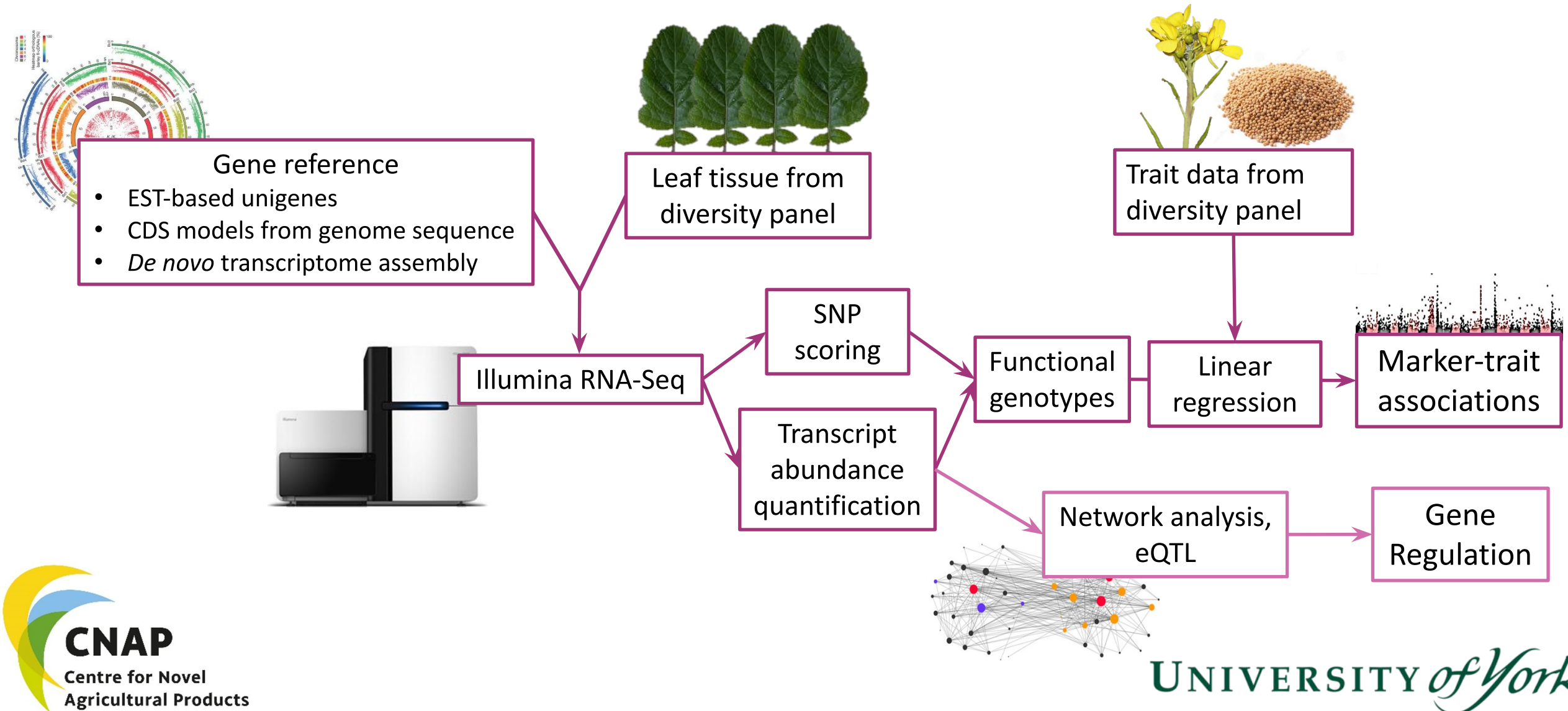


Mapping the genetic basis of yield and quality traits in *Brassica juncea*

Andrea Harper

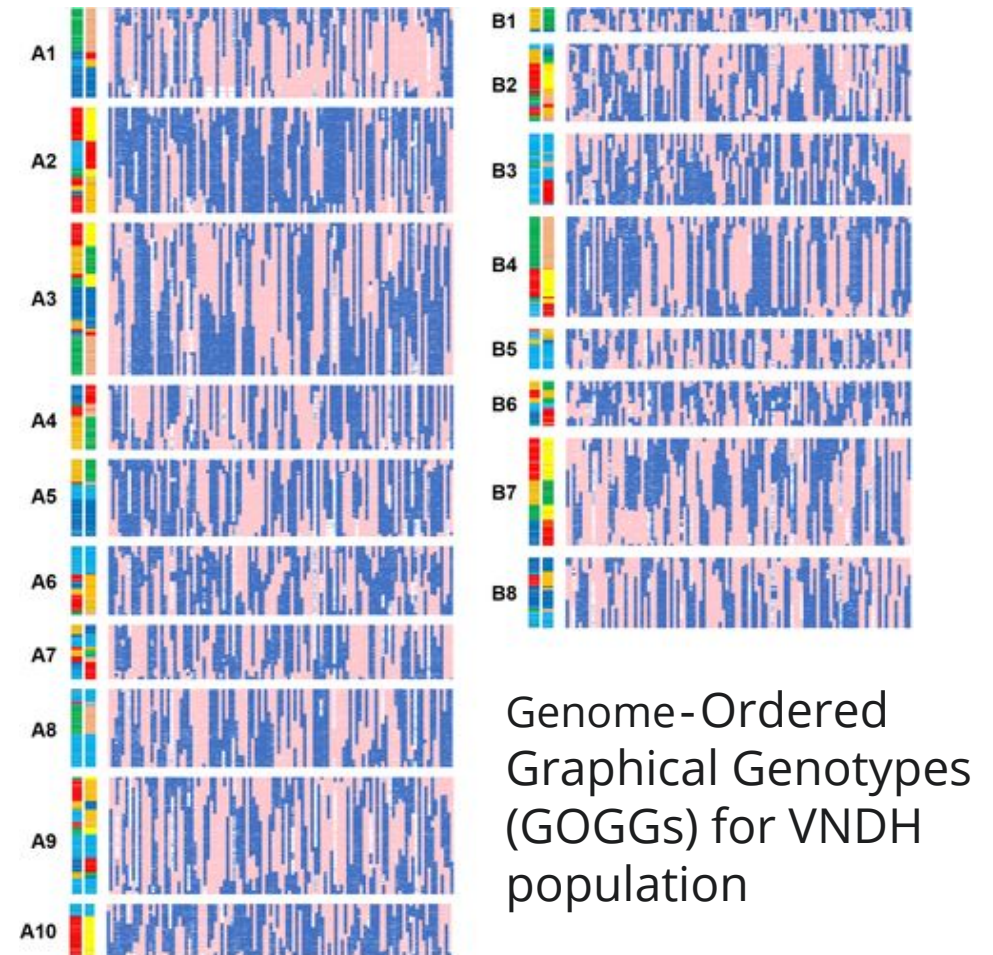
UK-BRC, 24th November 2020

Associative Transcriptomics pipeline



AB pan-transcriptome reference

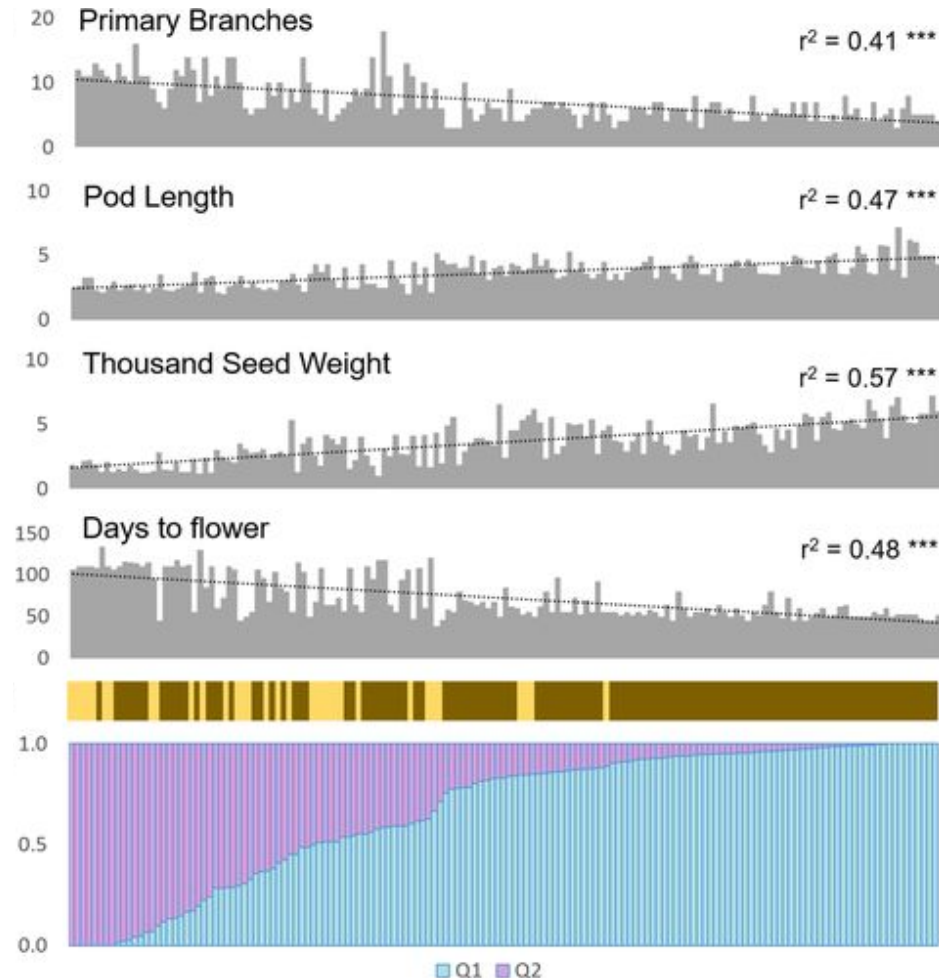
