

Sequencing the Bread Wheat Genome: IWGSC Update

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Meeting at KeyGene
Wageningen, The Netherlands
6 February 2015



IWGS

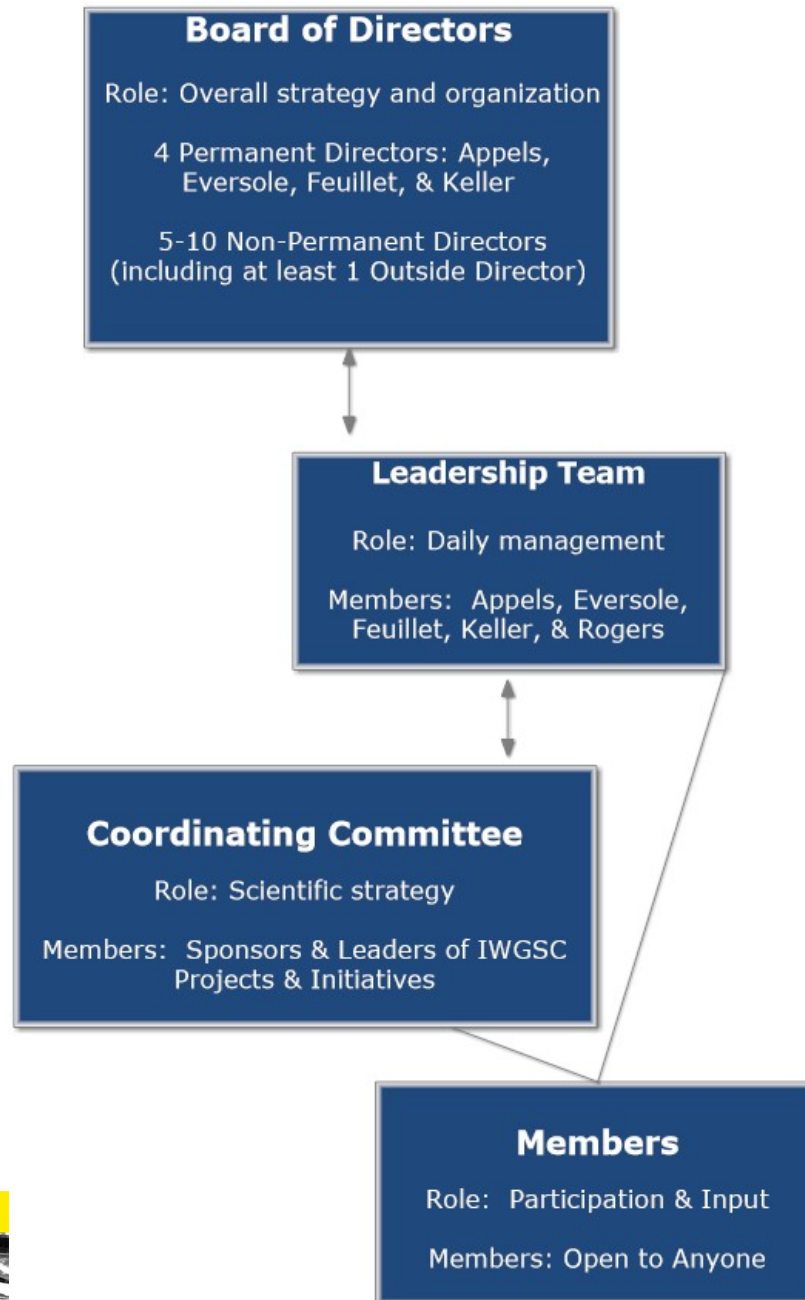
international wheat genome sequencing consortium

