# IPREFER

## Integrated Pennycress Research Enabling Farm & Energy Resilience

Winthrop B. Phippen, Project Director

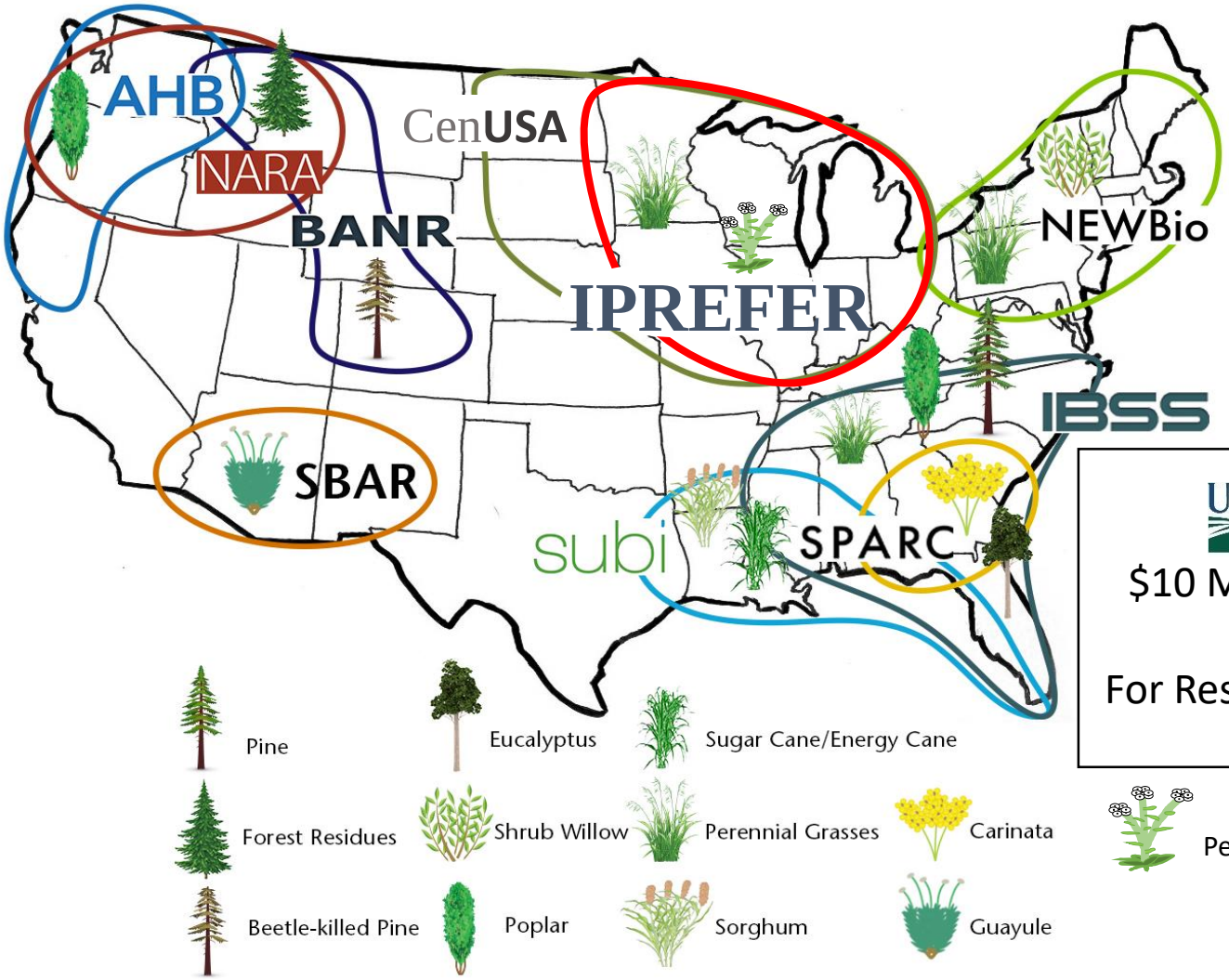
CAAFI Webinar - June 16, 2021







