

INTERNATIONAL WHEAT GENOME SEQUENCING CONSORTIUM



ANNUAL
REPORT
2019



OPENING LETTER

KELLYE EVERSOLE

IWGSC Executive Director & Chair of the Board

In 2019, the IWGSC continued its efforts to provide breeders and the broader scientific community with a full genome sequence-based toolbox for wheat improvement. We remain focused on the IWGSC Phase II vision of enhancing breeding through an increased understanding of the molecular basis of traits and their allelic diversity.

The impact of the high quality reference genome sequence, IWGSC RefSeq v1.0 continued to expand as illustrated by the publication between 2017 and 2019 of approximately 600 papers that utilized or referenced the sequence. An updated version of the reference sequence of bread wheat, IWGSC RefSeq v2.0, was released to the community in July under the Toronto pre-publication access agreement. This version used long read sequences and an optical map to close some of the gaps in the original reference. The annotation team has been busy integrating manual and functional annotation, with contributions from the community, and IWGSC RefSeq annotation v2.0 is expected to be released in 2020.

In October, Arbor Biosciences and the IWGSC announced the official release of the myBaits® Expert Wheat Exome capture panel. In late 2019, the IWGSC expanded its partnership with Arbor Biosciences and began designing a wheat promoter capture.

Contacts were initiated to put the Wheat Diversity project into motion. In this project, the genomes of eight to twelve landraces, representing

the full breadth of genetic diversity in bread wheat, will be sequenced at high quality. A pilot project using the latest technologies began and looks promising for providing platinum quality sequences at a reasonable price. These core sequences, in conjunction with the IWGSC RefSeq, will serve as the foundation for a diversity panel and haplotype map to provide breeders with access to a much broader gene pool.

Artificial intelligence tools such as natural language processing, machine learning, and deep learning offers an opportunity to accelerate the functional annotation of the reference wheat genome sequence. In 2019, the IWGSC began a partnership to develop an automated literature curation software for the assignment of wheat gene functions. The IWGSC also renewed its efforts to develop deep learning approaches for functional annotation.

None of our activities would have been possible without the hard work of IWGSC project leaders and the support of IWGSC sponsors. With the broadened activities of the IWGSC, we welcomed to the Coordinating

Committee new project leaders who are focused on more applied aspects of genomics that will ensure the reference sequence is translated rapidly by breeders. We also welcomed a new sponsor, BASF, that joined Florimond Desprez, INRAE, the Kansas Wheat Commission, Limagrain, RAGT, Syngenta and the University of Adelaide in supporting the IWGSC. Our continued success will depend on strong academic and industry leadership as well as financial support.

WE LOOK FORWARD TO WORKING WITH DEDICATED LEADERS AND WELCOME THE OPPORTUNITY OF NEW PARTNERSHIPS TO CONTINUE PROVIDING CRITICAL RESOURCES FOR THE WHEAT COMMUNITY.

At the time of publication of the 2019 annual report, most of the world is in “lock-down” due to the rapid spread of a deadly coronavirus. We hope that you, your loved ones, and your colleagues will remain healthy and safe during this challenging period.

OUR VISION

Enhance wheat breeding through an increased understanding of the molecular basis of traits and their allelic diversity

OUR GOALS



**LAY A
FOUNDATION
TO ACCELERATE
WHEAT
IMPROVEMENT**

**INCREASE
PROFITABILITY
THROUGHOUT
THE INDUSTRY**

OUR WORK

We provide tools and resources that serve as a foundation for the accelerated development of improved varieties and that empowers all aspects of basic and applied wheat science.

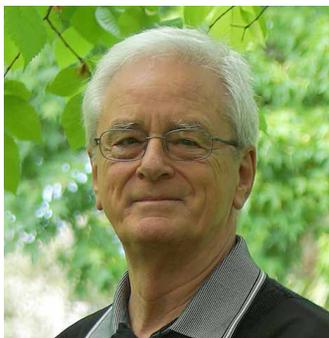
BOARD OF DIRECTORS

The Board, with input from the scientific Coordinating Committee, establishes the overall vision and mission of the Consortium. The Board also ensures the implementation of the strategic decisions made by the Coordinating Committee, a group comprised of 51 representatives of universities, research institutions, governmental agencies, and grower organizations, as well as small, medium, and large wheat breeding and seed companies.



KELLYE EVERSOLE

Chair of the Board of Directors and IWGSC Executive Director



RUDI APPELS

University of Melbourne & AgriBio, Australia



UTE BAUMANN

University of Adelaide, Australia



HIKMET BUDAK

Montana BioAg Inc, USA



ETIENNE PAUX

INRAE, France



SEBASTIEN PRAUD

Limagrain, France

2019 HIGHLIGHTS

DATA RELEASE

In July, IWGSC RefSeq v2.0, developed under the leadership of Mingcheng Luo and Jan Dvorak, was released to the community under the Toronto pre-publication access agreement.