10



2005 - 2015

The new IWGSC, Inc: A Nonprofit Corporation



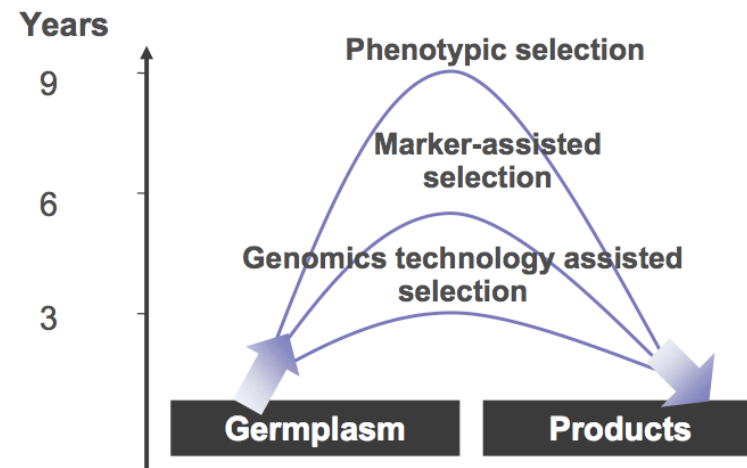
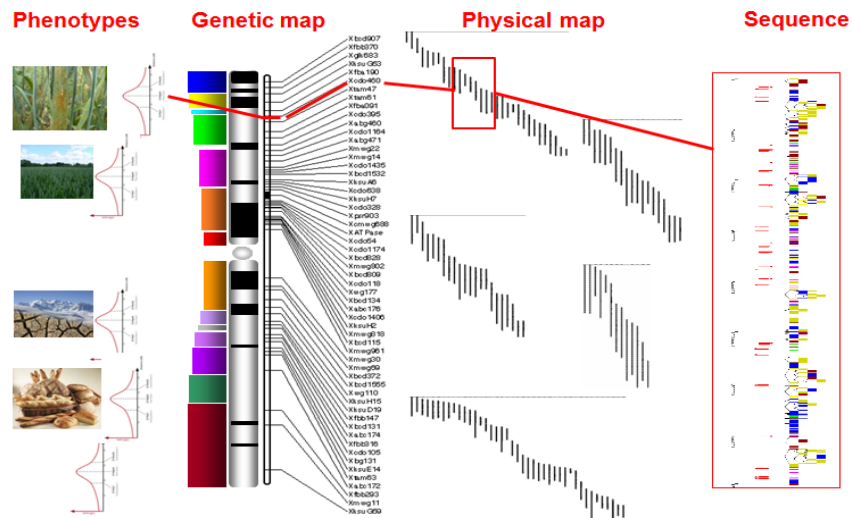
The Same Vision

Why

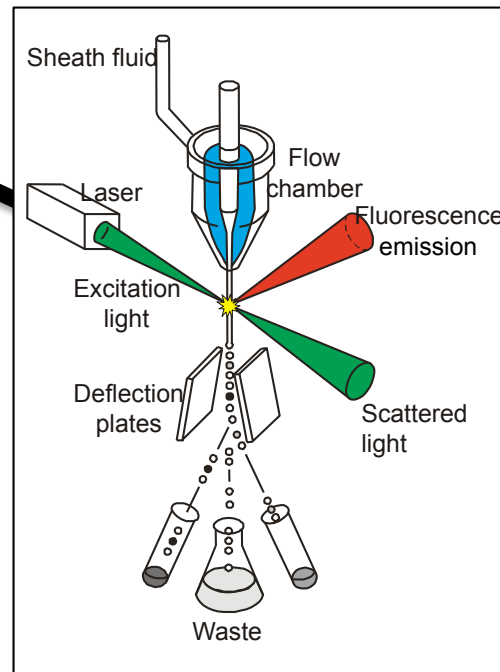
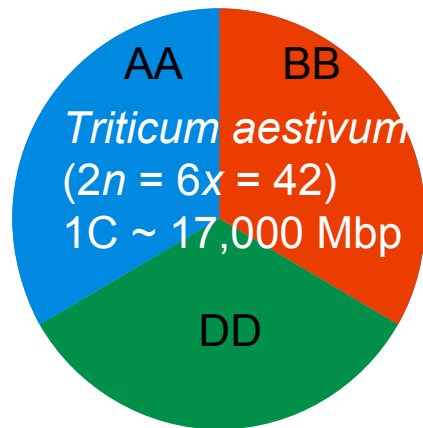
- Lay a foundation to accelerate wheat improvement
- Increase profitability throughout the industry

