

I W G S C



International Wheat Genome
Sequencing Consortium

IWGSC PHASE II: PAN-GENOME TO EXPAND WHEAT DIVERSITY

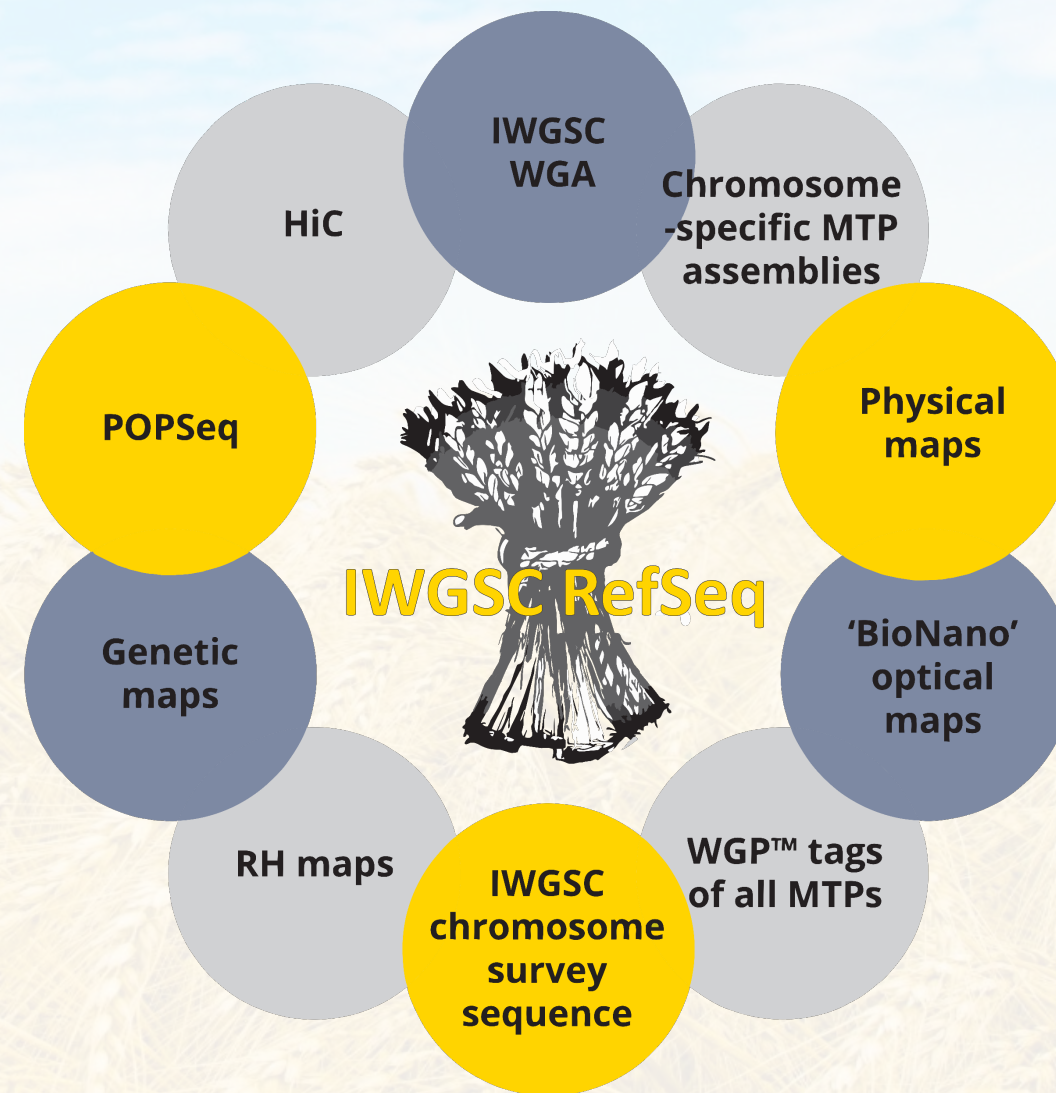
Kellye Eversole
IWGSC Executive Director

