



## Pasture Primer: Grasses and Pasture Plants - Hobby Farms

**What's in your pasture? Learn more about the grasses, legumes and forbs that make up your pasture.**

By Carol Ekarius

### No-till drills

No-till drills are designed to plant seed in soil that has not been plowed and cultivated, though in a very matted, old pasture, a light disking may be helpful.

The no-till method helps conserve soil moisture, leaves the microbially active soil on the surface and the stones and rocks below the surface, and lessens soil erosion.

A no-till drill has a single disc that cuts a slit in the ground followed by a pair of discs arranged in a “V” formation that widens the slit slightly for the seed to drop in.

The seed drops down through a seed tube. The seed tube has a press wheel that applies pressure to close the slit in the ground and compresses the soil around the seeds.

Interseeding recommendations often call for a “knock-down” application of herbicide to give the new seedlings a better chance to establish. A non-chemical approach is to graze or to clip the pasture close to the soil surface just before seeding.

No-till drills come in different sizes and different configurations. Some are designed for small grains and soybean exclusively, while others that are equipped with different seed boxes can accommodate forage seeds. They can occasionally be rented from local seed dealers or from area Soil Conservation Districts.

Of all the plants, the grasses are the most important to man.

Agnes Chase, former Smithsonian botanist Grasslands cover over half the land area of the United States. They not only provide forage for livestock and wildlife, but also help to stabilize soils and to reduce erosion.

The plants that make up grasslands—from improved pastures to natural rangelands—are critical for most small farms, yet they are often overlooked, underappreciated and undervalued by farmers.

When you look at the grasslands on your farm, you may think of them strictly as grass, but they are so much more.

Grasslands are complex environments that typically support many species of plants and creatures great and small, ranging from your livestock to microbes, insects, birds and wild animals.

Within pastures and rangeland, there are three major plant groups: the true grasses the legumes the forbs

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### The Grasses

As the curator of the grass collection at the Smithsonian Institution's National Museum of Natural History, Dr. Paul Peterson is one of the world's leading experts on the taxonomy of grasses.

For over 30 years he has studied the plants that make up the grass family, or the Poaceae family to botanists. Poaceae is a large family, with over 11,000 species worldwide and over 2,000 species found in North America.

The grass family is truly a critical plant family for agriculture.

More information



One of the best Web sites for information on specific pasture plants is the Forage Information System site at Oregon State University. The site has a tremendous amount of information and can be searched in a variety of ways. To me, the most valuable function is the forage species database, which gives information on and provides photos of all major forage plants. Visit the Forage Information website.

1) The folks who work at Alternative Technology Transfer for Rural America (ATTRA) have developed several excellent pasture publications, such as Sustainable Pasture Management, Assessing the Pasture Soil Resource, and Nutrient Cycling in Pastures, as well as other titles about topics such as raising dairy calves on pasture, pasture poultry, and more. Visit the Alternative Technology website, or call (800) 346-9140.

2) Check with your local cooperative extension agent (generally listed under your county's name in the phone book) and the local office of the Natural Resources Conservation Service (listed under United States Government in the phone book) for more information on local soils, best-adapted species and varieties for local conditions and animal performance, and for planting advice.

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Grasses are also valuable for aesthetic reasons.

"If you look in the horticultural trade," Dr. Peterson explains, "more people are paying attention to grasses for their appealing aspects. Thirty years ago, the only horticultural interest in grass was for use in lawns, but now a lot of native grasses are being brought into cultivation because they look nice and people want them in their gardens. They are appreciated just for their beauty."

Some grasses are annuals, which complete their life cycle in a single growing season; others are perennial plants, which can grow for years. Some are considered cool-season species, which dominate the northern tier of the country; others are warm-season species that can stand up to the heat of summer, particularly in the southern half of the country.

In all but a few extreme southern areas of the country, such as South Florida, the Gulf Coast and parts of Texas, New Mexico and Arizona, farmers are learning to extend their growing seasons by planting both cool-season and warm-season grasses.

True grasses start life as a monocot, or single-leafed seedling.

As they grow, grass plants have a main stem, which is solid at each joint, or node, of the plant, and a leaf extending off the stem above each node.

The leaves consist of two parts: A sheath, which fits around the stem, and a flat or narrow blade, which extends out from sheath and has parallel veins running vertically from the sheath. Grass plants have very fibrous root systems.

As wind-pollinated plants, their minute flowers are not brightly colored nor sweet smelling because they do not need to attract birds or insects.

Most grasses produce flowers and seed each year on little spikelets. Some perennial grasses can also vegetatively reproduce from horizontal stems called rhizomes or stolons.

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### The Legumes

Plants of the Leguminosae family include a number of common perennial pasture and hay plants such as alfalfa, birdsfoot trefoil, clovers and vetches.

Other members of the family include all types of beans and peas; peanuts; and some species of herbs, shrubs and trees.

Their seed-bearing pods characterize the 18,000 worldwide species of this family. Most species also have an association with root-borne bacteria (called rhizobia) that are capable of fixing nitrogen from the atmosphere and capturing it in the soil.



There are several significant differences between legumes and grasses: Legumes are dicots, or plants that emerge with two leaves. Subsequent leaves are compound, meaning they have multiple leaflets on each leaf (picture a “four-leaf clover,” which is actually a single leaf with four leaflets). With colorful and fragrant flowers, they are nectar plants for bees and other insects. They produce seeds and foliage that are rich in protein, making them a highly nutritious feedstuff.

Ken Hoffman and his wife Nancy run Havenwood Farm and Stables in Newton, N.J., as well as a small business called Farmette Services, which provides services to other landowners in his area ranging from fence construction and bush-hogging to pasture renovation.

He particularly likes including legumes—especially “grazing alfalfas”—in his pastures and the ones he renovates for others.

