

Fallow season cover crops in Mid-South agriculture production

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Producer questions in Louisiana

- What cover crop(s) should I use
- Plant and termination timing and management
 - Biomass and nutrient production
 - For example - corn – Feb 1
 - Rotations
- Weed and disease control
- Wet soils

What cover crops have we tried...

- Legumes
 - Clovers
 - Winter pea
 - Hairy vetch
 - Sunn Hemp
 - Cowpea
- Grasses/Small grains
 - Wheat
 - Cereal rye
 - Black oats
 - Triticale
 - Sorhum/Sudan
- Brassicas
 - Tillage radish
 - Canola
 - Turnips
- Others
 - Chicory
- Corn
- Soybean
- Cotton
- Sugarcane
- Rice
- Rotations
- Rangeland



Google Earth

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

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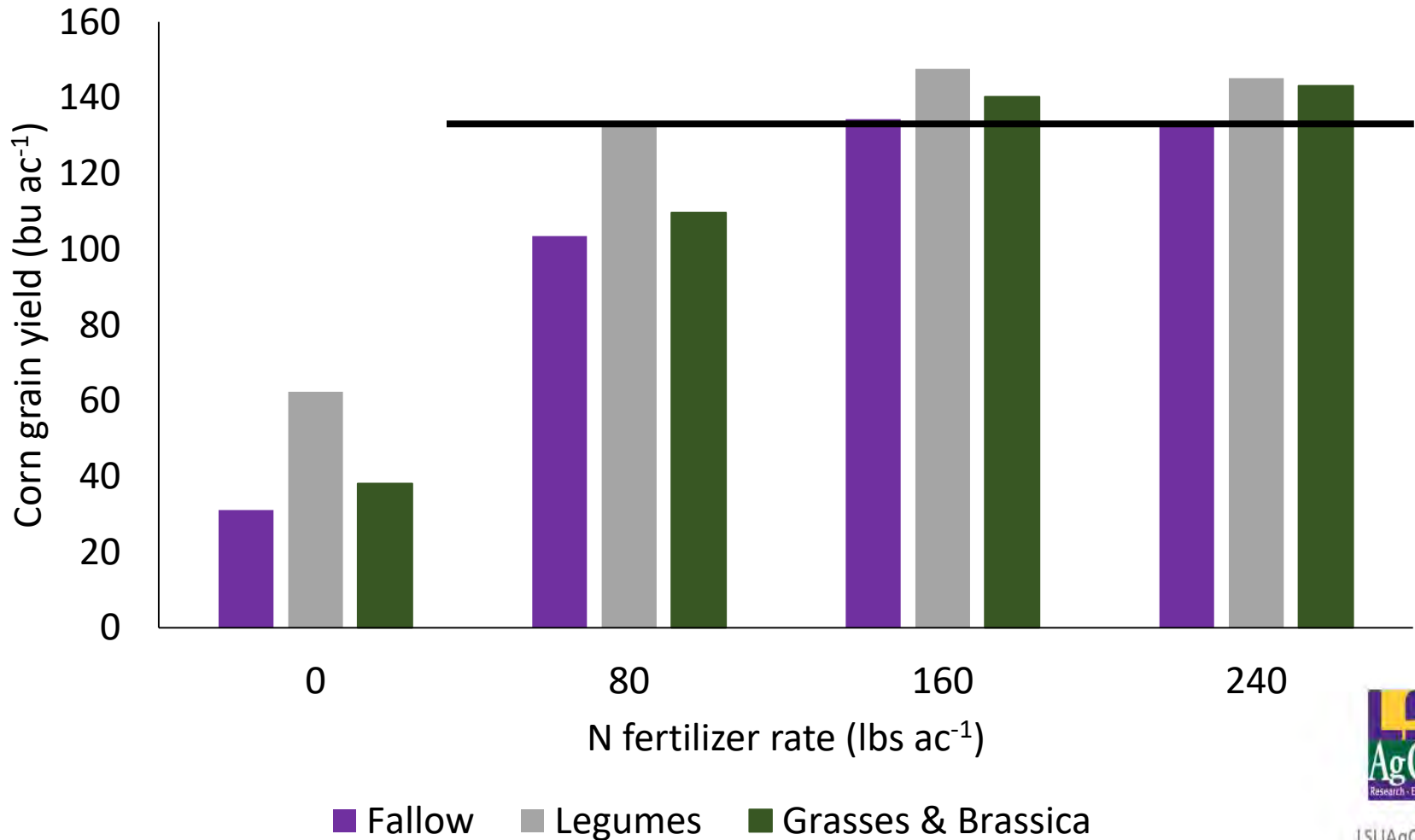
Image Landsat / Copernicus

