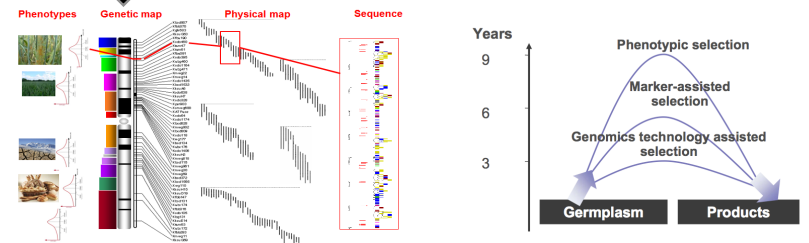
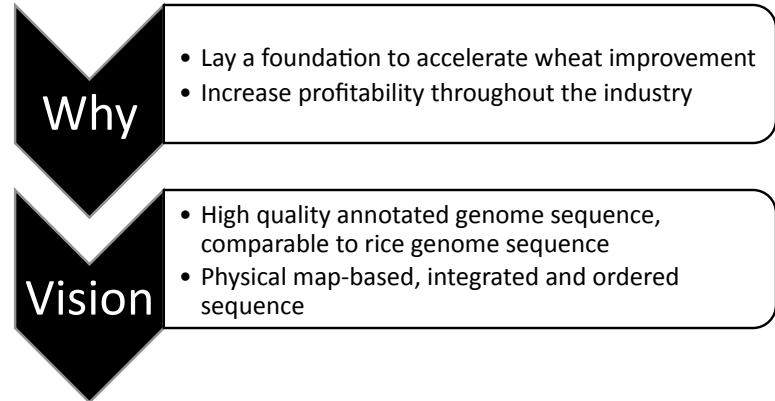


# The IWGSC: Building the sequence-based foundation for accelerated wheat breeding

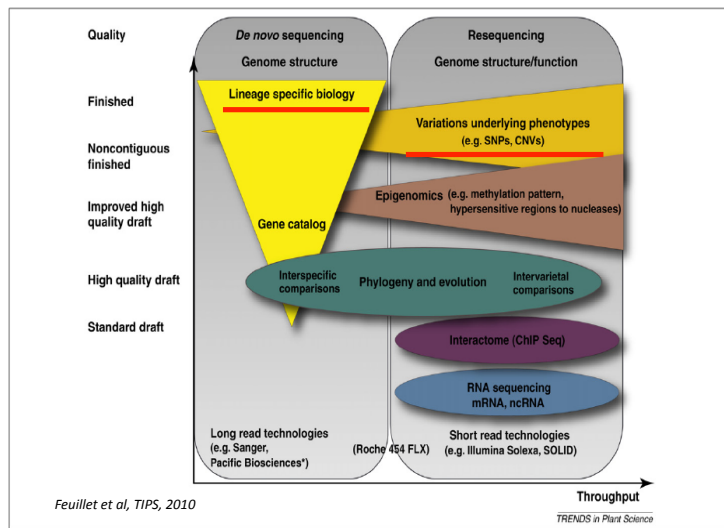
**Kellye A. Eversole**  
IWGSC Executive Director  
&  
The IWGSC

