



SMALL GRAINS BREEDING AT ILLINOIS AND TIPS FOR VARIETY SELECTION

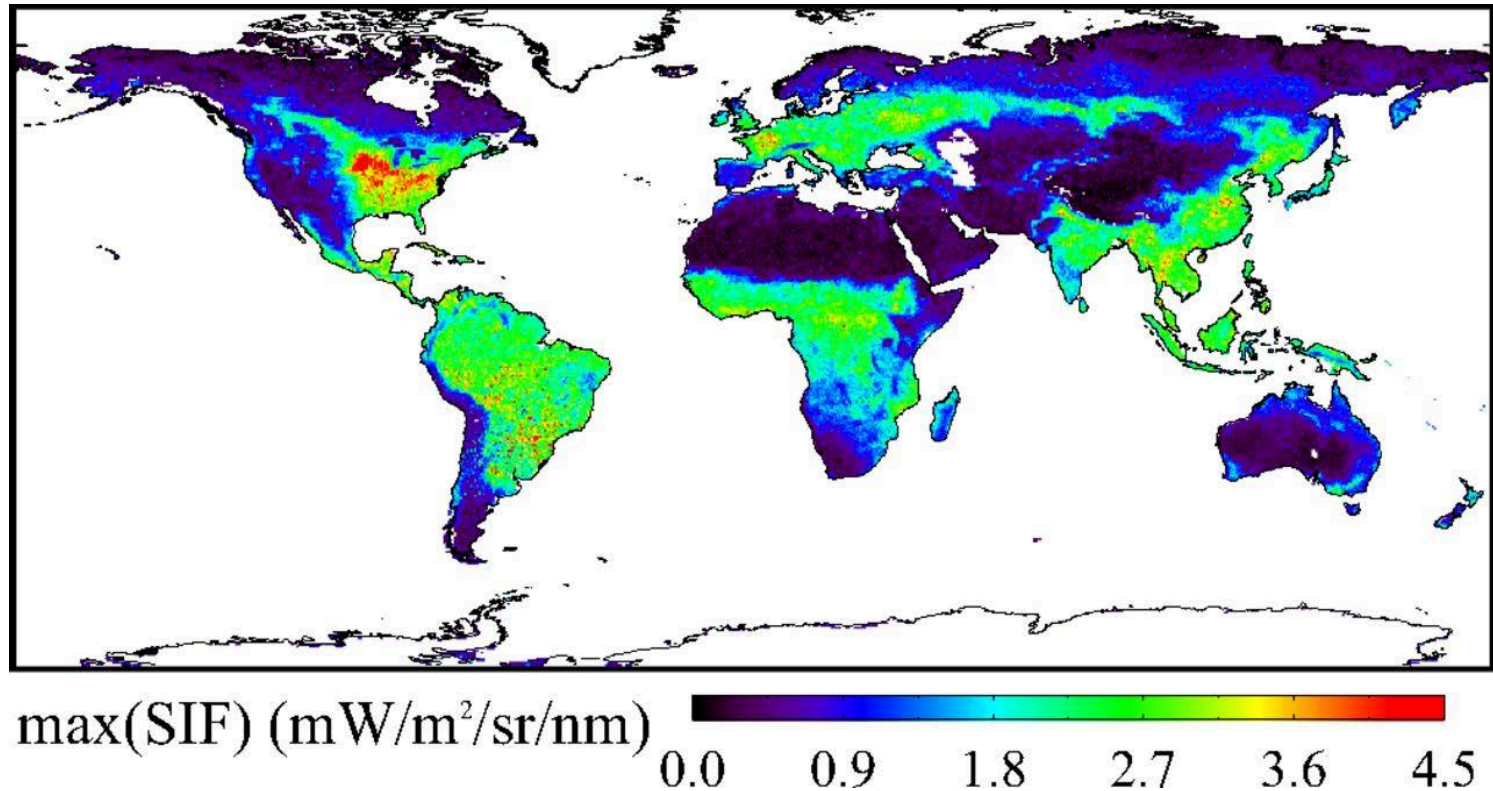
By: Jessica Rutkoski



Outline of Presentation

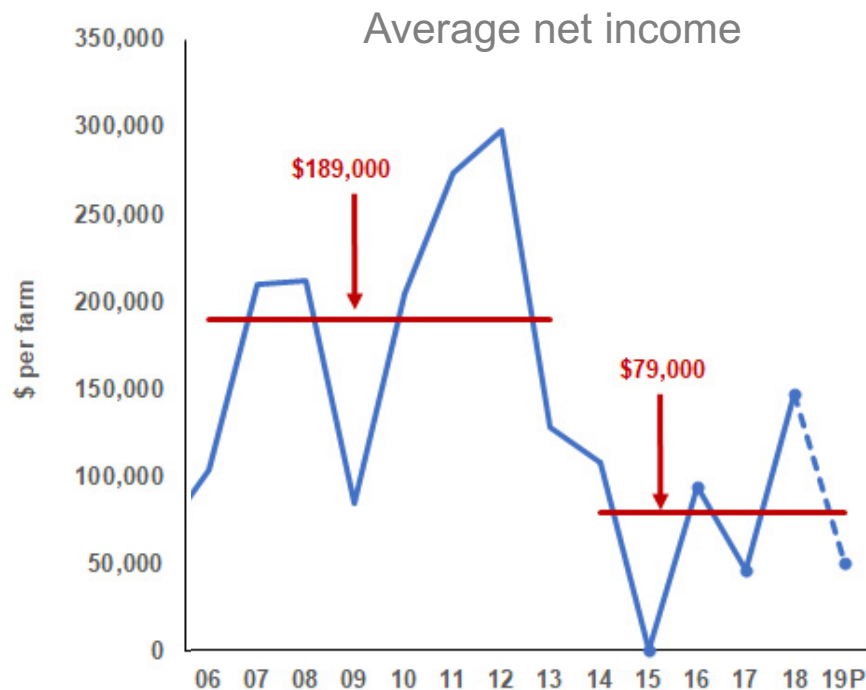
- Introduction