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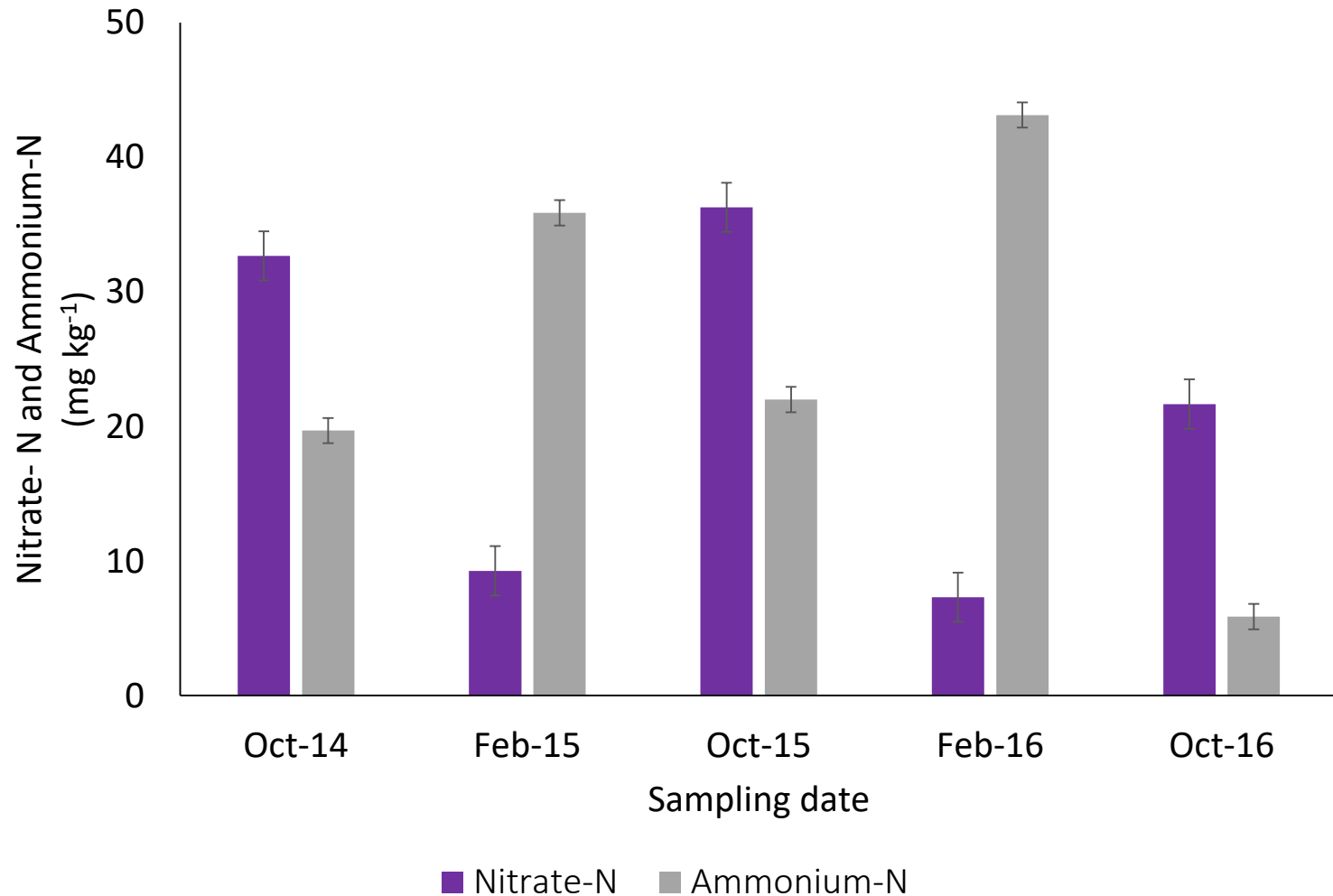
5 years of cover crops, no nitrogen fertilization, and conservation tillage

