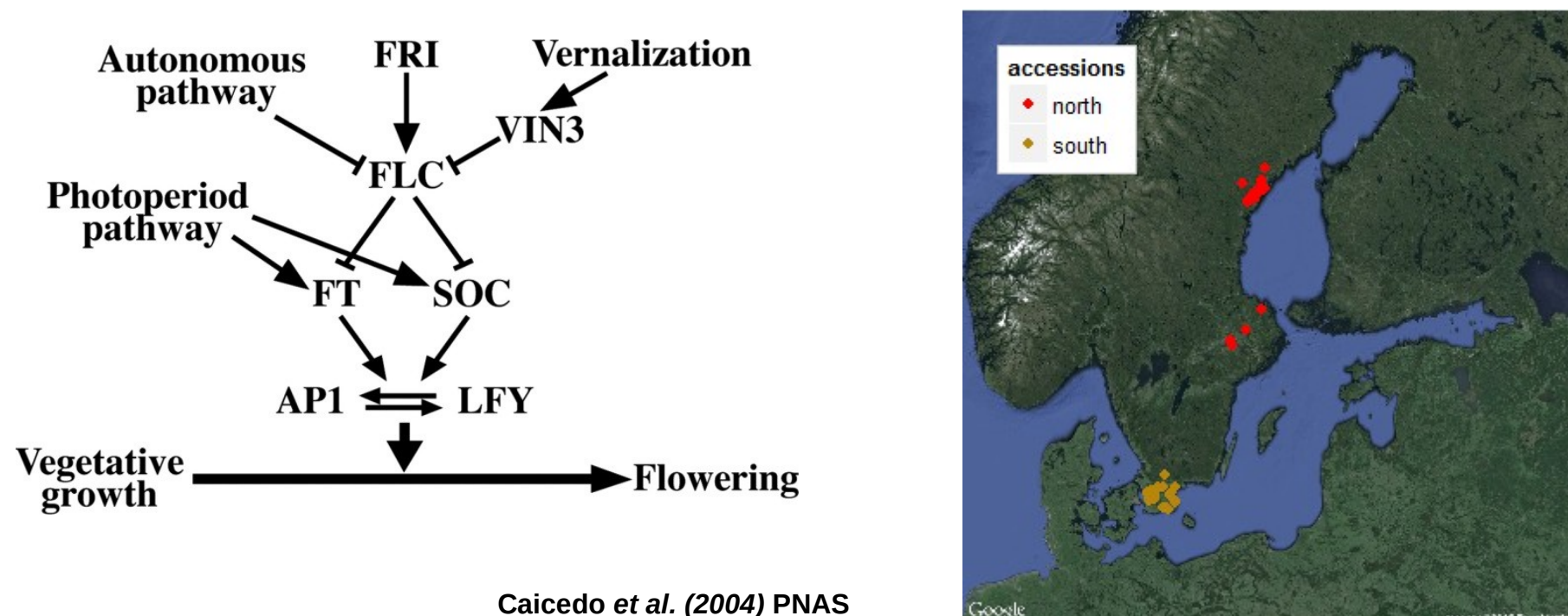# Natural Variation of Gene Regulatory Networks

Jan Freudenthal, Ammarah Anwar, William López and <u>Arthur Korte</u>
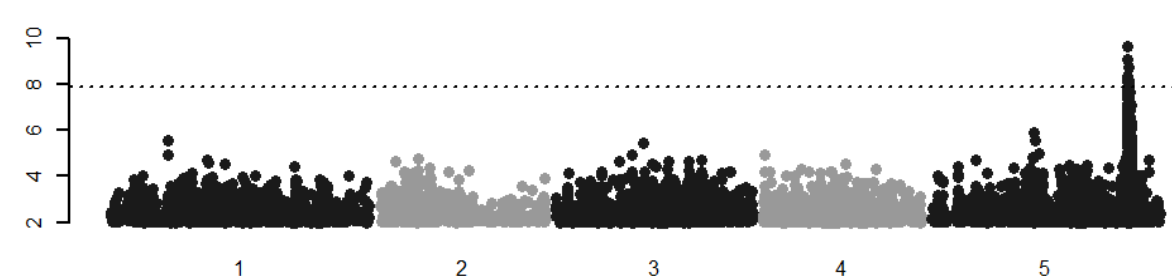
Center for Computational and Theoretical Biology, University Würzburg, 97074 Würzburg, Germany.

