

Forage Mass, Stem Length, Leaf to Stem Ratio, & Nutritive Value of Alfalfa Lines Following Selection for Salt Tolerance Using a Greenhouse Protocol

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Alfalfa (*Medicago sativa* L.), is one of the most extensively grown forage crops, but it is sensitive to saline soils. We measured breeding efficiency for increased salt tolerance in alfalfa by comparing lines selected from populations BC79S (a tetraploid spp falcata alfalfa), CS and SII with their unselected parental means for forage mass and associated changes in stem length, leaf-to-stem ratio, node number per stem, crude protein (CP), and neutral detergent fiber (NDF). Overall forage mass in a non-salt-stressed test (9,562 kg ha⁻¹) was greater ($p=0.001$) than under salt-stress (5,783 kg ha⁻¹), with a 40 % production advantage. In a non-salt-stressed test, BC79S and CS lines averaged 4% lower production than their parents while SII lines averaged 9 % greater production. Conversely, in the salt-stressed test all lines showed 20% overall greater seasonal production than their parents. Some selected lines produced more forage mass in both non-stressed and salt-stressed tests than their parents. Stem length, leaf to stem ratio, node number, CP, and NDF of selected lines varied with respect to non-stressed vs stressed, but they tended not to differ greatly from their respective parental means under either non- or salt-stress. The selection protocol provided a universal increase in forage mass under salt-stressed field conditions of selected lines. Furthermore, we identified lines with forage mass greater than their parental means under non- and salt-stressed field conditions.