

Managing the Land to Achieve the Desired Forage Stand

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Introduction

There is more to successful establishment of forages than tilling the soil and broadcasting a seed mixture on top of the soil surface. Producers need to develop a plan and follow through with the details of the plan to successfully establish forages.

This paper will address key areas of consideration regarding forage crop establishment.

Choice of site

Physical location of the site

If there are several locations where the forage seeding could be done, consider whether there is a need to have the pasture next to the farmstead to reduce wintertime feeding issues and to care for newly born livestock. It may also be advantageous to have the pasture close to the water resource for water delivery and to electrical source for electric fencing options. Hay field location might be based on ease of transport to the hay storage site, but producers should consider the benefit of crop rotation as soil quality properties can be improved where forages are part of the long-term cropping plan.

Soils on the site

If you have the luxury of deciding whether to put the pasture “here, or there, or over there,” consider the advantages and disadvantages of each site as it relates to topography and the soil types at the site. Soils that are more prone to erosion can be better protected from soil loss if the ground is in permanent vegetative cover (perennial forage-based) as compared to being used for row crop production. Soil types with good internal drainage are better choices for pasture when stocking density is high. Less damage to the forage will be done by hoof action if high rainfall occurs on a well-drained soil.

Soil

Plantback restriction of previous herbicides used

To avoid a major mistake, review the labels of herbicides used on the previous crop. Many herbicides have plantback restrictions that could exceed the time between

application of the herbicide and seeding of the pasture. Residual herbicide levels (carryover) could kill the desired forage seedlings as they germinate or develop as seedlings.

Soil testing and follow through

One of the violations that many forage managers make is to seed the crop without knowing what the soil nutrient levels are. A proper soil pH is fundamental to productive forages. This message has been carried to generation after generation by professional agronomists, yet the message has not been heard by all. One cannot apply agricultural limestone today with the expectation of the desired pH tomorrow. As with an individual trying to lose weight, the process of pH change does not provide the desired outcome instantaneously. If limestone is needed, it should be applied at least 6 months prior to seeding.

Another mismanagement practice that happens too often is an annual application of a fertilizer blend without knowing whether the amount spread is over- or under-applying what is really needed. Only by testing the soil according to soil type, and proper follow through with application of the needed nutrients can one begin to optimize forage yields.

Seedbed preparation

How much tillage is required to have a desired seedbed is dependent upon whether there is a need to incorporate limestone and fertilizer, presence of weeds, and whether good seed-to-soil contact is possible without an additional tillage pass. Primary tillage does not have to be done with a moldboard plow. Excellent forage stands can result with no-till seeding, and that factor plus the retention of some residue on the soil surface are good considerations if the soil is prone to erosion.

Forage Choice

Appropriate for soil

Forage species do not perform similarly on different soil types. Some forages perform better on well-drained soils, some on lesser-drained soils. Some forages will persist on droughty soils, while other forages are in need of a consistent supply of water to grow. If soil pH or soil fertility levels are not closely monitored, some forages will “fade away” and others will persist.

Appropriate for livestock to be fed?

Differences in forage quality exist among different forages. Livestock requiring a high plane of nutrition should have legumes as a component of the forage mixture selected. Switchgrass is currently being touted as an excellent cellulosic crop choice as a

biofuel, but it would not be a good choice for lactating dairy cattle on pasture as its energy and protein levels are inferior to many forage options.

Pure stand or mixture?

A mixture of a cool-season grass and a legume is advantageous over a pure cool-season grass or legume stand for the following reasons:

- Eliminates the need for nitrogen fertilizer on pure grass stands, because the legume in the mixture will provide nitrogen for grass growth.
- Lengthens the life of the pasture, because the grass will remain after the legume stand is reduced.
- Reduces the problem of legumes "heaving." This is the process in which legumes are raised from the soil surface by freeze-thaw action in the late winter and early spring, resulting in plant damage. The grasses hold the legume plants in place better than a pure legume stand can hold itself.
- Reduces soil erosion on steep slopes. Grasses have a more extensive root system and are better for soil conservation purposes than are pure legume stands.
- Improves livestock performance. A grass-legume mixture can improve animal gain and breeding performance over a pure grass stand. A mixture can also reduce animal disorder concerns of grass tetany or bloat.

A pure cool-season grass stand or a pure legume stand does have some advantages over a cool-season grass and legume mixture. Advantages are:

- Eases the management associated with trying to keep all species in a mixture competitive.
- Increases the number of herbicides that can be used for weed control. Weed control options are more limited with a grass-legume mixture.
- Improves forage quality. A pure legume stand is usually higher in forage quality than a pure grass stand or a grass-legume mixture.