Vision

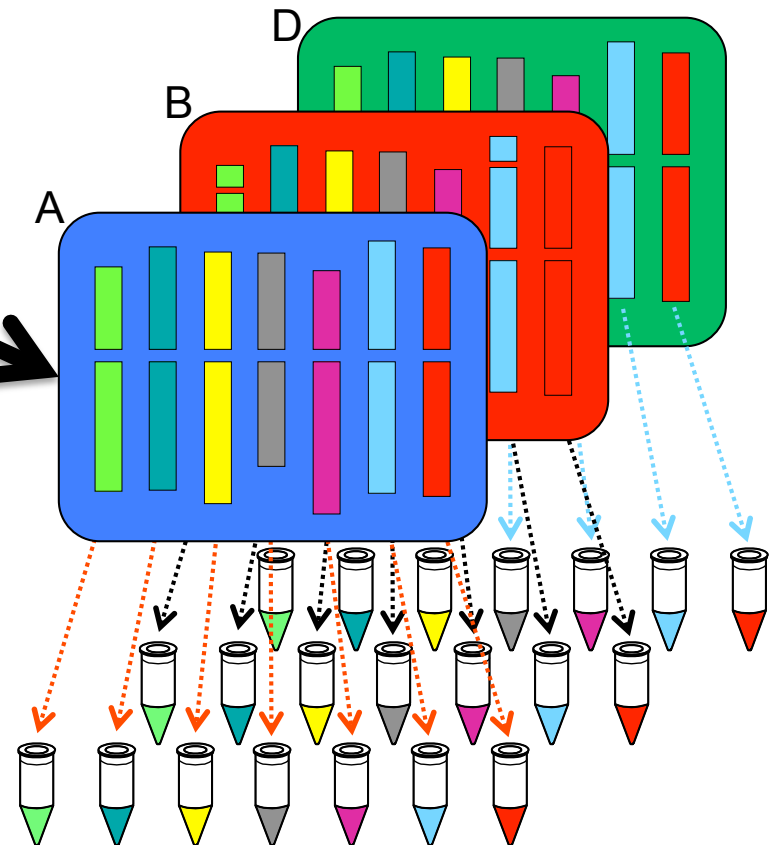
- High quality annotated genome sequence, comparable to rice genome sequence
- Physical map-based, integrated and ordered sequence



Managing the 17 Gb, Hexaploid Genome



Dissection of the genome into single chromosomes (arms)