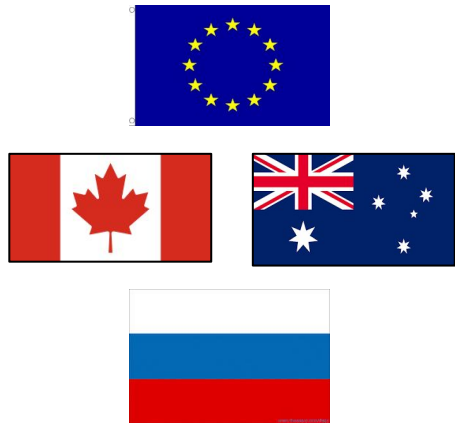
- Pseudomolecules built for the A and B genomes using published *B. rapa* Chiifu v2.0 (Cai et al., 2017) and *B. nigra* YZ12151 (Yang et al., 2016) genome sequences
- Corrected using high-density transcriptome SNP-based linkage mapping
- Published *B. rapa* Chiifu v2.0 and *B. nigra* YZ12151 CDS gene models mapped onto the pseudomolecules
- Additional *B. juncea* T84-66 CDS models interpolated into the A and B genomes respectively using collinear flanking genes
- The final AB pan-transcriptome resource comprises 93,963 hypothetically ordered CDS models (50,427 on the A genome and 43,536 on the B genome)



