

Genome Wide Association Studies for Exploring Salt Tolerance in Barley

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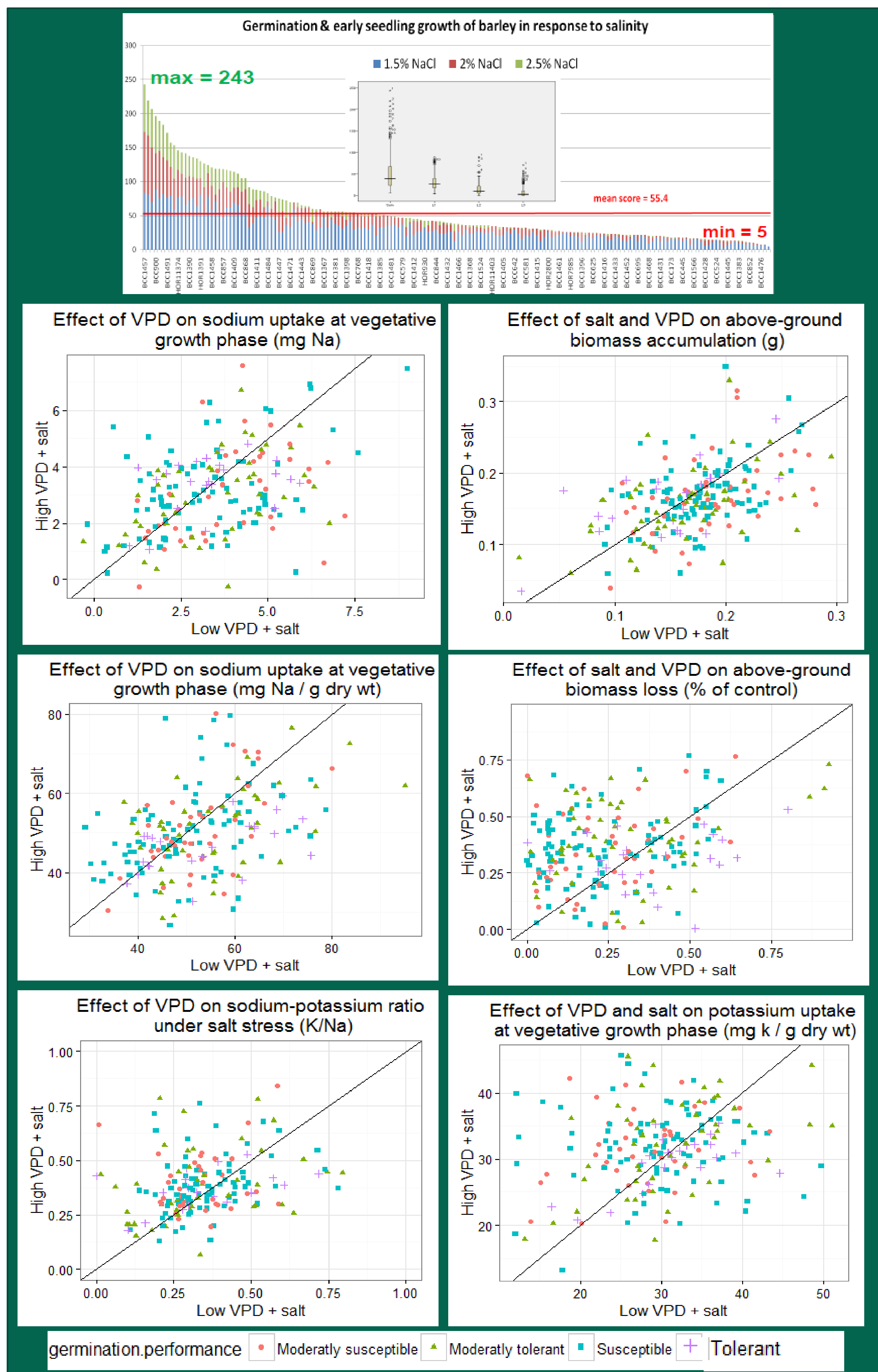
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Introduction

