



Seeding Small-Acreage Horse Pastures

Productive, well-managed pasture can provide most of the nutritional requirements for horses during the growing season. But horse owners with small acreages generally do not manage their pasture to maintain desirable grass and legume species and maximize forage output. Most small acreage horse pastures are severely over-grazed and under fertilized, leading to loss of the desirable forage species and the pasture being largely bare soil and for weeds.

Before you begin a pasture seeding or reseeding program, there is some very basic information that you need. Good pasture management practices are based upon knowledge of the soil resource available, how plants grow and where growing points are located in different plant species, the soil and climatic requirements of various pasture grasses and legumes, and how plants respond to grazing.

Obtaining thick, vigorous new stands is dependent upon proper seeding practices and favorable seedbed and environmental conditions. Proper soil pH, fertility, seedbed preparation, selecting high quality seed of appropriate species and varieties of grasses and legumes, seeding at the right time, good seeding techniques with equipment precisely adjusted for seeding rate and depth, and adequate control of weeds and insects are among the key factors to obtain thick, vigorous stands.

Planning for New Seedings

Preparations for seeding need to begin as much as 2 years prior to the actual planting of seed, especially for no-till seedings where lime and fertilizer can not be incorporated and mixed into the soil. Most old pastures and existing grasslands needing reseeding will require lime, fertilizer and weed control. These materials should be applied 6 to 24 months prior to seeding.

Do not attempt to reseed the entire pasture acreage at one time. Horses will need to be removed from seeded areas until the plants become adequately established to withstand grazing. Seedings made in late summer will usually be ready for grazing the following May. Seeding made in late winter/early spring will usually be ready for grazing 3 to 4 months later.

Control Existing Perennial Broadleaf Weeds

Perennial broadleaf weeds are usually present in older horse pastures, especially those that have been poorly managed, and may be present on cropland to be seeded to hay or pasture. Successful forage establishment of mixed grass and legume stands is dependent upon elimination of these weeds prior to

the time of seeding, either through tillage, herbicide application, or both. For best results, the weed control program should begin 6 months to a year before seeding.

The type of herbicide to be used will depend upon the composition of the existing vegetation and the kind of seeding (tillage vs. no-tillage). Early fall (2 to 4 weeks prior to the average killing frost date) is the most effective time period for application of herbicides to deep-rooted, hard-to-kill perennials such as dandelions, curly dock, milkweed, dogbane and Canada thistle.

Many herbicides must be applied by licensed pesticide applicators. Most commercial application equipment is designed for large fields and not suitable for use on small acreages. Commercial applicators also give priority to larger farm operations, so begin making contacts and arrangements for your needs at least 2 to 3 months prior to the target application time.

Liming and Fertilization

For tilled seedbed seedings, soil samples should be taken to the depth of the plow layer (the depth to which the soil is plowed, commonly defined as 6 2/3 inches). For no-till seedings, two sets of samples should be taken – one from the 0 to 2-inch depth to determine surface pH and fertility and the other to the normal plow depth.

Lime should ideally be applied 6 to 12 months prior to seeding and thoroughly incorporated into the plow layer to neutralize soil acidity. With no-till seedings, surface applications should be made 1 to 2 years ahead of seeding to allow for movement into the soil profile.

Phosphorus (P) level is especially critical during establishment. It is also commonly a limiting factor on unproductive, poorly managed pastures. A readily available supply of P within reach of the roots of young seedlings is essential for normal root development and seedling establishment. The demand for potassium (K) by young seedlings is relatively low. It is much more important once stands are established and high levels are essential for maintaining productive, long-lived stands.

Matching Plants to Soil and Site Characteristics

Many factors need to be considered when selecting suitable grass and legume species. Not every horse pasture is suitable for orchardgrass and bluegrass. Each species has its own particular characteristics, making it more or less suitable for a particular site and purpose. Many pasture plantings fail or perform poorly simply because the species chosen for planting is not adapted to the site or the area.

The first and foremost factors to be taken into account when selecting species is the necessity of matching grasses and legumes to the characteristics of the soil on which they are to be grown and the type of grazing management to be applied. Soil type, drainage, moisture holding capacity, fertility, pH and winter hardiness all have an effect on plant species adaptation. But horse owners, farm supply personnel, farm advisors and consultants often select or recommend species based on personal or industry preferences and biases without considering soil and site characteristics. Only species such as tall fescue, Kentucky bluegrass and white clover will withstand the close grazing practices used on most small acreage horse farms and often times they can not even withstand the ever-grazing abuse. A thorough and complete inventory of all available resources that will be utilized in the pasture and grazing program needs to be performed. Among the questions to be addressed in the process of selecting adapted grass and legume species are: What are the soil limitations of each field in the grazing system?