- University of Illinois Small Grains Program Overview
- Tips on Variety Selection

The US Corn Belt is the Most Agriculturally Productive Region in the World



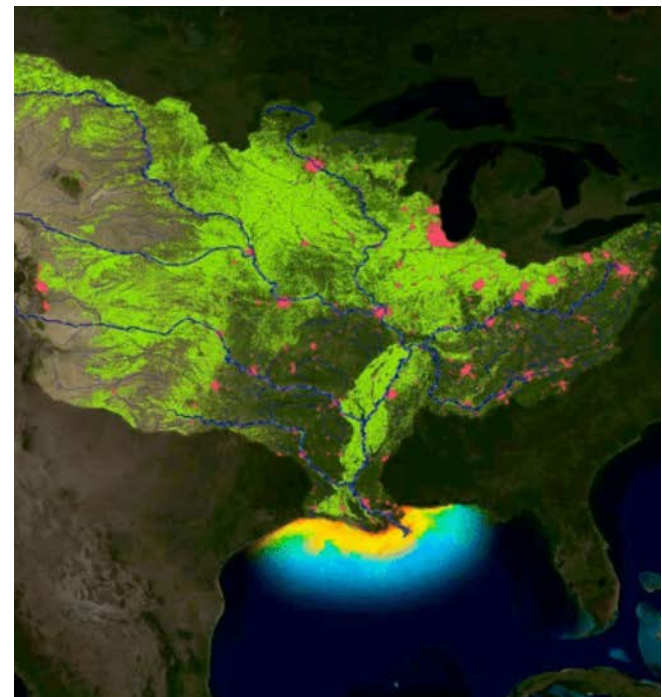
Corn Belt Farmers Face Serious Challenges