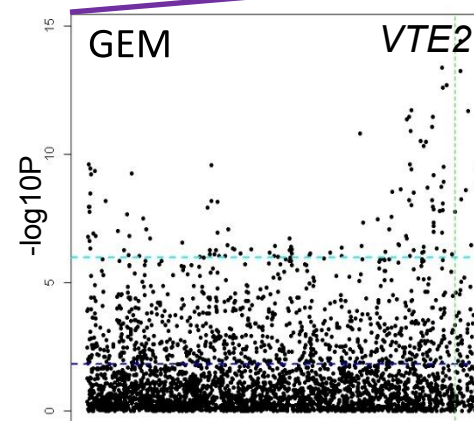
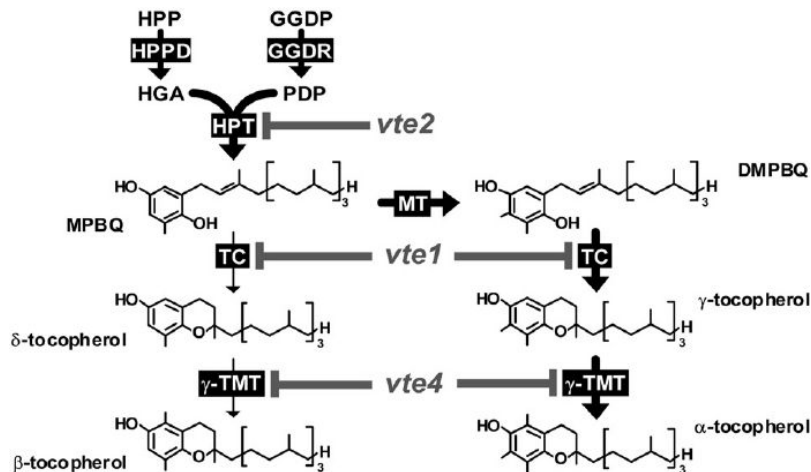
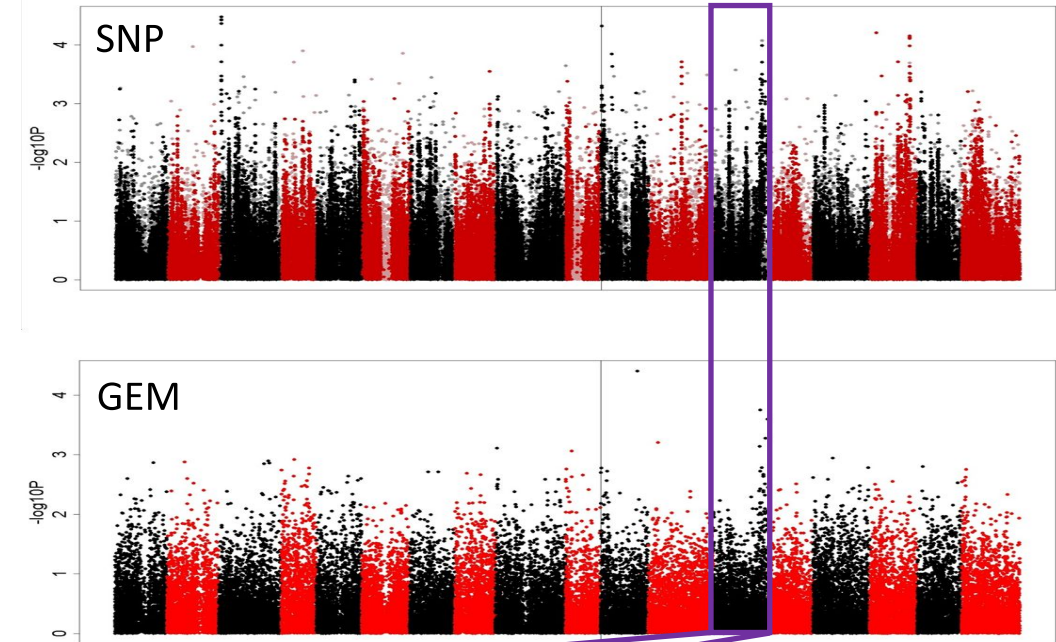
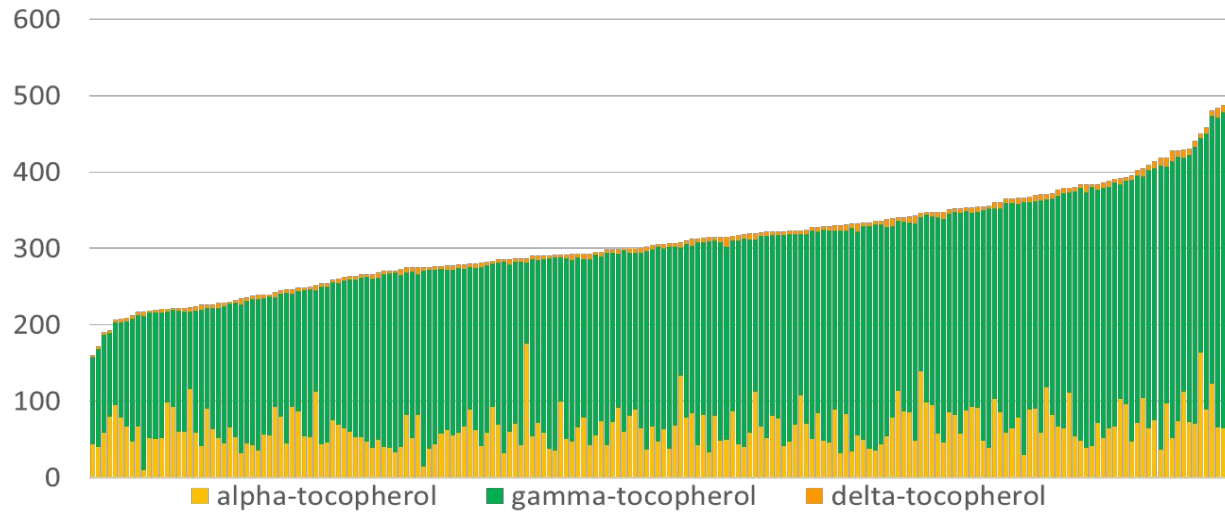
Diversity panel, markers and traits

