

Observations Summer and Fall of 2006. Edwin T. Bingham

Breeding continued in the sac X sac materials by selecting for large seeds, and unusual plant characteristics of potential use. This work is very interesting because we never before have seen so much variation on which to base selection.

Fertility. Seed production on sac materials in the greenhouse (GH) with hand pollination has been better than expected (50-75% of alfalfa), but, open-pollinated seed production by bees in the field was much less than expected. The second growth on sac clones, and sac X sac lines was left to flower and produce seed in August. Sufficient seed was produced to select for seed size and save as a reserve, but there is no surplus to test for yield in plots. A nearby field of soybeans was flowering in August, and may have attracted the bees.

Lodging resistance. Some sac lines observed in new seedings of microplots, remained standing after two heavy rains, that lodged everything else. We will evaluate them again in 2007, and include Cal-West's 'StandFast' as a check.

Recovery after cutting. Regrowth is slower than alfalfa, but we have not yet done a replicated study with checks in order to know how much slower. Slower recovery is thought to be a disadvantage, but the hybrid vigor in some combinations, and the robust nature of the plants, indicate the material could have a potential as a two-cut cultivar. Time will tell.

Unusual segregation at the P locus in sac-2. Background information on sac-2 can be found in the 'Field Observations' reported in 2005. Hybrid sac-2 should be duplex at the P locus (PP--), but self progeny did not segregate for cream/yellow in 2005. Crosses observed in 2006 revealed that sac-2 does not produce, or does not transmit, female gametes that segregate at the locus. Female gametes have at least one P allele, thus preventing self progeny from segregating. This could be explained by preferential pairing. On the other hand, sac-2 segregates when used as a pollen parent, and the segregation is about five gametes carrying a P allele (PP or P-), to one with no P allele (--). This could be explained by tetrasomic segregation, aneuploid gametes, or segregation distortion. Time will tell, if we do not run out of time.

Frost tolerance. It turns out that *Medicago arborea* although not winter-hardy, is very frost tolerant. Over the years, we have learned that we can leave *M. arborea* in the field nurseries until the night temperatures gradually fall to minus 8 C. There is a range in tolerance, and some lines can withstand minus 10 C, but that is another story. The other *Medicago* species with genotypes that can stay green at minus 8 C is *M. falcata*. Is there a message here?

Pictures. Many pictures are posted in Volume 5; in earlier reports, and in the Poster from the NAAIC.