

Author: [ADVANCED](#)Volume Page Keyword: 

[TOP](#) > [Available Issues](#) > [Table of Contents](#) > [Abstract](#)

ONLINE ISSN : 1349-1008

PRINT ISSN : 1343-943X

Plant Production Science

Vol. 8 (2005) , No. 3 334-337



[\[PDF \(459K\)\]](#) [\[References\]](#)

Recent Advances in Marker-Assisted Selection for Drought Tolerance in Pearl Millet

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(Received: September 1, 2004)

Abstract: Pearl millet [*Pennisetum glaucum* (L.) R. Br.] is the staple cereal of the hottest, driest areas of the tropics and subtropics. Drought stress is a regular occurrence in these regions, making stress tolerance an essential attribute of new pearl millet cultivars. Recent breeding research has mapped several quantitative trait loci (QTLs) for components of grain and stover yield *per se*, as well as yield maintenance, under terminal drought stress conditions. We report here the evaluation of these QTLs as possible selection criteria for improving stress tolerance of an elite hybrid cultivar. Initial evaluations, based on hybrids made with topcross pollinators bred from lines selected directly from the mapping population, indicated an advantage to the QTL-based topcross hybrids. This advantage seemed to be related to a particular plant phenotype that was similar to that of the drought tolerant parent of the mapping population. Subsequent evaluations were based on testcross hybrids of drought tolerance QTL introgression lines in the background of the drought-sensitive parent of the mapping population, H 77/833-2. These introgression lines were bred by limited marker-assisted backcrossing of a putative major drought tolerance QTL into H 77/833-2 from the mapping population's drought tolerant parent. Several of these QTL introgression lines had a significant positive general combining ability for grain yield under terminal stress and significantly out-yielded testcross hybrids made with the original

recurrent parent both in unrelieved terminal drought stress and in gradient stress evaluations.

Keywords: [Drought](#), [Marker-assisted breeding](#), [Pennisetum glaucum](#), [QTL introgression lines](#), [QTL mapping](#)

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To cite this article:

Rachid Serraj, C. Tom Hash, S. Masood H. Rizvi, Arun Sharma, Rattan S. Yadav and Fran R. Bidinger: "Recent Advances in Marker-Assisted Selection for Drought Tolerance in Pearl Millet". *Plant Production Science*, Vol. **8**, pp.334-337 (2005) .

doi:10.1626/pps.8.334

JOI JST.JSTAGE/pps/8.334

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