New Alfalfa Varieties

S. Ray Smith
Forage Extension Specialist
University of Kentucky

Commercial alfalfa breeding companies have continued to make great strides in the development of new varieties with unique traits. New traits include Roundup Ready®, potato leafhopper resistance, hybrids, lodging resistance, rapid regrowth, higher quality, resistance to new diseases, and more... I will address some of these new developments in the following pages. In addition, producers often ask the question: “Are improved varieties really worth the higher seed cost?” Dr. Jimmy Henning recently summarized 24 location years of Kentucky alfalfa yield data and found that the best 5 varieties in each test yielded 0.9 tons/A higher than the checks. Over a 5 year stand life this conservatively translates into more that $400 added profit. Similar to results summarized by Dr. Dan Putnam in California with greater than $400 profit for improved varieties over a 3 year stand life. New varieties can make a difference!

Review recent variety test results by going to the Kentucky Forage Website at www.uky.edu/Ag/Forage and clicking on “Forage Variety Trials” or “Forage Trials: Other States”.

Roundup Ready® Alfalfa

Finally, Roundup Ready® alfalfa is now available through the cooperative research of Forage Genetics International and Monsanto and these varieties show excellent tolerance to Roundup, good disease resistance, and good yield potential. Before making plans to plant 100 acres I should mention that the price in most states is over $7.00 per pound and pre-ordering seed is essential if you want to plant the spring of 2006. Roundup tolerance is definitely a useful trait in alfalfa, but Roundup Ready® varieties are not necessarily superior for other traits. Roundup Ready® varieties will be best used on fields where traditional weed control strategies have been unsuccessful. Some current advertisements promote Roundup Ready® varieties as significantly higher yielding and higher quality. These statements are not untrue, but they are based on the fact that weedy stands are lower yielding and lower quality than clean stands. Therefore, if you keep your existing stands weed free, then you will also produce high yields of high quality forage.

The advantages of Roundup Ready® alfalfa are self-explanatory, but let me list a few advantages: Improved likelihood of successful establishment, decreased competition from weeds and/or cover crops, decreased crop injury from herbicides, increased management flexibility, no crop rotation restrictions, decreased herbicide costs, and ease of use. There are a few things to remember when planting these varieties. For example, the first varieties released have about 90% Roundup tolerant plants and about
10% conventional plants. That means when you spray Roundup the first time, you will kill around 10% of your stand. Therefore, know that some alfalfa plant death is normal. Monsanto recommends that you use an early spray even if weeds populations are low. If you wait until the stand is more mature, the loss of the conventional plants might leave spaces in the field.

Roundup Ready® alfalfa varieties will be available in multiple brands with the same combination of traits/germplasm available to growers in conventional varieties. In August 2005 about 15 Roundup Ready varieties were released across the U.S. The estimated seed sales in 2005 were 1 million pounds. The estimated sales in 2006 are 4 million pounds.

**Potato Leafhopper Resistance**

Plant breeding companies continue to make progress in the development of potato leafhopper (PLH) resistant varieties. These varieties not only show high levels of resistance to PLH feeding, but also have good forage production and high levels of disease resistance. The most recently released varieties have been through 4 stages of improvement since the first varieties were released about 10 years ago. For example, results from a regional trial seeded in Ames, IA and S. Charleston, OH in the spring of 2005 showed that the newest PLH resistant varieties yielded 15 to 50% higher than the checks during the seeding year when subjected to PLH feeding. Note: even the most resistant varieties may require an insecticide spray during the seedling year since young plants are the more venerable to damage. See [www.oardc.ohio-state.edu/forage2005/table3.asp](http://www.oardc.ohio-state.edu/forage2005/table3.asp) for results of this regional trial and other variety trials comparing potato leafhopper resistance in the field.

**Standfast™ Technology**

CalWest Seeds has recently released a line of alfalfa varieties with Standfast™ Technology. This trademarked phrase refers to varieties with improved lodging resistance. Company data indicates that these varieties showed minimal lodging in tests where other varieties were almost flat (note: try to cut any alfalfa before it lodges, but that's not always possible especially during rapid spring growth). Interestingly, the European genetics that provides lodging resistance also provides for faster regrowth with company claims of an average of 25% faster regrowth than standard varieties. At present there is limited University data to confirm the advantages of Standfast™ varieties, but several trials are currently underway. CalWest states that the real advantage of these varieties is under aggressive management including more frequent cutting intervals. Adam Probst, a new graduate student at the University of Kentucky, will plant a series of trials with these and other varieties spring 2006.
**Hybrid Alfalfa**

Dairyland Seeds released the first hybrid alfalfas in 2001 after many years of development. Research over the last 50 years has shown that hybrid alfalfa has the potential to significantly increase alfalfa yield. There is still some debate as to whether a hybrid variety will show significantly higher yield at each cutting, but a University of Wisconsin report indicated that hybrids consistently yielded in the top 10% of varieties over 25 test environments [www.uwex.edu/ces/crops/uwforage/HybridAlfalfa.html](http://www.uwex.edu/ces/crops/uwforage/HybridAlfalfa.html). In other words, hybrids definitely appear to show strong yield stability from location to location. This translates into a variety that should show high yield on your farm. Additionally, Dairyland indicates that their hybrid varieties show faster regrowth and stronger stands over time. As with Standfast™ alfalfa, aggressive management may be the key to maximizing the benefits of hybrids.

