Genetics of Phosphorus Use Efficiency in *Brassica oleracea*

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Phosphorus Use Efficiency in *Brassica oleracea*

AIM:

To characterise genetics of phosphorus use efficiency (PUE) in *Brassica oleracea*

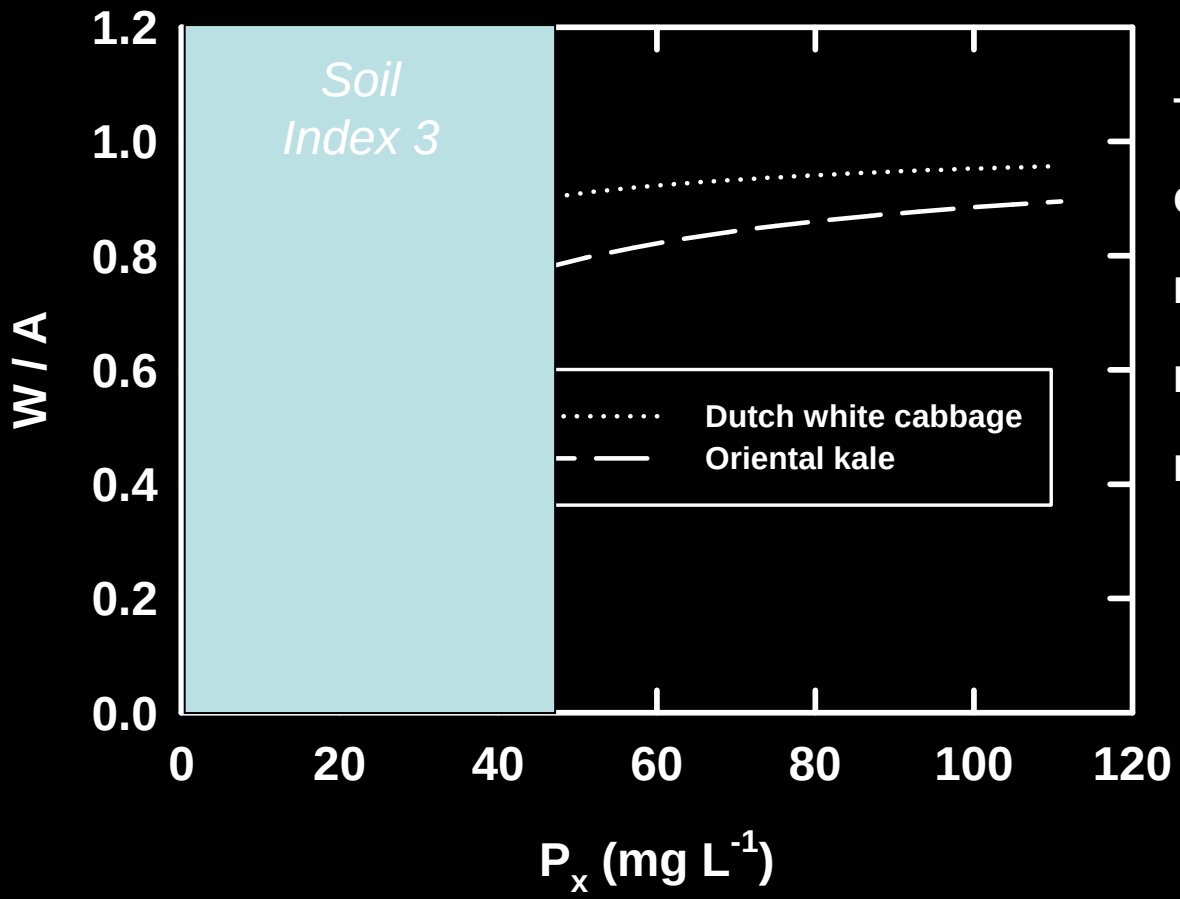
RESOURCES:

Genetic Diversity Foundation Sets (DFS), mapping populations, substitution lines

TO DELIVER:

1. **Information for fertiliser recommendations**
2. **Database of PUE of existing commercial F_1 varieties**
3. **Information for use in breeding / crop selection strategies**