Cereals for Food, Feed and Fuel –  
Challenge for Global Improvement

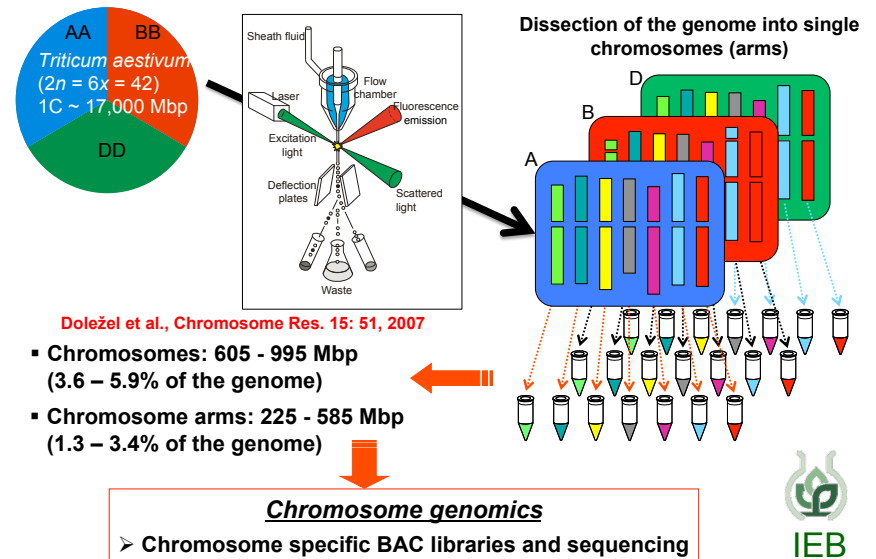
4 July 2014



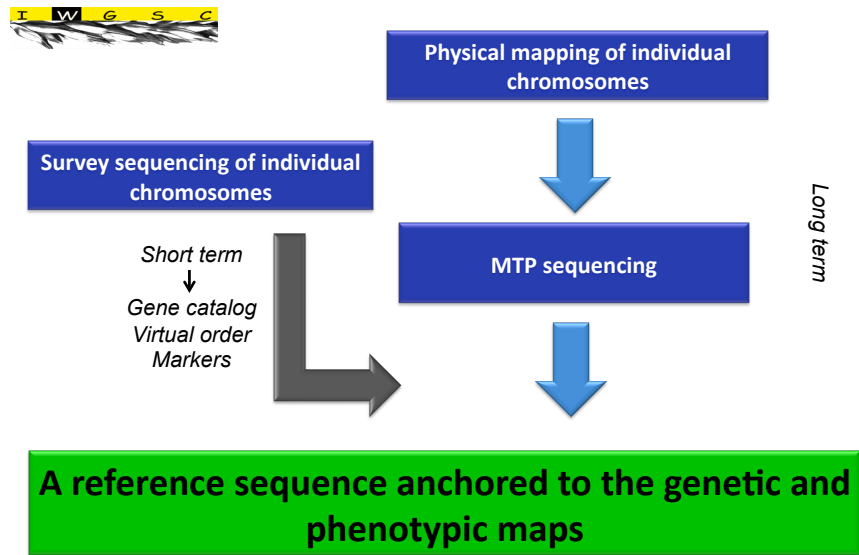
## A sequence for whom & for what purposes



