International Wheat Genome Sequencing Consortium

Announcement

A high quality bread wheat reference sequence will be available in less than two years

6 January 2016

Press Kit:
- Press Release
- Project Fact Sheet
- About the IWGSC

Press Release

Wheat Genome Sequencing Gets Major Boost

A high quality bread wheat reference sequence will be available in less than two years

Bethesda, Maryland, USA – 6 January 2016

The International Wheat Genome Sequencing Consortium (IWGSC) announced today the production of a whole genome assembly of bread wheat, the most widely grown cereal in the world, significantly accelerating global research into crop improvement. The project consisted of producing a whole genome assembly of the bread wheat variety *Chinese Spring* based on Illumina short sequence reads assembled with NRGene's DeNovoMAGIC™ software.

The public-private collaborative project is coordinated by the IWGSC and co-led by Nils Stein of IPK Gatersleben in Germany, Curtis Pozniak of the University of Saskatchewan's Crop Development Centre in Canada, Andrew Sharpe of the Global Institute for Food Security in Canada, and Jesse Poland of Kansas State University in the United States. Project participants also include researchers from Illumina, Inc.; NRGene in Israel and the United States; Tel Aviv University in Israel; and the French National Institute for Agricultural Research (INRA).

Funding for this project was provided by Genome Canada, Genome Prairie, Saskatchewan Ministry of Agriculture, the Saskatchewan and Alberta Wheat Development Commissions, and the Western Grains Research Foundation through the Canadian Triticum Applied Genomics ($CTAG^2$) project, Kansas State University through the US National Science Foundation Plant Genome Research Program, and Illumina, Inc.

The new data will help speed up the delivery of a high quality reference sequence of the bread wheat genome. Nils Stein explained, "The new bread wheat *de novo* shotgun assembly made by NRGene represents a major breakthrough for the IWGSC integrated strategy towards delivering a high quality reference sequence for each of the 21 bread wheat chromosomes."

Kellye Eversole, IWGSC Executive Director, welcomed the results, "The preliminary results obtained by NRGene are impressive. We have been waiting for a number of years to have a high quality whole genome sequence assembly that would complement our chromosome based strategy and accelerate the delivery of the sequence. Thus, this assembly comes exactly at the

International **W**heat **G**enome **S**equencing **C**onsortium
2841 NE Marywood Ct, Lee's Summit, MO 64086 USA
www.wheatgenome.org

right time because it can be integrated with the IWGSC chromosome specific resources developed over the past 10 years (e.g., chromosome shotgun sequences, physical maps, and physical map-based sequencing) to deliver a high quality reference sequence for the wheat genome in less than two years."

The whole genome assembly data will be integrated with physical-map based sequence data to produce a high-quality, ordered sequence for each wheat chromosome that precisely locates genes, regulatory elements, and markers along the chromosomes, providing invaluable tools for wheat breeders.

"This new wheat genome sequence generated by the IWGSC and its partners is an important contribution to understanding the genetic blueprint of one of the world's most important crops," said Curtis Pozniak. "It will provide wheat researchers with an exciting new resource to identify the most influential genes important to wheat adaptation, stress response, pest resistance, and improved yield."

Results of the whole genome assembly will be presented at several workshops at the Plant & Animal Genome Conference taking place in San Diego in the United States from 9 to 13 January 2016. All data will be available in the IWGSC wheat sequence repository at URGI-INRA.

Wheat is the staple food for more than 35% of the global human population and accounts for 20% of all calories consumed throughout the world. As global population grows, so too does its dependence on wheat. To meet future demands of a projected world population of 9.6 billion by 2050, wheat productivity needs to increase by 1.6% each year. Since availability of new land is limited to preserve biodiversity and water and nutrient resources are becoming scarcer, the majority of this increase has to be achieved via crop and trait improvement on land currently cultivated. A high quality reference genome sequence will provide the detailed genomic information necessary to underpin wheat research ensuring achievement of this goal.

