

Natural variation in endodermal development and plant mineral nutrient homeostasis.

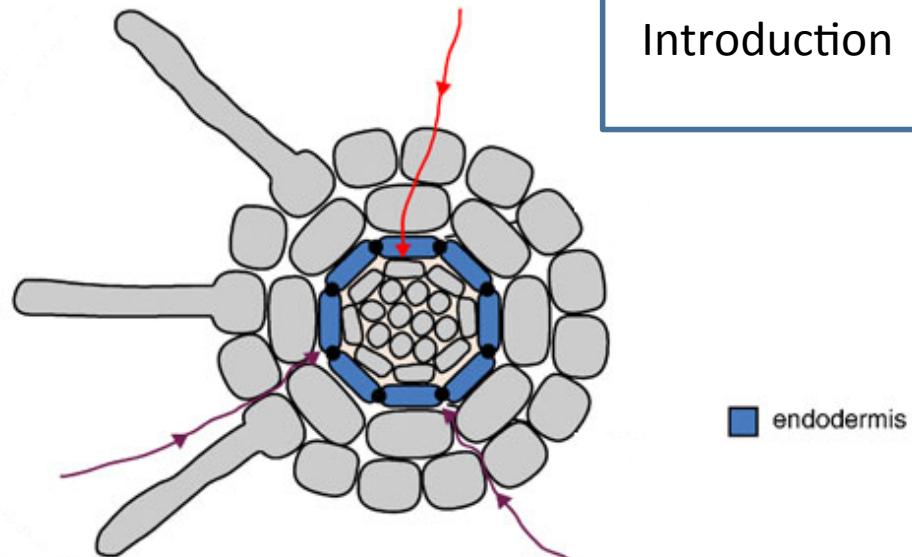
Monika Mierzwińska
University of Aberdeen



Aim:
better understanding of genetic architecture
underlying endodermal development

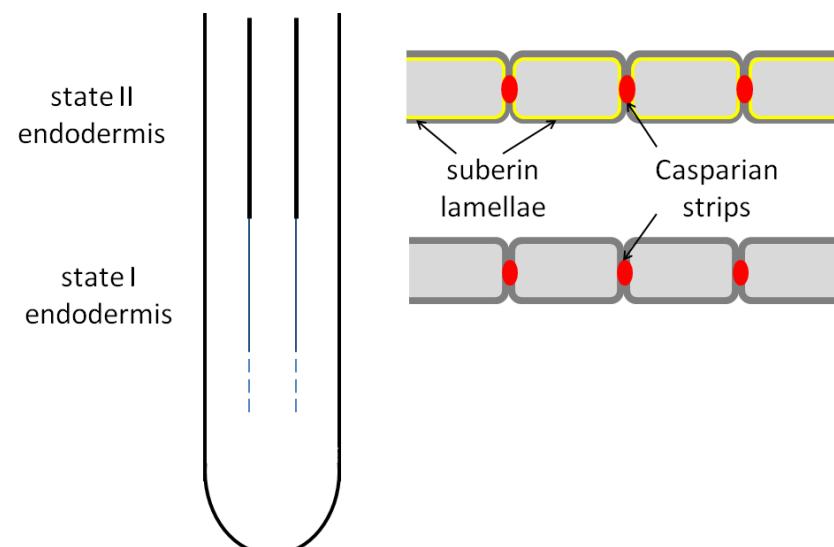
Endodermis

- Prevents flow of water
- Selective nutrient uptake
- Maintains xylem functionality
- Response to abiotic factors



(Allasimone *et. al.*, 2011).