DivSeek Roundtable
San Diego, California, USA
11 January 2019

High Quality Reference Sequence of Bread Wheat : IWGSC RefSeq v1.0



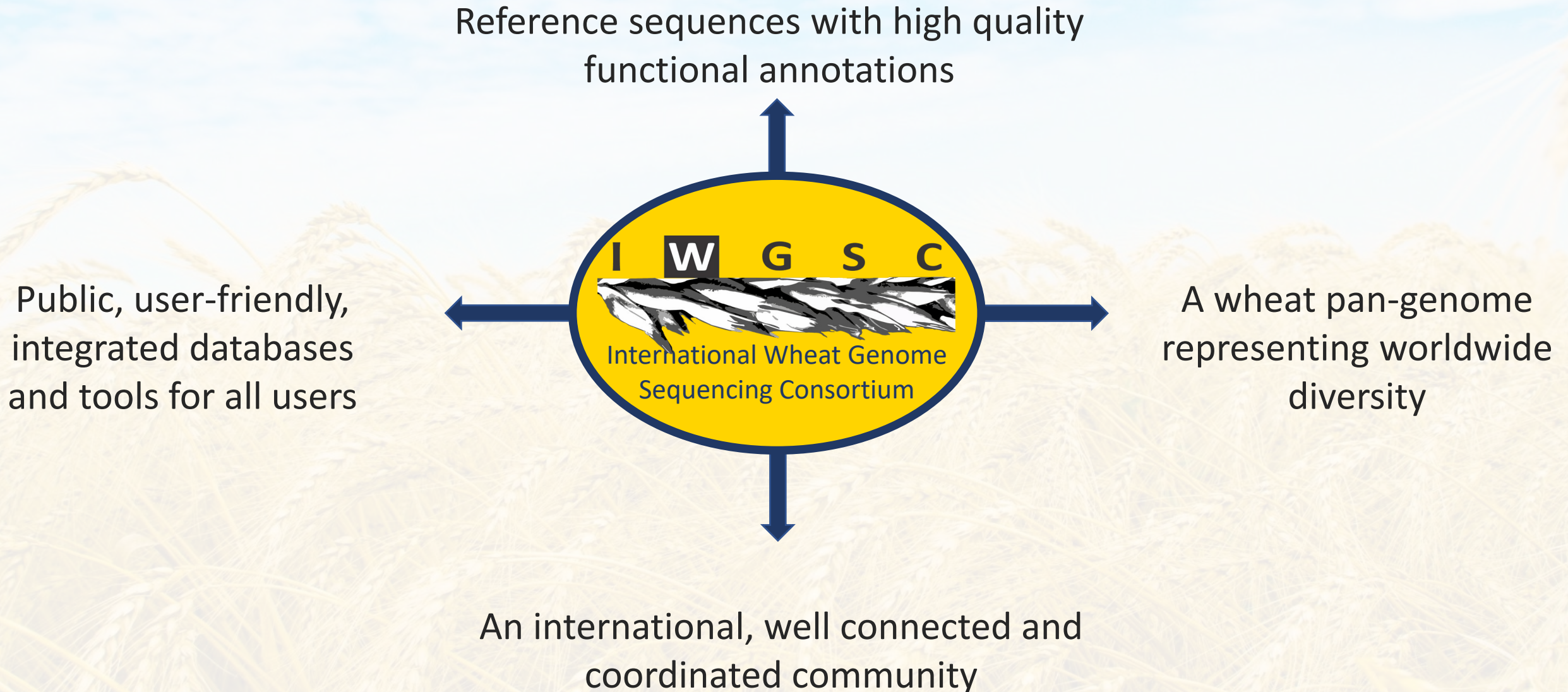
Science, 17 August 2018



Scaffold N50 = 7 Mb
Superscaffold N50 = 23 Mb



Vision and strategy for IWGSC 2.0



IWGSC Wheat Pan-Genome

- ▶ Develop a wheat pan-genome that represents the breadth of worldwide wheat diversity
- ▶ Reference quality for 8-12 landraces
- ▶ Diversity panels at draft quality
- ▶ Haplotype database
- ▶ Skim-sequencing and high throughput genotyping of many lines

