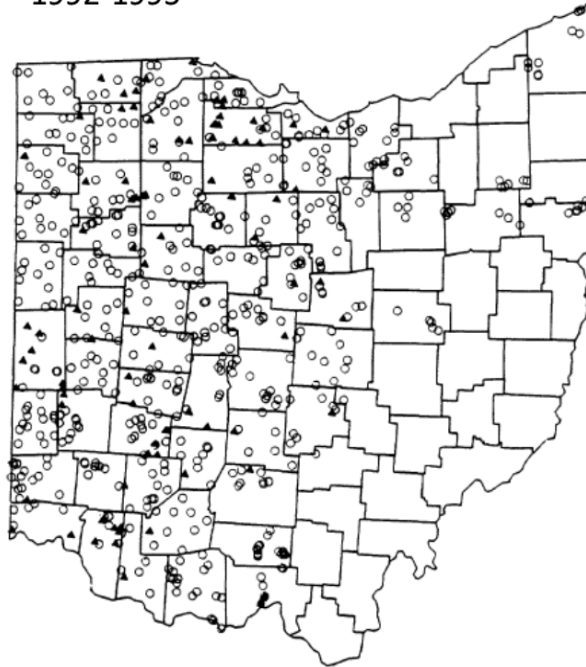
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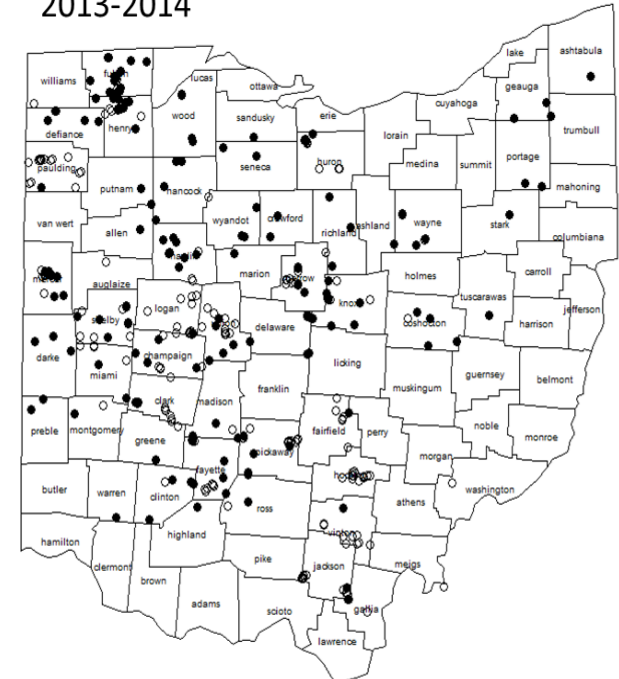
# Soybean Cyst Nematode

- **3 bu/acre** reduction in yield associated with fields that had >200 eggs/100 cc soil compared to <200 eggs/100 cc soil.