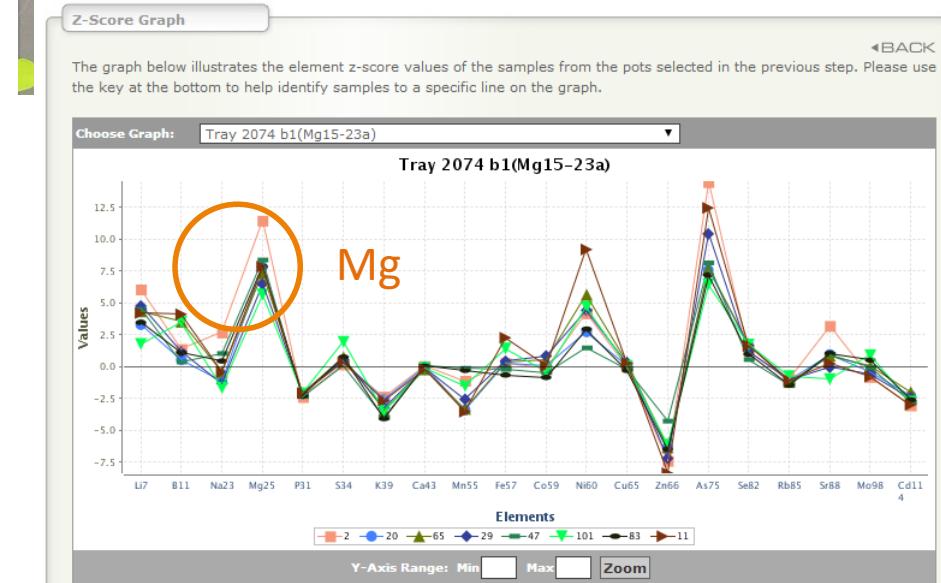
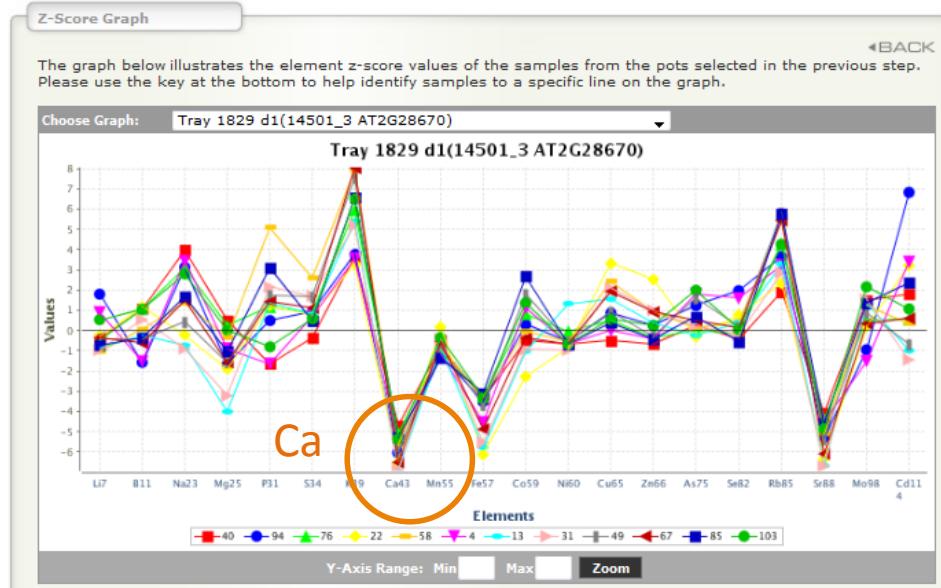
- Caspary strip
- Suberin lamellae