**Improved Quality**

WL Alfalfa and other companies have made significant improvements in alfalfa quality over the last 10 years. WL’s merger with Forage Genetics International in 2000 has meant a combining of forces in the development of improved quality varieties. If you are producing for a market that pays for top quality then a high quality variety may be an option for you. Remember though that cutting management is still the most important factor to insure high quality. When comparing varieties advertised for high quality, make sure to compare at the same stage of maturity. Almost without exception, an alfalfa variety cut at the bud stage will be higher quality than one cut at a bloom stage.

**Grazing Tolerance**

ABI alfalfa and other companies have released a number of grazing tolerant varieties during the late 15 years. In the last 5 years, grazing tolerance has been combined with traffic tolerance to provide further benefits from dual purpose alfalfa plantings. If you are planning to pasture your alfalfa stand for much of the growing season, then consider planting a grazing tolerant variety. Marketing and distribution of grazing tolerant varieties may change some with the recent purchase of ABI by Forage Genetics International, but the average producer will see little change. Before planting, consult variety test bulletins that show variety differences to grazing tolerance. In Kentucky, go to [www.uky.edu/Ag/Forage](http://www.uky.edu/Ag/Forage), click on “Forage Variety Trials” and look at the Alfalfa Grazing Tolerance Reports from the last few years.

Grazing tolerant varieties have not been left out of the Roundup Ready® picture and Alfagraze 300 and Alfagraze 600 will be in the marketplace soon. Although both have dramatically improved disease resistance over the original Alfagraze, the 300 version has a fall dormancy (FD) rating of “3” and the 600 version a FD rating of “6”. Since lower FD ratings equate with greater winter survival, Alfagraze 300 would be the recommended grazing tolerant variety for most of the transition zone including Kentucky. Remember that alfalfa can cause bloat and the option to reduce bloat by mixing with a grass is eliminated during the Roundup spraying phase of the stand.
Some producers have decided that it may worth dealing with pure stands of alfalfa for one or two seasons in order to clean up a problem weedy field. Then once the stand is weed field they can seed grasses like orchardgrass into the stand. Obviously, once a grass is interseeded, then Roundup is no longer a weed control option.

**General Purpose Alfalfa**

One of the major goals of all alfalfa breeding companies is the development of solid general purpose varieties with high yield, good disease resistance, and long stand life. Pioneer is one such company that continues to produce good general purpose alfalfas for their customers. In addition to solid varieties with proven performance, Pioneer has recently released varieties with potato leafhopper resistance, lodging resistant variety and other traits.

**Alleopathy**

During the last year I have often been asked if there are any varieties that can be planted directly following a previous alfalfa stand. My short and simple answer is “NO” and I really do not know of any major breeding work in this area. Alleopathy in alfalfa simply prevents recropping of alfalfa on alfalfa. The best advice with any variety is to wait at least a year before planting alfalfa into fields that previously contained alfalfa. This is especially true in no-till systems. Ideally, the field should be planted with an annual crop in between alfalfa stands.

Another question often comes up when discussing replanting alfalfa. Can I overseed alfalfa into a perennial grass pasture or hay field where a few alfalfa plants are still growing. Dr. John Jennings in Arkansas showed that plants rarely emerge within 8 inches of an old plant and new seedlings growing within 8 to 16 inches of old plants show a 25% reduction in growth. Therefore, you can no-till alfalfa into an old pasture stand with just a few plants, but there will be a sizable zone around each older plant where new alfalfa plants are not present or are weak.

**Sclerotinia Resistance**

Sclerotinia crown and stem rot is a disease that has limited fall planting of alfalfa in Kentucky and surrounding states during the last 15 years. It occurs as a late fall disease, but is usually not noticed until early spring when dead patches can be seen, often with a white cottony mold growing on the decaying plant material. There are no resistant varieties at present, although progress is being made. Current varieties marketed as resistant can still be infected, but they do provide some insurance against stand losses in years when disease severely is low to medium.

UK researcher Dr. Paul Vincelli offers the following advice: “Avoid planting alfalfa in late summer/early autumn where Sclerotinia occurs, especially no-till seedings in sod or fields previously sown to forage legumes. If fall seeding, seed as early as possible to
allow plants to develop larger, more resistant crowns. Deep plowing can reduce spore levels by burying sclerotia. However, plowing does not assure a disease-free stand since spores may arrive from neighboring fields (www.ca.uky.edu/agc/pubs/ppa/ppa10d/ppa10d.pdf).

New Traits: Bloat Resistance, By-pass Protein, Pharmaceuticals, etc…

A tremendous amount of research is taking place on the development of biotech or genetically engineered alfalfa varieties. These include the development of bloat resistant alfalfa through the expression of tannins. Low levels of tannins would also allow to have improved by-pass protein. Progress is being made on “low lignin alfalfa” that will result in improved fiber digestibility. The USDFRC estimates that a 10% increase in cell wall digestibility (from lower lignin) would increase milk and beef production by $350 million/yr and reduce manure production by 2.8MM tons/yr. In Canada, a privately-held biotechnology company, “Medicago,” is developing biopharmaceutical products using alfalfa as the protein production platform. In other words, alfalfa is genetically engineered to produce pharmaceuticals which are later extracted from the plant material.