Diversity in root apoplastic barrier deposition in salt treated wild and domesticated barley seedlings

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Abstract

Salt stress causes changes in root apoplastic barriers, such as the endodermis and the exodermis, and these changes are associated with variation in abiotic stress tolerance. We explored variation in root apoplastic barrier traits, O_2 consumption and root and shoot Na^+ and K^+ content in a diverse collection of commercial and wild barley accessions subjected to non-saline (control) and saline treatments. Lignin and suberin deposition in endo- and exo-dermal cell walls varied between the accessions and in response to salt treatments. Twenty-two wild barley accessions formed an exodermis in response to salt treatments, whereas the commercial barley cultivar Barke did not develop an obvious exodermis. Accessions with pronounced root barrier deposition tended to have lower O_2 consumption relative to the accessions with less obvious barriers. Treatment with abscisic acid enhanced suberisation and lead to a pronounced formation of an exodermis in wild barley accessions, whereas treatment with an ethylene precursor had no obvious effect on suberisation. Principal component analysis revealed associations between suberin deposition, root and shoot Na^+ and K^+, and root respiration. The variation in root apoplastic barrier traits within the barley accessions represents a useful resource for future crop breeding to improve environmental stress tolerance.

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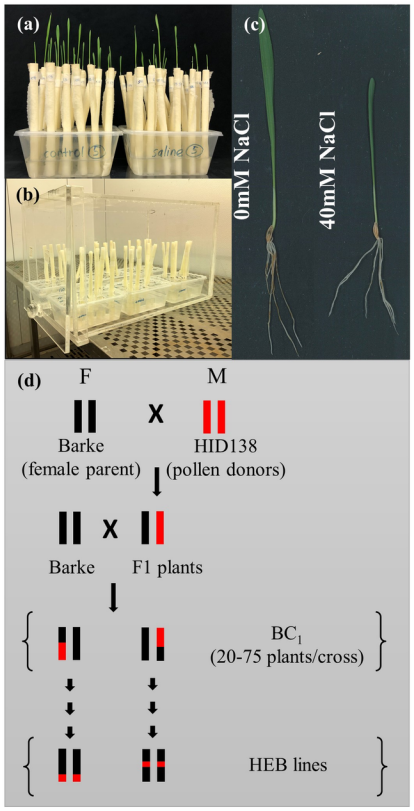

