Roundup Ready® Alfalfa, Novel Endophyte Tall Fescue, Red and White Clover, Bermudagrass, and More

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Roundup Ready® Alfalfa

Finally, Roundup Ready® alfalfa is now available and currently varieties show excellent tolerance to Roundup, good disease resistance, and good yield potential. Before making plans to plant 100 acres know 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 a very useful trait in alfalfa, but remember that Roundup Ready® varieties are not superior for other traits. Some current advertisements promote Roundup Ready® varieties as 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. 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. Also, make sure to use an early spray even if weeds populations are low. Otherwise, if you did not spray until 6 months after planting, the death 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 from FD3 to FD9. The estimated seed sales in 2005 were 1 million pounds. The estimated sales in 2006 are 4 million pounds.

Grazing tolerance varieties have not been left out 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. 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 a couple of years in order to clean up a problem weedy field. Then once the stand is weed field they have the option to seed grasses like orchardgrass into the stand. Obviously, this kind of interseeding eliminates Roundup as a weed control option in the future.

Other Improved Alfalfa Varieties

Rather than list the more than 300 alfalfa varieties that are now available for sale in the U.S. and the attributes possessed by each one, I will overview some of the traits present in new varieties and traits to be looking for in the future. Standfast™ is the trademarked name for a new group of alfalfa varieties that have been developed for lodging resistance and faster regrowth. These varieties will be useful where good soils promote lush growth/lodging problems and faster regrowth will allow cutting at shorter intervals.

There are a number of new varieties with resistance to the potato leafhopper and these are much better than the first leafhopper resistant releases. They show high levels of resistance, have good yield potential, and have good resistance to a broad range of disease and insect pests. Hybrid alfalfa continues to make inroads with several new varieties. Grazing tolerance continues to be a useful trait for many producers, but the release of new varieties may slow down a bit due to the merger of two major companies. Almost all new varieties will have good resistance to multiple pests, but it still pays to look closely at the profile of any new variety before purchasing.

Novel Endophyte Tall Fescue

Tall fescue was first planted on a widespread basis in the USA in the 1940’s, and now occupies over 35 million acres across the southeast and transition zone. It is one of the most widely adapted and persistent forage grasses in the country. It’s greatest strength though is also it’s greatest limitation. Early varieties of tall fescue, including KY31, contain an endophyte (fungus) that lives within the plant. The endophyte dramatically improves plant survival and stress tolerance, but this also produces ergot alkaloids that cause fescue toxicosis in ruminant livestock. The most common symptoms of fescue toxicosis include: 1) reduced feed intake, 2) decreased weight gain, 3) lower milk production, 4) higher respiration rate, 5) elevated body temperature, 6) rough hair coat, 7) more time spent in water and/or shade, 8) less time spent grazing, 9) low blood serum prolactin concentration, 10) excessive salivation, and 11) lower
reproductive performance. Fortunately, fescue toxicosis symptoms are rare in horses, with the exception of sometimes severe reproductive problems during the last trimester in pregnant mares.

About 25 years ago, when researchers discovered the endophyte that causes the problem they also realized that it was relatively easy to develop “endophyte free” varieties. These varieties show higher animal gains, but shorter stand life. Along with the release of endophyte free varieties plant breeders have developed soft leaved varieties, the newest of which rival perennial ryegrass in palatability. Improved winter hardy varieties have also extended the range of tall fescue in the U.S. and areas of western Canada.

Recently, a breakthrough occurred with the discovery that some endophyte strains did not produce ergot alkaloids and these endophytes can be inserted into different fescue varieties. Survival and stress tolerance are dramatically improved over endophyte free varieties and livestock symptoms virtually eliminated. These strains are often referred to as novel or non-toxic endophytes with a code designation of E++. Although it is fairly simple for researchers to insert novel endophytes into new varieties, a lot of field research and testing is required to find the right novel endophyte for each tall fescue variety. In other words, just because a variety has a novel endophyte, it should only be planted in areas where the variety is well adapted.

AgResearch was the first company to commercialize novel endophyte tall fescue varieties. They have patented 7-8 novel endophyte strains and therefore have complete control over how these specific strains are used. Much like Monsanto patented the Roundup Ready gene and any company that wants to produce Roundup Ready varieties must work with Monsanto. Other companies and public institutions are also developing novel endophyte varieties, but as with any patent they must prove that their novel endophyte strain(s) are different from the ones patented by AgResearch.

