

Past, Present, and Future Genetic Gain of Forage Yield in Alfalfa

Steve Wagner, Dan Gardner, Mike Velde, and Paul Sun of Dairyland Seed Company

Genetic gain in alfalfa has been estimated several times in the literature for the time period prior to 1992, and the estimates were perceived as being disappointing. The objective of this analysis was to update estimates of alfalfa genetic gain since 1992 for varieties adapted to the Midwestern USA, and to determine if the hybridization of alfalfa has improved genetic gain.

Data for the analysis consisted of all university variety trial tests that were conducted between 2001 and 2009 that tested the varieties of interest. Varieties used for genetic gain estimates were chosen to represent high yielding lead varieties in product lineups and did not include varieties that were bred for special traits. Seventy five varieties that were tested during this time period met these criteria and were released to the marketplace between the years of 1986 and 2009. Genetic gain was estimated by calculating the percent advantage of variety total accumulated yields over years against a standard check variety and regressing that against the year of varietal release.

The genetic gain of synthetic alfalfa varieties against Vernal was 0.41% per year, and against other check varieties ranged from 0.28% to 0.48% per year. The genetic gain of hybrid alfalfa varieties against Vernal was 1.15% per year, and against other check varieties ranged from 0.56% to 1.19% per year. In a much larger dataset that included proprietary data from Dairyland Seed Company, when compared against HybriForce-420/Wet, the genetic gain of synthetic varieties averaged 0.28% per year, and of hybrid varieties averaged 0.56% per year. 136 varieties in the public dataset were ranked by winning %, and 4 of the top 5 were hybrid.

This most recent estimate of alfalfa genetic gain of forage yield suggests that alfalfa breeders have been successful in accelerating the rate of genetic gain relative to prior decades. This data also suggests that msSUNSTRA hybrid alfalfa technology, since its release in 2001, has more than doubled alfalfa genetic gain and confers greater varietal stability across environments.