1) Profitability



Source: farmdoc

2) Environmental concerns



Small Grains are Part of the Solution

Rotations including small grains *vs* Corn-soybean rotation

Equal overall profitability

Greater profit stability

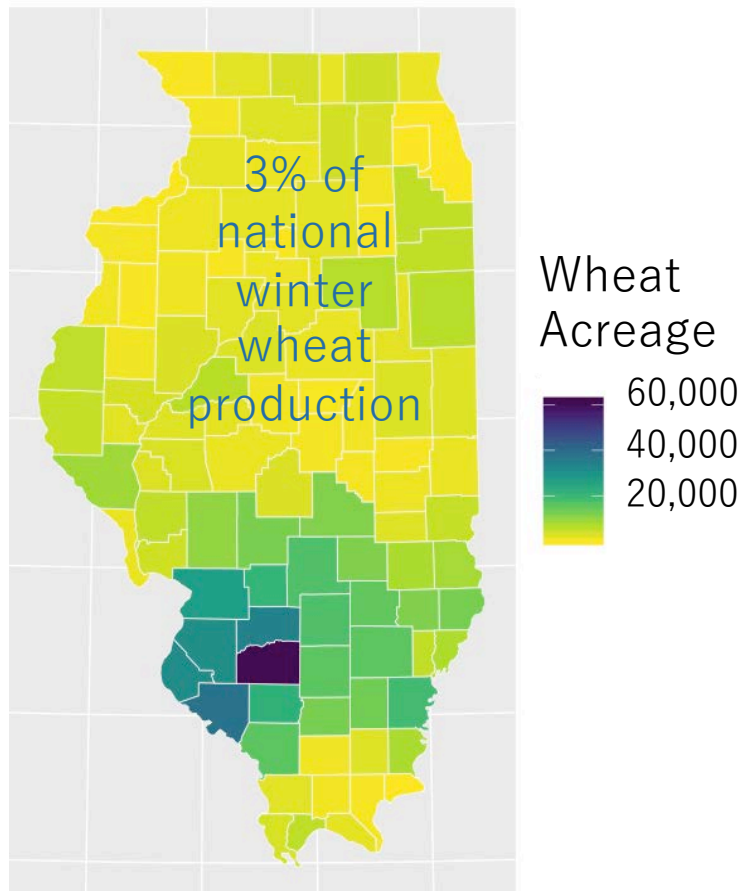
200x less freshwater toxicity

Less agrichemical use

Equally effective weed control

Small Grain Production in Illinois

Wheat Acres



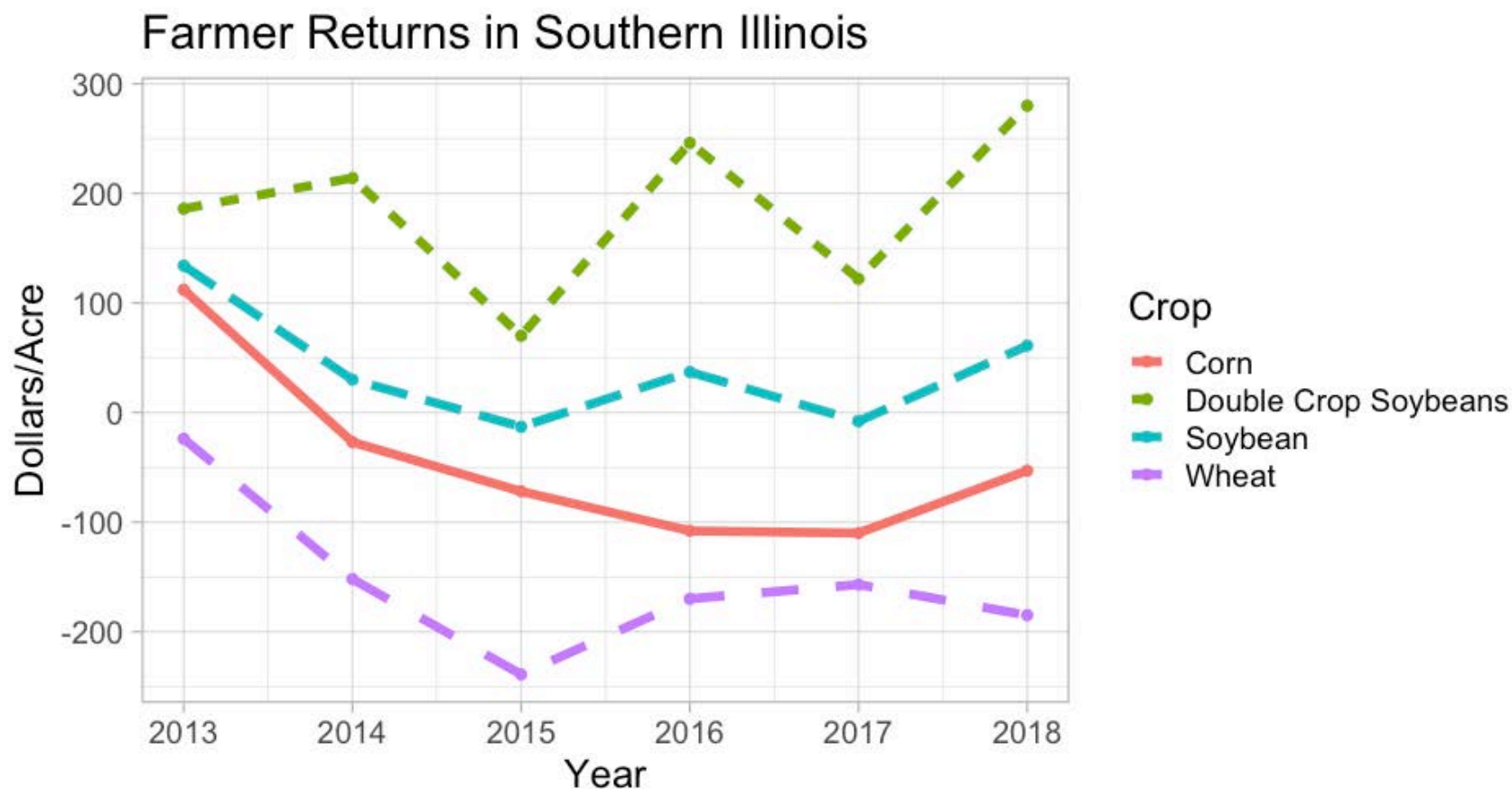
<https://www.nass.usda.gov/>

Wheat Double Cropping with Soybean



Photo: <https://www.ilsoyadvisor.com/>

Profitability of Wheat/Soybean Double Cropping



Small Grains Breeding at Illinois

Our Mission: Develop varieties that:

- Improve farm income
- Support greater cropping system diversity



Wheat



Oat

Special Thanks To:

Olivia Handal-
Research Specialist



Elias Handal- Senior
Research Specialist

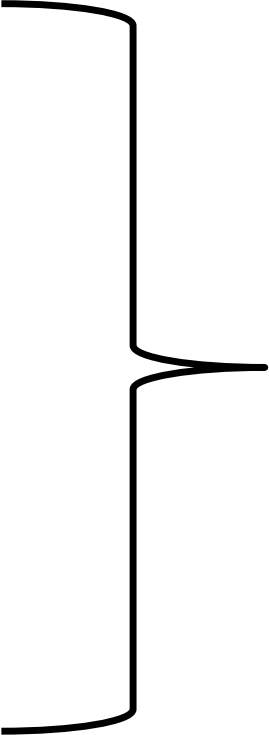


Juan Arbelaez- Assistant
Professor-International Plant
Breeding, leading oat and rice
breeding



