FIELD DAY REPORT - 1993

Texas A&M University Agricultural Research and Extension Center at Overton

Texas Agricultural Experiment Station
Texas Agricultural Extension Service

Overton, Texas

May 28, 1993

Research Center Technical Report 93-1

IMPROVEMENT OF RESEEDING IN BERSEEM CLOVER

G. R. Smith, C. L. Gilbert, and I. J. Pemberton

Background. Reliable reseeding annual clovers reduce capital inputs in forage-animal systems and enhance early establishment of dense clover swards. Components of reseeding include seed production, seed survival over time, and seed germination during a time when environmental conditions favor establishment. Seed survival of annual clover is enhanced by the development of a hard, water-impermeable seedcoat. Hard seed must be softened by mechanical and chemical degradation of the seedcoat and seedcoat cuticle before germination can occur. High summer temperatures and changes in temperature contribute to softening of annual clover hard seed.

Objectives of this research were: to evaluate hard seed production and rate of hard seed softening for berseem clover grown under temperate climate conditions; and to determine progress in improvement of hard seed characters in berseem clover.

Research Findings. Ninety-eight cold tolerant berseem clover plants were selected at Overton, Tx in 1983 from a space-planted nursery of 'Mississippi Winter-Hardy' berseem clover. Seed from each selected plant (half-sib family) were planted in rows replicated twice and evaluated for cold tolerance and forage potential in 1983-84. Twelve half-sib families were selected for further evaluation and were established as spaced plants in 1985. Two hundred and nineteen plants were allowed to pollinate in 1986 and hard seed production was evaluated. Twenty-four berseem families were selected for progeny testing based on relatively high hard seed percentage at harvest (>59%).

Selected half-sib berseem clover families were planted in 6-ft. rows at Overton, TX in 1986 and 1987. In 1987, the berseem clover cultivar 'Bigbee' was included for comparison. Entries were arranged in a randomized complete block design with two replicates. The Sawtown sandy loam soil (fine-silty, siliceous, thermic Glossic Paleudalf) was sampled prior to planting each year and amendments applied according to soil test recommendations. Mature seeds were harvested in June each year and hand-cleaned using rubber-coated rubbing surfaces. Hard seed of each clover entry were evaluated at harvest and after 90 d of simulated summer temperatures (12 h at 100F and 12 h at 75F).

Average initial hard seed of 24 berseem clover families ranged from 27 to 65% in 1986. Hard seed levels of these berseem clover families dropped to a range of 0 to 18% after 90 d of simulated summer temperatures. Hard seed levels of 16 berseem clover families dropped to less

than 5%. In 1987, berseem family hard seed levels at harvest ranged from 37 to 67%. Ninety days of summer temperatures caused rapid hard seed softening to a range of 5 to 34% hard seed. Four elite berseem clover families were identified with improved hard seed persistence compared to Bigbee. Average hard seed levels after 90 d of summer temperatures were 6.8, and 26.9% for Bigbee and the four elite berseem families, respectively (Fig. 1). In each year, berseem families varied significantly ($\underline{P}>0.05$) for both hard seed at harvest and for hard seed level after 90 d.

Application. Berseem clover is generally recognized as a non-reseeding crop. However, berseem clover families varied widely in these studies for initial hard seed production and rate of hard seed softening. Four elite berseem clover families were identified with consistent results across two years of progeny testing for improved hard seed traits. These experiments indicate moderate potential for improvement of berseem clover reseeding in a temperate environment.

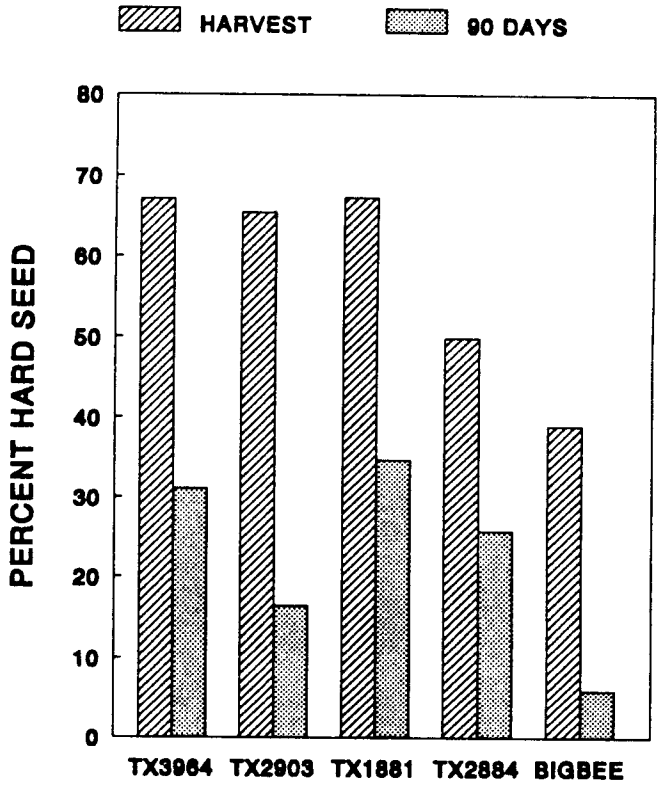

Figure 1. Percent hard seed at harvest and after 90 days of simulated summer temperatures for four selected berseem clover lines compared to the berseem cultivar Bigbee.