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***Medicago arborea* traits segregating in F2 families of *M. sativa* X *M. arborea* crosses**

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Abstract

Medicago sativa and *M. arborea* have been hybridized by electrofusion in cell culture (Nenz et al. 1996), and by making large numbers of cross pollinations of *M. arborea* on *M. sativa* male sterile plants selected for the purpose by Bingham (2005), and by Armour et al. (2008). Five hybrids produced by Armour et al. in AU contain part of the *M. arborea* genome based on AFLP markers, anthracnose resistance, and pod coiling. Ten hybrids produced in Wisconsin differ from each other in morphology and fertility possibly due to loss of some chromosomes from both parental genomes during seed development. Most hybrids are male sterile, but three have some pollen and were used in crosses with other hybrids to generate segregating F2 populations. *M. arborea* traits that are segregating and of potential use in *M. sativa* include: 1. large seeds, 2. lodging resistance, 3. frost tolerance, and 4. a heterotic block that we are trying to stabilize and use to increase yield. Improved longevity may be segregating, but will take years to study. Other traits segregating that appear neutral or undesirable for breeding include variation in flower color, erratic flowering and fewer flowers per raceme, fertility, pod shape, contractile seedling growth, root and crown morphology, dormancy, and plant color. Leaf and stem morphology varies dramatically over stages of growth in the field and glasshouse and has not yet been studied. The segregation observed in F2 and F3 generations indicates there is chromosome pairing and recombination involving the two parental genomes, and the extent of the variation indicates that most of the *M. arborea* genome was represented among the original unbalanced hybrids. Results of current crossing and backcrossing efforts will be presented in the poster.

References

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- Nenz, E.; Pupilli, F.; Damiani, F.; Arcioni, S. 1996. Somatic hybrid plants between the forage legumes *Medicago sativa* L. and *Medicago arborea* L. Theor Appl Genet. 93:183-189.