Response of *Brassica oleracea* to P availability



Trialled 8 F_1 genotypes, field and glass

Genotypes had similar response to P

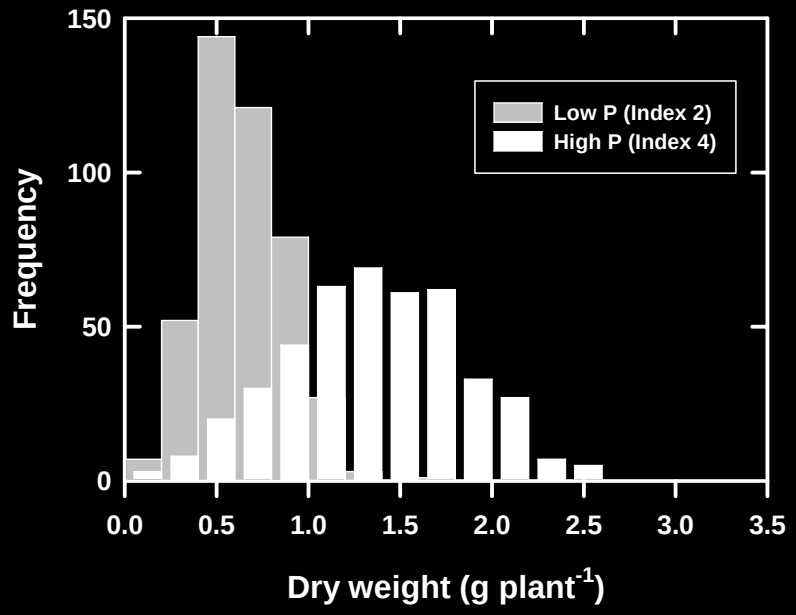
Rankings independent of environment

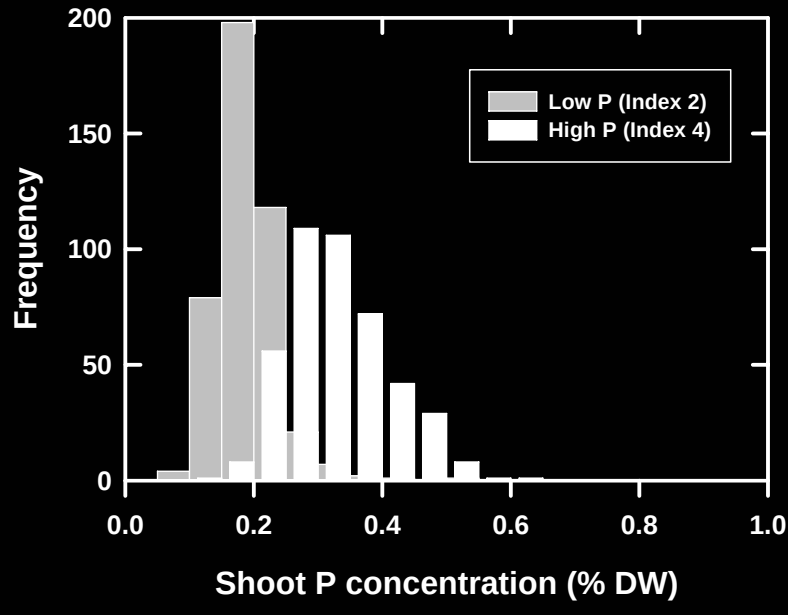
Responses modelled by 2 parameters

Responses can be estimated by data obtained at 2 soil P

Greenwood et al. (2005) Crop Science 45: 1728-1735
Greenwood et al. (2006) Plant and Soil 281: 159-172