- 1) Shallow soils are droughty and they will stress plants during hot, dry weather.
- 2) Is drainage a limiting factor any place on the farm? Species differ in their ability to persist on poorly drained soils.
- 3) Are fertility and pH limiting factors? It is important to know not only what the fertility and pH limitations are, but also to know where they are (which fields). Soil pH and fertility are correctable limitations but keep in mind that it may take 2 to 3 years or more for surface applications of lime and fertilizer to effectively change levels in the root zone.
- 4) Does topography restrict performing management practices? Steep slopes limit access and operation of equipment for liming, fertilizing, clipping, etc., a criterion to consider with species requiring high pH and fertility.
- 5) What will be the frequency of grazing and length of the rest periods?
- 6) Is the primary intended purpose of the pasture to supply feed or to be an exercise lot?

Prepackaged 'shotgun' mixtures of numerous grasses and legumes usually have no advantage over simpler mixtures of one or two grasses and one or two legumes carefully selected to match specific species to soil and site characteristics and grazing system goals.

Certified seed of known varieties should be used. Certified seed carries a label certifying that it is seed of the particular variety listed on the label and that the seed meets minimum standards of quality in purity and germination and has low weed seed content (usually less than 0.25%).

Seeding New Stands

Tilled Seedbed Seedings. Tilled seedbed seedings are sometimes referred to as conventional tillage practices (plowing, disking, harrowing, etc.) are used to prepare the seedbed. The purposes of tillage are to loosen the soil, eliminate existing vegetation, turn under surface weed seeds, incorporate lime and fertilizer into the soil, and provide a smooth surface.

No-till Seedings. No-till seeding reduces soil erosion and conserves soil moisture for germination and seedling growth. No-till technology allows seeding without plowing or disking. Herbicides such as paraquat and glyphosate enable suppression of existing vegetation without tillage. For late summer seedings, it is important that all existing vegetation be eliminated 4-6 weeks prior to seeding. The use of paraquat or glyphosate and the application rate is determined by the type of vegetation present. The applicator hired to do the spraying should be able to help you determine the rate necessary or contact your local county Extension office (Maryland Cooperative Extension listed under county government offices). This application will be followed by an application of paraquat at the time of seeding for control of weeds that germinated after the first application 4 to 6 weeks earlier.

When To Seed

The primary seeding times for cool-season species are late winter/spring (late February to mid-May, depending upon location) and late summer (August to mid-September). Late winter/spring seedings are not common. Soil moisture and rainfall are generally good, evaporation is less and soil moisture is retained longer during the establishment period than with late summer seedings. However, seeding too early in cold, wet soils can result in poor germination, seedling loss due to fungal diseases and weak stands. On the other hand late spring seedings often fail due to stress from high temperature and lack of moisture. Also, annual weeds are more of a problem with late spring seedings.

Advantages of late summer seedings include less competition from weeds and damping-off (fungal) diseases are not usually a problem. Late summer seedings need sufficient time and heat unit accumulation for adequate growth before killing frost. These seedings should be made early enough to allow at least 6 weeks for growth after germination and emergence (Note: 6 weeks after emergence – not 6 weeks after seeding). Seedlings should be at least 3 to 4 inches tall before killing frost. Seedings made after out-of-dates (September 1 for mountainous region of western Maryland, September 10 for the rest of the state) are more subject to winter injury and possible winterkillings since the plants do not have as much time to develop and become established.

Seeding Depth

Seeding depth varies with soil type (sandy, clay or loam), soil moisture availability, and time of seeding and firmness of the seedbed. Seeds placed too deep are not likely to emerge. Seeds placed on the surface or at a very shallow depth or in loose or cloddy seedbed often do not have adequate seed-soil contact. In these cases, dry soil conditions following seeding usually results in desiccation and death of the seedlings. Thus in a firm seedbed is essential for proper seed placement, good seed-soil contact and successful establishment.

Seed should be covered with enough soil to provide moist conditions for germination. Under humid conditions, best results are obtained when placement is between ¼ and ½ inch deep. Under more arid conditions, such as sandy soils or to reach moist soil, the seed must be sown deeper. However, seed placed deeper than 1 inch may not emerge or be so weakened that survival is reduced. Generally, the optimum seeding depths are ¼ to ½ inch on clay and loam soils and ½ to 1 inch on sandy soils. Shallower depths within these ranges are better for species with smaller seed sizes and for early spring seedings. Deeper depths are recommended for species with larger seed sizes and for late spring and summer seedings when moisture conditions are less favorable.

