



Quantitative Trait Locus (QTL) involved in the resistance of barley (*Hordeum vulgare* L.) to the mildew under different water treatments, in semi-arid Mediterranean region

Submitted by Elisabeth Planchet on Thu, 09/27/2018 - 11:28

Titre	Quantitative Trait Locus (QTL) involved in the resistance of barley (<i>Hordeum vulgare</i> L.) to the mildew under different water treatments, in semi-arid Mediterranean region
Type de publication	Article de revue
Auteur	Zoumarou-Wallis, N [1], Teulat, Béatrice [2], Zinsou, V [3], Ben Salem, M [4], Rhoma, S [5]
Editeur	International journal of science and advanced technology
Type	Article scientifique dans une revue à comité de lecture
Année	2012
Langue	Anglais
Date	Janvier 2012
Numéro	1
Pagination	136-143
Volume	2
Titre de la revue	International Journal of Science and Advanced Technology
ISSN	2221 - 8386
Mots-clés	arid [6], Barley [7], Mediterranean [8], Mildew [9], molecular marking [10], QTL [11], semi [12]

Résumé en anglais

In the present study we evaluated the contribution of molecular marking to the breeding of barley (*Hordeum vulgare* L.) for resistance to the mildew (*Erysiphe graminis* sp *L. hordei*) in semi-arid Mediterranean region. For this study a F8 progeny of 167 recombinants inbred lines (RILs) from two row barley was cultivated at the experimental station of the National Institute of Agronomic Research of Tunisia (INRAT), at Kef during the cropping season of 1999/2000. The trials, in a completely randomized design, were conducted under three water treatments: (1) irrigation at seedling emergence, (2) no water addition and (3) irrigation at first observation of water stress symptoms. Assessment of natural infection by mildew was made every fifteen days starting from the day when water treatments were setup. Statistical analyses of data showed a high among progeny variation within the progeny of RILs regardless a water treatments; however plants of treatment 1 (irrigation since seedling emergence) appeared to be the most susceptible. A combination of data on susceptibility of barley to natural infection by mildew and data from the genetic map generated from the crossing of Er/Apm vs Tadmor (parents of the 167RILs) allowed the detection and localization of several QTLs on chromosomes 3(3H), 4(4H) and 7(5H) of the barley. The most significant QTLs were located on the longer arm of chromosome 4(4H); on a portion where several authors have located reaction genes of barley to *E. graminis*. Overall, our results showed that the detection of QTL responsible of the expression of the resistance to *E. graminis* seemed to be intimately linked to the initial cropping conditions (e.g. temperature and optimum humidity). Indeed, no primary QTL were observed for dry conditions treatment (no irrigation). Moreover, the available literature reports did not allow us to confirm the relative situations of the secondary QTLs found for these treatments. Thus, genes of resistance to *E. graminis* would express themselves only in conditions that are favorable for the development of the pathogen. Improving the resistance of barley to mildew infection requires therefore, by a good knowledge on the process that governs expression of these genes.

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