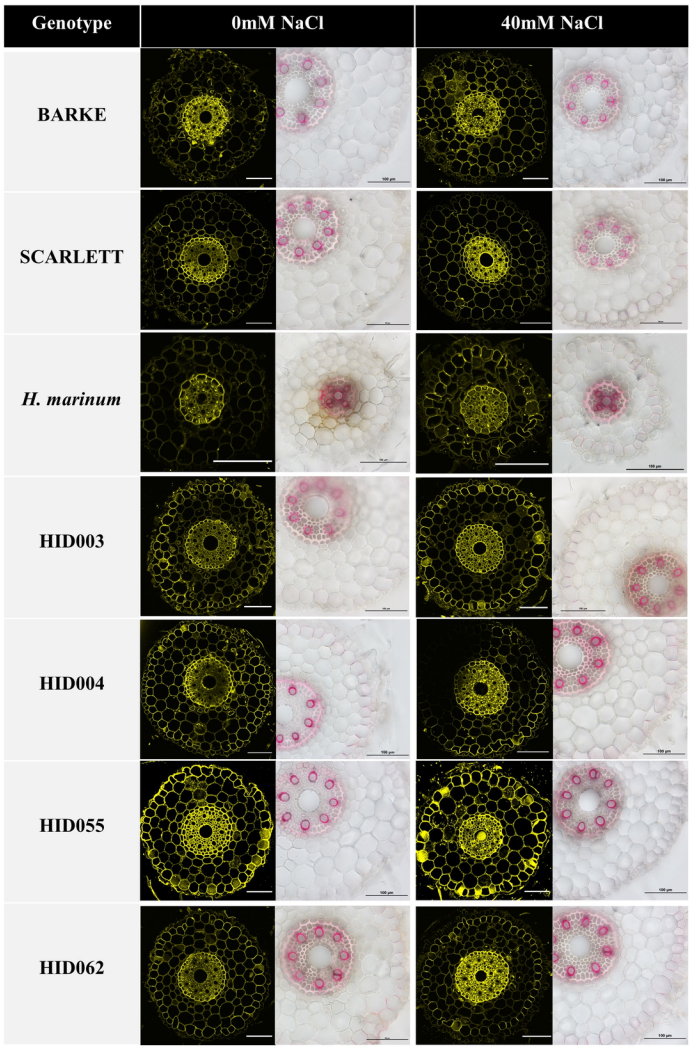

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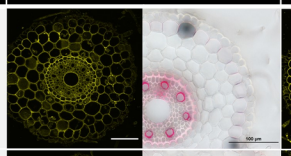
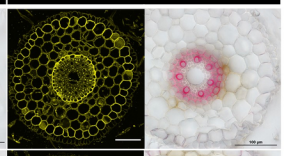
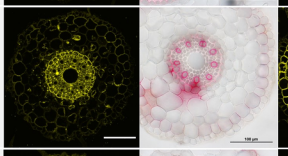
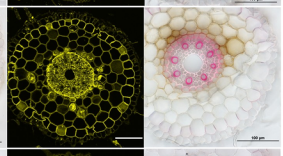
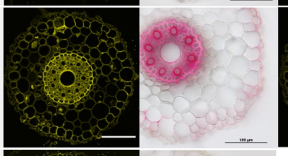
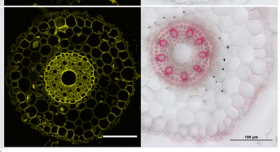
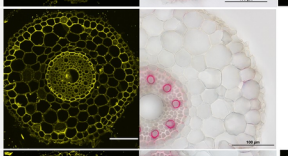
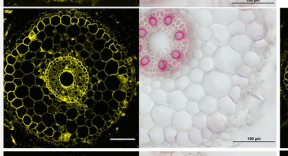
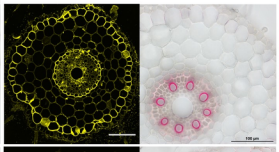
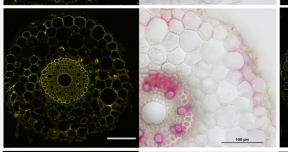
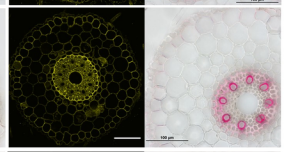
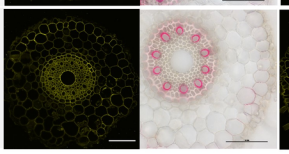
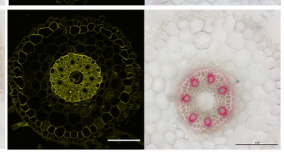
HID065				
HID069				
HID080				
HID099			NA	NA
HID101				
HID102				
HID109				

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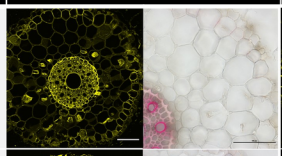
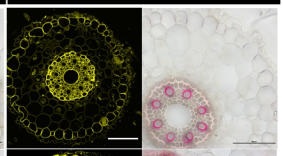
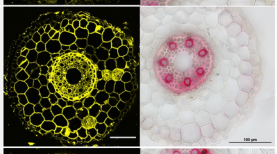
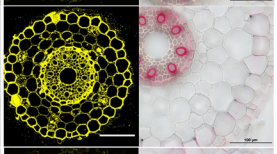
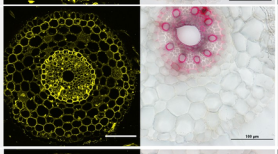
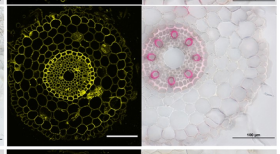
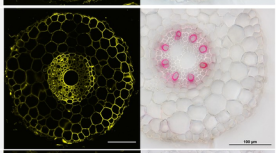
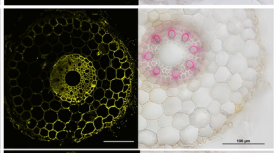
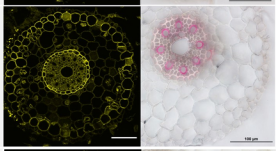
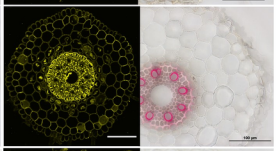
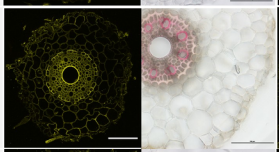
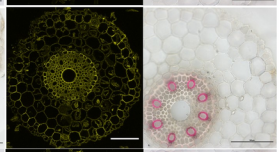
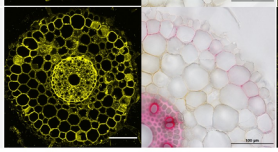
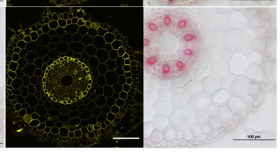
HID114		
HID138		
HID140		
HID144		
HID219		
HID249		
HID270		

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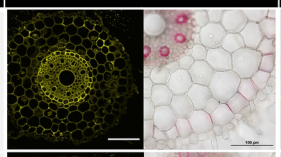
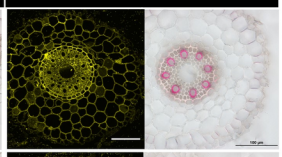
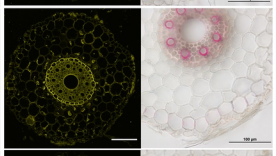
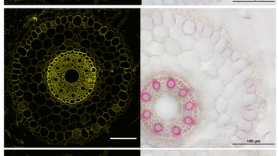
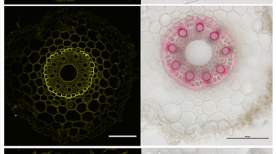
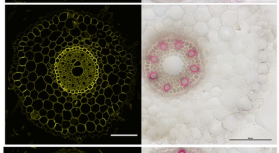
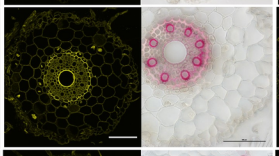
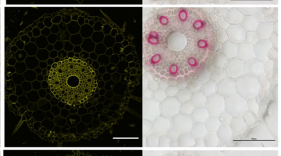
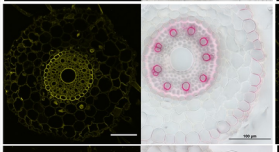
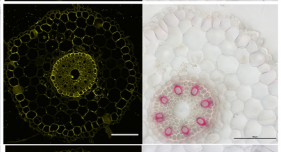
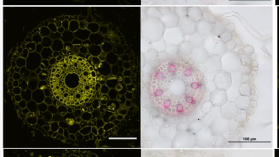
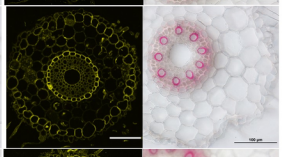
HID294		
HID295		
HID357		
HID358		
HID359		
HID380		
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