- Increased SOM 29%
- Legumes
 - Decreased soil pH
 - Increased soil moisture
 - Greater nitrate-N (22%) and ammonium-N (9%)
 - Increased C cycling enzyme activity
 - Larger populations of saprophytic fungi
- Grasses & Brassicas
 - Greater K, Ca, Mg
 - Increased total microbial biomass
 - Larger populations of AMF

Legumes supplemented N fertilizer applications

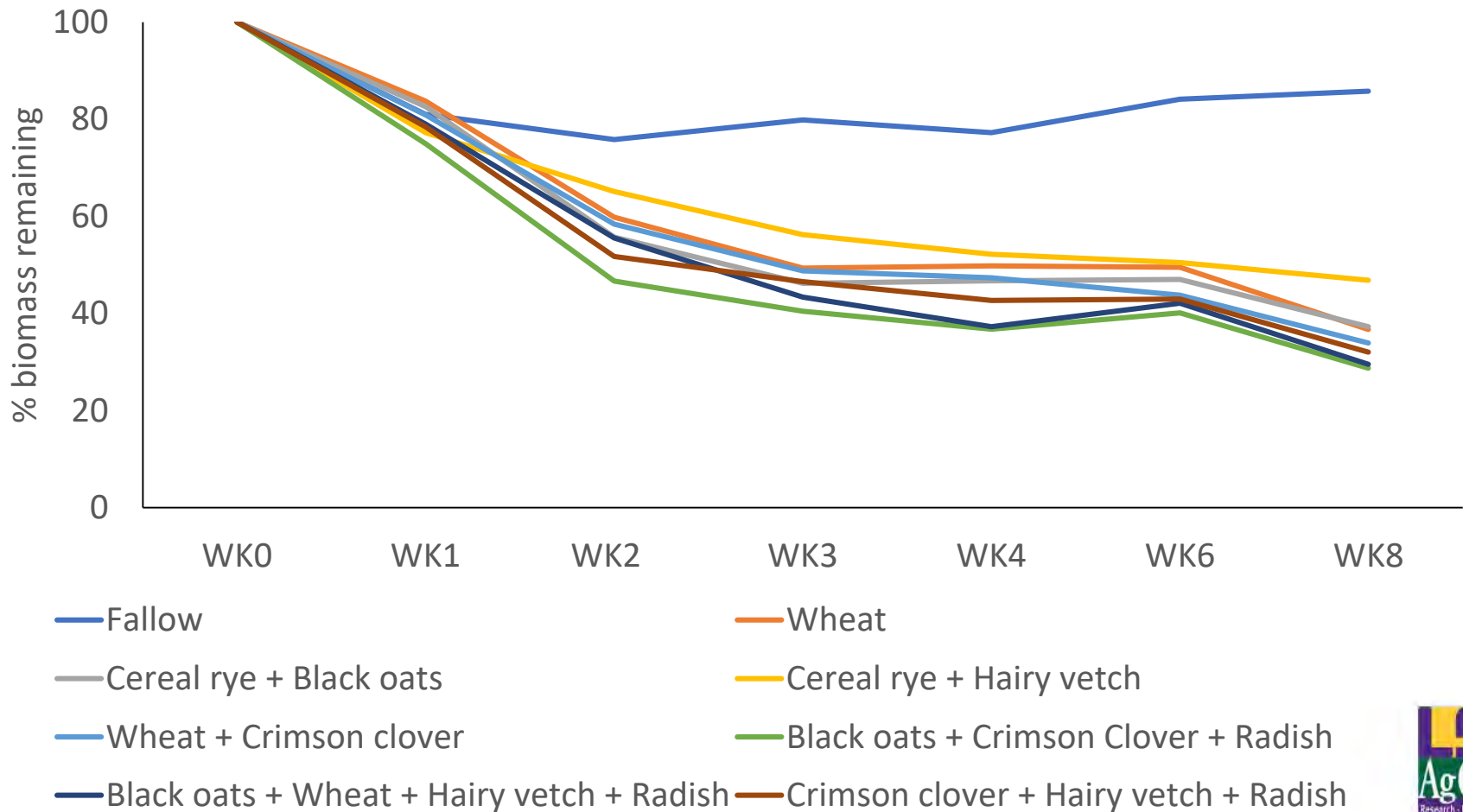


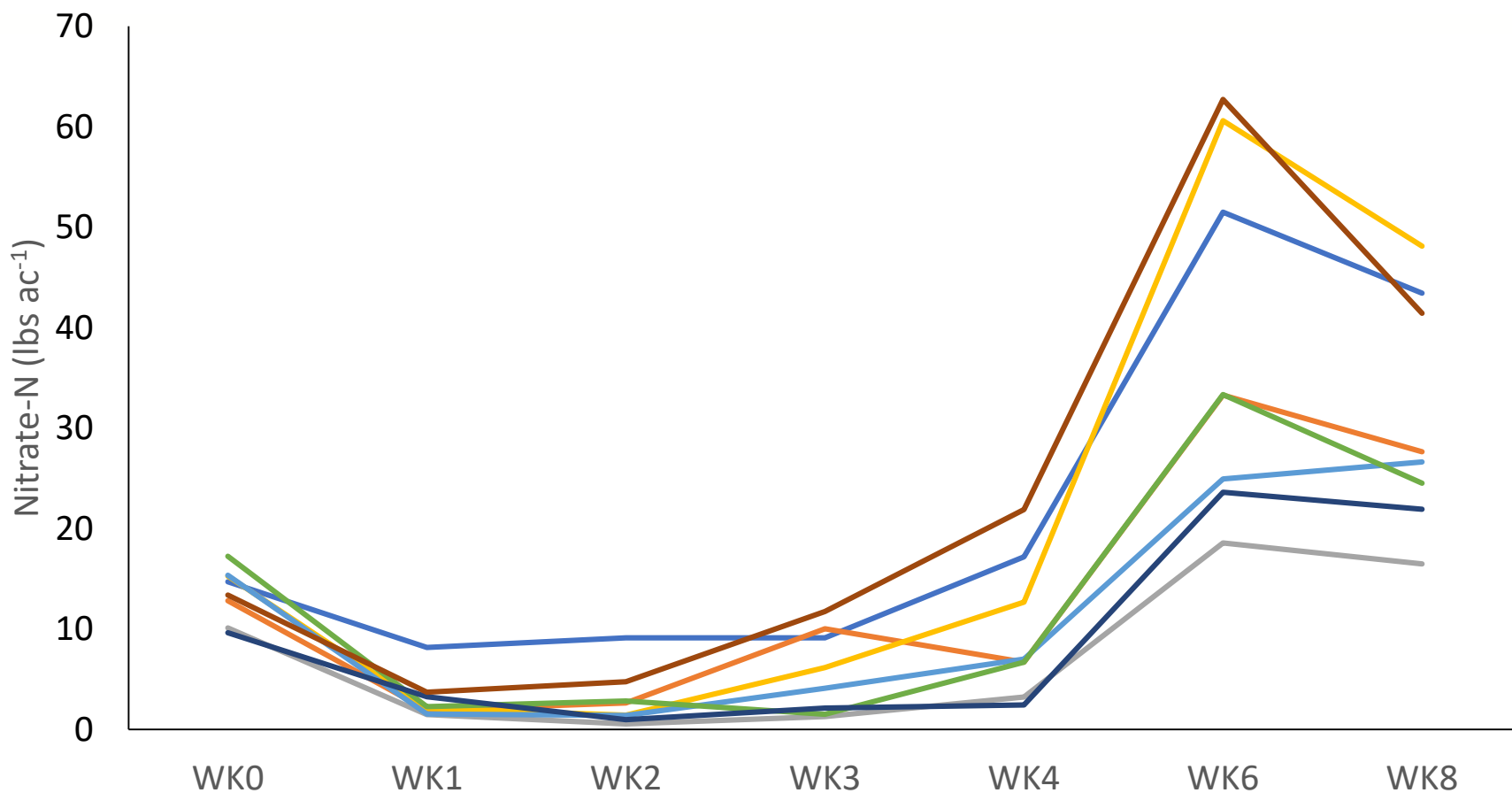
Cover crops are scavenging N





Biomass degradation

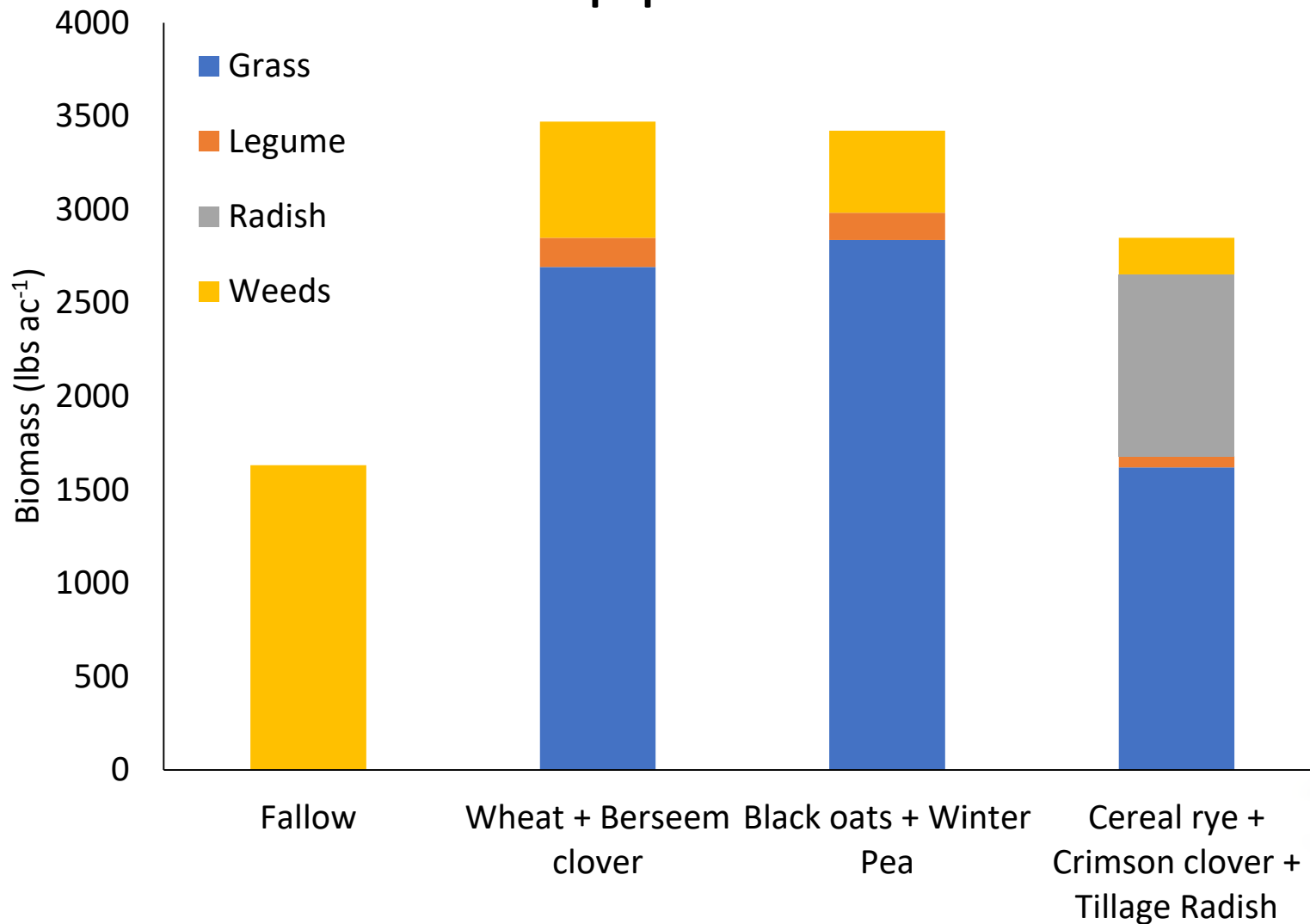




- Fallow
- Cereal rye + Black oats
- Wheat + Crimson clover