Endodermis and element composition

control medium
-Ca/+Mg

Introduction



Experimental
approach

Genome Wide Association Study

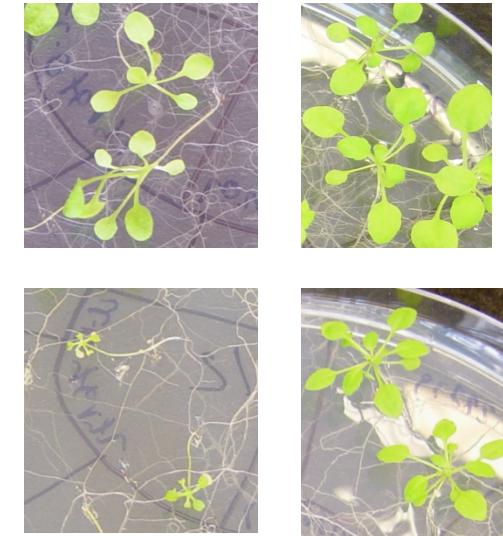
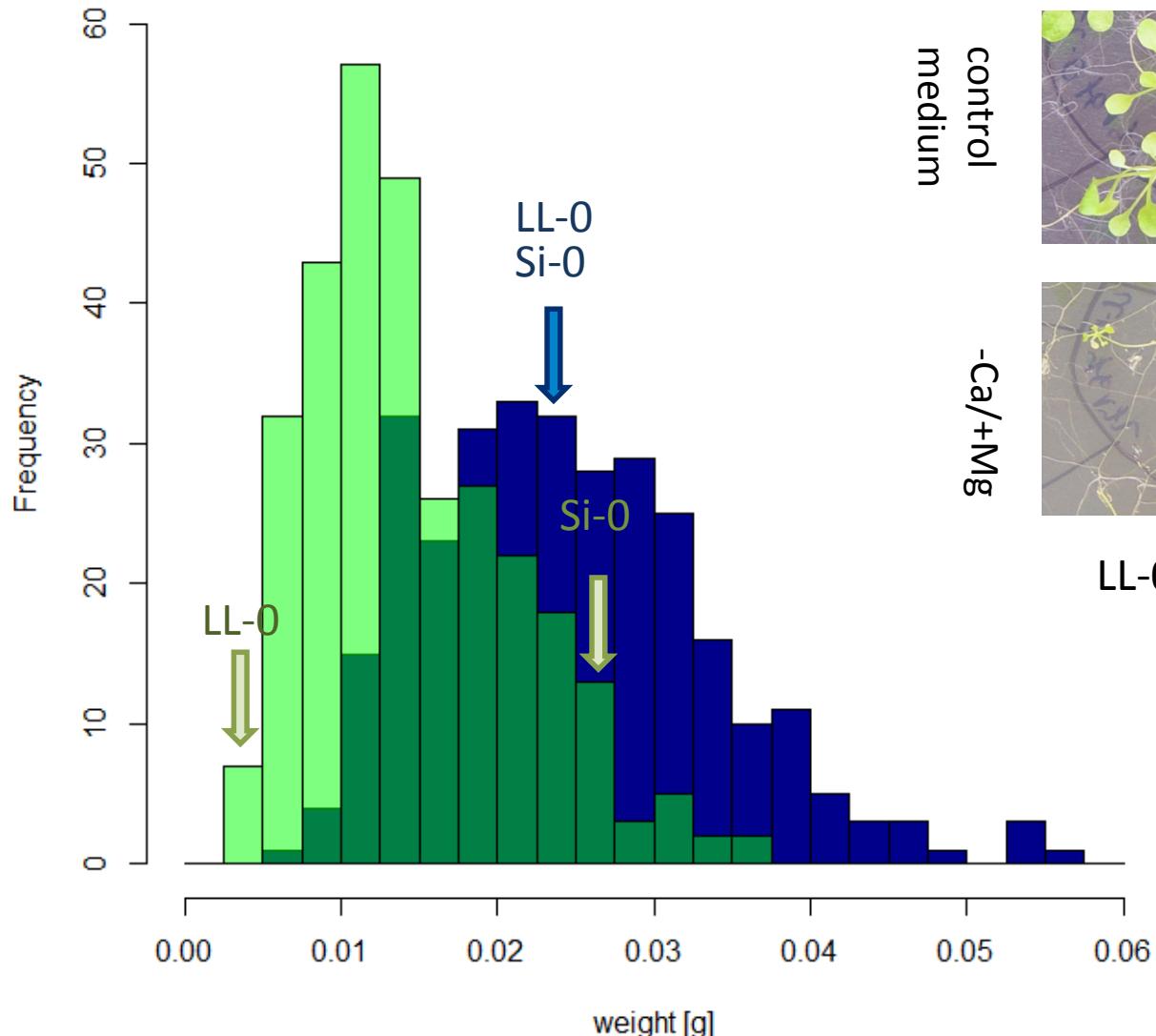
Efficient Mixed-Model Association eXpedited (EMMAX)