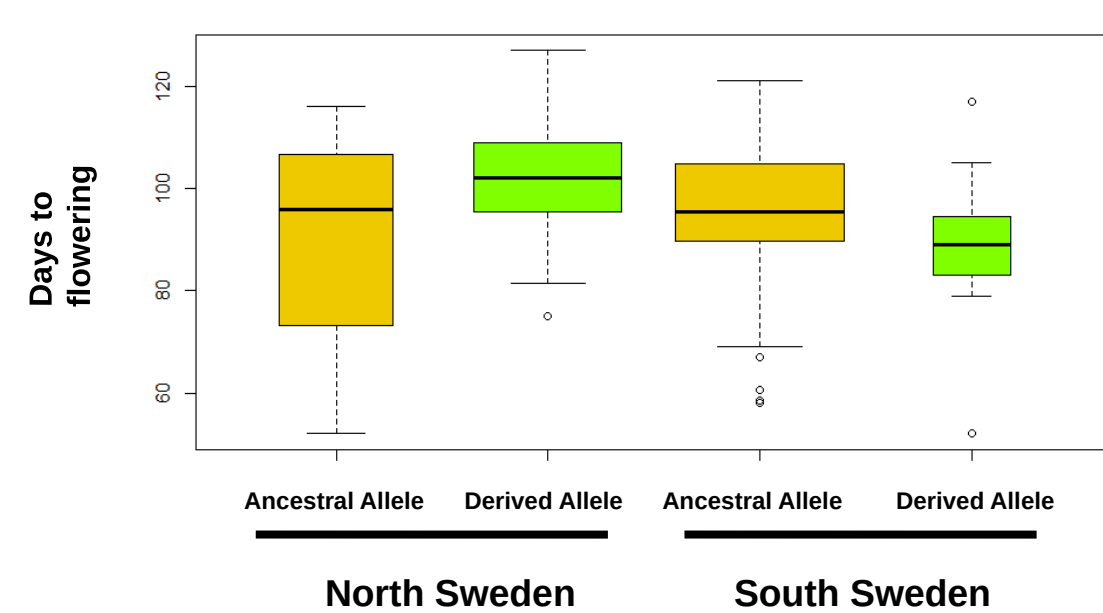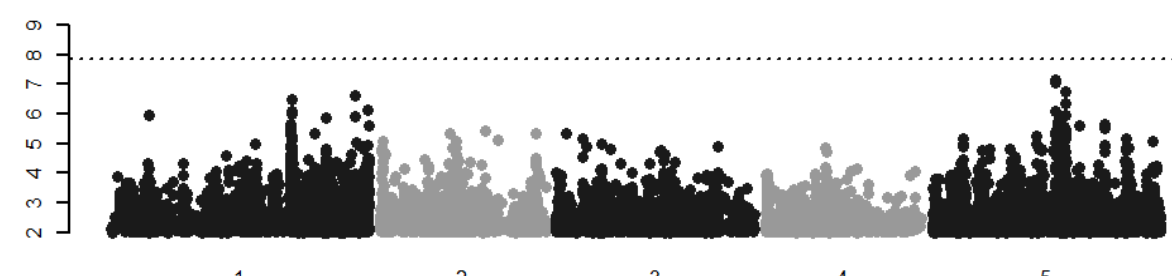## Natural variation in the flowering time pathway in *Arabidopsis thaliana*

Caicedo *et al.* (2004) PNAS

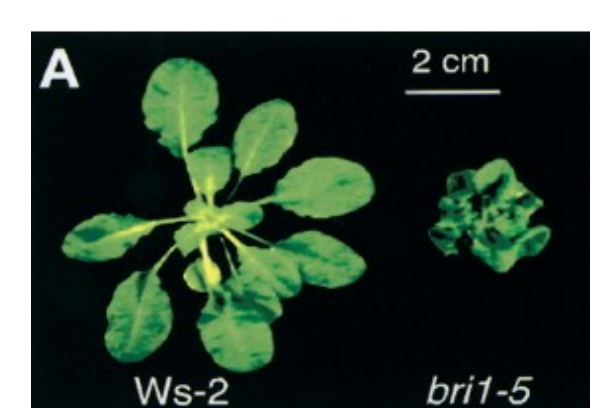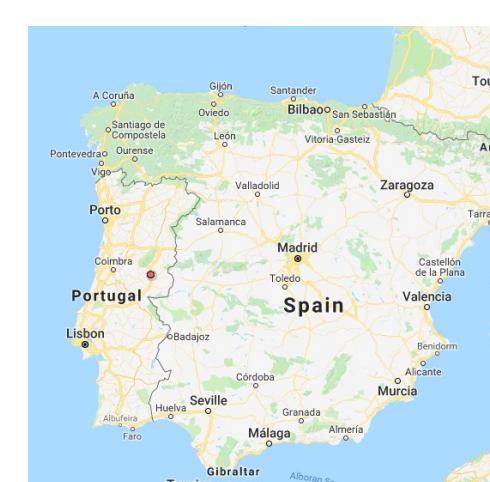## GWAS in local populations

North Sweden

South Sweden

The effect of the respective allele depends on the genetic background

Effect of gene knock-out is depending on the genetic background

Natural BRI1 knock out in an accession from Portugal (IP-Alo-0)

Santiago Mora-García *et al.* 2004, Genes Dev.