# National Institute of Food and Agriculture - Coordinated Agriculture Projects

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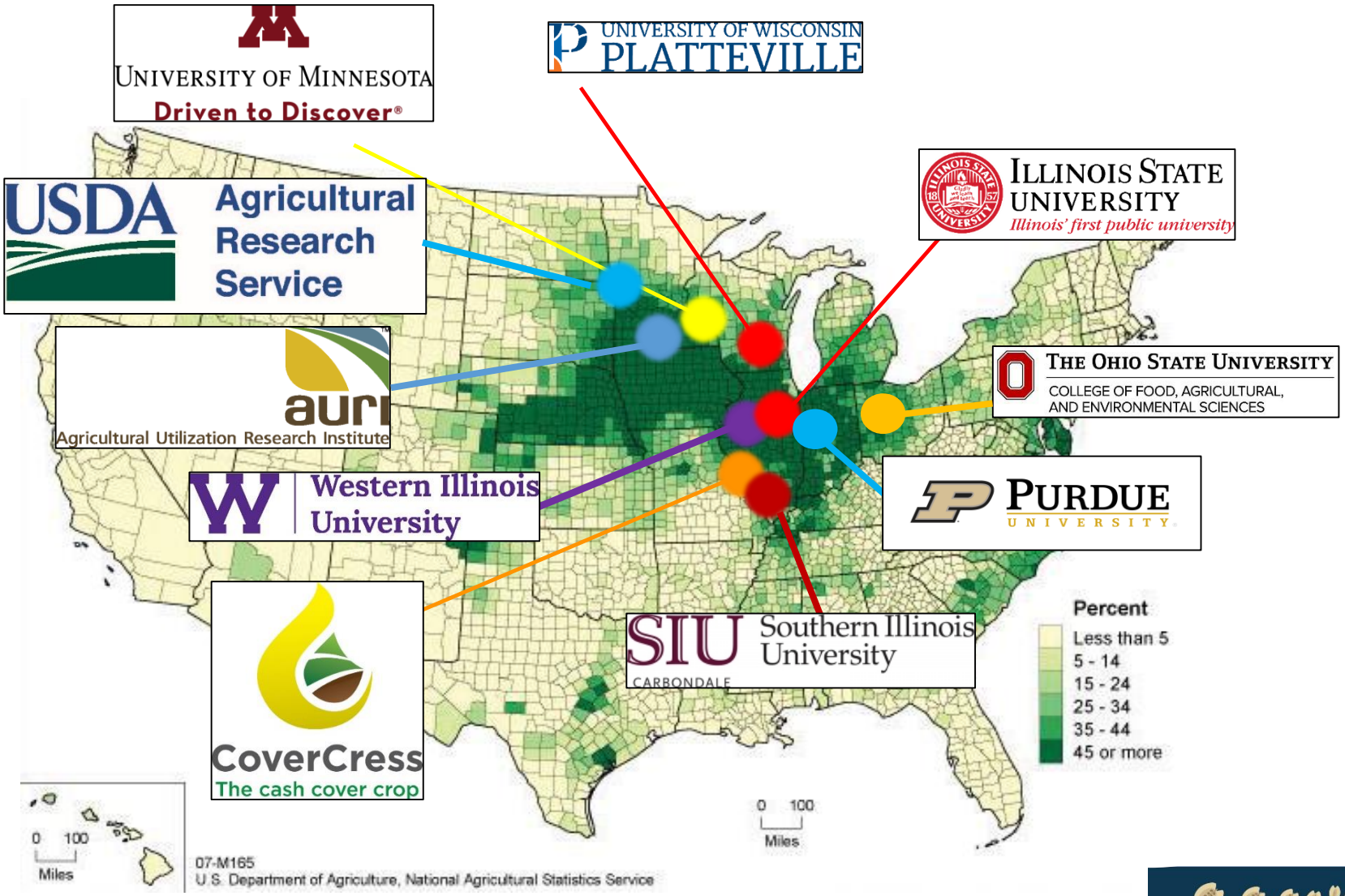
$10 Million SAS CAP Grant
2019-2024
For Research, Education and Outreach

