Global Oat Genetics Database

Executive Summary

The global oat genetics and breeding community is ready to propel in the modern era of technology-based breeding and needs urgently a global data repository. The Triticeae Coordinated Agricultural Project (TCAP – www.triticeaecap.org) developed by the wheat and barley communities offers an opportunity for jump-starting this effort and aligning oat to these other two grain species. A group of interested parties has come together to discuss a tactical plan forward and requires sponsorship and financial support for execution by the oat millers and growers (short term) and public funding agencies (long term).

Vision Statement

By the end of 2014 the oat breeding and genetics community and the oat millers and growers will be able to share genotypic, metabolic, and phenotypic data in a shared global database. Every user will be able to contribute and access data from genetic studies, breeding populations, and field trials of oat varieties from all regions and public and private researchers.

This tool will enable open sharing of raw data supporting scientific publications, variety releases, and coordinated or individual trialing efforts. The outcome will be a networked and unified community that builds knowledge exponentially by rapidly embracing the "era of big data" and the most modern computational techniques.

Opportunity Statement

In the last five years, the oat breeding and genetics community has developed various datasets of genomic, phenotypic, and breeding information as an outcome of cooperative public/private research activities. The Collaborative Oat Research Enterprise (CORE) was the major initiative in North America resulting in the establishment of a genomic platform for oats. Meanwhile, multiple initiatives and research projects have developed more datasets in North America and Europe. These datasets are currently housed in different databases and access by the broad community is challenging.

Meanwhile the wheat and barley communities have joined efforts through the TCAP project in North America and have developed an integrated database that allows efficient sharing of data among researchers. The oat community aspires to align itself to the TCAP model and then grow and evolve the data management systems in parallel.

Objectives and Deliverables

1) Migrate the oat database from the Avena Toolkit to the TCAP platform and publish CORE data by the end of February 2014.
2) Create a database management capability within the TCAP group for support to the oat community. Appoint leadership responsibility to Drs. Jannink, Tinker, and Lazo and provide support for a Data Curator to manage the database.
3) Mobilize and engage the global oat community in the use of the database as unique and centralized repository of data and as a tool to enable public breeding and cooperative research. Ensure that all main oat research and key public trialing parties are utilizing the database by the end of 2015 as only official tool for data sharing.

Project Structure

The project will be managed through a Steering and Project Committees. Participation is proposed as follows:

- Steering Committee: Jack Okamuro (USDA-ARS), Gabe Gusmini (PepsiCo), Joe Lutz (General Mills), Bruce Roskens (Grain Millers), to be designated (POGA), Nicholas Tinker (AAFC), Catherine Howarth (European Oat Community), and additional members to be identified through consultation.
- Project Committee: Jean-Luc Jannink (TCAP), Gerard Lazo (Graingenes), Dave Matthews, additional volunteer members especially representing communities outside of North America.

The Project Committee will report to the Steering Committee. The Steering Committee will interface with sponsors and stakeholders.

Resource Request

The TCAP database has been created with funds provided by NIFA and agreement by this organization to expand the database to oat has been obtained via USDA-ARS.

USDA-ARS has agreed to dedicate time and expertise by Drs. Jean-Luc Jannink and Gerard Lazo. Dr. Nicholas Tinker from AAFC has agreed to contribute to the development of the system.

The subscribers seek funding from millers and growers associations for:

1) A half-time Data Curator for 12 months who would operate under the direction of Dr. Jannink and the Project Committee. The cost of this resource is estimated to be around 30-45,000 USD.
2) Project advocacy and user's engagement: two options presented.
    a. A part-time Project Executive Advocate with the responsibility of engaging the public community selected private users to populate and utilize the database for open sharing of pre-competitive data. The cost of this resource is estimated to be around 30,000 USD

(honorary and travel expenses) and shall remain active for twelve months since the publication of the database.

b. A fund of 30,000 USD to be used for awards and recognition to breeding programs who successfully upload significant data in the system in 2014 and 2015. This fund would be administered by the Steering Committee and awarded in tranches based on evaluation of the data uploaded. The receipient of the awards will need to apply the award towards the purchase of software/hardware for digital data collection and analysis related to the use of the proposed data base.

Meanwhile the Steering Committee and sponsors will advocate for the development of public funding to create a full-time permanent position part of the USDA-ARS and/or AAFC for long-term sustainability of the initiative and to replace the 12-month appointed Data Curator.

Subscribers:

Gabe Gusmini (PepsiCo)
Joe Lutz (General Mills)
Bruce Roskens (Grain Millers)
Nicholas Tinker (AAFC)
Kay Simmons, Jack Okamuro, Jose Costa, Jean-Luc Jannink, and Gerard Lazo (USDA-ARS)