- Black oats + Wheat + Hairy vetch + Radish
- Wheat
- Cereal rye + Hairy vetch
- Black oats + Crimson Clover + Radish
- Crimson clover + Hairy vetch + Radish



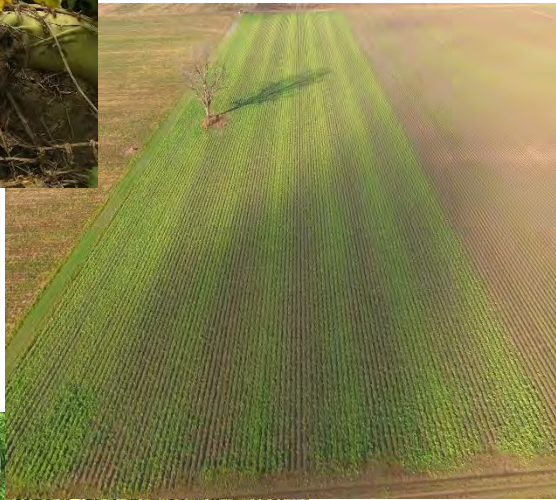
Biomass production and weed suppression

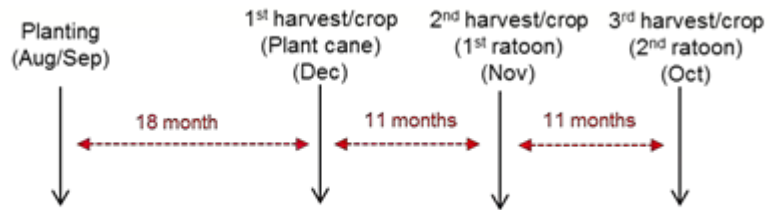


On-farm demonstrations

- 2016 – Conservation Innovation Grant
 - 10 acres of polyculture cover crops per demonstration
 - 16 producers with 19 demonstration fields
- 2018 – Louisiana Conservation Innovation Grant
 - Cover crops in a rice/soybean rotation
- 2019 – Taylor Foundation Grant
 - 2 on-farm demonstrations of Best Management Practices