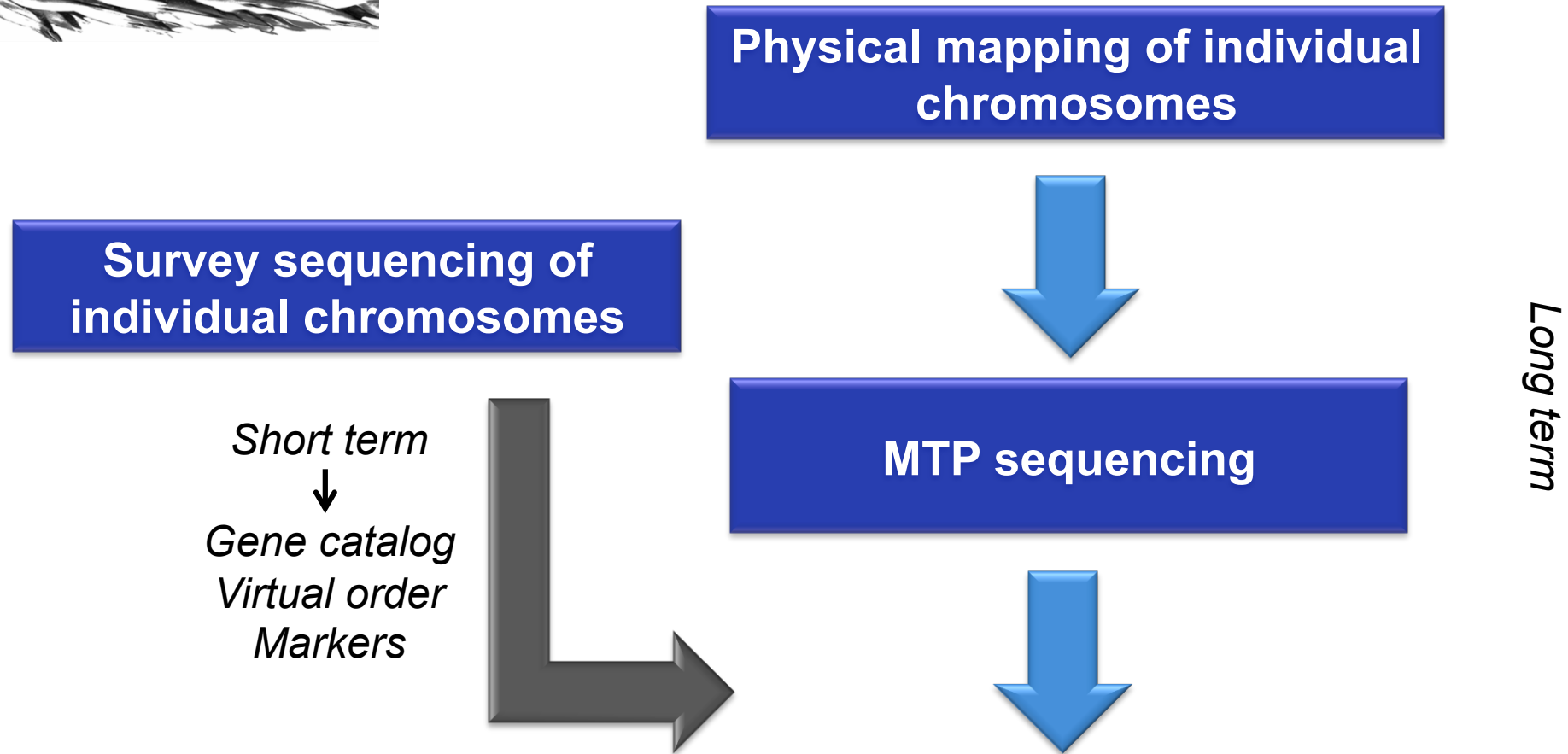
Doležel et al., *Chromosome Res.* 15: 51, 2007

- Chromosomes: 605 - 995 Mbp
(3.6 – 5.9% of the genome)
- Chromosome arms: 225 - 585 Mbp
(1.3 – 3.4% of the genome)