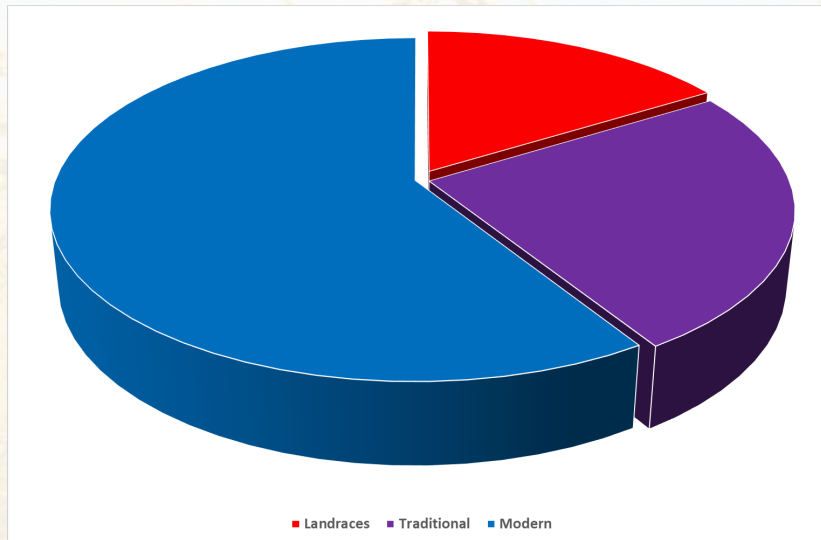
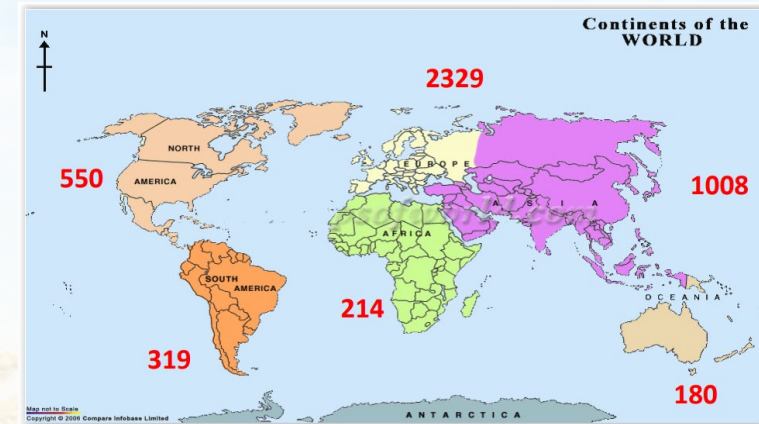


Representative Sample of Worldwide Diversity

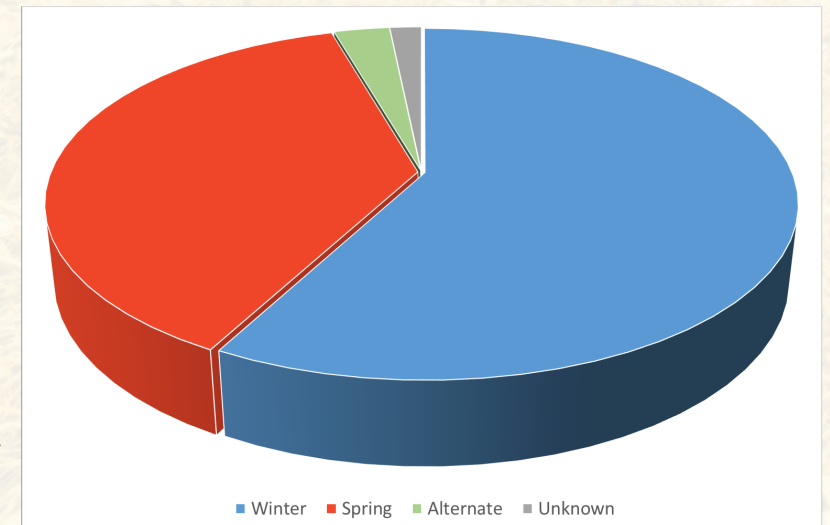
4,506 wheat accessions

out of the 11,960 hosted at the INRA Biological Resource Centre for small grain cereals

