

January
2020

Oat Global 2020

Mission

Oat Global is a public-private partnership committed to improving resilience, quality, and value of oat by coordinating precompetitive research, breeding and extension on a global scale.

Goals

- Coordinate global oat research, breeding and extension priorities and activities
- Facilitate communication across the worldwide oat community
- Advocate for and secure funding to support precompetitive oat research, breeding and extension
- Provide a platform for formation of public-private and public-public partnerships

Genomics

Near Term Goals, Genomic Selection in Oats is very important to push genetic gain forward.

- Design a pilot-scale SNP chip and assay representative breeding lines. Spring 2020
- Invest in a low-cost genotyping SNP chip to enable high-quality, quick turnaround data. Summer 2020
- Goal is to utilize predicted breeding values for new crosses in Fall of 2020
- Invest in a new genotyping array that combines multiple species together to drive the per-sample price down to a suitable level for breeders (The North Central Small Grains Genotyping Laboratory in Fargo, Dec 2020).

Long term goal, reference genome is essential to support molecular efforts

- Pick representative North American lines to contribute to global Oat Pan-Genome effort. Summer 2020
 - Collaborate with USDA.

High-density genotyping platform will be possible once we have reference genome information.

Phenotyping

Goals

- Explore near infrared (NIR) spectroscopy to improve the prediction of important oat biochemical components such as protein, oil, and beta-glucan, using recently purchased FT-NIR system (MPA-II, Bruker Scientific, LLC).
- Test application of NIR/IR imaging analysis system for rapid characterization of oat physical traits such as groat shape and plumpness, dehulling efficiency and groat percent in oat.
- Test new computer algorithms such as machine learning procedures for calibration of prediction models.
- Test the Single Kernel Characterization System (SKCS) for oat groat characterization.
- Compare rancidity between hullless and covered oat varieties.
- Expand quality evaluation of oat varieties.
- Provide quality data for genotyping samples upon request.

Seed Quality

Near Term Goals

- High throughput oat grain analysis
 - 1000s of samples at 10x speed at reasonable cost
 - 20 – 40,000 samples not likely in the near term
- Traits of interest (suggested, but not complete)
 - NIR – Bg, Fat, Protein
 - Mechanical: % Groat, Ease of dehull, breakage, plumps/thins/mids,
- Establish quality advisory committee
 - Standardized protocol for sample submission and analysis (range of measurements)
- Need to better coordinate oat quality analysis to build database of traits of interest
- Better coordination of oat quality with genomics/T3
 - Take advantage of public oat nurseries; ION (advanced lines), UOPN
 - Capture GxExM metadata around locations

Long term goals

- Novel/new utilization of oats
- High volume milling phenotypes of the ‘oat universe’
- Consumer Traits of interest

Oat Rust

Near and Long term goals

- Hire a Dr. Rines replacement to expand on germplasm work and introgression
- Duplicate rust samples to be placed in a second repository for back-up in case of critical failure
- Perform AgRenSeq to clone resistance genes in order to have “perfect” markers for selection
- Expand rust collection further requiring extensive travel
- Develop and fund multiple rust nurseries across the U.S.
- Expand and utilize international nurseries for sample collection (limitation here is APHIS regulations requiring all samples to be processed at Ft. Detrick most of the year (except for Dec. to Feb.))