1992-1995



2013-2014



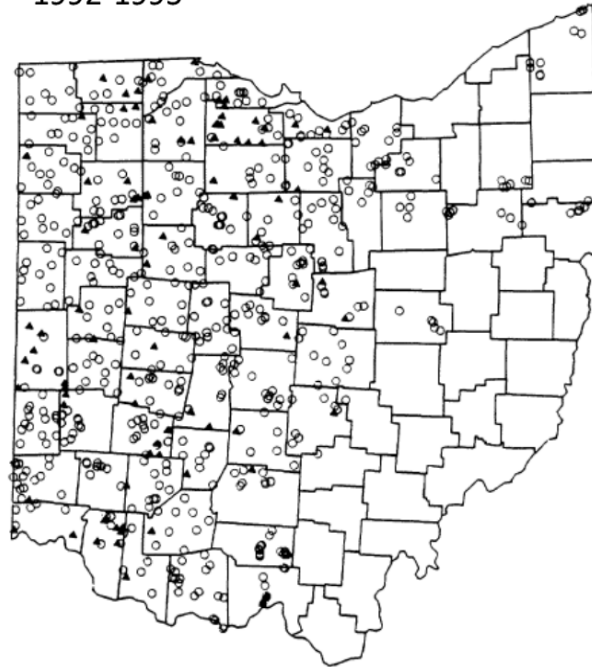
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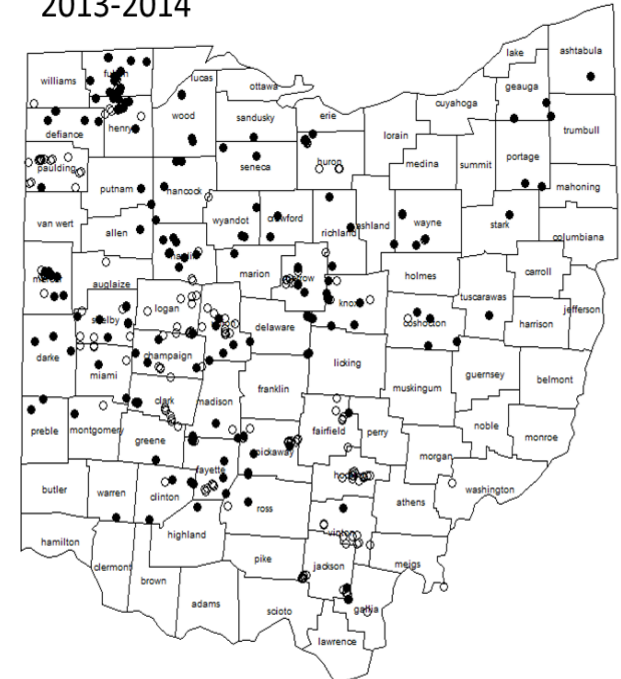
# Soybean Cyst Nematode

- “With as few as 1,600 eggs/100 cc soil, yield losses of 25% have been reported in Ohio.”  
- Dr. Anne Dorrance

1992-1995



2013-2014



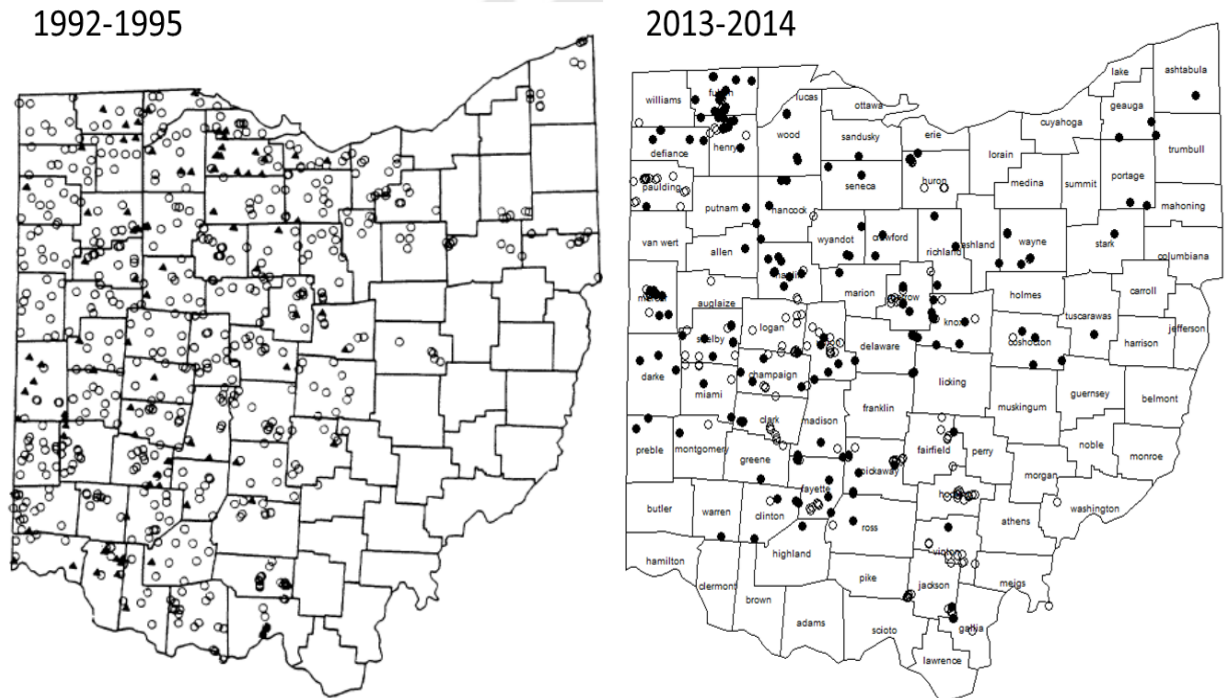
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# Soybean Cyst Nematode

