



# 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 acreage generally do not manage their pasture to maintain desirable grass and legume species and maximize forage output. Most small-acreage horse pastures are severely overgrazed and underfertilized, leading to the loss of desirable forage species and leaving the pasture largely bare soil and prone to 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 depends on 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 SEEDING

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 cannot be incorporated 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 the 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, whether 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 is not suitable for small acreage. 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 & FERTILIZATION

For tilled seedbeds 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.

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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 a common limiting factor in 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 that one's 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 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 in 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 affect 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 oftentimes they cannot withstand the abuse of overgrazing. A thorough inventory of all available resources to be utilized in the pasture and grazing program needs to be conducted. Among the questions to be addressed in the process of selecting adapted grass and legume species are:

- 1) What are the soil limitations of each field in the grazing system? Shallow soils are droughty and they will stress plants during hot, dry weather.
- 2) Is drainage a limiting factor in 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 the operation of equipment for liming, fertilizing, clipping, etc., a criterion to consider for species requiring high pH and fertility.
- 5) What will be the frequency of grazing and length of 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, all existing vegetation must be eliminated 4-6 weeks prior to seeding. The use of paraquat or glyphosate, and the application rate, are 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 University of Maryland Extension office. This application will be followed by a paraquat application at seeding to control weeds that germinated after the first application, 4-6 weeks later.

## WHEN TO SEED

The primary seeding times for cool-season species are late winter/spring (late February to mid-May, depending on location) and late

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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 temperatures 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 the 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 the killing frost. Seedings made after out-of-dates (September 1 for the 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 much time to develop and become established.

## SEEDING DEPTH

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

Seeds should be covered with enough soil to provide moist conditions for germination. Under humid conditions, best results are obtained when placement is between  $\frac{1}{4}$  and  $\frac{1}{2}$  inch deep. Under more arid conditions, such as in sandy soils or to reach moist soil, the seed must be sown deeper. However, seeds placed deeper than 1 inch may not emerge or be so weakened that survival is reduced. Generally, the optimal seeding depths are  $\frac{1}{4}$  to  $\frac{1}{2}$  inch for clay and loam soils and  $\frac{1}{2}$  to 1 inch for 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 summer seedings when moisture conditions are less favorable.

## 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 new plants to grow to 10-12 inches, mow to a height of 3-4 inches, allow them to regrow to 10-12 inches again, and mow to 3-4 inches a second time. After the second mowing, let the plants grow again 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 the crown buds and are usually not seriously damaged by cutting. However, clipping too frequently can reduce seedling development and forage yields the following year.

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 horses while grazing. If this is the case, another mowing and regrowth cycle is needed. Be sure not to graze plants below 3-4 inches tall, 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. Spring growth is allowed to reach the late boot/early heading stage and then harvested as hay. Once the regrowth following the 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 weed competition 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 of seedling stands weakens the plants and increases their 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.



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New seedings should be monitored for slugs, insect, and disease problems at least weekly for the first 6 to 8 weeks. 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 seeding.

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For more information on horse manure management and other soil conservation and water quality practices, contact your local Soil Conservation District. Addresses and phone numbers can be found through [mda.maryland.gov/HOW](http://mda.maryland.gov/HOW).

The Horse Outreach Workgroup (HOW) provides information to horse owners on pasture and manure management. HOW consists of representatives from local Soil Conservation Districts, the Maryland Department of Agriculture, USDA Natural Resource Conservation Service, University of Maryland Extension, and the Maryland Horse Industry Board.

*Reviewed by Erika Crowl, University of Maryland Extension. August 2024.*



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