Phenotype

Results

Distribution of weight in control and treatment



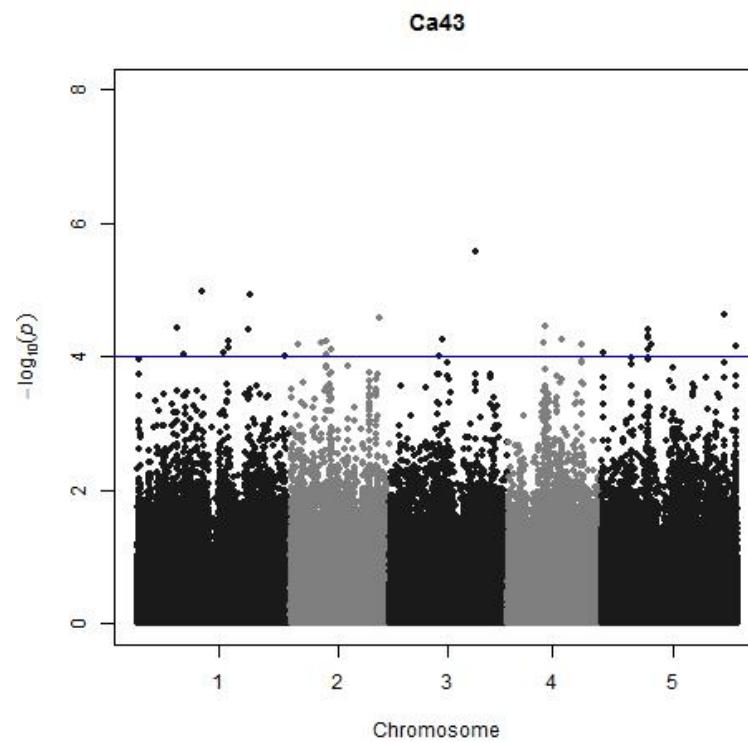
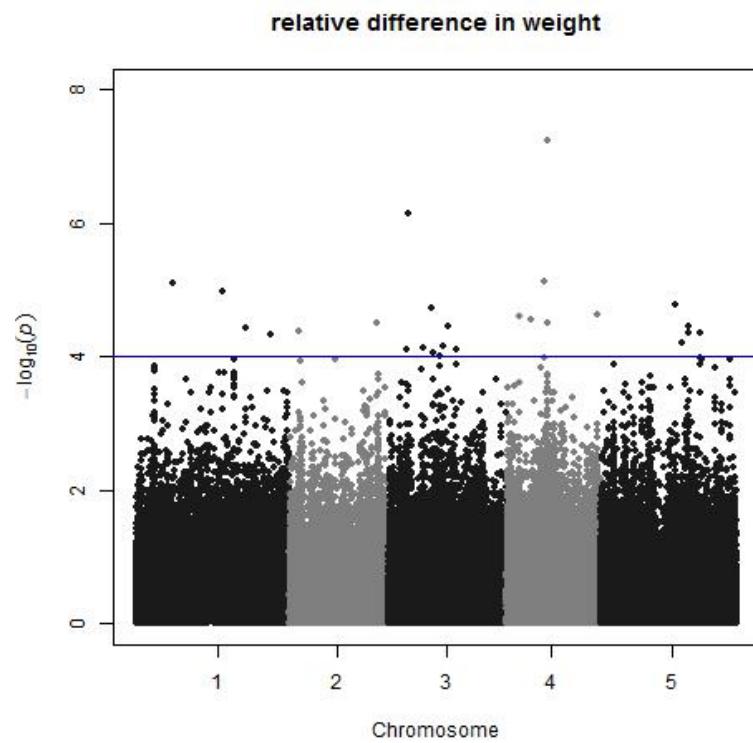
LL-0