- >80% of soybean fields in Ohio have detectable levels of SCN.
- Where SCN was detected, 75% of farmers were unaware of the problem.

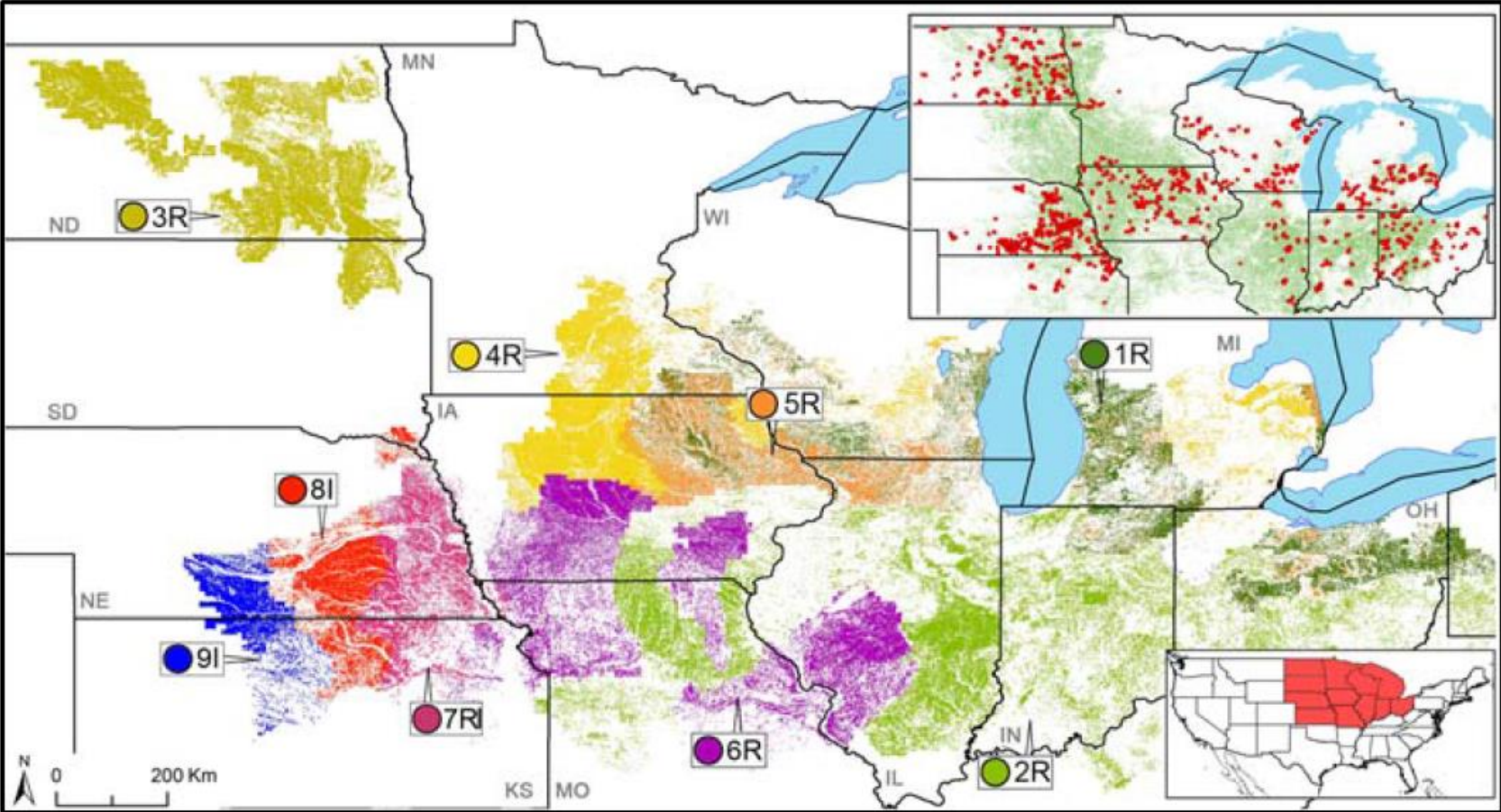


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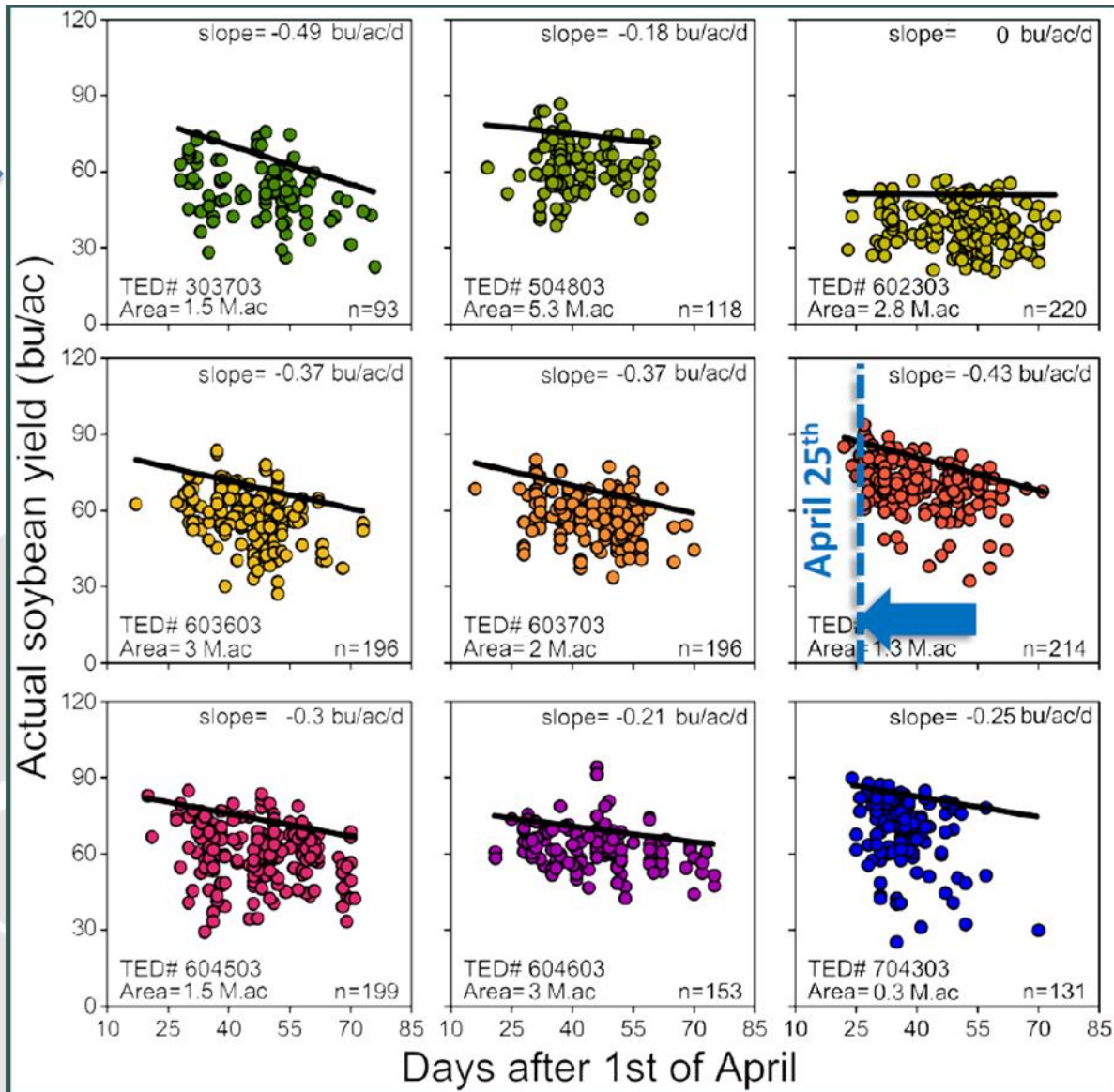
# Planting Date