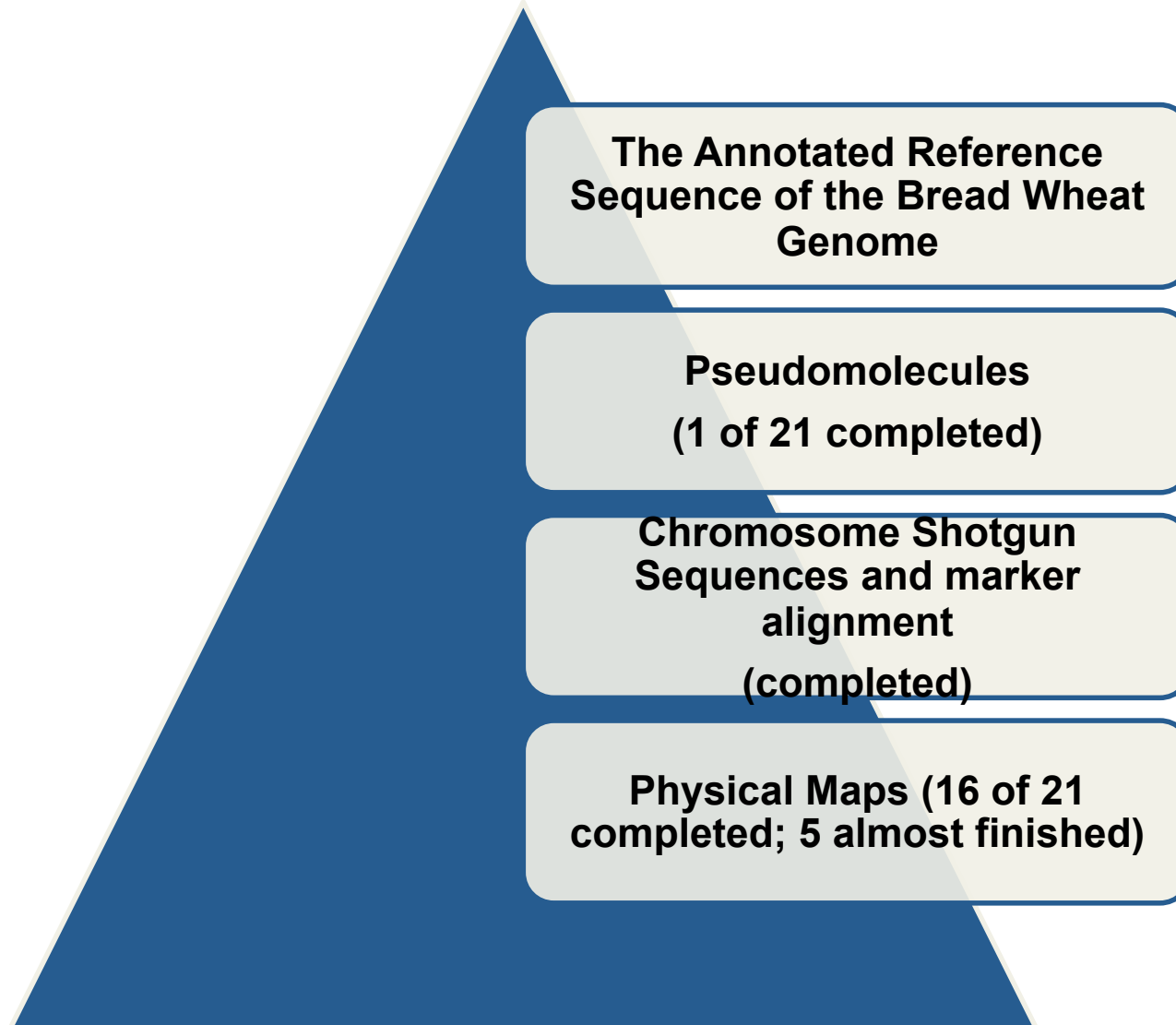
Chromosome genomics

- Chromosome specific BAC libraries and sequencing

Roadmap to the Wheat Genome Sequence



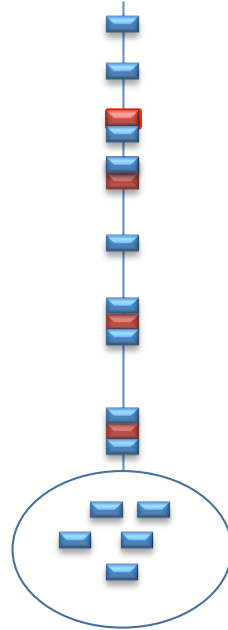
IWGSC Projects



Moving Towards the IWGSC Target



Whole Chromosome Shotgun



**CS chromosome
survey sequences
(2014)**

Max 53% using synteny and
genetic mapping (GZ): « virtual
order »