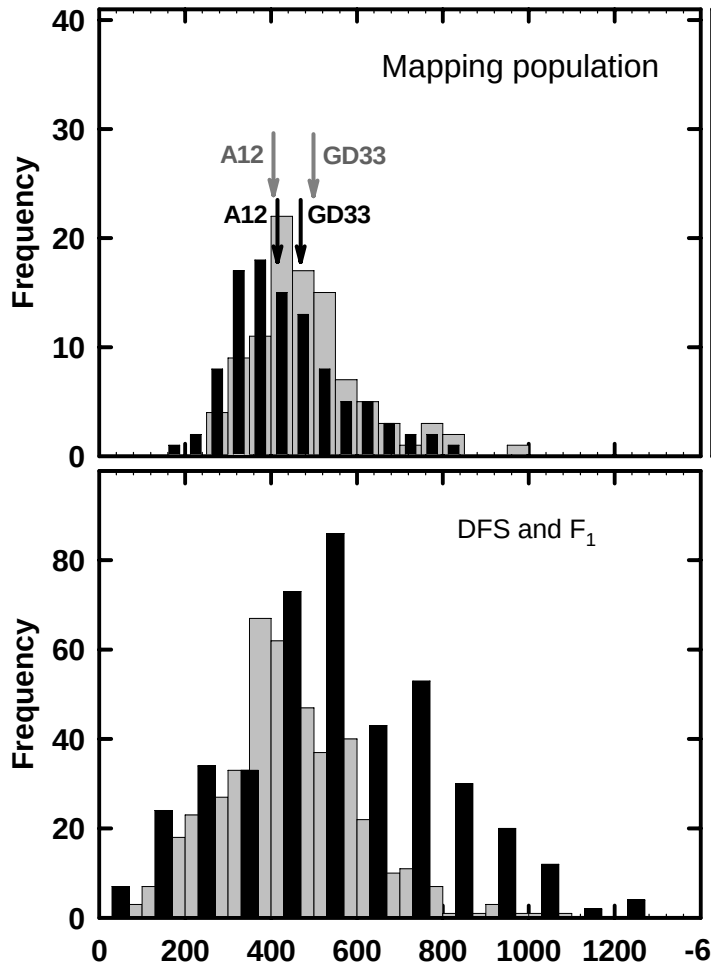
Variation in Yield and P Concentrations among *Brassica oleracea* genotypes