Pennycress

# Pennycress collaboration

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# Integrated Project

**Mission:** Optimize off-season pennycress oilseed production by overcoming production and supply chain bottlenecks.

- **Research**

  **Breeding/Genetics**- Advance breeding lines, identify and integrate new traits

  **Agronomy/Crop Management** – Crop establishment, rotations, SCN, seed treatments

  **Ecosystems Services** – Impact of pennycress as a cover crop, pollinator health

  **Supply Chain** – Processing, stability, conversion, seed handling tools for producers

- **Outreach/Extension/Education**

  **Illinois Farm Bureau –** link to producers

  **4-H and FFA programming –** educating new farmers

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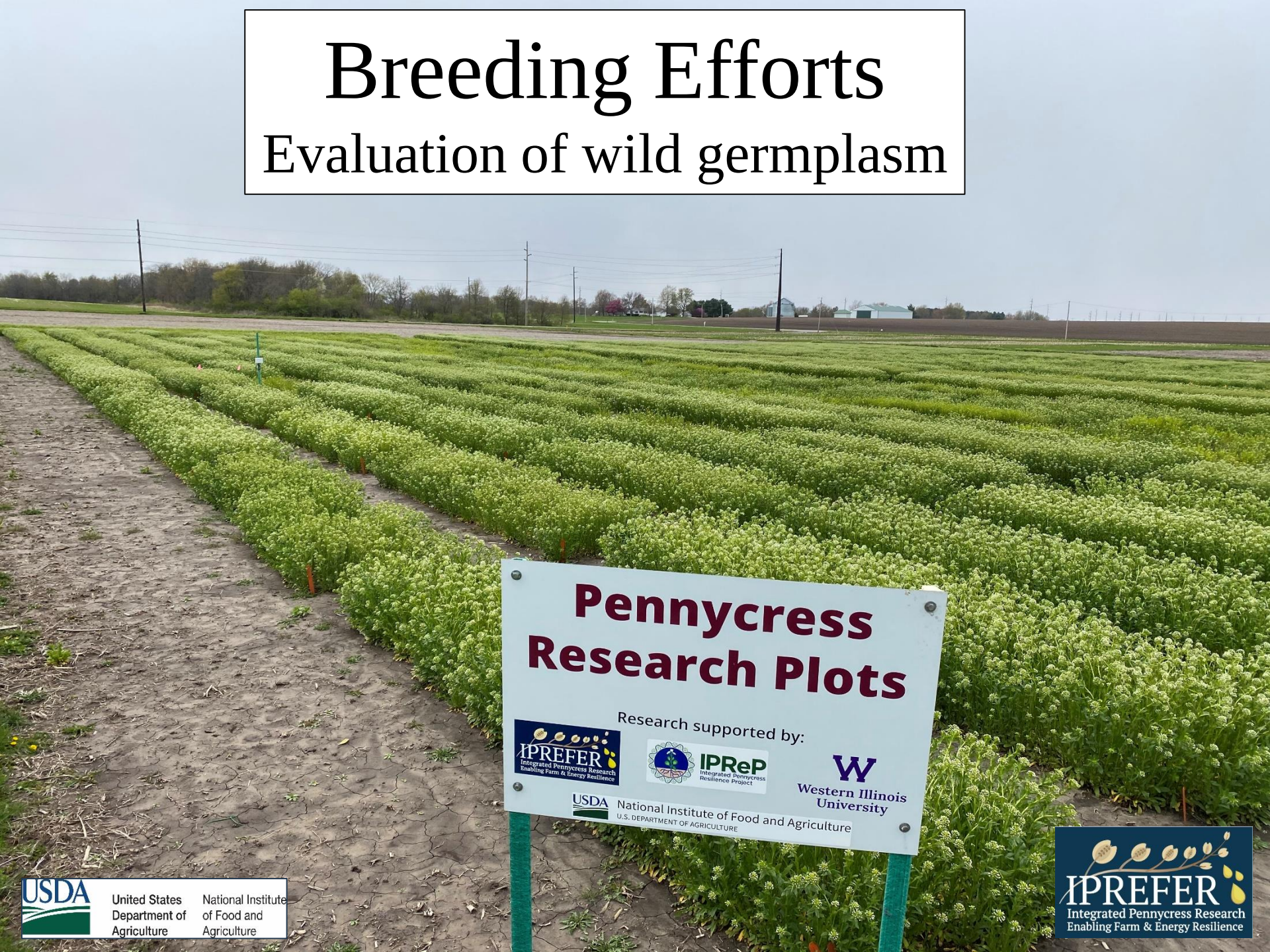
# Breeding Efforts