Chromosome MTP



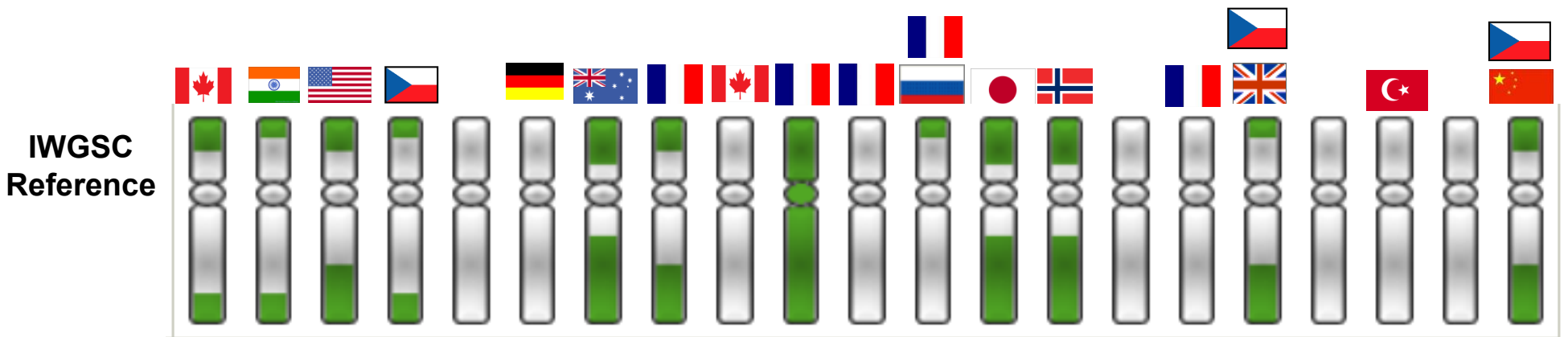
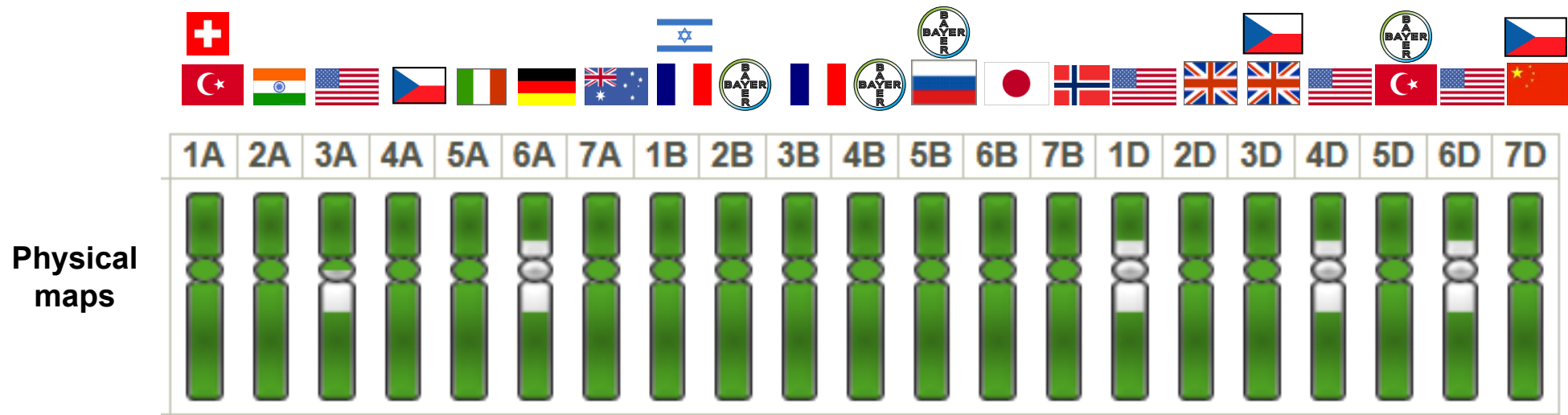
**CS
3BSEQ
(2014)**

94% real
order

completeness of information

**Gold
standar
d**

Progress towards completion of Bread Wheat



IWGSC Chromosome Shotgun Sequencing Initiative



HelmholtzZentrum münchen
German Research Center for Environmental Health



Amplified
DNA- sorted
individual
chromosomes

~50X
Illumina
sequenc
e

Chromosome
arm sequence
assemblies

Gene
modeling,
virtual
ordering
(GZ),
annotation,
functional,
structural
analyses

Composition
and
Evolution of
the 21 Bread
Wheat
Chromosomes

A, S, D, &
AB
genomes
(7)