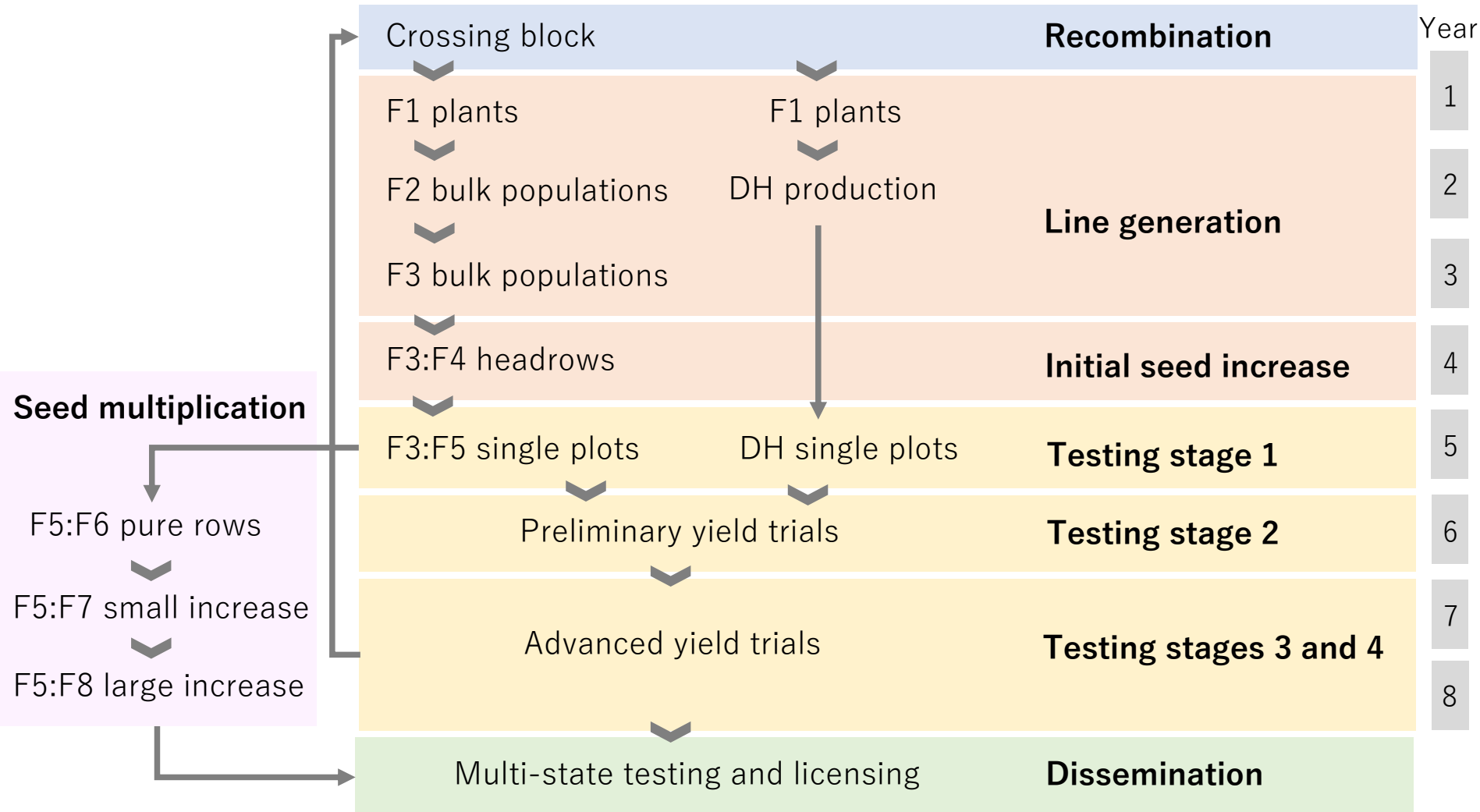
What Traits We Target

- High Yield
- Early maturity
- Low vomitoxin
- High test weight



Higher profits
when double-
cropping

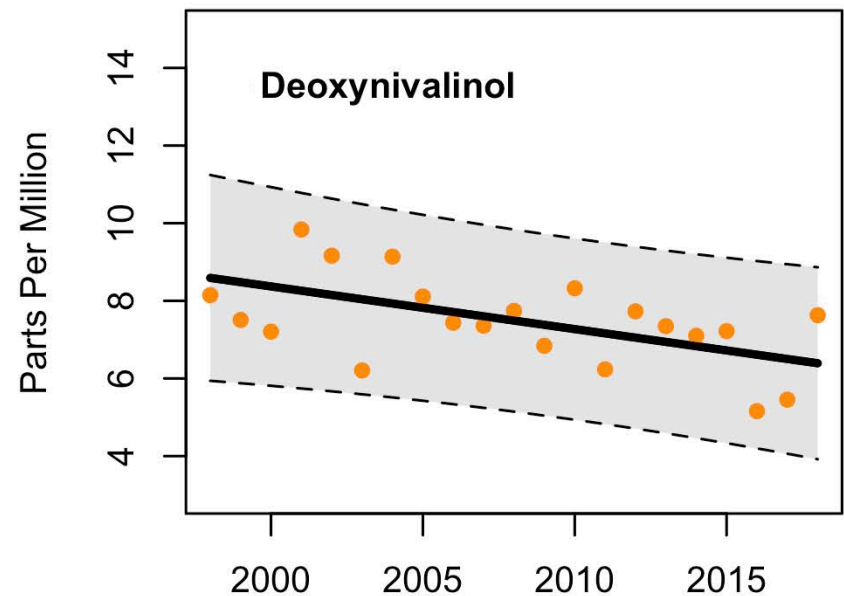
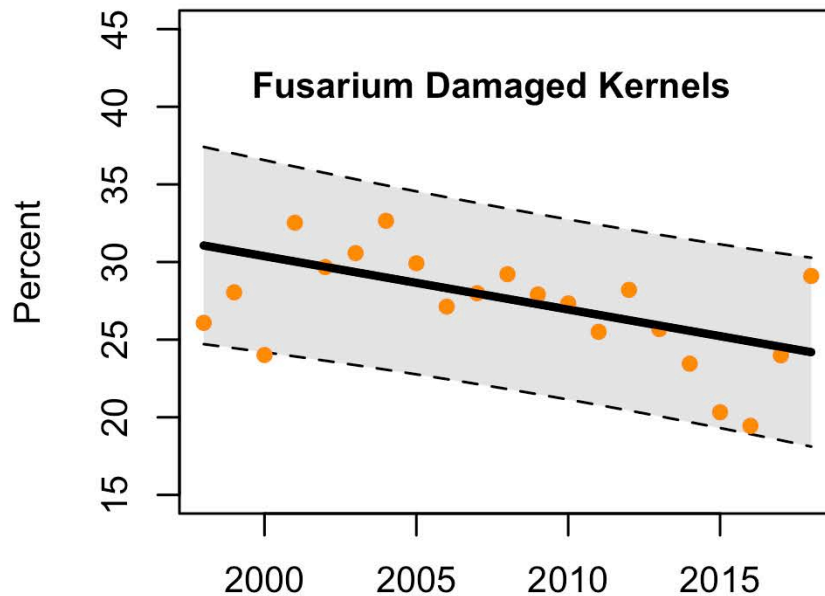
Our Breeding Process