- 151 *B. juncea* accessions used for AT
- 101 Indian accessions, 6 Australian, 13 Canadian, 6 Chinese, 19 European, 6 resynthesised
- 171,196 SNPs with minor allele frequencies > 0.05
- Significant expression detected for 48,975 CDS models
- Traits measured in India field trials – architecture, yield, phenology, seed size, oil content, tocopherols

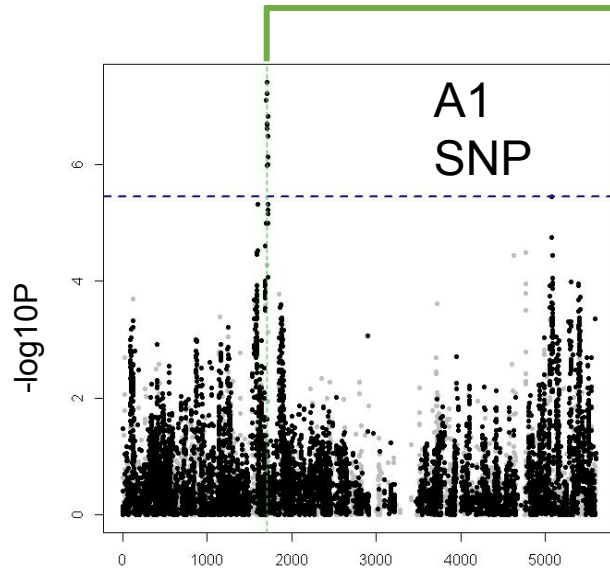
Population structure correlates with many important traits



Seed quality in *Brassica juncea*

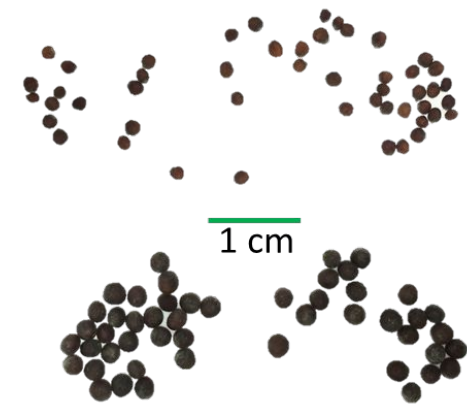
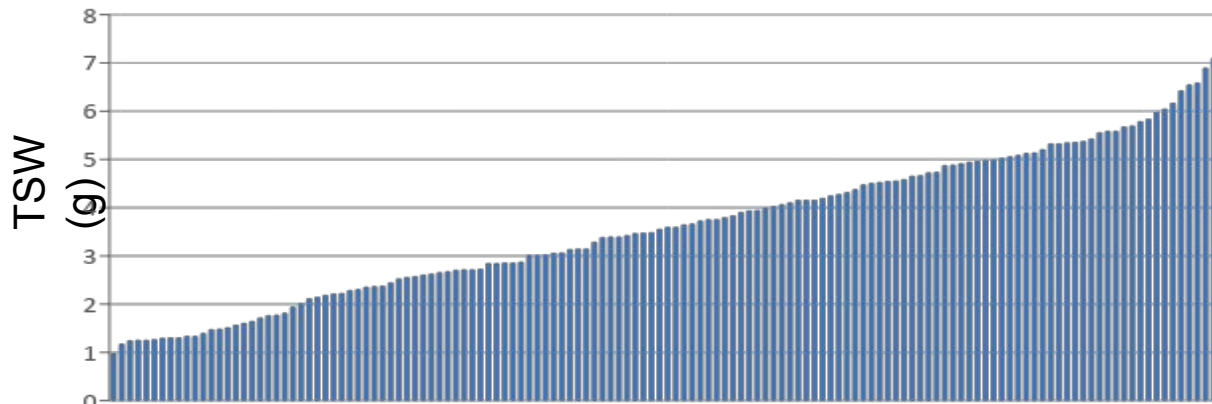


TSW in *Brassica juncea*



Key regulator of endosperm nuclear division *TTL*

- Seed growth mainly coupled to endosperm and integument growth
- Early endosperm development involves nuclear division without cytokinesis, producing large, multinucleate endosperm cells.



Predictions showed 1.7 fold weight difference between single SNP marker alleles ($p=0.004$)

Acknowledgements

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the plant journal

S E B

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Validation of an Associative Transcriptomics platform in the polyploid crop species *Brassica juncea* by dissection of the genetic architecture of agronomic and quality traits

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TSW in *Brassica juncea*

