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Quantitative trait loci for seminal root angle and number in the maize IBM population

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In maize, seminal roots develop and the primary root system deteriorates as the plant matures. The seminal roots comprise the majority of the root system of the adult plant and give the plant stability against lodging. Because seminal roots are the primary means of water uptake in the adult plant, their development under drought conditions is vital. Previous research has suggested that seminal root angle and abscisic acid (ABA) level are correlated in maize. Additional research has shown that ABA levels are related to drought tolerance. This study focuses on identifying quantitative trait loci (QTL) that affect seminal root angle and the number of seminal roots entering the soil from each node. The QTL generated for seminal root angle and number per node can then be used to evaluate the relationship with drought tolerance. A set of 94 mapping lines from the intermated B73 x Mo17 (IBM) mapping population was used to measure the angle between the seminal root and the stalk. The number of seminal roots entering the soil from the first two nodes was measured as well. Molecular markers evenly distributed throughout the genome were used to run the QTL analysis using QTL Cartographer Version 1.16. The following QTL analyses were run: seminal root angle, number of roots entering soil from the first node above ground, and number of roots entering soil from the second node. Three QTL were found for seminal root angle, two QTL for the number of roots at the first node above ground, and three QTL for the number of roots at the second node above ground. These QTL positions were then compared to previously known QTL for drought tolerance and root traits.