About the IWGSC

The IWGSC, with more than 1,100 members in 55 countries, is an international, collaborative consortium, established in 2005 by a group of wheat growers, plant scientists, and public and private breeders. The goal of the IWGSC is to make a high quality genome sequence of bread wheat publicly available, in order to lay a foundation for basic research that will enable breeders to develop improved varieties. The IWGSC is a U.S. 501(c)(3) non-profit organization.
www.wheatgenome.org

About IPK Gatersleben

The Leibniz Institute of Plant Genetics and Crop Plant Research, member of the Leibniz association, is a public non-university research institute with about 500 employees from over 30 nationalities. IPK`s mission is to study crop biodiversity for a better understanding of crop plant performance as a foundation for Bioeconomy in the time of global change. IPK is a leading institute in cereal genome analysis. www.ipk-gatersleben.de

About the University of Saskatchewan, one of Canada's top 15 research-intensive universities

- The U of S Crop Development Centre in the College of Agriculture and Bioresources is a field crop research organization that seeks to improve economic returns for farmers and the agriculture industry by improving existing crops, creating new uses for traditional crops, and developing new crops. agbio.usask.ca/research/centres-facilities/crop-development-centre.php
- The Global Institute for Food Security at the U of S helps deliver transformative innovation to agriculture in both the developed and developing world. http://gifs.ca

About Kansas State University

Kansas State University (K-State) was founded in 1863 as the nation's first operational land-grant university. K-State researchers work to decode nature and improve lives—advancing the forefront of global food systems, biosciences, and animal health by using an interdisciplinary approach to enable impactful technologies and enhance well-being. The work of K-State researchers is critical to building the knowledge base necessary to drive innovation and economic development in Kansas, the region, and the country. In addition to conducting basic and applied research, K-State pioneers and prioritizes education and outreach that improves lives and revitalizes communities. www.k-state.edu/

About NRGene

NRGene is a genomic big data company developing cutting-edge software and algorithms to reveal the complexity and diversity of crop plants, animals, and aquatic organisms for the most advanced, sophisticated genetic research and breeding. NRGene tools have already been employed by some of the leading seed companies as well the most influential teams in academia. NRGene is located in Ness Ziona, Israel. www.nrgene.com

Contact

Isabelle Caugant
IWGSC Communications Officer
communications@wheatgenome.org
+32 484 750 634
Twitter: @wheatgenome

###

Fact Sheet

IWGSC Whole Genome Sequencing and Assembly Project

Project outline

The project includes the production of a whole genome assembly of the bread wheat T. aestivum cv Chinese Spring (ERGE 2135) based on Illumina short sequence reads assembled with NRGene's DeNovoMAGIC™ -2 software.

Main results

The Chinese Spring wheat gDNA was used to produce ~x210 coverage of illumine reads sequencing data. The libraries for this sequencing were prepared from varying insert sizes. Denovo assembly using this sequencing data resulted in scaffolds with total assembly size of 14.6Gb and with L50, L90 values of 7.06 Mb, 1.26 Mb, respectively. The proportion of gaps in the scaffold sequences was 1.8%.

Project Team

This IWGSC project includes the following principal investigators and participating institutions:

- Nils Stein, IPK Gatersleben, Germany
- Curtis Pozniak, University of Saskatchewan, Canada
- Andrew Sharpe, Plant Biotechnology Institute, National Research Council, Canada
- Jesse Poland, Kansas State University, USA
- Assaf Distelfeld, Tel Aviv University, Israel
- Fred Choulet, INRA, france
- Jane Rogers, IWGSC
- Kellye Eversole, IWGSC
- Mike Thompson representing Illumina, Inc. (Illumina), USA
- Gil Ronen representing Energin.R Technologies 2009 Ltd (NRGene), Israel

Project Funding

Funding for this project was provided by Genome Canada, Genome Prairie, Saskatchewan Ministry of Agriculture, the Saskatchewan and Alberta Wheat Development Commissions, and the Western Grains Research Foundation through the Canadian Triticum Applied Genomics ($CTAG^2$) project, Kansas State University through the US National Science Foundation Plant Genome Research Program, and Illumina, Inc.