The data currently available at URGI are:

- IWGSC RefSeq assembly v1.0
- IWGSC RefSeq assembly v2.0 (under Toronto protocol)
- IWGSC RefSeq annotation v1.1, including genes and RNAseq mapping
- IWGSC RefSeq annotation v1.0, including structural annotation (genes, transposable elements, ncRNAs), functional annotation, RH maps, GBS maps, optical maps)
- Physical maps for all chromosomes
- MTP BAC WGPTM sequence tags for all chromosomes, except 3B.

Non-Toronto Protocol data are also available at Ensembl Plants, NCBI and GrainGenes.

IMPACT OF IWGSC REFSEQ V1.0



>220

scientific articles using or referencing IWGSC RefSeq v1.0 published in 2019

IWGSC-ARBOR BIOSCIENCES COLLABORATION



In October, Arbor Biosciences and the IWGSC announced the official release of the myBaits® Expert Wheat Exome capture panel.

The panel was designed using the reference genome for bread wheat, cv. Chinese Spring, IWGSC RefSeq v1.0, which was fully annotated and published by IWGSC members. The panel utilizes over two million probes to cover 200 megabases of high confidence exons in the genome and is compatible with both hexaploid and tetraploid cultivars of wheat.

New panels are under development.

IWGSC MEMBERSHIP

The membership increased by 15% in one year.



2,800

members



70

countries



[HTTPS://WHEAT-URGI.VERSAILLES.INRA.FR/SEQ-REPOSITORY](https://wheat-urgi.versailles.inra.fr/seq-repository)

38,000

VISITS

on the IWGSC data repository website

43,500

DOWNLOADS

of wheat sequence and annotation data

100,200

VISITS

on the wheat browsers

145,600

BLASTS

against wheat sequences

COMMUNICATION ACTIVITIES

JANUARY

Leader Spotlight on Manuel Spannagl

Newsletter

Press release: Arbor Biosciences and the IWGSC partner on Wheat Exome

PAG Conference: workshops, poster & business meeting

Leadership Awards: H el ene Berg es, Hirokazu Handa, Curtis Pozniak, and Francis Qu etier

Early Career Award: Carolina Sansaloni

JULY

Press Release: Arbor Biosciences partners with Curio Genomics for analysis of IWGSC Wheat Exome

Press Release: BASF joins IWGSC

Announcement: IWGSC RefSeq v2.0 now available at URGI

NOVEMBER

Leader Spotlight on H el ene Rimbart

APRIL

Sponsor Highlight on Florimond Desprez

Announcement: IWGSC becomes a member of DivSeek

Newsletter

MAY

2018 Annual Report

JUNE

Kellye Eversole interview on BYU radio

Leader Spotlight on Jaroslav Dole el

SEPTEMBER

Newsletter

OCTOBER

Sponsor Highlight on the Kansas Wheat Commission

Announcement: release of the myBaits[®] Expert Wheat Exome panel

 www.wheatgenome.org

39,300 VISITS

24,700 USERS

86,450 PAGEVIEWS



@wheatgenome

83 TWEETS

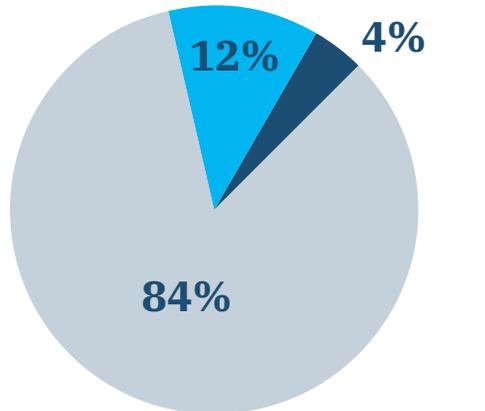
1,700 FOLLOWERS

190,300 IMPRESSIONS

FINANCES

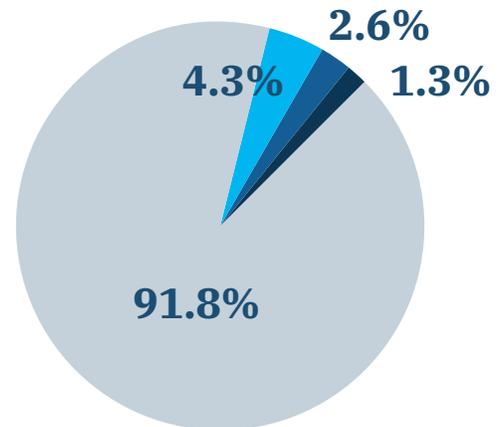
The IWGSC is financially supported by sponsors – private companies, research institutions, and grower organizations.

REVENUES



- Private Companies
- Research Institutes and Universities
- Grower Organizations

EXPENSES



- Contract Services and Professional Fees
- Travel
- Operating Expenses
- Meetings/Workshops/Communications

SPONSORS



www.wheatgenome.org



info@wheatgenome.org



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wheat.genome



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