Seeding Rates

Pasture seeding rates are higher than hay seeding rates to provide a denser sod for grazing. This is especially true for horse pastures. Table 1 lists seeding rate recommendations for various choices and mixtures based on soil type.

Management during Establishment

New seedings should not be grazed until the plants have developed sufficient root systems to prevent uprooting when grazed. One approach is to allow the new plants to grow to 10-12 inches, mow to a height of 3-4 inches, allow to regrow to 10-12 inches again and mow to 3-4 inches a second time. After the second mowing, let the plants again grow to 10-12 inches. By this time the plants should be ready for grazing so allow the horses to graze them down to 3-4 inches. Most forage grasses and legumes regrow from crown buds and are usually not seriously damaged by cutting. However, clipping too frequently can reduce seedling development as well as forage yields the following year. So don't overdo it.

To test for adequate root development, grasp a handful of plant material and tug on it. If you can easily pull it out of the ground, the root system is not sufficiently developed to prevent uprooting by the horses as they graze. If this is the case, another mowing and regrowth cycle is needed. Be sure not to graze the plants lower than 3-4 inches and graze only when the soil surface is dry and firm. Never graze new stands during wet periods, especially on tilled seedbeds.

If it is feasible to harvest the spring growth as hay, this is another option for allowing plants to develop a sufficient root system before grazing. The spring growth is allowed to grow to the late boot/early heading stage and then harvested as hay. Once the regrowth following hay harvest is 10-12 inches tall, grazing can begin.

Weeds often invade new seedings and the stand may be reduced if they are not controlled. Clipping, in addition to being a good management practice for developing root systems during establishment, will also reduce competition of weeds with the new grass and legume seedlings. But it should not be done too early. If clipped too early, only the tops of the weeds will be removed, leaving active buds on the stubble to produce new branches and even more competition. Sufficient weed growth should be allowed so that most active buds are removed when the new seeding is clipped.

Even though the seedlings from late summer seedings may make considerable growth during the late summer and fall period, they should not be cut or grazed. Clipping or grazing seedling stands weakens the plants and results in greater susceptibility to winterkilling. Grazing or clipping of new spring seedings should end 4 to 6 weeks prior to the average killing frost date to allow for buildup of reserves for winter. Avoid grazing of new stands during wet periods, especially on tilled seedbeds.

New seedings should be monitored for slugs, insect and disease problems at least weekly for the first 6 to 8 weeks. Pasture producers often fail to monitor new seedings and it is difficult, if not impossible, to determine the cause of seeding failures when you don't know what happened during that 6- to 8-week period following seeding.

Summary

There are no shortcuts or substitutes for good management practices and procedures for establishing pastures. Poor management before and after seeding can result in wasted effort. But once this pasture improvement has been made, there is often a tendency for horse owners to slip back into old practices of overgrazing, inadequate fertilization, and soon the new seedings are back to weeds and low productivity. After seeding it is necessary to follow up with good forage management to realize continuing benefits from a new seedings.

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Reviewed by members of the Maryland Horse Outreach Workgroup. The Horse Outreach Workgroup was established to provide information to horse owners on pasture and manure management issues. Technical assistance is available from local county Soil Conservation Districts/Natural Resource Conservation Service and the Maryland Cooperative Extension office. The workgroup consists of representatives from local Soil Conservation Districts, Maryland Department of Agriculture, Natural Resource Conservation Service, Cooperative Extension, University of Maryland, the Equiery, and the Maryland Horse Council. The Maryland Department of Agriculture's Office of Resource Conservation provides coordination for the workgroup.

For more information on horse manure management and other soil conservation and water quality practices, contact you local Soil Conservation District. For more information contact your local Soil Conservation District/ Natural Resources Conservation Service/ (SCD/ NRCS) office or county Maryland Cooperative Extension (MCE) office. Addresses and phone numbers can be found at http://www.mda.state.md.us/resource_conservation/technical_assistance/index.php , <http://www.md.nrcs.usda.gov/contact/directory> or <http://extension.umd.edu> or check the listing County Government for SCD/MCE or US Government, Department of Agriculture for NRCS of the phone book blue pages. January 2004, revised January 2007