

## An Industry Perspective on Investing in Alfalfa Improvement

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A 50+ year collaboration between public and industry plant breeders, plant pathologists, entomologists and agronomists has led to significant improvements in alfalfa forage yield potential, forage quality, multiple pest resistance and persistence. The NAAIC has been core to this ongoing collaboration. However new technology and tools for crop improvement challenge the alfalfa research community to rethink research priorities, research methods, and the structure of research collaborations.

I propose a multi-pronged research agenda that includes germplasm development, development and evaluation of novel breeding systems, marker-assisted breeding and biotech trait development. Many of these research projects will require collaborations that are both interdisciplinary and cross-institutional, with structural challenges in the treatment of confidential information and intellectual property. If alfalfa as a crop is to stay competitive in comparison to corn and soybeans, we will need critical mass in funding and focus in implementing long term research initiatives. I believe this will only come through these complex collaborations.

Of particular interest is the deployment of molecular markers in alfalfa breeding programs. Properly deployed, this tool has the potential to increase efficiency of our conventional breeding programs, help identify and develop heterotic germplasm groups, aid the introgression of traits/genomic sequences from exotic sources, and facilitate trait integration and trait stacking for biotech traits. This needs to be a focus for the industry and for any new scientist joining the public sector as an alfalfa breeder/geneticist.

Genetic engineering and biotech traits represent a second key tool for future alfalfa improvement. Although the plant biotechnology industry is currently investing >\$1billion/year in gene discovery and trait development for crop improvement, the clear focus is on traits with direct application to corn, soy or cotton. Alfalfa should benefit from traits that can be successfully deployed across crops, such as herbicide tolerance, abiotic stress tolerance, and insect resistance. However for “forage only” traits, such as those leading to improved forage quality, gene discovery and/or trait development will likely need to come from collaborations between public, non-profit, and industry alfalfa scientists.

I applaud the NAAIC for structuring a discussion on future research priorities. As an industry scientist I hope we can clearly identify goals that result in value-added products farmers want and will pay for. All institutions will need this incentive to justify the long-term investment and to provide focus for successful collaborations that bridge institutional culture.