## Evaluation of wild germplasm



# Changed common weed into a novel oilseed crop through extensive R&D efforts

***Golden Grain Pennycress / CoverCress is as divergent from Field Pennycress as Canola is from Oilseed Rape***

**Field Pennycress (Thlaspi Arvense L.)**
***Common Weed***

8+ Years of Breeding, Selection, Gene Editing and Field Trials

**Golden Grain Pennycress / CoverCress™**
***Novel Oilseed Crop***

| | |
|---|---|
| ~25-30% Total Oil | ~30-32% Total Oil |
| >35% of Oil = Long Chain, Unhealthy Erucic Acid | ZERO Long Chain, Unhealthy Erucic Acid |
| Thick, Dark Seed Coat (Black) | Thin, Transparent Seed Coat (Golden) |
| Low seed germination rate (~30%-50%)/high dormancy | Immediate seed germination rate (>95%)/no dormancy |
| 500-1,200 lbs/Acre yield | 1,500-,2000 lbs/Acre yield |
| >40% ADF Fiber in meal/25% in seed | ~20% ADF Fiber in meal/14% in seed |
| ~25% Crude protein | ~30% Crude Protein |
| Early June maturity | Mid-May maturity (5 to 10 days earlier) |


Superior plants with improved germination and stand establishment
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# Early Maturity and Crop Uniformity

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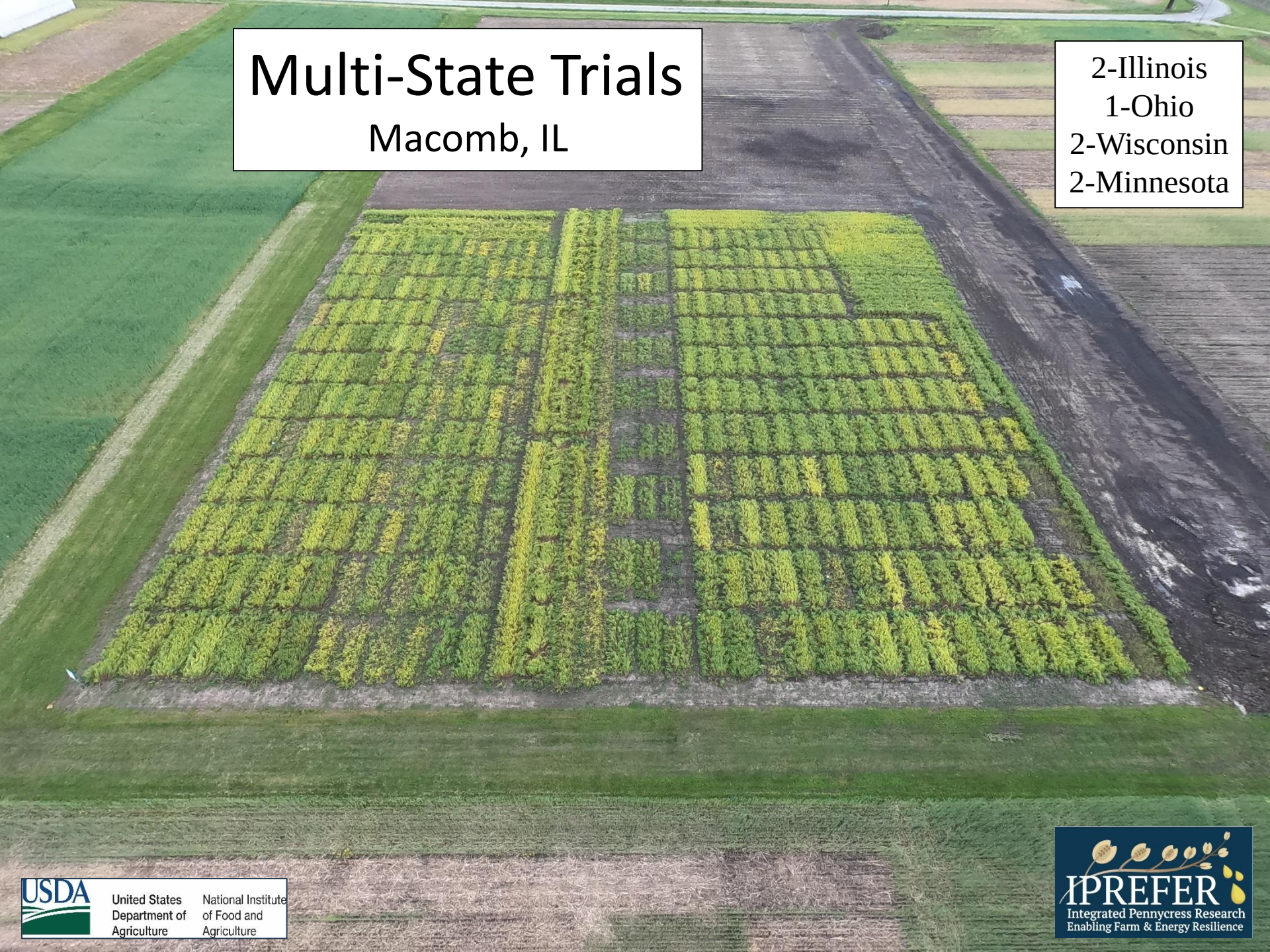
# Multi-State Trials