The Hoffman's 84-acre farm includes about 32 acres of pasture that supports a dozen horses and over 100 laying hens that are part of his commercial pasture-poultry operation. When improving pastures, he generally uses a no-till drill to interseed the legumes into the existing stand.

“I include legumes in every pasture because they are a great nitrogen source,” he says, “and also because they have long tap roots, so they can really get down and help breakup any hardpan that might develop. Thanks to their taproots, they bring other nutrients up that are buried really deep in the soil.”

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#### The Forbs

From a botanist's point of view, forbs are all the herbaceous (or non-woody) flowering plants other than grasses. Although this group includes the legumes, it also includes many other families.

For practical purposes, I think of forbs as all the miscellaneous flowering plants that grow in pastures, including a number of weedy species. For example, dandelions are a forb.

Forbs are dicots, many have a taproot, and all have colorful and fragrant flowers that attract insects. They often make good grazing plants, and sheep and goats do particularly well in pastures that have an abundance of forbs.

Farmers often plant annual forbs, like kale, rape or turnips, as pasture crops to extend their grazing season, since many of these can be grazed well into the fall and winter.

Although most of the time these are planted as an annual forage crop in a field by themselves, last year Ken experimented with interseeding chicory, a perennial forb, into his pastures with his no-till drill and liked the results:

“Like the legumes, the chicory has a long taproot, which brings up nutrients, and the horses seem to enjoy it,” he says. “Chicory is supposed to have medicinal value. Thomas Jefferson was big into growing chicory for forage and wrote extensively about it.”

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#### Pasture Perfect

Dr. Keith Johnson has been a faculty member of the Purdue University Agronomy Department in West Lafayette, Ind. since 1981.

Growing up on a farm in Nebraska, he developed a keen interest in forage crops for pasture and for hay that has stuck with him throughout his career.

“My Masters' project was related to getting legumes into tall fescue to improve animal nutrition and my PhD was looking at fertility influences on tall fescue in hay pastures.” Today Johnson's research looks at how paddock numbers and forage types within a farm influence profitability for cow and calf producers.

Based on his experience, Dr. Johnson has a great deal of advice about pasture improvement.

“It comes down to looking at your farm as a whole system. You have to decide what you want to do. If you want to have lactating goats, then keep in my mind there probably ought to be a legume component in your pastures; whereas, if you are going to have under-exercised geldings, they will get along nicely with a predominantly grass pasture with a minimal



amount of legumes.”

Next, Dr. Johnson explains that although grasses, legumes and forbs have a wide range of areas in which they grow successfully, from mountain peaks to desert valleys to coastal areas, not all species grow well in all areas of the country, nor in all soil conditions.

Some require high moisture, others do well in drier areas; some thrive on sandy soils, others perform best on heavier soils. Selecting the right forage species for your area is one of the keys to establishing and to maintaining healthy pastures.

“One of the frustrations I find today is that I get e-mails from all over the country asking me for advice,” Dr. Johnson says, “but I’m not the best person to advise someone in Colorado, or Georgia, or Oregon. I think everybody needs to have a list of professionals within their region that they can count on for solid advice. In the area of livestock and pastures, I’d say a veterinarian, an agronomist, an extension agent and a financial advisor would be on the short list of professionals.”

Ken Hoffman agrees that you need to find people and resources that will help you understand your local circumstances.

“I learned a lot by doing research on the Internet and reading. I subscribe to Hobby Farms, Stockman Grassfarmer and Acres USA, and I’ve accumulated about 50 books on soil fertility, plant management, grazing management and similar topics. I also think you need to talk to people who are actually doing it in your area in addition to the extension office. You can spend a lot of money on seed yet have poor results because there are times of the year to plant and times not to plant; there are soil conditions you need to understand before selecting seed. It’s more involved than just throwing out seed if you want to have a good-quality pasture, so do your homework first.”

Both Dr. Johnson and Ken agree on the first step: Establish a baseline of what you have now.

They both recommend having soil tests done and reviewing soil maps (usually available from the Natural Resources Conservation Service). Also, for existing pastures, you need to inventory what is already there.

“It could be that you have some very desirable forages that are just waiting to explode with some tender loving care,” Dr. Johnson says.

Tender loving care for an abused pasture often involves developing a fertilization program.

“Get your soil test done and then decide on what route you are going to go—organic or synthetic—for restoring fertility,” Ken says. “If you opt to apply a synthetic fertilizer, you will have to give the field rest and keep your animals off it for a while, as synthetic fertilizers can be toxic immediately after application.”

Ken also points out that you should select seed that is labeled as a forage variety.

“I can get Kentucky bluegrass or rye in commercial mixes, but I always look for varieties that are labeled for forage. The forage varieties may grow taller, stand up better to grazing pressure or be safer for livestock. For example, fescue grasses can have endophytes in them, which can cause toxic reactions in livestock; varieties labeled for forage are endophyte-free, whereas commercial varieties might not be.”

Here are a few more points to consider in planning your perfect pasture: Species that are generally adapted to your area may not perform well on all parts of your farm, such as on hillslopes or in low, wet areas. In newly planted pastures, allow seedlings to become well-established before grazing (plants having attained at least six inches of growth is a good rule of thumb). Let the soil be solid enough to take hoof action from grazing animals.

Subdividing your pasture and using managed grazing techniques may be the best “fertilizer” money can buy—by managing livestock through grazing with multiple paddocks you have better control of what and when your animals eat; thereby improving forage quantity and quality.

About the Author: Carol Ekarius is a contributing editor to HF and hobby ranches in Colorado. She is the author of *Hobby Farm: Living Your Rural Dream for Pleasure and Profit* (Hobby Farm Press, 2005).

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