Co-occurrence of premature STOP codons

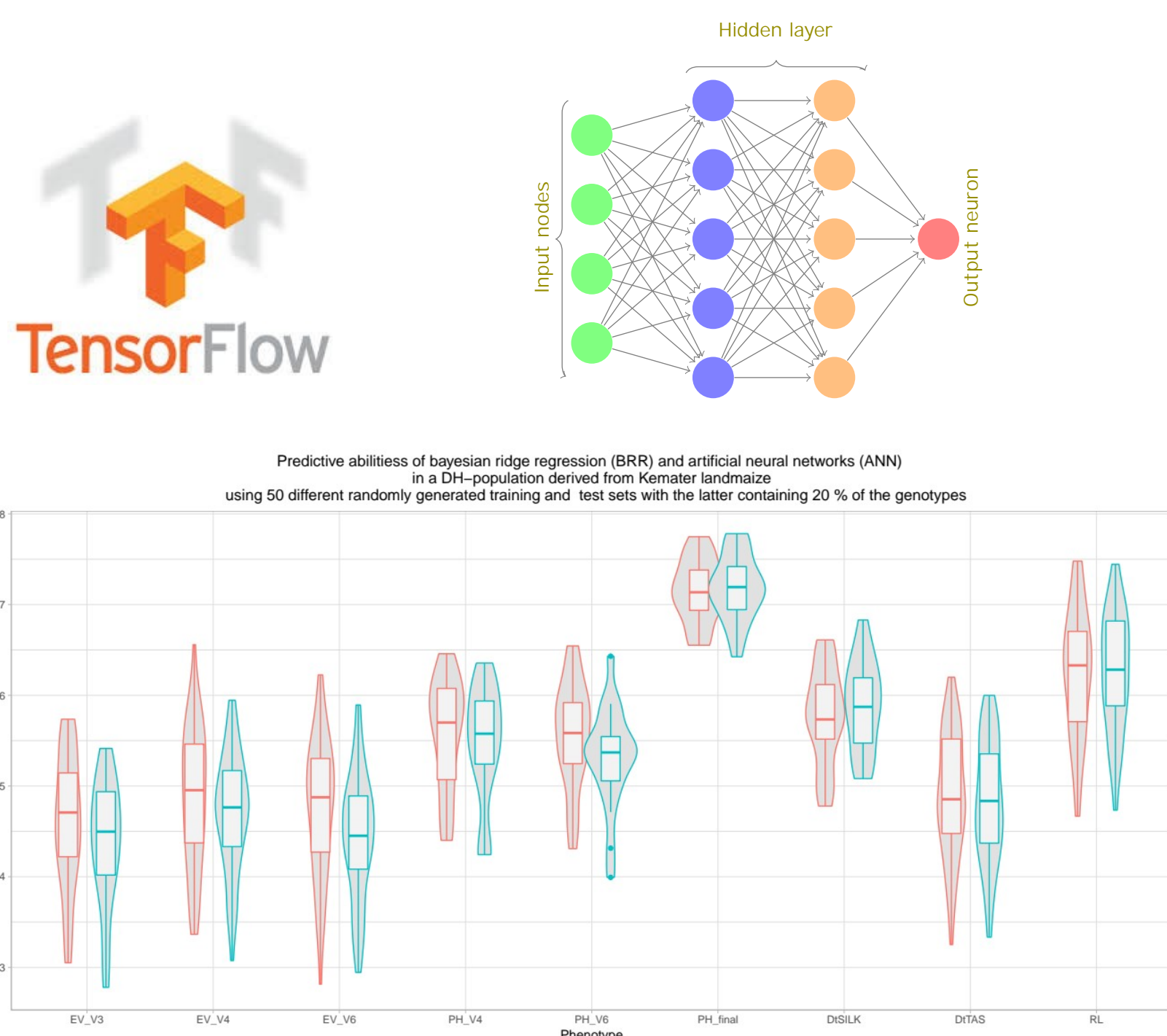| Gene 1	Gene 2	gene1_count	gene2_count	Co - occurrence	Lower border	Upper border	P-value
AT1G66920	AT3G59750	341	251	122	100	157	0.03
AT4G36140	AT5G45150	312	356	266	138	196	1.7e-57
AT3G05685	AT3G63320	444	114	38	55	96	5.6e-16

Many genes are knocked out together more (or less) often then exspected by chance

