Hybrid Alfalfa – Marketing Buzz or True Science?

by Alan Patterson, Dairy Specialist, Pioneer Hi-Bred

There has been a lot of buzz in the forage world recently due to the introduction of "Hybrid Alfalfa" to the market place. This has created some excitement and generated many conversations. Let us take a look at the science and biology behind what defines a true hybrid.

History of Crop Hybridization

The hybridization of corn seed was a major step forward in agriculture. Hybrid vigor brought growers significant improvements over the open-pollinated corn varieties they had been planting before Henry A. Wallace started selling hybrid corn seed.

A natural assumption would be that the same process could improve other species; and it has been used in species such as sorghum, sunflower, and canola. However, alfalfa is a different story.

Unlike hybrids and pure-line varieties (such as soybean and wheat), alfalfa varieties are not a collection of genetically identical seeds. An alfalfa variety is a population of individuals that trace to a common set of many parents; but those individuals are not genetically identical.

Alfalfa does not have the capability to develop inbred lines that are genetically identical. Therefore, at this time, it is not possible to produce commercially viable, 100 percent hybrid alfalfa.

Let us also consider another perspective. Hybrid corn is produced by creating two inbred parent lines. This is done by self pollinating each line to itself until you have a set of homogeneous plants with homogeneous genetics. These inbred parents are then crossed to produce a hybrid seed that has homogeneous genetics and will produce homogeneous plants, which will express hybrid vigor.

Alfalfa Breeding…How is it Different?

In the simplest terms, alfalfa plants are not self fertile. This means that they cannot self pollinate. Without self pollination, you cannot develop an inbred. Without inbred parent lines, you cannot produce a plant that has homogeneous genetics. Without homogeneous genetics, you do not have homogeneous plants. You cannot produce a true hybrid alfalfa.

Hybrid by Definition

"If the definition of a hybrid is simply a cross between two parents to form a third individual, then ALL COMMERCIAL alfalfa seeds are hybrids," said David Miller, Ph.D., Pioneer Alfalfa Research Manager. "But most growers expect more from a 'hybrid' in terms of uniformity and performance," he said.

Does Performance Follow?

The real issue is not whether you label a product a hybrid; it is whether it performs like a true hybrid. In university trials, alfalfa marketed as hybrids has not offered the significant bump in productivity that hybrid corn offered.

"We should see an increase in performance. We don't see any effect on yield data in our tests," Miller said.

University of Wisconsin forage specialist, Dan Undersander, said some of the alfalfa products marketed as hybrids that he tested contain good germplasm, but they are not necessarily better than the top alfalfa varieties at this point. He said the university's variety trials have not indicated any advantage for alfalfa marketed as hybrids.

"Working with alfalfa is different than working with corn," Undersander said. "Because you're dealing with a population, if you have a resistance to a given disease, only a percentage of the alfalfa stand will show it." In corn, the entire field would show resistance.

Unrealized Potential

While he sees potential for alfalfa varieties marketed as hybrids to deliver strong yields and other valuable traits, Undersander reports those advantages are not evident to date. When choosing alfalfa products, consider traditional measures: yield, persistence, standability, other agronomic traits, disease and insect resistance, and so on.

Bottom Line

While hybridization is a great technology in several crops, be aware of the limitations in alfalfa. If you are expecting genetic uniformity and hybrid vigor that significantly alters performance, you may be disappointed in the current crop of alfalfa varieties marketed as hybrids.