Increasing oleic acid and decreasing saturated fat in sunflower lines

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Biography

- Ph.D (2006-2012) Plant Pathology, University of Kentucky
- Postdoc (2012-2015) Plant Pathology, University of Kentucky
- Research associate (July 2015-present) Dr. Brent Hulke lab, USDA

Projects underway

- Sunflower fatty acid genetics and molecular breeding
- Genomic selection modeling in oilseed sunflower
- Glandular trichome density genetics (QTL mapping) in sunflower (paper in draft)

Progress on fatty acid genetics project

- Project proposed in 2013, but Postdoc (me) not hired until July 2015
- First field season (2015)
  - Grow out SAM population (210 lines, 10 X coverage sequenced)
  - Phenotyping of fatty acid composition of SAM population (association mapping)
  - Development of a biparental linkage mapping population segregating for saturated fat in a high oleic background (HOLS)

Progress on fatty acid genetics project

- We are running gas chromatography (GC) on the SAM population now (more than 400 samples, expected to be finished this month)
- Will run HOLS linkage population shortly behind
- Will use the SAM population data to do preliminary association mapping analysis to find fatty acid modifier genes (minor genes)

Future plans

- 2016 field season
  - Grow out SAM population again, normal and late planting dates to cause change in environment
    - Final association analysis including genotype-by-environment interaction
  - Grow out linkage mapping population
    - gather fatty acid data on each line
    - conduct linkage mapping of major saturated fat modifiers
    - compare association mapping with linkage mapping results
- 2017 and beyond?
  - Answer questions that remain about fatty acid inheritance – functional genomics
  - Develop breeding models to predict fatty acid composition of oilseed lines

New high oleic releases

- Four oilseed sunflower germplasms (2015)
  - HOLS1
  - HOLS2
  - HOLS3
  - HOLS4
- High oleic, with reduced saturated fat, in HA466 background
- These are parental materials for our linkage mapping efforts
- Currently available for distribution

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Dr. Hulke lab members

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Keegan Jones (biological sciences aid)

Funding agency

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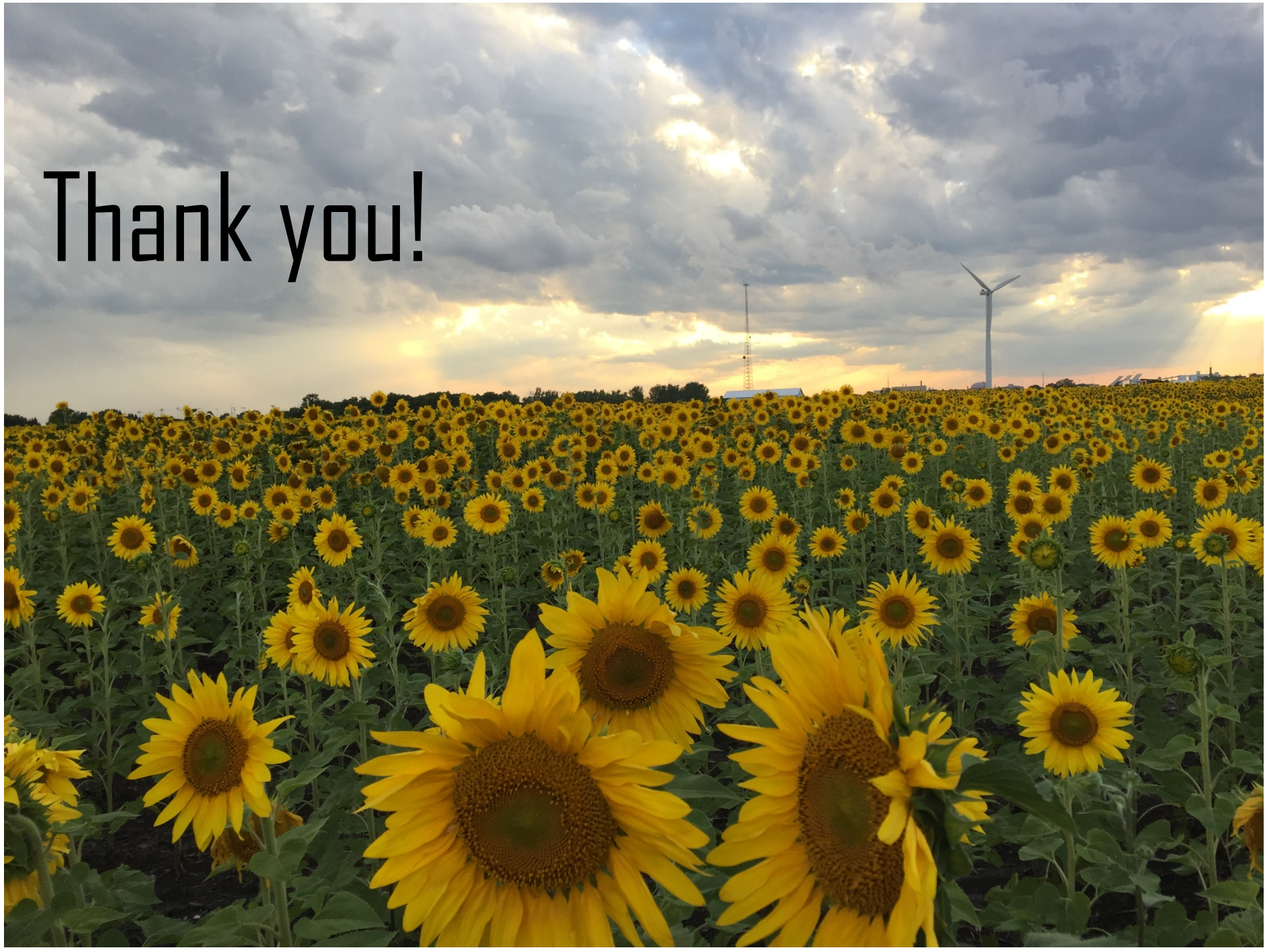
- National Sunflower Association (partial sequencing of SAM)
- National Sclerotinia Initiative (sequencing of breeding program)


Thank you!