

Is It Time to Think about Renovating or Planting a New Pasture or Hay Field? Part 1: The Pre-Planning Process

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Over the years since I first came to Delaware, I have received numerous requests concerning overseeding or renovating pasture and hay fields. Unfortunately, these requests usually come about just before someone wants to actually plant. In reality, producers should begin considering the process as much as a year ahead of the actual time that they want to plant a field. Since our fall plantings of forage crops seem to perform better than spring plantings, it's a good time to begin a discussion of the process. Often, we find ourselves moving into mid- to late-fall without having taken the time to really consider all decisions that have to go into improving the odds that the planting will be successful. Seed costs alone can equate to more than a hundred dollars per acre in investment expense; and, if we really take into account all the variable costs, a new pasture or hay field can easily represent an investment of hundreds of dollars per acre.

So in the pre-planning process, what's first? I know many get tired of hearing the phrase but testing the fertility of your soil far ahead of time is still the number one issue. The proper sampling depth is 0 to 4 inches in fields where you will be using a no-till drill to seed the forage and on fields that you do not plan to use deep tillage and have not been applying significant quantities of commercial nitrogen (N) fertilizer. In these instances, you will not be incorporating lime to neutralize acidity from the N fertilizer or incorporating large amounts of phosphorus [P or (P₂O₅)] or potassium [K or (K₂O)] fertilizer. Your expectation is that the soil test will indicate that the soil pH is in the 6.0 to 6.8 range and the P and K levels are in the medium to optimum range. If your expectations do not prove true and the pH is low enough to require several tons per acre of limestone or the P and K levels are low to very low and the fertilizer and lime needs to be mixed into the soil thoroughly, you will need to change plans and consider some type of tillage to incorporate fertilizer and/or lime.

If you have used large quantities of commercial N fertilizer in the past, you really should take both a 0-2 inch depth sample for determining the soil acidity in the upper soil layer as well as a 0 to 4 inch depth sample for nutrient content (phosphorus, potassium, calcium, magnesium and other essential elements). If you are unsure when limestone was last applied to the field, sampling both depths is a good approach since it will provide you with more information about the nutrient status of your field.

The reason for this distinction is that the ammonium or urea N forms that are applied as fertilizer are converted by soil bacteria into nitrate through a process called, nitrification. In this process, the soil bacteria oxidize the reduced form of N and release hydrogen ions that cause the soil to acidify. Since the N is all surface applied, the release of acidity near the soil surface can create a condition known as 'acid roof' where the top inch or two of soil is much more acidic than the deeper layers of soil. A second reason involves the very slow movement of limestone

down through the soil. Studies on pastures in Connecticut many decades ago showed that lime moves downward at a rate of about 1 inch per year. Therefore, it takes a very long time to have an impact on the entire rooting zone of the forage grasses and legumes.

In fields where tillage is planned prior to establishing a forage crop, the traditional plow layer sample (0 to 8 inches) for both soil pH (acidity) and essential nutrient status is the appropriate choice. If the soil sample indicates that the soil must be limed, apply the recommended amount of limestone and work it into the soil as soon as possible to allow time for the limestone to neutralize soil acidity before planting time. If the weather after lime application and incorporation remains dry, the limestone will not completely dissolve and neutralize the soil acidity. I recommend that producers take a second soil test before planting in late summer or early fall to determine if any additional lime is needed. Additional agricultural lime and the recommended P_2O_5 and K_2O fertilizer as well as any other needed nutrients can be applied and worked into the soil shortly before planting the field.

Everyone asks the question of whether to apply N at the time you plant a new field or seed a field you are renovating. My preference is that you should wait until the new grass is several inches tall and has enough biomass and roots to compete for applied N and store any extra N for future growth. Very small forage seedlings use and need very little N, no more than a couple of pounds N per acre, until they reach 2 to 4 inches in height. Often the residual N from organic matter mineralization during the summer, will supply the small amount of N the seedlings require. Once the forage plants have enough leaf area to capture the sun's energy and convert it into more plant tissue or into sugars for storage, the demand for N will increase significantly. When forage seedlings are very small, weeds or current vegetation in renovated fields are likely to be better able to compete with new forage seedlings for N, light, water, and other nutrients. Although annual weeds and/or current vegetation will be present when N fertilizer is finally applied to the new seedlings, the perennial forage seedlings will be in a better competitive position to compete for the components needed for growth and establishment. Summer annual weeds that germinated with the forage crop will be killed at the first fall/winter frost and provide the forage plants with more space, sun, water, and nutrients.