Varieties Keep Improving Every Year

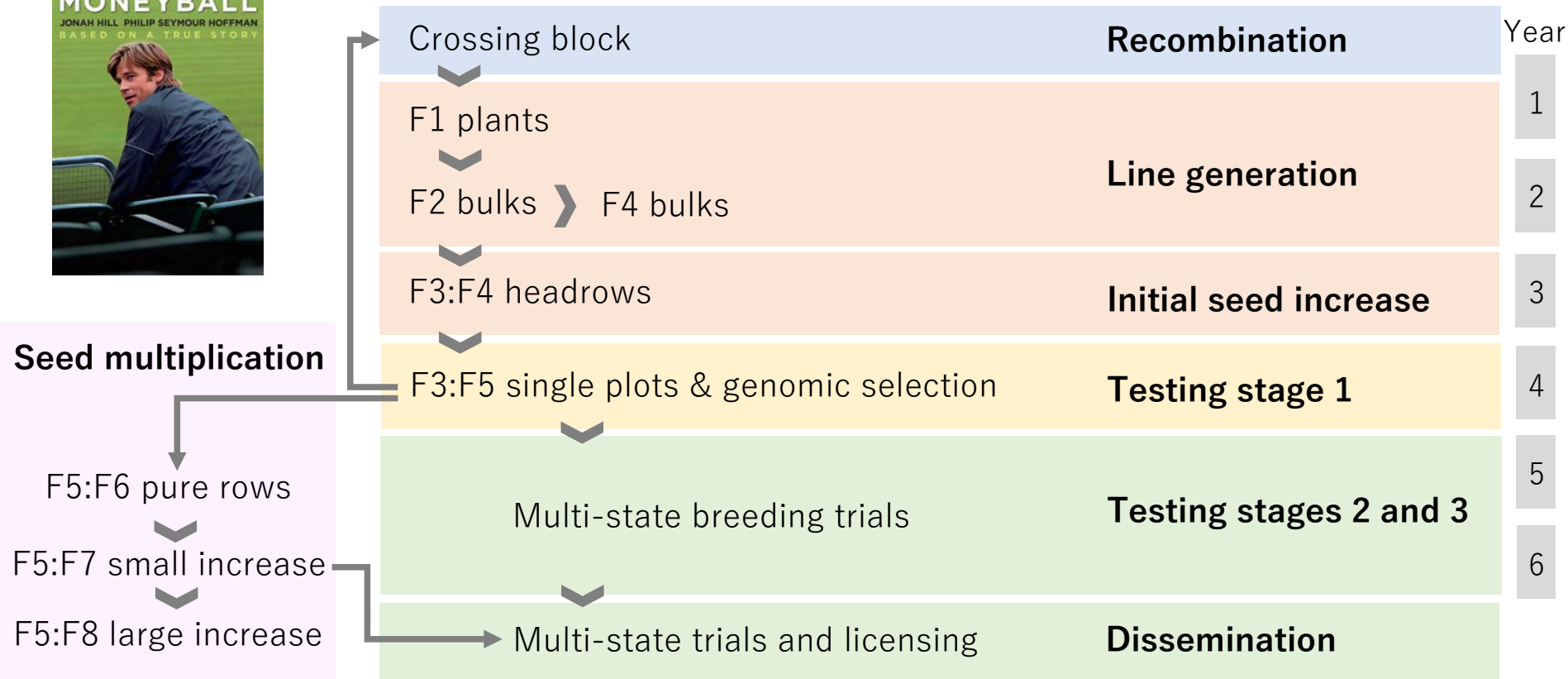
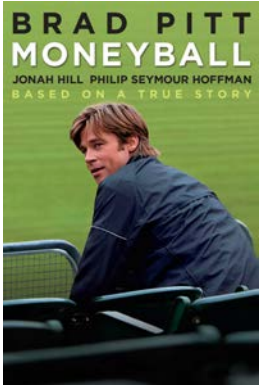
1.09 % reduction in FDK per year