Genomic prediction

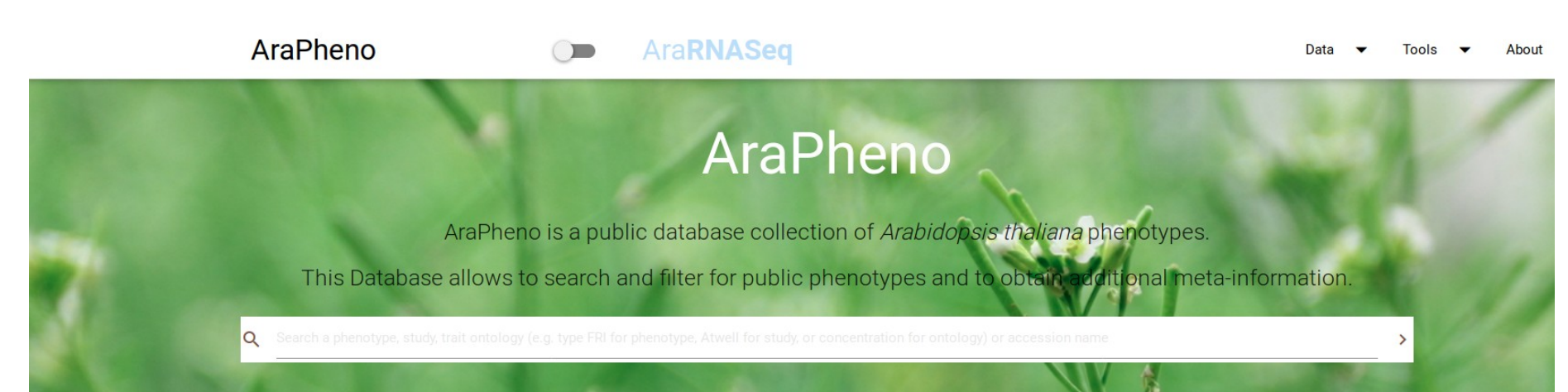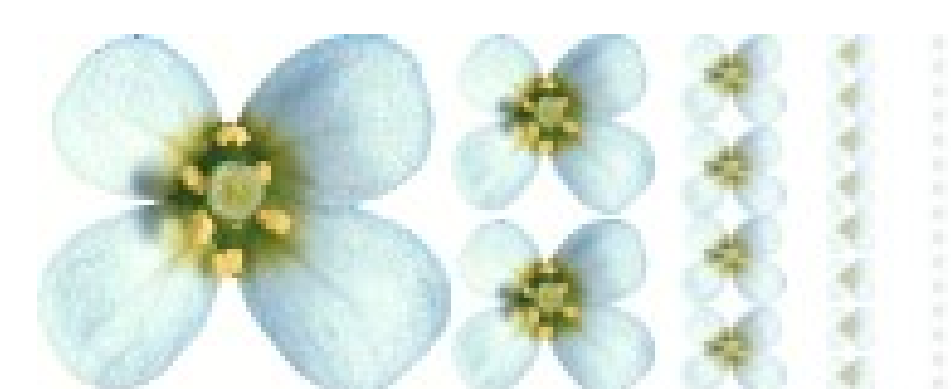**MAZE - Accessing the genomic and functional diversity of maize to improve quantitative traits**

GP with artificial neural networks
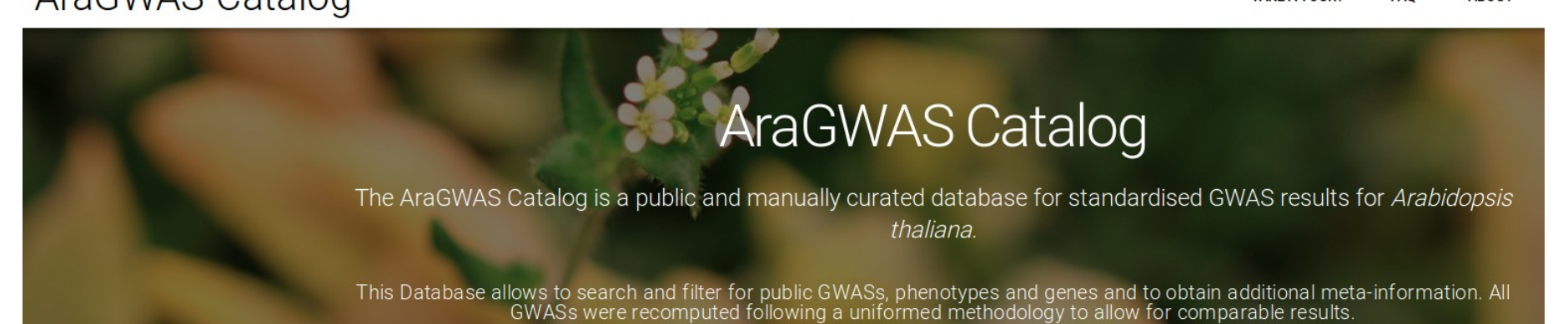

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www.1001genomes.org

https://go.uniwue.de/korte