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-0.60  
bu/ac/d

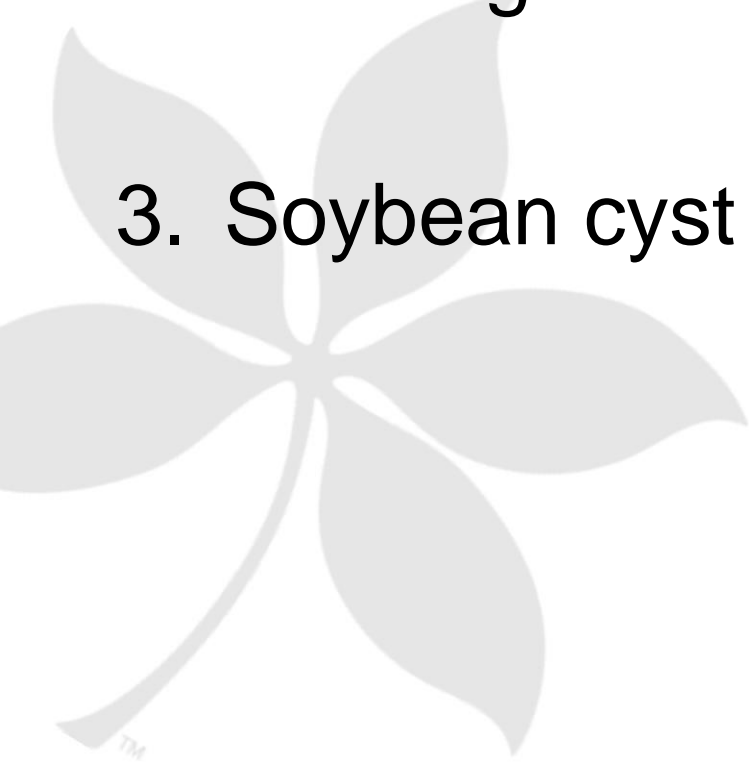


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# How to manage for greater yield potential?