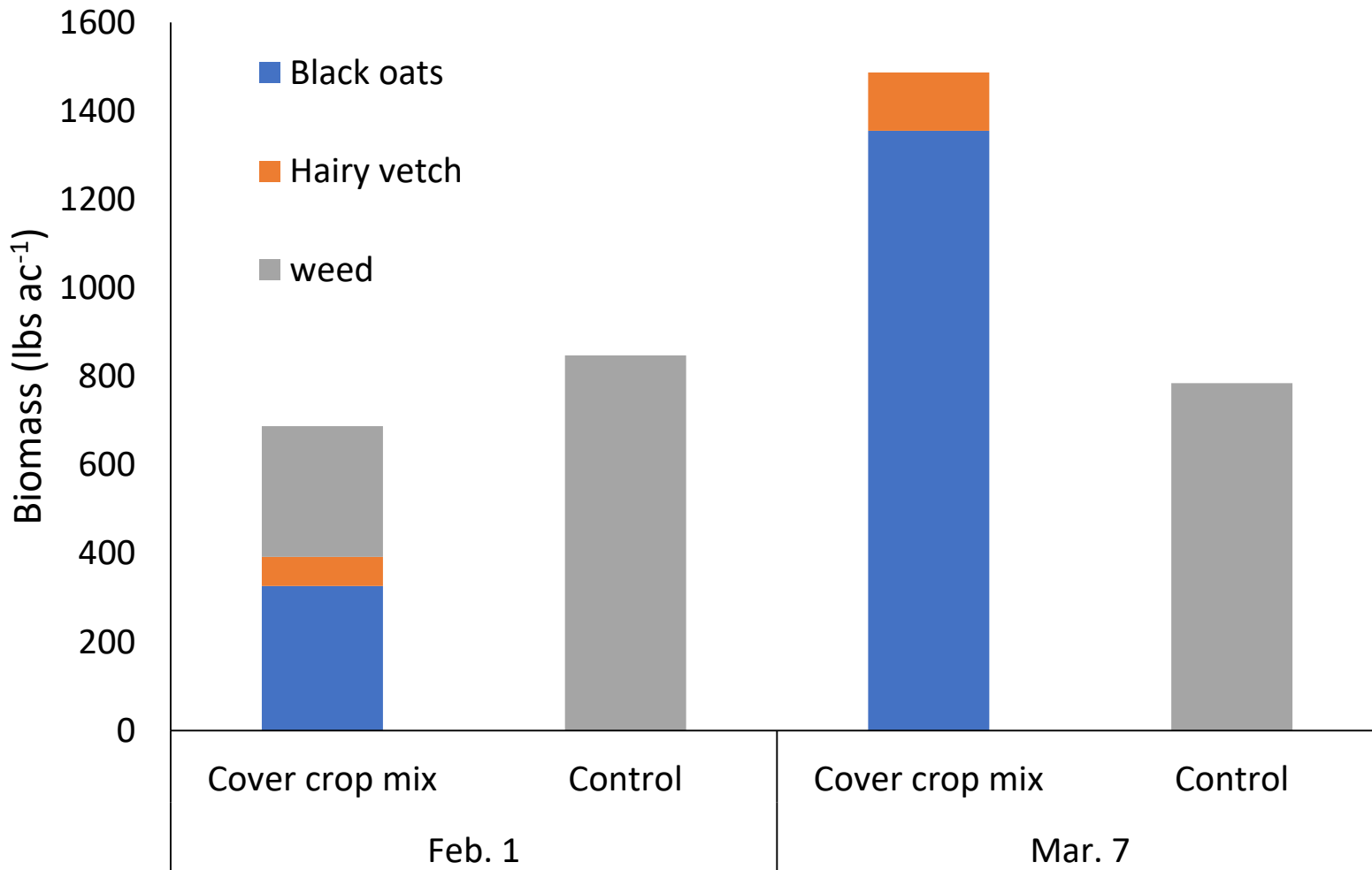








Weed suppression and continued cover crop growth



On-farm trials – Corn & Soybean

- Yields ranged between -9 and +18 lb ac⁻¹
- Insecticide seed treatments
 - Improved stands of corn, cotton, and soybean following cover crops
- Runoff water quality
 - Decreases in turbidity, total suspended solids, and total dissolved solids
 - Greater nitrate and ammonium in cover crops

On-farm trials - Sugarcane

- Yield response was variable
 - Yield ranged from -5 to +7.1 tons ac^{-1}
 - Sugar yields ranged from -1,000 to +1,437 lbs ac^{-1}
 - When no N added +1,300 lbs ac^{-1}
- Delaying termination to March
 - Decreased stalk populations by $\sim 7,000$ stalks ac^{-1}

Posters

- #9 – Interaction of winter cover crops and nitrogen applications on corn grain yield, nitrate-N, soil enzymes, and soil microbial composition
- #16 – Evaluation of soil type and seeding rate on cover crop biomass and weed suppression
- #17 – Cool-season annuals effects on soil health in warm-season grass pastures and rangelands in the Mid-South central USA

Thank You
Questions??



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