

**W888****The Photoperiod Response Gene Ppd-H1 Affects Leaf Size and Phyllochron in Barley**

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Time: 2:30 PM

Room: Golden Ballroom

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Leaf size is an important agronomic trait, as it is related to radiation use efficiency and transpiration rate directly affecting photosynthesis and response to water limitation. Leaves are initiated by the shoot apical meristem following a repetitive pattern and the time interval between the emergence of two successive leaves is called phyllochron. While the molecular mechanisms of leaf development and growth are well understood in model species, genes controlling leaf size in important crops of the Triticeae tribe are largely unknown. Towards genetic dissection of this trait in barley, we analysed a panel of 138 European winter cultivars. Population structure analysis based on genotyping with the 9k iSELECT barley SNP chip platform (Illumina) revealed a clear partition between 2- and 6-rowed cultivars. Flowering time, leaf blade width and length data collected in two field trials in Italy and Iran were used to run genome wide association analyses, uncovering major association peaks with markers on the *Ppd-H1* photoperiod response gene. To further investigate the effects of *Ppd-H1* on leaf size, we characterized three pairs of spring barley cultivars with a mutated *ppd-H1* allele and their respective introgression lines carrying the dominant *Ppd-H1* allele. Under long days, *Ppd-H1* photoperiod sensitive lines had a lower number of leaves with reduced dimensions, shorter phyllochron and period of vegetative growth compared to lines homozygous for the *ppd-H1* photoperiod insensitive allele. Our results establish a novel link between the genetic control of flowering time and leaf size in barley and possibly other crops.

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