

### **Improvement of Reseeding in Crimson Clover**

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Crimson clover (*Trifolium incarnatum* L.) is the most important annual clover to US agriculture, with primary use as a winter annual forage legume overseeded on warm season perennial grass pastures in the US southern region. Crimson clover US seed production (all in Oregon) averaged 4.4 million lbs/year for 2004 through 2007 with a conservative estimated seed sales value of \$5.0 million per year. Crimson clover is native to southern Europe and has been grown in the US for more than 150 years but with increasing use in the last 60 years. As introduced from Europe, this forage legume did not have high hard seed levels and was not reliable in producing volunteer (reseeding) stands in the temperate, year around rainfall, climate of the eastern and southern US. Dixie crimson clover was developed in the early 1950's in response to the need for a cultivar with improved reseeding traits that could also be produced as certified seed. Dixie is a composite of three crimson farm strains that exhibited excellent field reseeding, high forage yields and high hard seed test results in laboratory evaluations (Hollowell, 1953). As recent as 1959, common crimson clover had less than 5% hard seed at harvest (Bennett, 1959), but improvement in the hard seed level through recurrent selection could be demonstrated. Chief crimson clover was developed (Hollowell, 1960) through nine cycles of recurrent selection for hard seed with the final generation stabilized at 65% hard seed (as measured at harvest with hand-cleaned seed). A study was initiated in 2004 to evaluate hard seed persistence of crimson clover breeding lines and cultivars. Fifty-five half-sib lines derived from Autauga and Talladega crimson, one advanced experimental crimson and the cultivars Tibbee and Dixie were grown in replicated rows in 2004-05 and 2005-06 at Overton, TX. Seed samples from each row plot were harvested at field maturity each year. Seed subsamples (100 seed each, all seed remaining in calyx) were placed in nylon bags and incubated under field conditions for 180 and 320 days. Each incubation period was started in early November following seed harvest in June 2005 and June 2006. The nylon bags containing the seed samples were placed in a shallow trench in a clean-tilled field plot and covered with a 2-inch layer of topsoil. Seed survival was determined by hand counts of hard seed remaining in the nylon bags after the incubation period. The crimson entries in this study varied widely in 320 d seed survival (320SS) for both evaluation years. The range of 320SS was 1 to 24% in 2006 and 1 to 47% in 2007. Five elite breeding lines were identified capable of producing progeny with 320SS greater than 22% in both evaluation years. In contrast the cultivar Dixie had only 2 and 12% 320SS in 2006 and 2007, respectively. The cultivar Tibbee had 2 and 10% 320SS in the same two evaluation years. The 320SS data from these experiments gives us an indication of hard seed remaining in the soil seed bank after a winter, spring, and summer exposure to field conditions. The cultivars Tibbee and Dixie continue to produce some hard seed with persistence varying from low to moderate. Variation exists in this experimental crimson germplasm to increase hard seed persistence and improve reseeding, relative to the performance of these check cultivars. Evaluations will continue on the elite breeding lines identified in these experiments.

### **References**

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