1. Soil fertility
2. Planting date
3. Soybean cyst nematode

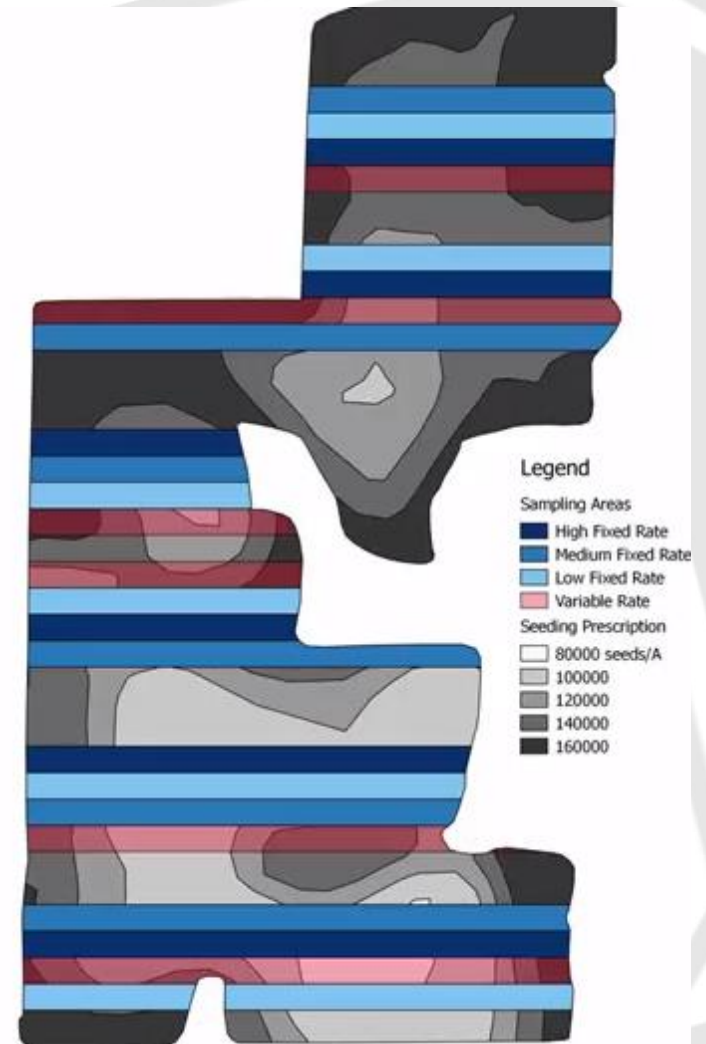


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# 2017 \*new\* research

- Variable rate seeding technology
  - How to create management zones?
  - What rates should be used?
  - Create a “field diversity” index
  - Economics of VRS
  - Plant architecture, harvest losses, and combine efficiency





# Continuous Soybean Production

- Many farmers planting soybean after soybean for economic reasons
- Can a grass cover crop mitigate some of the effects of continuous soybean production?
- Soybean RM (Group 0 through 4)
- Soybean harvest date/rye:oat planting date



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# Re-Evaluating Crop Staging

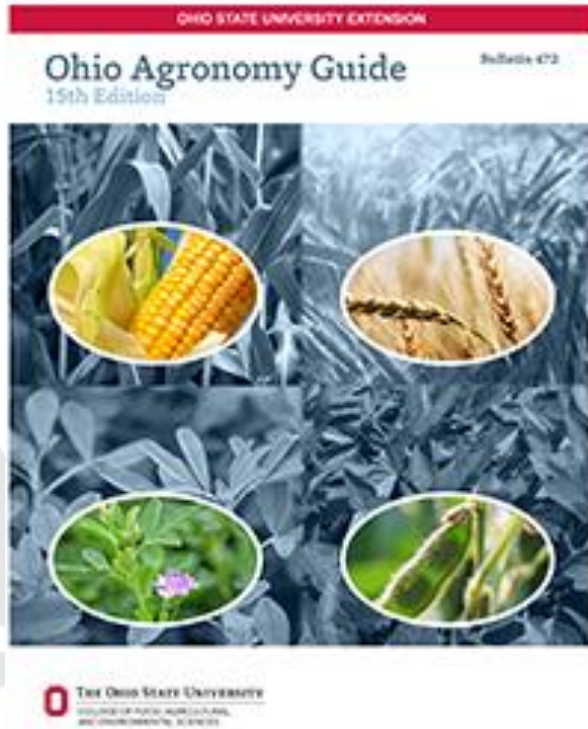
- Update and re-evaluate the soybean staging system
- Multi-state: Wisconsin, Ohio, Virginia, Kentucky, Arkansas, and Mississippi



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# Revised Ohio Agronomy Guide



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# Questions?

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