The first novel endophyte variety released in the U.S. was Jesup MaxQ. It was developed as a joint project with AgResearch/University of Georgia/Pennington Seeds. Jesup refers to the tall fescue variety and MaxQ is the name of the novel endophyte strain put into this variety. This partnership is also producing other novel endophyte varieties as well as working with other companies to develop novel endophyte varieties. At present, the only other commercially available novel endophyte varieties are Flecha, a western variety adapted to areas where annual rainfall is less than 20 inches and Advance, a soft leafed variety that is still being evaluated for regional adaptation.

Other University and company labs are exploring their own techniques for developing novel endophyte tall fescue. For example, Dr. Chris Schardl at the University of Kentucky has developed novel endophyte strains in perennial ryegrass using molecular genetic “knock-out genes.” In other words, he has
halted the production of ergot alkaloids from an existing perennial ryegrass endophyte. Dr. Schardl and his lab are now transferring this technology to tall fescue endophytes.

Researchers and producers agree that combining novel endophytes with the best tall fescue varieties is a winning combination. There is still a lot of work to be done and long term survival studies are underway, but “breakthrough” is not too strong a word to use.

Red Clover

Although there are not a lot of new red clover varieties, several companies and Universities have active red clover breeding programs. In some ways, red clover is the easiest species to make variety recommendations for. Simply put, “only plant certified seed of improved varieties, never plant common seed.” University of Kentucky research has shown that the difference between improved varieties and common seed can be 6000 to 10,000 lb/acre in higher yield and 1 to 1 ½ years longer stand life. Sometimes you may “luck up” and find that the bag of cheap common seed you purchased was actually an overstock of an improved variety, but UK variety trials show that 9 times out of 10 certified seed of improved varieties showed higher yield and longer stand life.

Most red clover breeders continue to make small steady improvements in stand persistence through improved resistance to root and crown diseases, but no variety yet has the ability to dependably survive more than 3 growing seasons. There are two new traits that will be useful for producers coming out of breeding programs. One is improved grazing tolerance in red clover. Look at Kentucky’s and other state’s websites for the results from grazing tolerant trials. Another useful trait is the release of varieties with reduced stem and leaf pubescence. Less pubescence mean less dusty hay. About 3 years ago Dr. Norm Taylor (University of Kentucky) released the first low pubescent variety “Freedom!”. As with Roundup Ready alfalfa, seed quantities of Freedom will be tight so get your orders in to Barenburg distributors soon.

White Clover

It is getting a little hard to make sense of new white clover varieties. In the past, the recommendation was to plant an improved variety of ladino white clover. Ladino types are closely related to the common Dutch types that seem to grow everywhere, but ladino white clover is taller with larger leaves that Dutch white. Therefore, larger plants and larger leaves produce higher yields. While that is true, ladino types do not live as long as Dutch whites. In recent years, many producers have stated that they could sacrifice some yield for longer persistence. Therefore, companies are now starting to release intermediate types that are hybrids between ladino and Dutch whites. For the most part, these intermediates look to be a good compromise between their two parents. Make
sure though that you review yield and stand persistence information from variety trial publications before planting new intermediate varieties on your farm. In addition, at least one company and one University have released (or soon will) a true Dutch white ecotype with lower yield, but much better persistence that the ladinos. Ecotype simply means that the variety originated from surviving plants collected from one location or a relatively small area.

**Bermudagrass**

Improved bermudagrass varieties provide many advantages including high yields, tolerance to close and frequent grazing, dense sod formation with resistant to trampling damage, drought tolerance, excellent summer production, and efficient response to nitrogen. The first improved bermudagrasses were released in the 1930’s by Dr. Glenn Burton, USDA-ARS, Tifton, GA. It was not until the development of Tifton 44 though that bermudagrass varieties were winterhardy enough for the transition zone. The limitation of all bermudagrass varieties until recently were that they were sprigged types. These types do not produce seed and have to be planted using above and below ground stem pieces (rhizomes and stolons) placed into the ground similar to rooting cuttings of ornamental plants. Fortunately once they are rooted they quickly spread, but sprigging is a labor intensive and expensive process that many producers have been reluctant to do. There are a number of adapted sprigged types available for the Heart of America region (KY, MO, IN, IL, and OH) including Midland, Midland 99, Hardie, Tifton 78, Quicksand, and others.