## Managing the 17 Gb, Hexaploid Genome



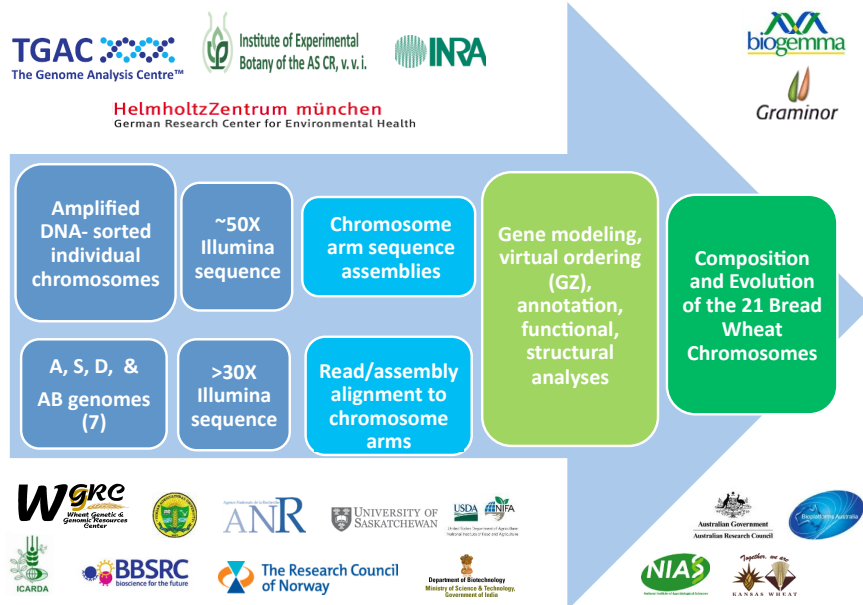
# Roadmap to the Wheat Genome Sequence



# Current status of individual projects

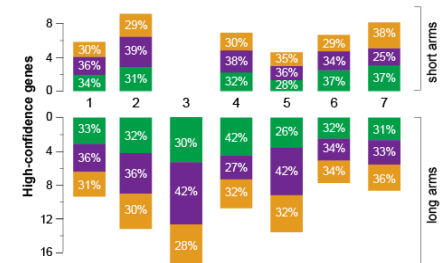
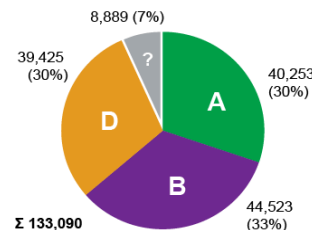


# IWGC Chromosome Shotgun Sequencing Initiative



# IWGC 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



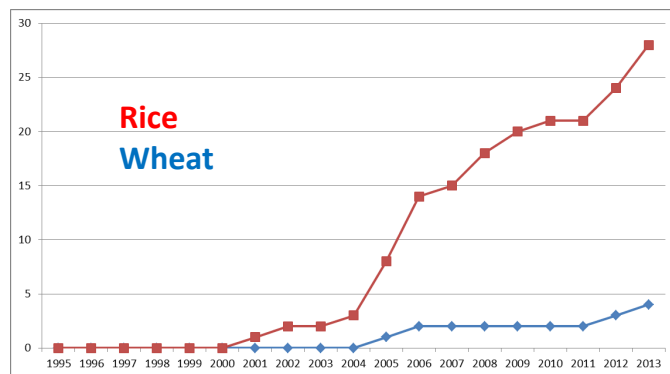
## IWGSC Chromosome Survey Sequencing - Summary

- Almost full wheat gene complement identified and allocated to chromosome arms
- On average, 53% of genes virtually ordered along chromosomes
- High level of inter- and intrachromosomal duplication
- Over 3.5 M markers mapped to contigs (1.3M wheat markers + 2.3M SNPs) - SSR, EST, DArT, SNP (90k) markers...
- 13.2 million SNPs from POPSeq aligned to contigs



## Power of A High Quality Reference Sequence

Number of QTLs Cloned



Feuillet et al, Trends in Plant Sciences, 2010; Rey et al, unpublished update)

## IWGSC CSS Resources are Facilitating

- High density SNP chips
- New phylogenetic analyses of wheat genome evolution
- Homoeologue-specific gene expression analyses
- Wheat haplotype map
- TILLING projects in *T. durum* and bread wheat

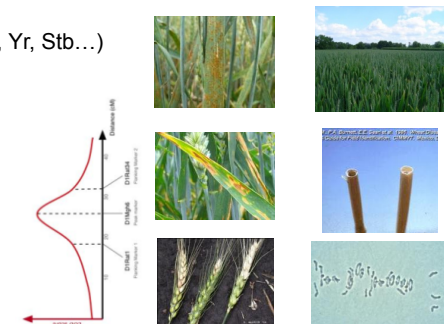
## 3B Reference is facilitating map-based cloning

