Hybrid Alfalfa: Reality or Pipe Dream? Dairyland Seed Company

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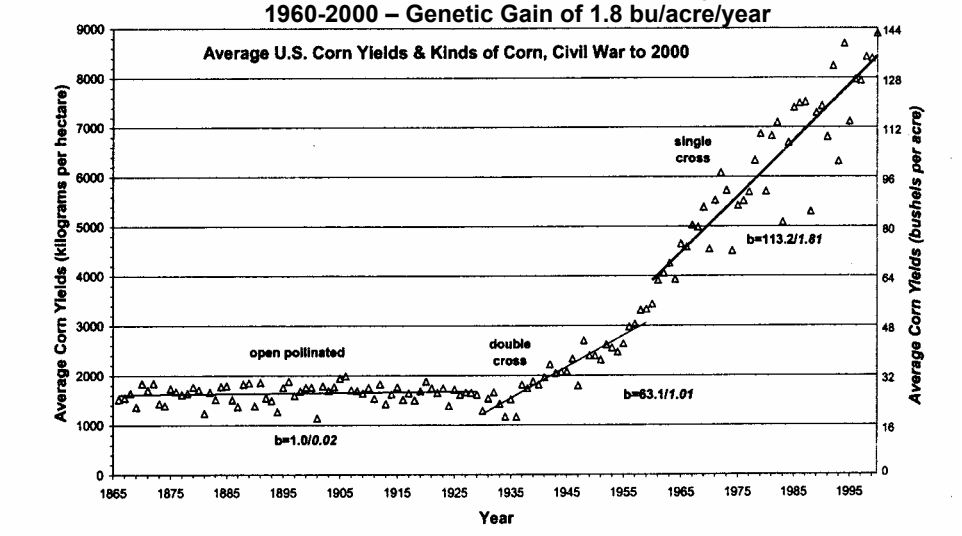
ABSTRACT

Progress in increasing alfalfa forage yield has been minimal over the past 20 years. This is due primarily to lack of pollen control in open pollinated synthetic varieties. All alfalfa varieties to date have been open pollinated synthetic varieties. New alfalfa hybridization technology provides the tools to overcome the forage yield barriers that have been hindering alfalfa breeders from making progress

Key Words: forage yield, alfalfa, hybrid, hybridization, msSUNSTRA.

Historically alfalfa breeders have struggled in increasing forage yield capabilities. In a study that looked at the history of alfalfa yields in university trials, the University of Wisconsin found no genetic gain in forage yield in alfalfa varieties in the Midwest for the past 17 years (Wiersma et al., 1997). The USDA reported that alfalfa yields in recent years showed a slight decline. In contrary, hybrid corn has shown 1.8-2.0 bushels genetic gain per year (Figure 1) for the past 40 years.

Figure 1. The History of Corn Yields (Troyer et al.)
1860-1930 – Total Gain of 2 bu/acre
1930-1960 – Genetic Gain of 1 bu/acre/year
1960-2000 – Genetic Gain of 1.8 bu/acre/year



Average U.S. Corn Yields & Kinds of Corn, Civil War to 2000; periods dominated by open pollinated, by four-parent crosses, and by two-parent crosses are shown, "b" values (regressions) indicate average gain per year; data compiled by USDA.

Just as open pollinated corn showed no yield gain from 1860-1930, alfalfa breeders have struggled with the same lack of progress. The primary reason for the lack of alfalfa forage yield gain has been the inability to control pollen flow in open pollinated synthetic varieties. When corn breeders went from open pollinated corn to double cross and eventually to single crosses, grain yield improved significantly. Controlling pollination by hybridization of alfalfa will allow alfalfa breeders to over come this yield barrier.

Dairyland Seed Company released the first hybrid alfalfa in March of 2001. Hybrid alfalfa is being released to alfalfa growers across the greater hardy and semi-dormant alfalfa production areas of the United States. Non-dormant hybrid alfalfa varieties will be released in the near future. The features and benefits of hybrid alfalfa are listed in Table 1. Hybrid Alfalfa's are products of Dairylands exclusive patented msSUNSTRA Hybrid Alfalfa Technology.

Table 1. Features and benefits of hybrid alfalfa.

Feature	Benefit
Increase spring vigor	Allows for earlier cutting for increased quality with less risk of stress and stand loss.
Faster regrowth with more vigorous plants	Photosynthesis starts sooner, which increases yield due to better use of water and nutrient uptake.
More resilient plants	Provide greater forage yield production in years 3-4.
Fine Stems	Excellent potential for high quality forage. Herbage tends to dry faster than large stemmed varieties.
Hybrid Yield	Increase in forage yield capabilities. Eight to fifteen percent in state trials. Ten to twenty five percent in farmer strip plots.
Drought Tolerance	Quick ground cover to reduce moisture loss. Deep rooted to capture moisture.
Shade Tolerant	Competes well with nurse crops.
Traffic tolerant	Tolerates wheel traffic when soil conditions are wet.

As alfalfa breeders explore biotechnology possibilities, hybrid technology can be a platform to bring new technology traits quickly to the market in agronomically superior genetics. In addition, for biotech traits that need strict seed production isolation, gene outflow can be contained with hybrid technology using male sterility.

References

Weirsma, D. W., D. J. Undersander, J. G. Lauer, and C. R Grau. 1997. Lack of Alfalfa Yield Progress in the Midwest. CAIC Abstract

Troyer, A.F. 2000. Temperate corn--background, behavior, and breeding. P. 393-466. *In* A.R. Hallauer (ed.). Specialty Corns, 2nd edition. CRC Press, Boca Raton, FL.