Si-0

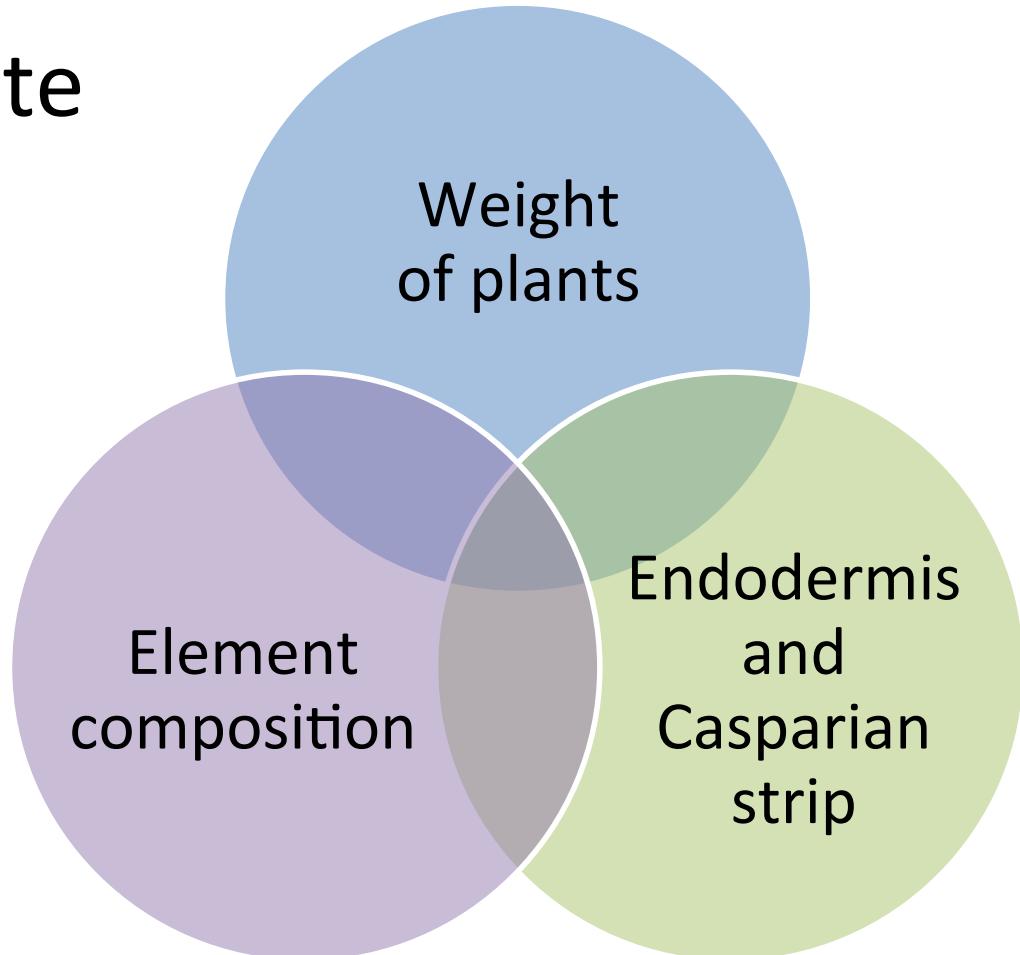
Broad sense
heritability
57.67%

Results

Association results



Candidate genes

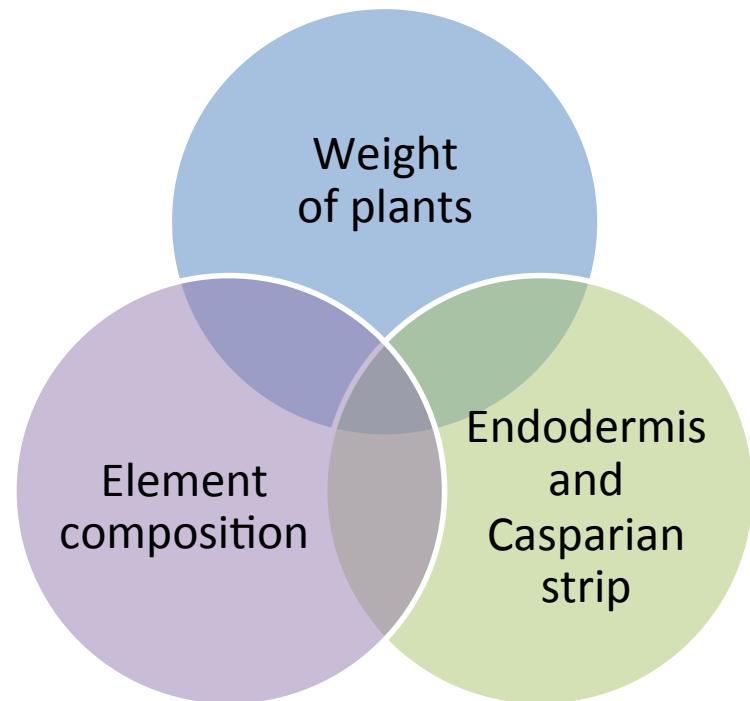


Results

Results

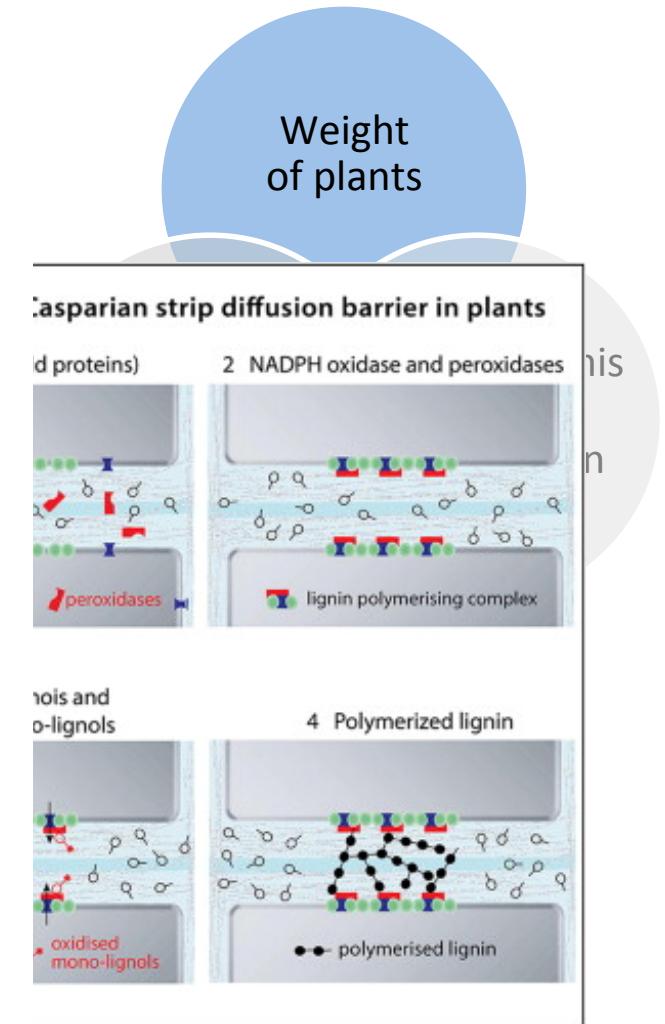