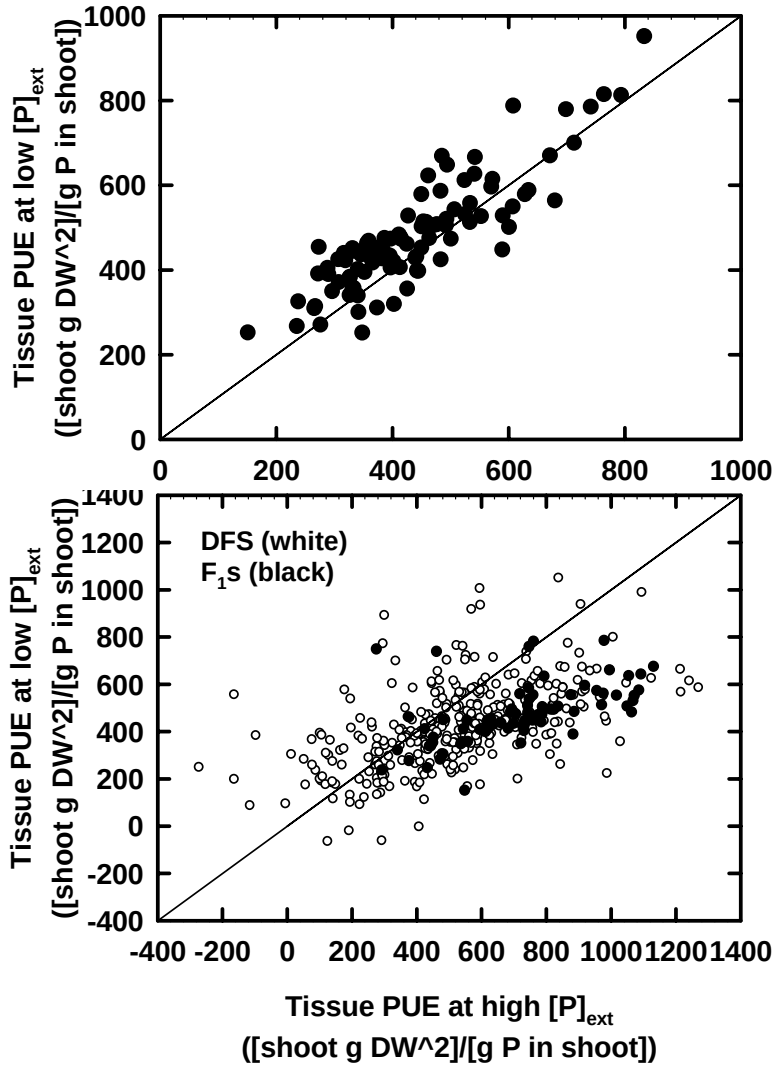




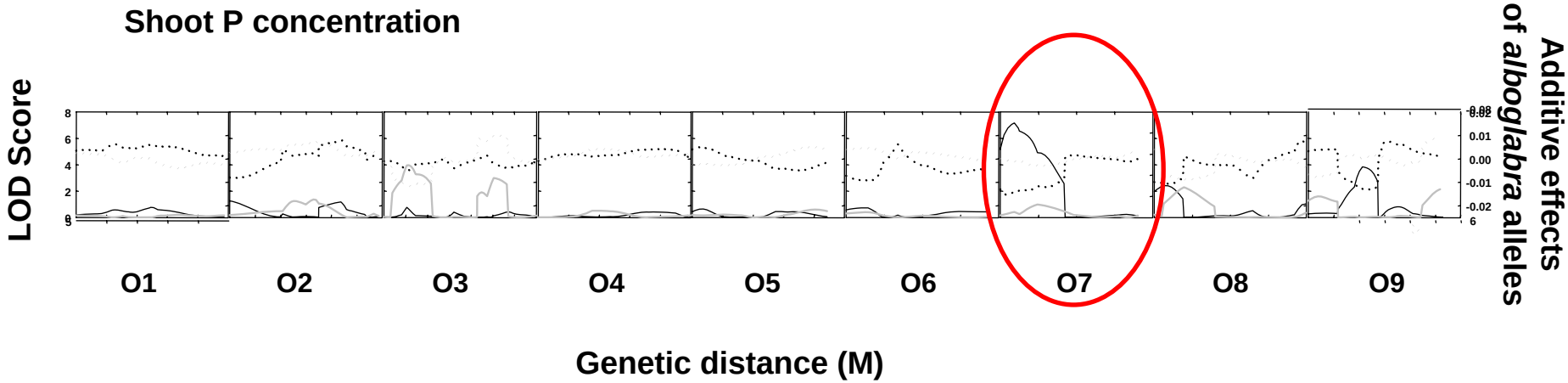
Broadley et al., July 2005
White et al. (2005) IPNC