Macomb, IL

2-Illinois
1-Ohio
2-Wisconsin
2-Minnesota



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# Agronomy

Pennycress adds both economic and ecological value without disrupting corn, soybeans, or ecosystems

Corn

Soybean

1,500 lbs seed/acre = $218/acre seed value

Goal: 3 million acres by 2030 = $0.5 billion/year crop

Harvest with same equipment as used for soybeans

# Ultra-low carbon intensity score projected when both direct (LCA) and indirect (ILUC) impacts are combined

Preliminary

**Life Cycle Associates**

LCA.6143.1.2019

**Table 3.** The CI of CoverCress™ biodiesel production.

| | CI (g $CO_2$e/MJ) |
|---|---|
| Final CI | 30.23 |

- ✓ Direct score of 30 will be reduced by a negative ILUC score
- ✓ Includes crop and fuel production

**Carbon intensity score for several fuel sources:**

| Fuel Source | Biodiesel, Waste Grease | Electricity | Bio-LNG | Renewable Diesel Tallow | Ethanol, Sugarcane | Biodiesel, Canola |
|---|---|---|---|---|---|---|
| Carbon Score | 18.12 | 31.58 | 65.81 | 29.96 | 51.04 | 57.84 |

| Fuel Source | Biodiesel, Soybean | Ethanol, Corn | CNG | Propane | Car Gasoline | Diesel |
|---|---|---|---|---|---|---|
| Carbon Score | 58.25 | 69.89 | 79.93 | 83.05 | 100.77 | 101.65 |

# Introducing a new cash crop for the Midwest!

March 24, 2021

The First ‘Cash Cover Crop’ Edges Closer to Commercialization
CoverCress Inc. announces $8 million in partner funding for new low carbon oilseed

(ST. LOUIS) – Midwestern farmers are one step closer to the prospect of growing a new cover crop that will generate a cash margin while supporting regenerative agriculture. CoverCress Inc. announced it has raised another $8 million to fund its final stage of crop development and scale up for its first commercial planting for the fall of 2022.

Bunge Ventures Ltd., the venture capital arm of the leading global agribusiness and food company Bunge (NYSE: BG), led the Series B-1 financing round. REG Ventures, LLC, a subsidiary of Renewable Energy Group, Inc. (Nasdaq: REGI), a leading U.S. producer of biodiesel and renewable diesel, was another new strategic investor.

The innovative company is developing a new winter oilseed crop under the CoverCress™ brand. It’s planted near corn harvest, and harvested immediately before soybean planting, enabling three full season crops in two seasons. Derived from field pennycress, a native winter annual, the low carbon intensity oil from the plant represents a new scalable source of material for producing fuels like renewable diesel, biodiesel and sustainable aviation fuel.

