Variation for shoot generated from roots among PIs of *Medicago sativa* subpp. *falcata*

Lan Xu[1], Derek Kannenberg[1UG], Arvid Boe[2], Roger N. Gates[1],
and Patricia S. Johnson[1]
[1]Department of Natural Resources Management
[2]Department of Plant Sciences
South Dakota State University
Brookings, SD 57007

Alfalfa is a major forage for dairy and beef cattle in North America. In addition, alfalfa provides ecosystem services through increasing soil nitrogen and providing habitat for pollinators and wildlife. In the semiarid northern Great Plains, alfalfa establishment and persistence are challenged by grazing, disease, and abiotic stress. However, *Medicago sativa* subsp. *falcata* (yellow-flowered alfalfa) has showed capability to produce adventitious shoots on the roots. This source of vegetative regeneration could be favorable for increasing stress tolerance and persistence. The objective of this study was to identify promising new PIs of *Medicago sativa* subsp. *falcata* that have capacity to regenerate from roots. Several *falcata* PIs were randomly selected from the National Plant Germplasm System and Persist II (*M. sativa*) as control. About 20+ healthy 1-yr old plants for each entry were selected. Each root was cut into segments 6cm long, originating 1cm or 7cm below the cotyledonary node. Root segments of each entry were planted upright in 15 cm dia. plastic pot filled with Miracle Gro potting soil. Pots maintained in a greenhouse with 16h light/8h dark photoperiod, and 24±3°C temperature, and misted daily. Number of root segments producing adventitious shoots counted weekly for at least 12 weeks following planting. Six PIs populations produced adventitious shoots from roots. The frequency of generating adventitious shoos from roots ranged from 3.8% to 57% among the 6 populations. There were 66.7% to 100% produced adventitious shoots survived and developed into new individual plants. Most survived plants successfully produced flowers. Such discovery of phenotypic trait enhancing vegetative reproduction would have potential use as parental material for development of germplasm suitable for grazing persistence, drought, cold tolerance and disease resistance.