

SEQUENCING OF WHEAT CHROMOSOME 5D UNDERWAY IN TURKEY

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The International Wheat Genome Sequencing Consortium (IWGSC) and the Wheat Initiative announced today that funding was secured in Turkey for reference sequencing of wheat chromosome 5D. This is another step towards achievement of a high quality reference sequence for each of the 21 bread wheat chromosomes in order to provide plant breeders with high quality tools to accelerate breeding programs and produce a new generation of wheat varieties with higher yields and improved sustainability.

Reference sequencing of chromosome 5D will be carried out over the next two years by a team led by Hikmet Budak, head of the Plant Molecular Biology and Genetics Lab at Sabanci University in Istanbul, Turkey, who received two grants from the Scientific and Technological Research Council of Turkey (TÜBİTAK) and the Republic of Turkey Ministry of Food, Agriculture and Livestock to produce the reference sequence of both arms of chromosome 5D.

“Wheat is one of the most important crops in Turkey as it is here that modern wheat originated. The reference sequence of chromosome 5D will identify candidate genes for introgression into elite cultivars and will provide valuable genomics tools for both researchers and breeders. TUBITAK and the Ministry of Food, Agriculture and Livestock are well-aware of the impact that the sequencing of chromosome 5D will have on improving genomic assisted breeding”, says Hikmet Budak.

The sequencing strategy adopted by the IWGSC is a chromosome-by-chromosome approach that is based on physical maps. This is the only strategy that can be used with today’s technology to efficiently deliver a high quality, ordered sequence comparable to the gold standard reference sequence of rice.

Two physical maps will be used for reference sequencing of chromosome 5D. The one for the short arm of the chromosome (5DS) was produced by Sabanci University with funding from TÜBİTAK and the one for the long arm of the chromosome (5DL) was produced as part of a €1 million contribution from Bayer Crop Science aimed at delivering the remaining physical maps needed to advance the bread wheat sequencing project. The company has agreed to an early release of the 5DL data to allow the reference sequencing to begin.

The first reference sequence of the largest wheat chromosome, 3B, was released in the journal *Science* in 2014 and established a benchmark for subsequent sequencing. Under the leadership of the IWGSC, reference sequencing of 12 other chromosomes – in addition to the 5D project – is currently underway in 11 countries and will be completed in the next two years.

The IWGSC and the Wheat Initiative members are still seeking funding for reference sequencing of seven wheat chromosomes. Provided that €11.5 million is secured soon, the IWGSC anticipates that a high quality genome sequence for bread wheat could be publicly available by 2018.

“In its Strategic Research Agenda, the Wheat Initiative identifies the availability of a fully assembled bread wheat genome sequence as a game-changer allowing for more efficient delivery of improved wheat cultivars adapted to their environment,” says H  l  ne Lucas, International Scientific Coordinator of the Wheat Initiative. “We recognize Turkey’s participation to this worldwide effort, and would welcome similar contributions from other countries, private companies and other stakeholders to allow the delivery of the fully assembled and annotated sequence by 2018.”

Wheat is the most widely grown cereal crop in the world and the staple food for more than 35% of the global human population. With a projected world population of 9.6 billion by 2050, the Food and Agriculture Organization (FAO) forecasts that the demand for wheat will increase by 60%. 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 would contribute greatly to achieving 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 an Associated Program of the Wheat Initiative.

www.wheatgenome.org

About the Wheat Initiative

Created in 2011 following endorsement from the G20 Agriculture Ministries, the Wheat Initiative provides a framework to establish strategic research and organization priorities for wheat research at the international level in both developed and developing countries. The Wheat Initiative fosters communication between the research community, funders and global policy makers, and aims at securing efficient and long-term investments to meet wheat research and development goals.

www.wheatinitiative.org

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