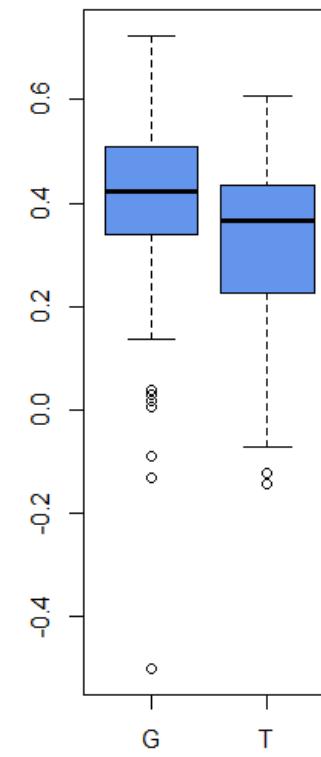
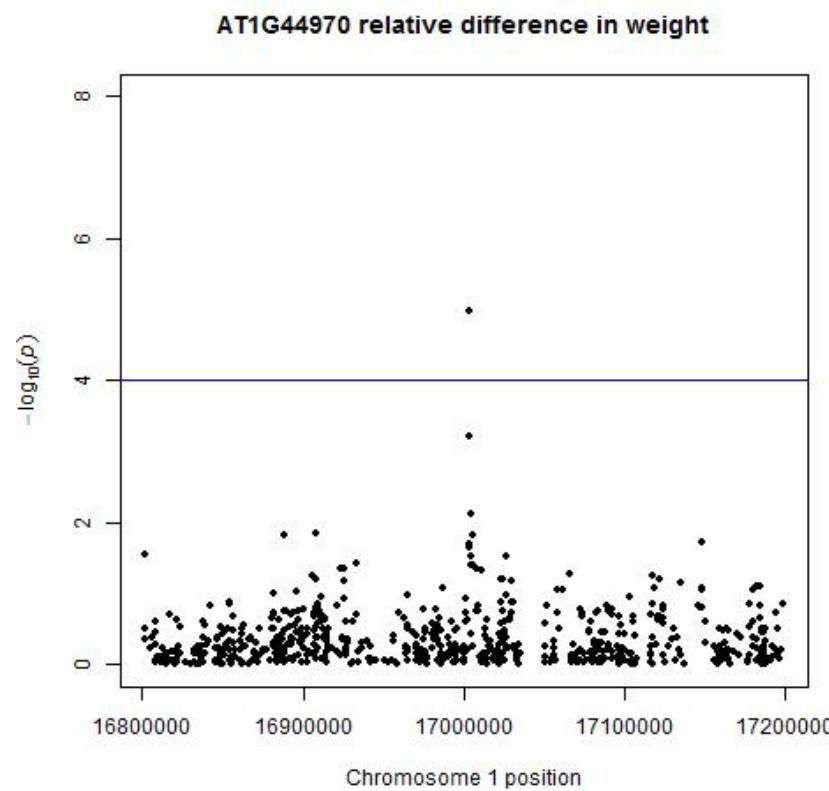
Candidate genes

- Peroxidase superfamily
- Dirigen like proteins
- Transcription factor
- Signal transduction
- Defence response
- Unknown proteins