Now that you've taken care of any soil fertility issues that can reduce the chance for a successful stand, the next decision involves choosing the right seed to plant. I've had the opportunity over the years to read many seed labels on various pasture mixes offered for sale. I understand the convenience of buying a prepared pasture mix and the allure of these mixes. The buyer often assumes that the seller has spent the time and energy studying the issue and has come up with a mixture that in their opinion and experience has the best chance of success. I certainly can't speak to motivation of the seller but keep in mind that from a business point of view, seed that is mixed and offered for sale needs to be sold over as large an area as possible to justify the expense of wholesaling large quantities of seed as well as blending, packaging, and labeling the seed. In my opinion, this nullifies the expectation that the seller has designed the mix for your particular field or location.

After looking at the species of forages used in the prepared pasture mixes, I find that these mixes are more often a shotgun approach to seeding. A bit of everything is included in hopes that something will establish in all areas of the field. Usually they contain a quick establishing

grass such as annual or perennial ryegrass that can germinate in as little as 5 to 7 days so the buyer can feel comfortable that the new seeding is successful. Horse pasture mixes usually contain the feel-good or highly recognized grasses such as timothy and Kentucky bluegrass along with some orchardgrass and probably an endophyte-free tall fescue to provide more permanent cover. Finally, a legume such as white or ladino clover, red clover, or alsike clover will be in a pasture mix to provide the N-fixing legume everyone wants in a pasture.

The convenience of these mixtures comes from not having to mix them yourself before you fill the seed drill. The allure comes from not having to make a decision other than how much seed per acre to plant and not having to choose individual species to plant. For most buyers, the convenience and allure end up costing them many, many dollars per acre in seed costs for seed of grasses that won't survive in grazing situations or won't survive more than a season or two at best or will be unproductive during the middle of the summer grazing season.

So what should you do? I prefer going with a simpler mixture using forage species that are adapted to our region. In most cases, the only species that will survive for many years in our transitional zone climate is tall fescue. Because of endophyte (an fungus growing in some tall fescue plants) issues, many growers have tried the endophyte-free tall fescue varieties and some have had success with keeping a stand for many years while others have seed stands decline or disappear quickly. The newest chapter in this issue has been the development of novel or friendly endophyte tall fescue varieties. The novel endophyte tall fescue varieties do not produce the chemical compound (alkaloids) that interfere with animal performance but still provide benefits to the tall fescue plants helping them survive in many stressful environments. A limitation still in evidence with these new tall fescue varieties is that horse owners who breed horses do not all accept tall fescue as a feed source for their animals. This can limit tall fescue's acceptance.

What other species can you include in your simple mixture? Orchardgrass is another grass that many producers like to include in a pasture mixture but you should be aware that many orchardgrass fields are failing due to a disease/insect/environment/management complex interaction we've been calling orchardgrass decline. If you choose to include orchardgrass, keep it as a small proportion of your mixture. The other grass to include at least on heavier soils and in the northern portion of Delaware is Kentucky bluegrass. Be sure to include several varieties of the Kentucky bluegrass to help with disease resistance. It will be most productive early in the year (early spring to early summer) and mid- to late-fall. Finally, add in a legume to help with providing N for the grass to use as well as to improve the protein and forage digestibility of the pasture. For grazing, most people prefer a ladino-type of white clover. Although slobbers (the animal produces excessive amounts of saliva) is a potential concern with all clovers, it seems to be mostly associated with red clover. Often included in commercially sold horse pasture mixtures, alsike clover is known to cause photosensitivity (sunburn) and sometimes liver injury especially in horses and should not be included in your pasture mix.

One of the new grazing-types of alfalfa should be considered especially by beef producers. These varieties tolerate rotational grazing systems and produce well during the summer period in most years. Alfalfa is very deep rooted and can be a great addition to pastures and provide more and higher quality forage in the summer grazing period.

You will find it useful to talk to your seed dealer about the various varieties of each species that are available. Once you decide on the varieties to use and you purchase seed, you can mix your own pasture mix by either purchasing or renting a cement mixer and combining the seed in the proportions you decide are best for your purpose and field. Since many legumes now come pre-inoculated with the N-fixing bacteria and often are coated with a fine limestone, do not over mix the seed and when you re-bag it store it where it is protected from high temperatures and humidity. Stored properly, the seed can be held over the winter if something prevents you from seeding this fall but you should plan to plant as soon as possible after purchasing seed. Not only are the N-fixing bacteria alive; but, if you use a novel endophyte tall fescue variety, the endophyte has a limited storage time (around a year under good conditions) before it needs to be planted. Although tall fescue seed will germinate after longer storage times, the endophyte fungus may no longer be alive. The fungus only lives in the plant and is not soil-borne.

In the next article coming out later this summer, I'll cover some of the other management issues to consider such as planting date.