

Marker-assisted backcrossing of aluminum tolerance QTL from diploid *Medicago sativa* subsp. *coerulea* into autotetraploid *M. sativa* subsp. *sativa*

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Aluminum (Al) toxicity is the major growth-limiting factor for crop production on acid soils, which comprise up to 40% of the world's arable lands. At low pH, Al becomes soluble and available to plants resulting in inhibition of root elongation and reduced plant growth. Surface liming, used to correct soil acidity, is expensive and does not neutralize harmful levels of subsurface aluminum. Alfalfa is sensitive to aluminum toxicity, and conventional breeding methods have made little progress in introducing Al tolerance. Two QTL for Al tolerance have previously been identified in diploid *Medicago sativa* ssp. *coerulea*, associated with the RFLP markers UGAc471 and UGAc502. We have used 2X-4X crosses to transfer these QTL from the diploid to the autotetraploid level. Eight autotetraploid progeny were obtained from a cross between a diploid, Al tolerant genotype from PI 464724, and genotypes from the cultivar 'CUF 101'. One of these 2X-4X hybrids, ALTET 4, carries positive marker alleles for both Al tolerance QTL. Currently, we are using RFLP marker-assisted backcrossing to move these QTL into cultivated alfalfa. Additionally, we are using bulked segregant analysis to develop SSR markers more closely linked to the Al tolerance QTL, in order to simplify the genotyping of backcross individuals.