✓ originating from 108 different countries



✓ comprising landraces, traditional cultivars and modern varieties



✓ with spring and winter wheat

Courtesy of Etienne Paux

Genotyped with High-Density SNP Array



TaBW280K SNP array

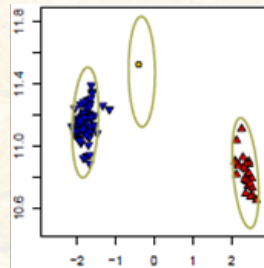
X



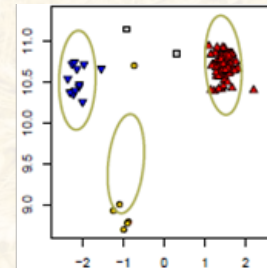
4,506 wheat lines



113,457 SNPs with less than 2% missing or heterozygous data



99,333 PolyHighRes



14,124 OTVs

Presence-absence variations



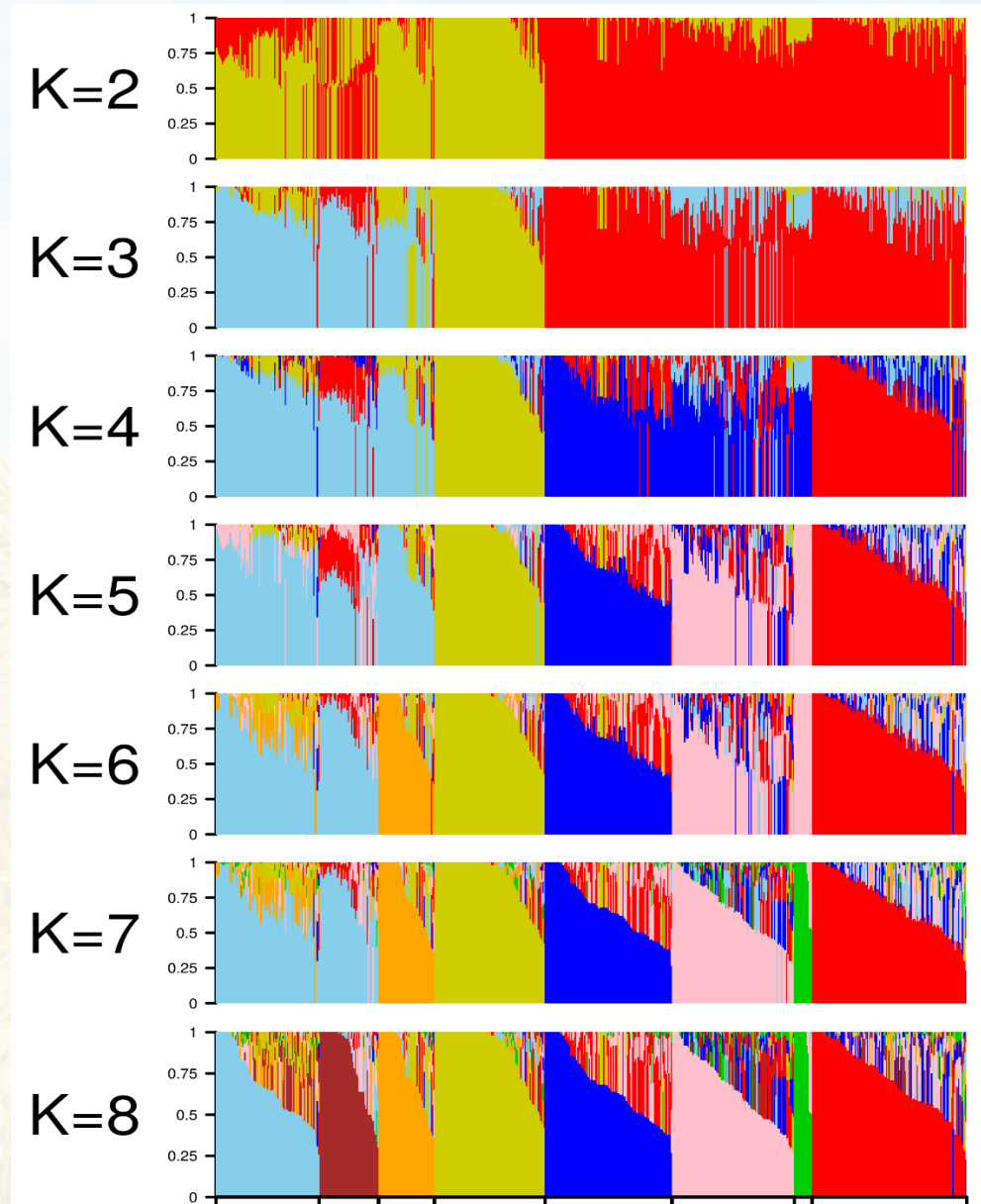
8,741 haplotypes

Courtesy of Etienne Paux



BioRxiv: <https://doi.org/10.1101/477455>

Landraces Structured in Eight Populations



South East Asia
(SEA)