Data Availability

Sequence assembly will be released through the IWGSC Survey sequence repository at the Unité de Recherches en Génomique Information (URGI), INRA-Versailles.

International **W**heat **G**enome **S**equencing **C**onsortium
2841 NE Marywood Ct, Lee's Summit, MO 64086 USA
www.wheatgenome.org

International Wheat Genome Sequencing Consortium

Who We Are

The International Wheat Genome Sequencing Consortium was established in 2005 by a group of wheat growers, scientists and breeders to advance wheat improvement. At that time, genomic resources for wheat improvement were lagging behind other major crops such as maize and rice. Because of its size and complexity, wheat was considered impossible to sequence. Thus, despite its socioeconomic importance and the recognition of the power that a genome sequence brings to breeding programs, bread wheat remains one of the last major crops without a high-quality reference genome sequence.

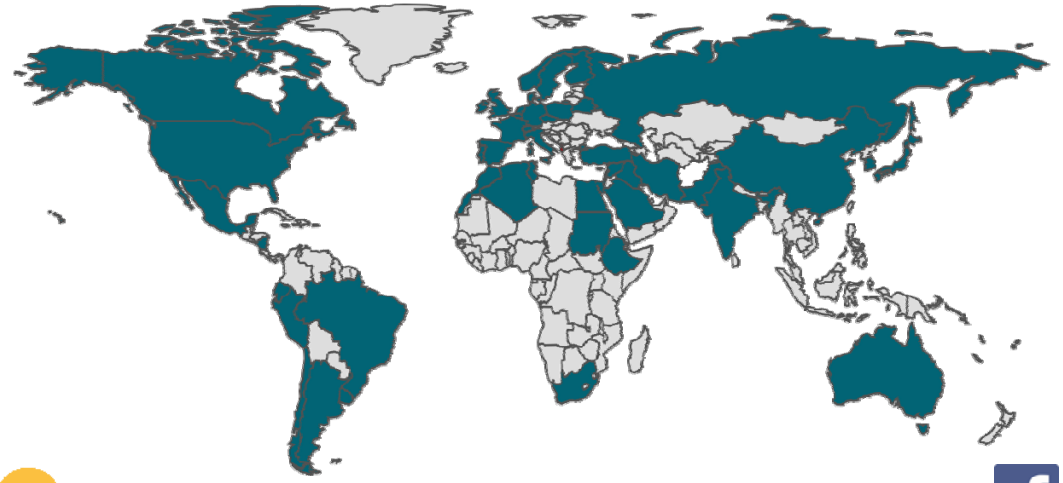
To change this paradigm, the IWGSC is dedicated to producing a reference sequence of the bread wheat genome for accelerating molecular breeding, better understanding of the molecular basis of key agronomic traits, and knowledge of the structure and function of the wheat genome.

The IWGSC is a 501(c)(3) nonprofit organization registered in the United States led by a Board of Directors, a Leadership Team, and a Coordinating Committee. The Board of Directors decides the overall strategy and the Leadership Team is in charge of the daily management. The Coordinating Committee, composed of sponsors and leaders of IWGSC projects, is responsible for establishing the overall scientific strategy and the strategic roadmap. IWGSC membership is open to any individual who is interested in supporting the goals and activities of the consortium.

372 Institutes/Companies

55 Countries

1166 Members



wheatgenome.org

facebook.com/wheat.genome

info@wheatgenome.org

@wheatgenome

flickr.com/photos/iwgsc

All resources are publicly available at: wheat-urgi.versailles.inra.fr

Wheat

The staple food for 35% of the world population

Wheat production needs to increase by 60% to feed 9.6 billion people by 2050

The most widely grown cereal crop in the world

Provides 20% of all calories consumed

Kellye Eversole,
IWGSC Executive Director

+1.301.618.9543
eversole@eversoleassociates.com