Results

Candidate gene *PER09*

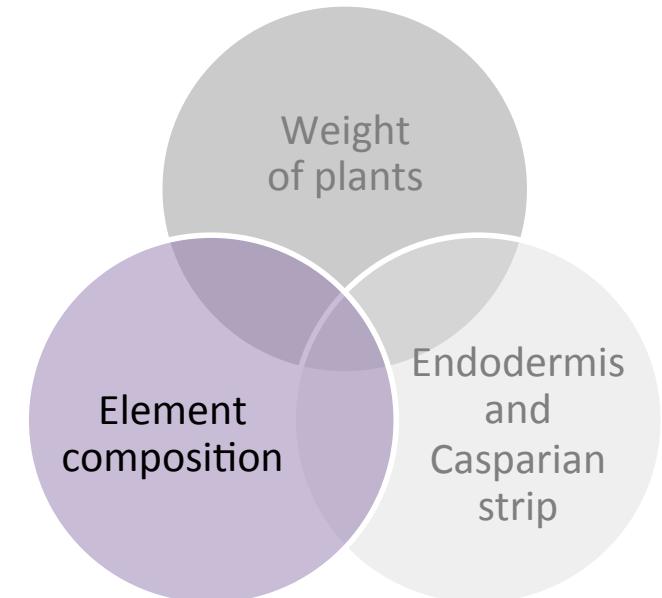
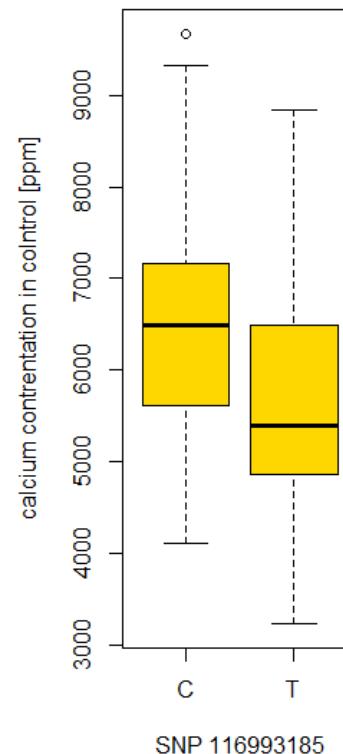
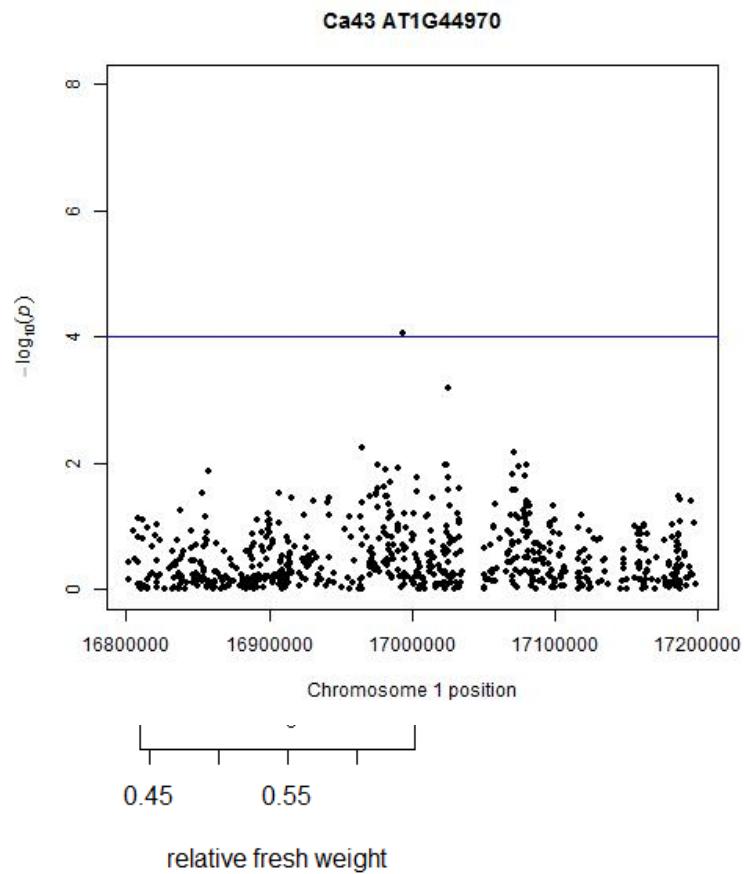