Fortunately, plant breeders in recent years have been developing improved seeded bermudagrass varieties. These can be planted with conventional seeders, as long as a shallow seed depth is assured. Many of these varieties produce forage yields almost as high close as the best sprigged types in the transition zone. Seeded types have been available for a long time for the southern U.S., with Arizona Common the most widely available. But these early seed sources did not have sufficient winterhardiness for the transition zone. One new variety that has performed very well is “Wrangler”. It has demonstrated good winter survival in Kentucky and Virginia and other transition zone states. Other winterhardy seeded types are being released, but make sure to compare their winter survival to that of Wrangler from state or regional variety trial results. The best comparison is to review stand survival ratings after a severe winter.

**AND MORE**

**Brassica’s**

Broad-leafed forage plants in the brassica family have long been used where high quality grazing crops are desired. Whether in New Zealand for fattening lambs or in the U.S. to put weight on stockers, the quality and palatability of brassicas is unparalleled. In fact, most brassicas are so rich that a recommended
practice is to fill your livestock up with dry hay before turning them into a brassica pasture. A common brassica for grazing is purple top turnip. Purple top is still available and can be very productive. One limitation of this variety though is that it expends considerable energy producing a large bulb like root structure (the turnip). Although some livestock will eat the turnip, the leaves are the most desirable and the highest quality part of brassicas for grazing animals. Therefore, if you are considering brassicas, then look into some of the newer hybrid taprooted types that produce higher yields, quicker regrowth, and many grow better in the warmer months.

There are many other species in the brassica family that produce high quality forage for grazing. Some are best suited for fall stockpile grazing, other for spring planting/summer grazing, and others are best known for their quick regrowth. There are a number of seed dealers that distribute brassicas including Ampac and Barenburg. Check with your local seed dealer for availability and for the brassica that best fits your situation.

**Orchardgrass**

Many good varieties are being released with improved disease resistance, stand longevity, and even improved grazing tolerance. Leafy grazing types like "Tekapo" are gaining in popularity for pasture. Several new varieties have been developed for the southeastern U.S. like Persist (TN), Prairie (KY), and a new variety from Georgia.

**Festololium**

Festololiums are a type of grass that is a hybrid between perennial ryegrass and fescue. Most varieties are crosses with meadow fescue. They are like perennial ryegrass but better with improved summer production, improved winterhardiness, and improved palatability. They are like fescue with high yields, and long term survival, but even the best festololium will not show stand persistence equivalent to an endophyte free tall fescue. Since they are highly palatable it is important to make sure they are not overgrazed.

**Annual ryegrass**

True annual ryegrass (Westerwolds type) shows rapid establishment with high seasonal productivity during the year of planting. It is a true annual species and produces seedheads during the year of planting. Commonly used to overseed warm season grass pastures across the southern U.S. in the fall.

Italian ryegrass has stand survival for up to two years. It provides high yields of quality forage, quick regrowth, early spring growth, and late fall growth. It requires longer rest periods than perennial ryegrass for maximum production.
Also, Italian ryegrasses rarely produces seedheads during the year they are seeded.

Intermediate or hybrid ryegrass. Developed by crossing perennial ryegrass with Italian ryegrass and shows advantages of both. Higher yield and longer growing season than perennial ryegrass and more persistent and winterhardy than Italian ryegrass.

Perennial ryegrass. Tetraploid varieties are usually higher yielding than diploids with larger leaves and tillers, less ground cover, more disease resistance, and tend to have higher digestibility. Diploid types tend to have finer leaves, produce more tillers, better stand persistence, and are more tolerant to heavy grazing.

Check out the University of Kentucky Forage Website (www.uky.edu/Ag/Forage) for more information on variety choices. If you are in Kentucky or a neighboring region simply go to the Forage home page and click on “Forage Variety Trials”. If you are in a surrounding state, then go to the home page and click on “Forage Variety Trials: Other States”.