

A meta-analysis of QTLs controlling root growth and the response to abiotic stresses in maize

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ABSTRACT

There is no doubt that breeders indirectly selected for more efficient root systems whilst selecting for yield. However, there is comparably little information about the root morphology they selected for, nor about its response to abiotic stresses or the genes controlling it. This paper aims for a meta-analysis of four recent QTL studies performed by us using the following maize populations: CML444 x SC-Malawi RILs (C6), Ac7643 x Ac7729/TZSRWM RILs (C5) (both CIMMYT), Lo964 × Lo1016 F_{2:4} families (Lo; Experimental Institute for Cereal Crops, Bergamo, Italy) and an association mapping panel of 74 temperate maize inbred lines (UOH; University of Hohenheim) (see poster of Reimer et al.). Two studies aimed to map temperature tolerance (Lo and UOH) the other two aimed for desiccation tolerance (C5) and drought avoidance by altered root morphology (C6). Root morphology was assessed non-destructively in growth pouches and destructively in sand columns (Lo) before the second leave had fully developed. In all population the same basic characteristics were measured, i.e. the growth of axile and lateral roots as well as their ratio. A consensus map will be presented and the most promising target regions controlling root morphology in these populations will be discussed.

KEYWORDS: *Zea mays* L., root growth, corn, quantitative trait loci, stress tolerance