Variation in tissue PUE among *Brassica oleracea* genotypes

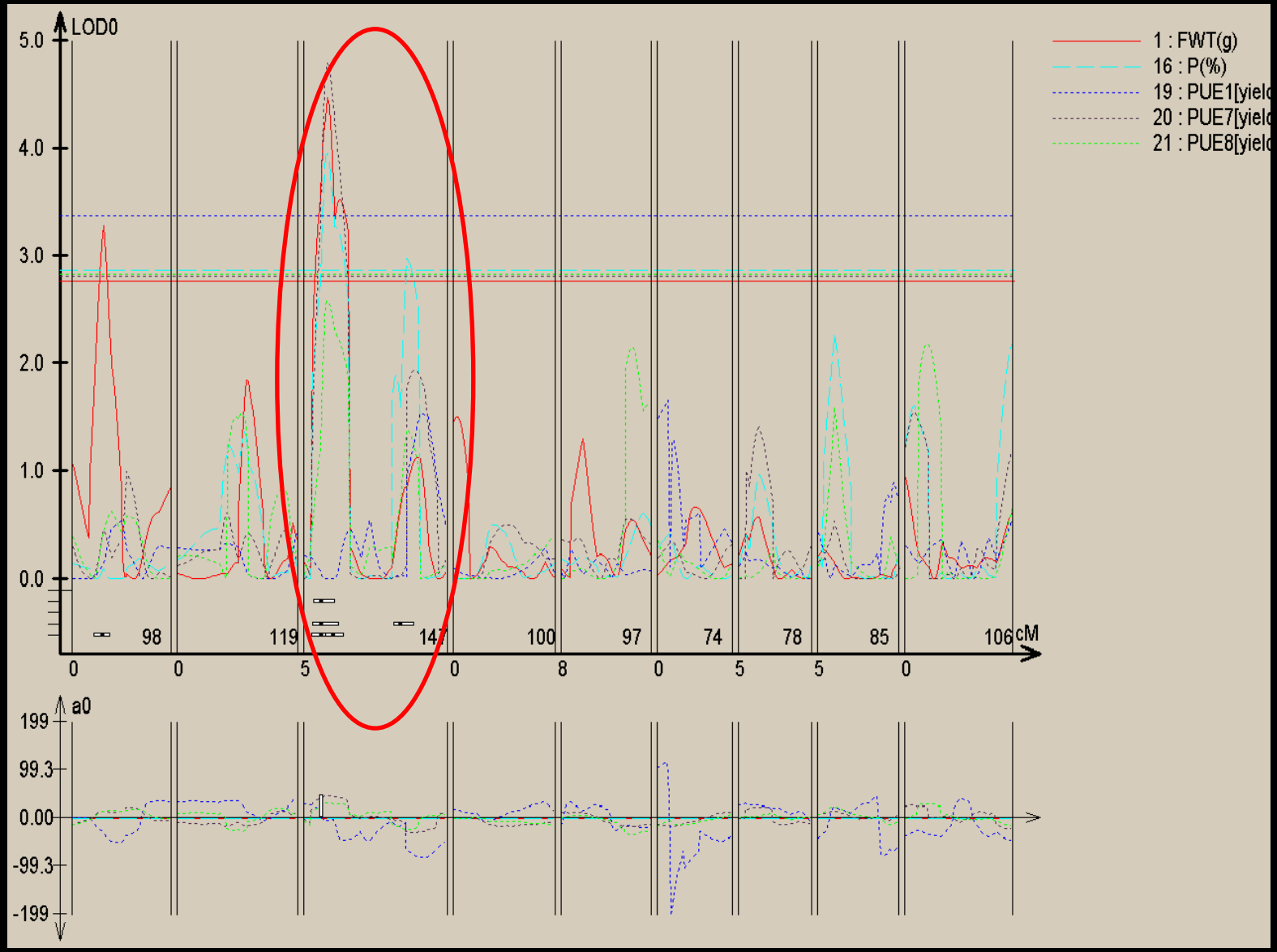




Chromosomal Loci
Impacting Shoot P concentration in *B. oleracea*



Chromosomal Loci Impacting PUE in *Brassica oleracea*



References and Acknowledgements

[1] Broadley MR, Hammond JP, King GJ, Astley D, Bowen HC, Meacham MC, Mead A, Pink DAC, Teakle GR, Hayden RM, Spracklen WP, White PJ: Species-wide genetic analysis of *Brassica oleracea* reveals leaf-calcium (Ca), potassium (K), and magnesium (Mg) concentrations are consistent between environments and associate with non-pleiotropic loci on linkage group 09. Submitted to *Plant Physiology*.

[2] Greenwood DJ, Stellacci AM, Meacham MC, Broadley MR, White PJ (2005) Phosphorus response components of different *Brassica oleracea* genotypes are reproducible in different environments. *Crop Science* 45, 1728-1735.

[3] Greenwood DJ, Stellacci AM, Meacham MC, Broadley MR, White PJ (2006) Brassica cultivars: P response and fertilizer efficient cropping. *Acta Horticulturae* 700, 91-96.

[4] Greenwood DJ, Stellacci AM, Meacham MC, Mead A, Broadley MR, White PJ (2006) Relative values of physiological parameters of P response of different genotypes can be measured in experiments with only two P treatments. *Plant and Soil* 281, 159-172.

[5] White PJ, Broadley MR, Greenwood DJ, Hammond JP, King GJ, Meacham MC, Stellacci AM (2005) Optimising phosphorus fertilisation of *Brassica*. In: *Plant Nutrition for Food Security, Human Health and Environmental Protection*, pp. 1052-1053.