### 40 genes and QTL mapped on 3B

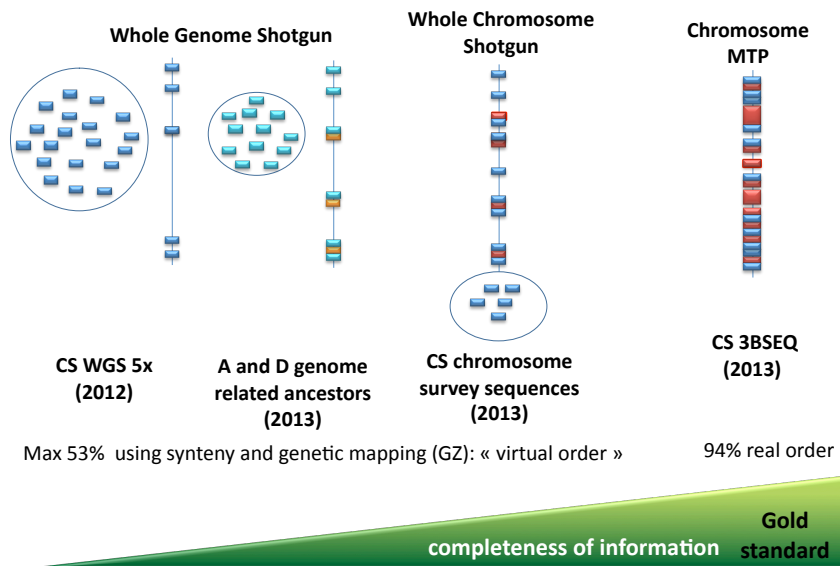
→ 4722 markers on 3B consensus map, 3102 in 964 SC (679 Mb = 82 % of the sequence)

### → 13 map-based cloning projects

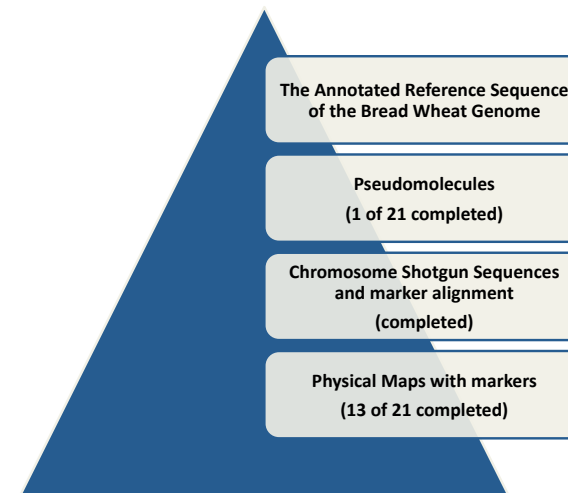
- Disease resistance genes (Sr, Lr, Yr, Stb...)
- Solid stem (saw fly)
- Yield
- Drought tolerance
- Boron transporter
- Flowering time
- NUE
- Chromosome pairing...



## Wheat Sequences Available Now



## IWGSC Projects



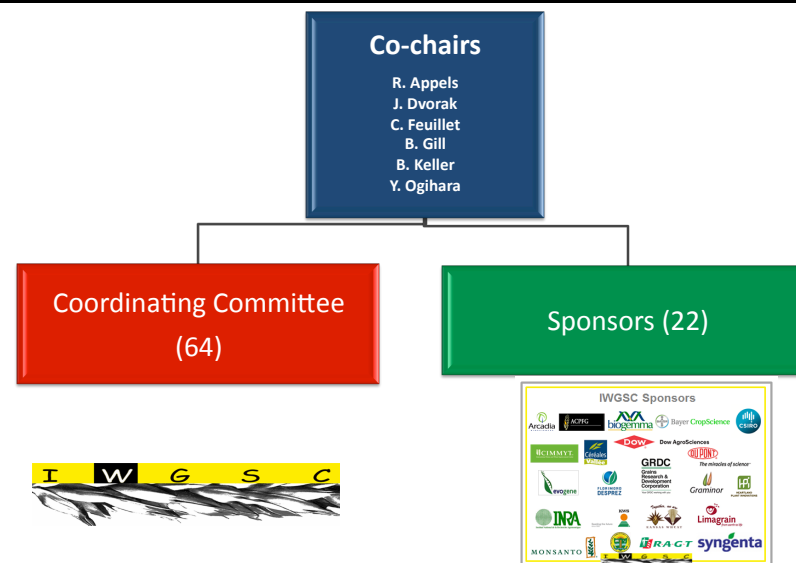
## IWGSC Resources

- 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](http://plants.ensembl.org/Triticum_aestivum)



## Acknowledgements



Thank you for your attention!

[www.wheatgenome.org](http://www.wheatgenome.org)

@wheatgenome