In general, advantages of a cool-season grass and legume mixture outweigh advantages of pure stands of either component.

Pre-blended mixture or make your own?

Pre-blended mixtures already in a seed bag are convenient to purchase, but there are issues that need to be considered before they are utilized. Pre-blended mixtures do not give the producer full opportunity to best match the specific grasses and legumes to the soil types on the farm. In time, two or three predominant forage species in the prepackaged mixture survive because of soil type, harvest management, and/or the fertilization program. This small number of forage species in the established stand is far less than the six or more forage species that were in the original pre-packaged mixture. Many times the varieties within the pre-blended mixture are not the newest releases that may have some advantage over older varieties.

Another issue that can be problematic, if not carefully considered, is seed size. The percentage of each forage species listed on a seed tag is on a weight basis. Seed size should influence the pounds of each forage seed ordered when mixtures are developed. What may appear to be a small percentage contribution of a particular forage on a seed tag could actually result in a large contribution of forage in the pasture if seed size of the forage is small (examples: timothy and white clover).

Seeding

Equipment used

Many equipment choices are available to seed selected forages. Choices include drills, a cultipacker seeder, and broadcasters.

Whatever equipment type is used, a firm seedbed free of growing weeds is desirable. If the seedbed is not firm and the cultipacker seeder is not the implement used, then the field should be cultipacked before seeding occurs; an after-seeding cultipacking might be necessary, too, if seed is broadcast or if drill press wheels are not doing a good job of providing seed-to-soil contact.

Seeders should uniformly distribute the seed; uneven distribution of a mixture of cool-season grasses and legumes in a fan broadcaster can be a concern when only one seeding pass occurs.

Seeders that have separate seed boxes for grasses and legumes, or “fluffy” or more dense seed, have an advantage as the boxes can be independently calibrated.

Row width of a drill should be less than 7 inches when seeding most perennial forage species. Warm-season grasses that inherently have a large amount of “chaff” (examples: big bluestem and indiagrass) are best sown with specially designed drills that can evenly distribute lower purity percentage seeds.

Depth of seeding

Most perennial forage seeds are small in size and should not exceed a seeding depth of one-quarter inch. Careful observation should be given to assure that seed is not placed too deeply by the seeding implement used.

Date of seeding

Be aware of the best time to seed the forages selected and have the task completed in the suggested timeframe to reduce the risk of having a poor stand. Seedings completed

outside of the best management guidelines are subjected to stresses caused by increased weed pressure, dry weather, or winter injury.

Inoculation

Legume seed should be purchased pre-inoculated or inoculated with the specific strain of rhizobia bacteria best for the legumes used to ensure that nitrogen fixation is at full capacity.

Weed Control

Seeding on a timely basis and excellent stand development can reduce negative consequences caused by weeds.

Perennial weeds should be under control before seeding of permanent grass-legume forage crops occur. Stands of desired forages could be lost if perennial weeds are not controlled prior to seeding (Example: If Canada thistle is controlled with a herbicide, legumes in the stand will be killed, too.).

Herbicide

There are limited herbicide options when cool-season grass and legume mixtures are the preferred forage choice. An approach to weed control in areas where weed pressure is known to be severe is to seed the desired legume or grass first. Weeds can be controlled in the pure stand with expanded herbicide options in year one, and the other component of the mixture that would have been killed in year one with a broadcast application of the herbicide can be introduced the next year.

Companion crop

When seeding cool-season grasses and legumes in the spring, a low seeding rate of spring oat (1 bushel per acre) can reduce weed composition and provides a source of hay when cut between the boot and soft dough stages of development.

Clipping

Another alternative to weed control is clipping weeds with a mower before they cause excessive competition. Forage seedlings should not be clipped too low to the ground; preferably, the weeds are clipped at the height of the developing forages.

Time of First Use

Preferably harvest the first growth of the seeding as hay or silage. Before a newly sown pasture is grazed, the plants should be fully established and the footing must be

solid. Do not graze new stands the first time when the soil is moist from recent rainfall.

Do not overgraze the stand. Leave at least four inches of ungrazed growth, and rotate the livestock to another pasture so the stand can fully recover.

Reference

Bledsoe, L., K. Hendrix, B. Johnson, K. Johnson, T. Johnson, G. Nice, G. Shaner, M. Sweeten, and G. Willoughby. 2004. *Purdue Extension Forage Field Guide*. Purdue University Cooperative Extension Service Publication ID-317. 260 pp.