>30X
Illumina
sequen
ce

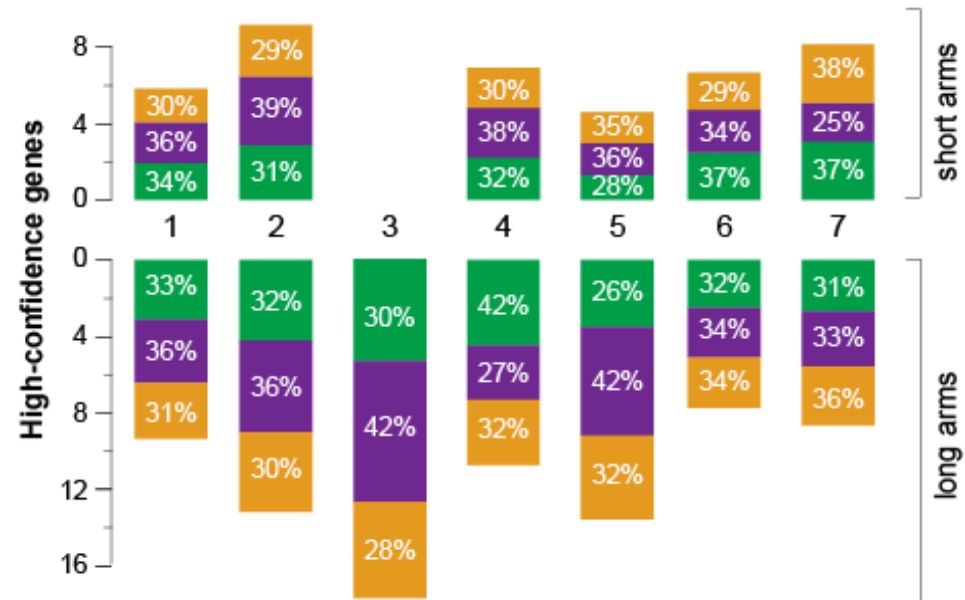
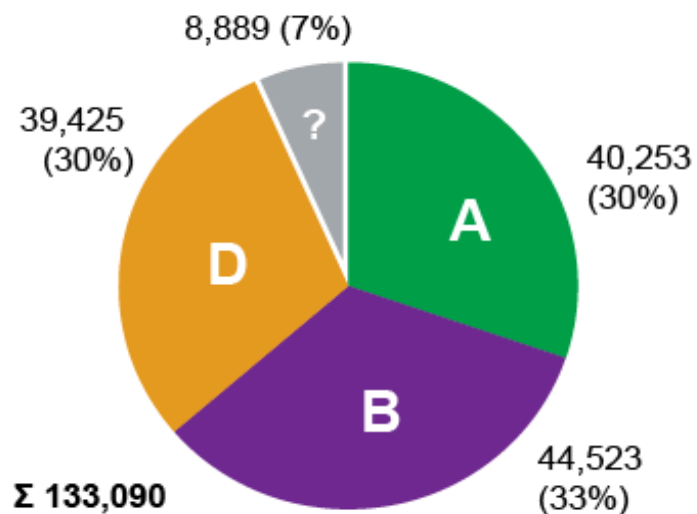
Read/
assembly
alignment to
chromosome
arms



IWGSC Chromosome Survey Sequence Data

- Sequence assemblies for 40 chromosome arms + chromosome 3B
 - ❖ Total length **10.2 Gb**
 - ❖ **128Mb (1DS) – 639Mb (3B)** assembled sequence per chromosome
 - ❖ N50 contig length after repeat masking = **6.1kb** (1.7kb-8.9kb)

- Annotation (RNASeq, FLcDNA, grass genomes): **124,201** allocated to chromosomes



IWGSC Resources

- All resources accessible at URGI, Versailles

<http://wheat-urgi.versailles.inra.fr/Seq-Repository/>

- IWGSC CSS Raw sequence reads in the SRA
- IWGSC CSS assemblies available at URGI and EBI
- IWGSC CSS assemblies & gene models integrated into EnsemblPlants

http://plants.ensembl.org/Triticum_aestivum



IWGSC Sponsors



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Dow AgroSciences

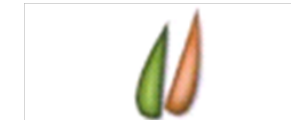


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I W G S C



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