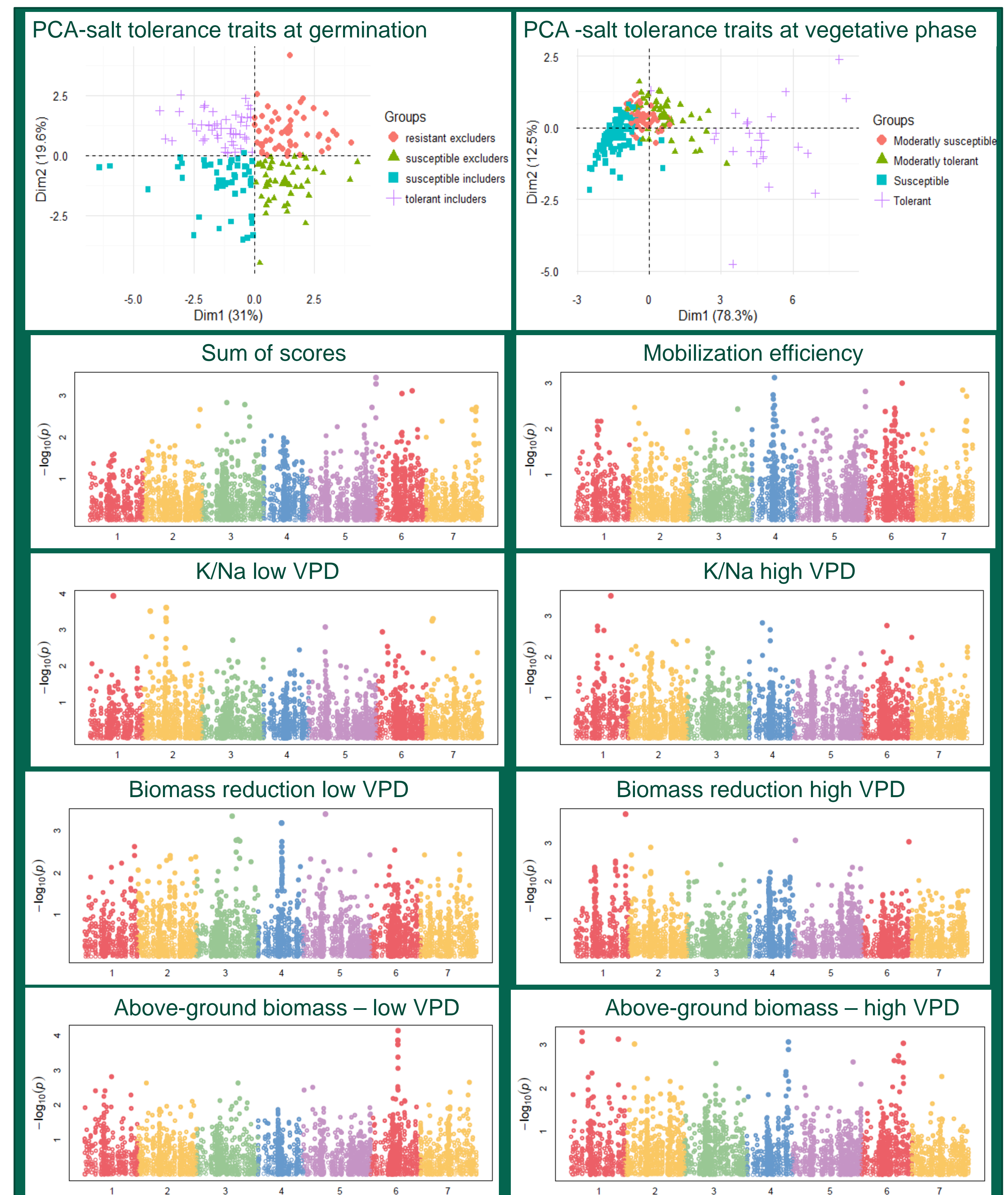
- Salt uptake in plant is passively driven by stomatal responses to leaf-to-air vapor pressure deficit (VPD)
- Exploring genotypic responses to salt & VPD stress is essential for developing robust salt screening tool
- Test of QTLs with respect to salt & VPD stress is necessary to assess combined / alternative effects
- Calculating QTLs at different crop development stages could detect markers linked to genes of interest

Results



- Diverse set of 216 spring barley accessions of worldwide origin were screened for salt tolerance at emergence & early seedling stage (250 mM NaCl & control) in growth chamber
- Genotypes screened for tolerance to salt and VPD stress
- Genotypes grown on hydroponics within phenotyping platform & exposed to varying VPD levels (0.73 and 1.85 kpa) and to salt level of 200 mM NaCl & control
- Genome wide association studies (GWAS) employing 9K SNP markers (iSelect assay)

Results (continued)



Conclusions

- Effect of salt stress on biomass reduction (% of control) was more severe under high VPD
- Germination responses to salinity vary with resistance strategies at later vegetative growth phase
- Salinity in combination with VPD resulted in discovery of a broader range of QTLs linked with salt tolerance mechanisms
- PCA based on Na & K uptake & biomass discriminated genotypes within mapping population into resistant excluders, tolerant inclusions & susceptible excluders/inclusions

Materials & Methods