# Transitioning from an R&D focused business to a commercial scale business

**Farmer & Field**

- ✓ Building initial farmers to watch crop in 2020-22 for fall 2022 planting
- ✓ Aim for 250-500 farmers to grow up to 50K acres in fall 2022 planting

**Seed & Grain**

- ✓ Building multiple partnerships for grain collection with existing local elevators
- ✓ Partners for quality seed production
- ✓ Services including delivery to end-users

**Downstream Uses**

- ✓ Agreements for supply of CC-WG as feed ingredient
- ✓ Develop strategic partnerships for longer term crush/oil and meal use

- ➢ Out of the 30M acres in our market, we see 1/3 of those acres as our addressable market and forecast being on 1/3 of those acres by 2030
- ➢ We will initially go to market with CoverCress Whole Grain (CC-WG) as a feed ingredient for broiler chickens (2021 – 2024)
- ➢ Our long-term opportunity is CoverCress FLEX (CC-FLEX) to crush for ultra-low CI oil feedstock and high protein meal markets (2024 and on)
- ➢ We are building partnerships to complete the path from farmer to the user of the grain

# Commercial seed increase

Arenzville, IL

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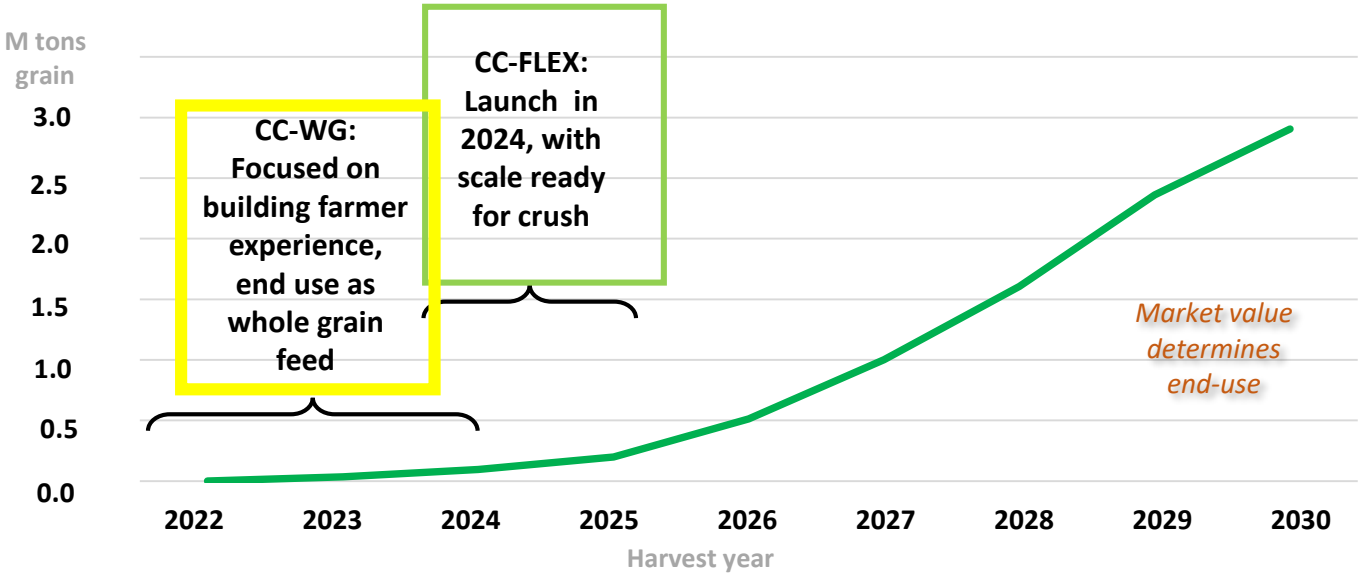
Harvest yield ranged from 1,900 to 2,400 lbs/acre

# CoverCress Product Release Timeline

Our plan allows for time for farmers to see before they adopt




**30M acres**
(Southern Midwest)

Eco Systems Services?

Questions?