1.28 % reduction in Vomitoxin per year



Year

Accelerating the Breeding Process



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Choosing a Variety: What to Consider Besides Yield

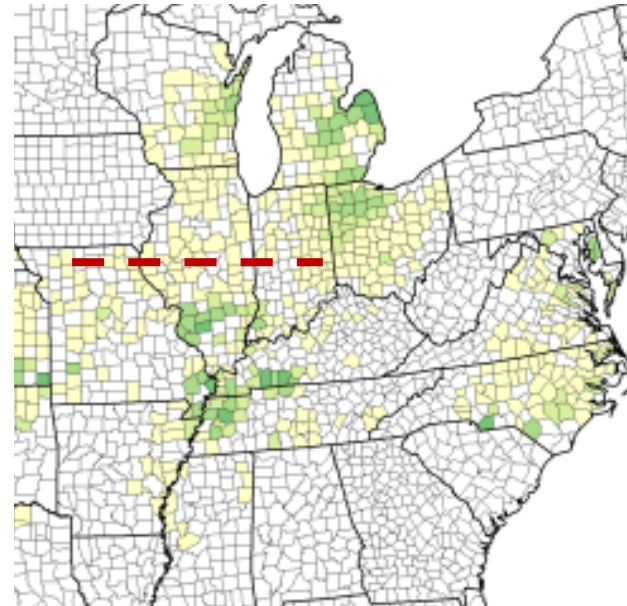
- What are the quality requirements of your target market?
- Is early maturity a priority?
- What diseases tend to be a problem?
- Is more or less straw desirable?

Statewide Varieties Trials for Winter Wheat

- Illinois:
<http://vt.cropsci.illinois.edu/wheat.html>
- Kentucky:
<http://www.uky.edu/Ag/wheatvarietytest/>
- Wisconsin:
<https://coolbean.info/small-grains/variety-trial-results/>
- Missouri:
<https://varietytesting.missouri.edu/wheat/results.htm>
- Ohio:
<https://www.oardc.ohio-state.edu/wheattrials/>

Emphasize Results from Your Region

Look at multi-location and multi-year performance within your region and at similar latitudes



Credit: USDA

Interpreting Trial Results

- **Mean or Average**- Combines data across locations, equally weighted.
- **LSD**- How different two varieties need to be in order to say that they are actually different.
- **CV**- The level of noise in the data, $CV < 20$ is considered good.

Example: Comparing Variety Yields

- Top Yielder in Southern Illinois in 2019: CP9606 with 100.2 bu/acre
- The $LSD = 6.1$
- Thus, varieties 94.1 bu/acre or higher were as good as CP9606 in terms of yield



Compare Yields Within Maturity Group

- Later maturing varieties get an advantage
- Compare early varieties with other early varieties



Photo credit: @MStateCorn

Interpreting Scab Resistance Data

- Always compare the ratings with those of check varieties
- Choose varieties with Scab ratings equal or lower than the moderately resistant check



In Summary

- Small grain breeders are producing a steady stream of improved varieties for you to choose from.
- Consider multiple factors when choosing varieties.
- Statewide variety trials can help guide decision-making.

Acknowledgements

- Fred Kolb
- Olivia Handal
- Elias Handal
- Juan Arbelaez
- Student workers



U.S. Wheat & Barley
Scab Initiative



**Agricultural
Research
Service**

Summer Job / Internship

Small Grains Breeding

Department Of Crop Sciences, University Of Illinois



Questions

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