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The genetic basis of resistance in barley to diverse *Puccinia striiformis* isolates

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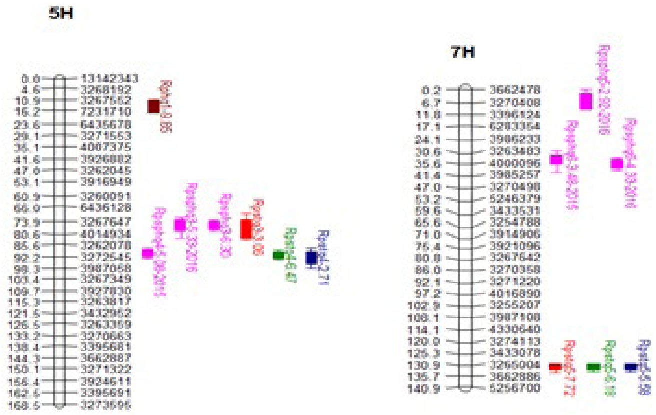
The genetic basis of resistance to stripe rust caused by *P. striiformis* in barley is not well understood. Therefore studies are required to determine the inheritance of resistance to this pathogen species in barley. Should such studies identify genes that are pleiotropic (effective to multiple pathogens); they could be transferred between cereal crops to increase the diversity of genetic resistance in disease control. Barley is infected by the adapted pathogen *Puccinia striiformis* f. sp. *hordei* (P*sh*) and is an intermediate or near nonhost to the *formae speciales* (ff. spp.) adapted to wheat [f. sp. *tritici* (P*st*)] and to barley grass [f. sp. *pseudo-hordei* (P*sph*)]. The aims of this study were to determine the genetic basis of resistance in barley to diverse isolates of *P. striiformis* and to conclude whether or not the adult plant leaf rust resistance gene R*ph*20 confers pleiotropic resistance to *P. striiformis*. To determine the genetic basis of resistance to *P. striiformis* in barley, we developed a Recombinant Inbred Line (RIL) population using a *P. striiformis*-susceptible accession (Biosaline-19) and the immune cultivar Pompadour, which carries R*ph*20. The immunity in Pompadour at the seedling stage to four diverse *P. striiformis* isolates was due to resistance Quantitative Trait Loci (QTL) on chromosomes 1H, 2H, 4H, 5H and 7H with both overlapping and distinct specificities that were confirmed through histology assessment. In the field, RILs that were seedling-susceptible to *Psph* were resistant, indicating the presence of APR which was mapped to chromosome 7H and co-locate with the leaf rust APR gene *Rph23*, suggesting either pleiotropic resistance or the involvement of a gene closely linked to or allelic with *Rph23*. Unlike many pleiotropic APR genes identified and isolated in wheat, our data suggest that the leaf rust APR gene R*ph*20 does not confer resistance to the *P. striiformis* isolates used in this study.



Biography

Rouja Haghdoust is a PhD student in Plant Breeding, The University of Sydney, Australia. She has a broad interest in molecular basis of plant-pathogen interactions and plants molecular genetics. Her PhD project is focused on study of the genetic basis of resistance in cereal crops to diverse rust pathogens. Her research includes resistance gene identification in response to diverse rust pathogens in selected barley mapping populations, subsequent fine mapping analysis with an ultimate aim to discover novel resistance genes in barley that are effective to rust pathogens and can be transferred to other crops. She is eager to collaborate with other scientists and devote her knowledge to improve crop yields by overcoming biotic stresses such as rust diseases to ultimately provide durable resistance for cereal breeders around the world.

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