Indian Peninsula
(INP)

Central Asia – Africa
(CAA)

Caucasus
(CAU)

NW Europe
(NWE)

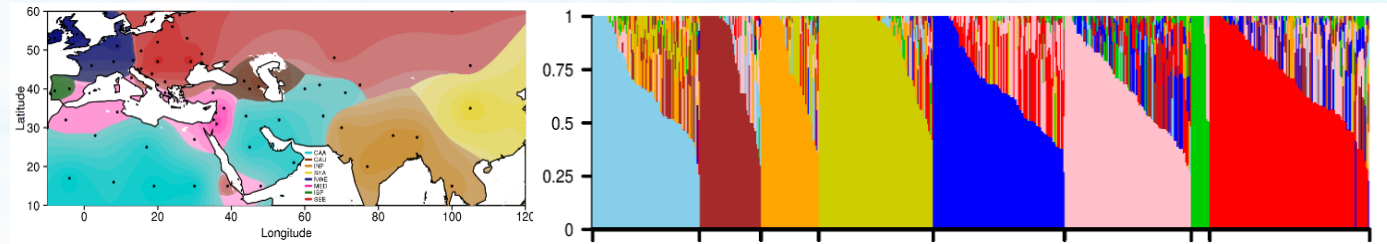
SE Europe
(SEE)

Iberian Peninsula
(IBP)

Mediterranean basin
(MED)

Courtesy of Etienne Paux

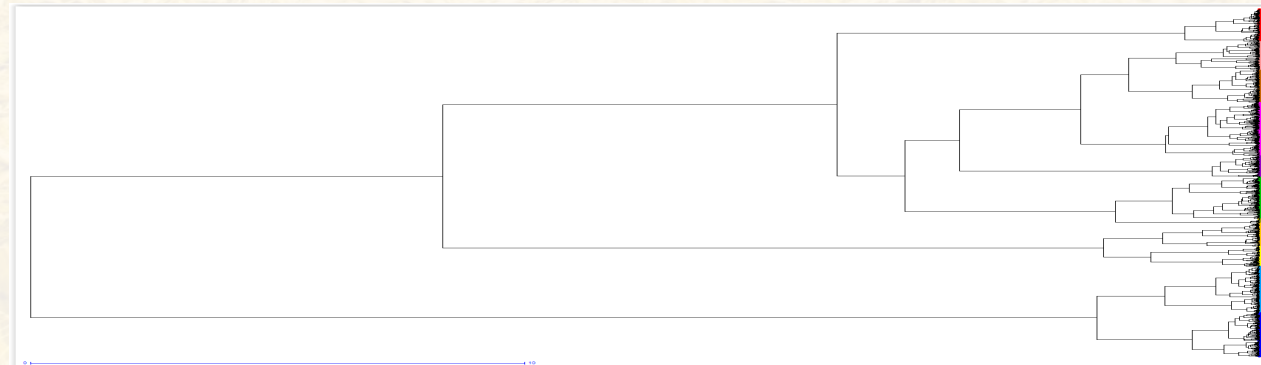
Towards an IWGSC Wheat Pan-Genome



Eight landraces with less than 1% admixture @ 180-220X

→ describe ancient wheat haplotypes

+



Additional lines (including elite varieties) @ 30-40X

→ describe the modern genetic diversity (including alien introgressions)

Courtesy of Etienne Paux

Acknowledgements for Phylogeography Data



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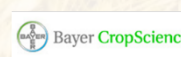
Romain De Oliveira

Jonathan Kitt

Charles Poncet

Fred Choulet

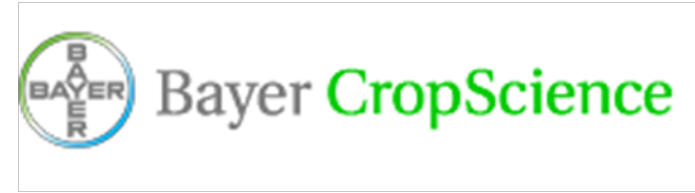
Etienne Paux



BioRxiv: <https://doi.org/10.1101/477455>

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IWGSC Sponsors





Thank you for your attention!

www.wheatgenome.org



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