Lee et al., 2013

Results

Candidate gene *PER09*

p-value = 0.0006486; r=0.1942283



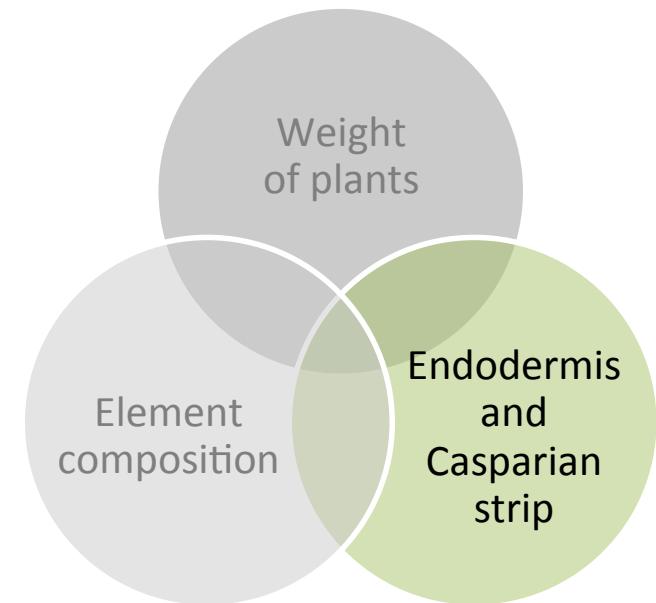
Results

Candidate gene *PER09*

Coexpression with
MYB36, CASP1, ESB1

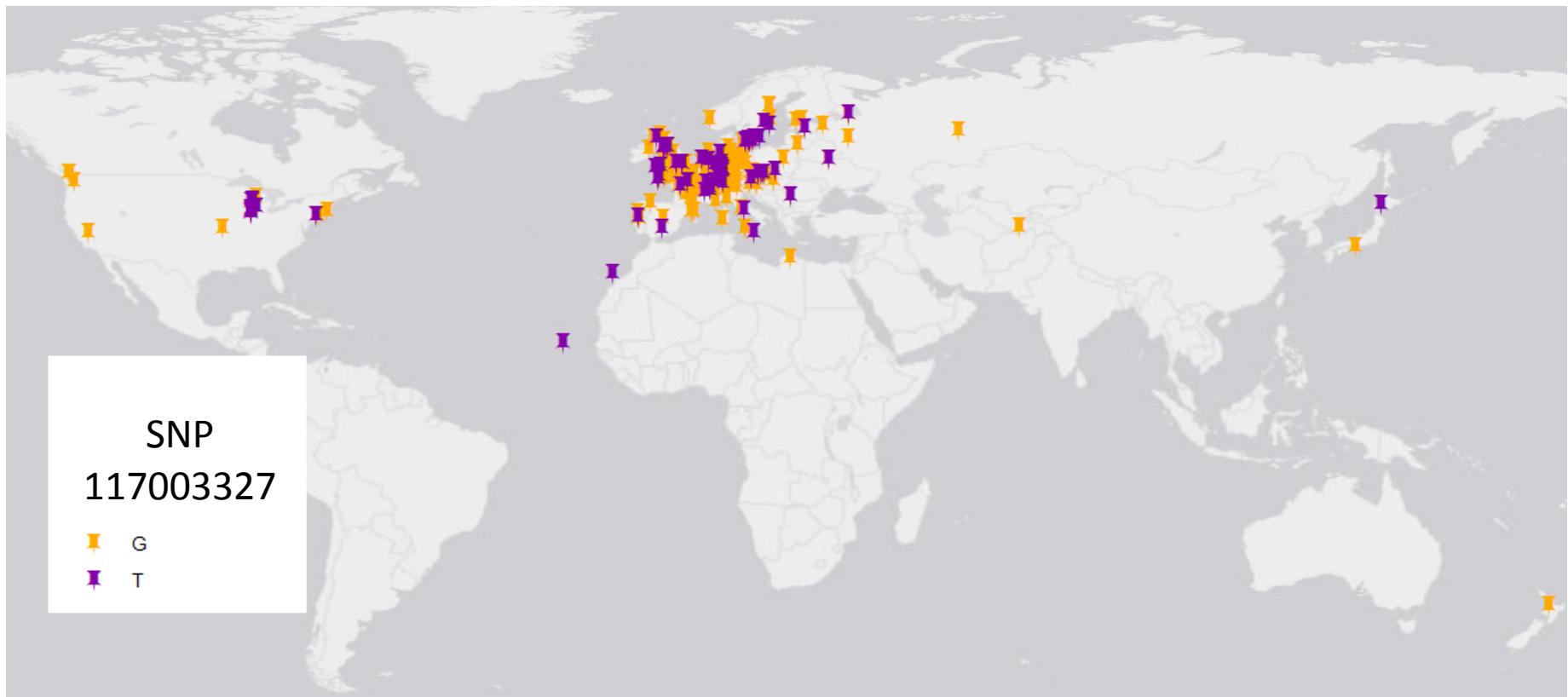
Overexpression in
endodermis

Gene product found
in endodermis



What is next?

Adaptive value?



Summary

- **Conclusions**

Variation in response to treatment both in weight and element composition.

Association results suggesting that variation is polygenic.

Candidate genes possibly involved in both endodermal development and mineral nutrient homeostasis.

Acknowledgements

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Thank you!

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