From ron@mlfarm.com Tue Nov 29 19:24:27 EST 1994
Article: 13558 of misc.rural

Frequently Asked Questions About Pastures

1. Why pasture?

On many high-productivity farms today, the answer might be `nostalgia' or `to clean up odd corners that the tractors can't reach.' Some large, mechanized farms get along with no pasture at all. Dairy cows are fed silage, hay, and grain; market lambs and beef cattle are fattened in feedlots; horses get by on stall feeding. In the interest of efficiency and maximum gains, pasture is sometimes limited to dry cows or rams after breeding.

The economics of high-productivity mechanized farms don't necessarily apply to smaller farms, and especially hobby operations, where pasture can provide excellent low-cost feed, savings in hay and manure handling, a healthier environment than the barnyard or feedlot, extra-clean wool or grass-fed lamb or beef for specialty markets, long-term benefits to the land, and the pleasures of watching foals or lambs gambol on a grass field.

2. How much pasture do I need?

Pasture needs depend on whether the pastures are primary or supplementary feed, local rainfall, forage quality, the availability of alternate pastures for rotation, the level of fertilizer and other nutrients applied to the pastures, the time and equipment available for pasture maintenance such as clipping

or taking a cutting of hay, and the length of the grazing season.

The usual rule of thumb is that one acre of permanent pasture can support one animal unit (one cow or horse, six sheep or goats). Pasture productivity can vary widely from that guideline. Lush improved pastures can often support 10-12 ewes with their lambs per acre. Stocking rates for aggressive rotation, with substantial rests for the pastures after each grazing cycle, can reach six animal units (6 cows or 24 sheep) per acre on improved pastures. At the other end of the scale, a cow would have trouble supporting itself on two or more acres of some scrub pastures, and one sheep per acre is the rule on some Australian sheep stations.

Too much pasture can be as big a problem as too little, unless you can take a cutting of hay when the forage gets ahead of the animals, or use a mower to clip weeds and over-ripe grass to provide fresh grazing. (See the Haying FAQ for information on haying practices and equipment.)

3. How do I convert woodland, or an overgrown field, to a productive pasture?

The methods depend on whether you have more money or more time. Instant pastures are expensive. If you're willing to spend a few years on the project, it can be done with minimal investment.

Start with a survey of the trees. There may be some trees you want to leave on an overgrown orchard, field, or woodlot, like old apple trees or ancient `wolf' trees on the edges of a field. Most animals enjoy fallen fruit (watch out for drunk sheep if the apples lie too long), and all animals need shade. You may be able to sell mature trees to a logger; otherwise, take advantage of the firewood. If you have access to a chipper, the slash can be

chipped for garden mulch and as path coverings. Alternatives for the slash are burning (you'll probably need a permit), or piling in an out-of-the-way area as a wildlife refuge. It will eventually rot down.

The quick way to a pasture is to hire a bulldozer with a grubber blade, or a backhoe, to clear the stumps and stones. A grubber blade looks like a huge rake, and will clear out stumps and large stones without scraping away the topsoil. A good backhoe operator can also pull stumps and stones without disrupting too much of the topsoil. Some backhoe operators find it easier to pull stumps when the trees are left standing, by using leverage high up on the trunk. It may be wise to ask before you bring out the chainsaw. If you hire a bulldozer without a grubber blade, make sure the operator scrapes the topsoil aside before pulling stones and stumps, and regrades the topsoil afterwards.

If you have more patience than money, saw stumps parallel to the ground -- a sharp stump can wreak havoc with tractor tires or the feet of livestock -- and where possible, cut the stumps low enough to clear a mower, so you can clip the pasture even before the stumps rot. You may want to hire a backhoe or dozer to pull a few large stones, or learn to live with them. Lambs love a big stone or two for games.

You can cut brush low to the ground with a chainsaw, a saw-blade on a heavy-duty weed-whacker, or a heavy-duty brush hog. Be careful with light-duty brush hogs on heavy brush or a stony field, or saw-blades on lawn-trimmers. You may be able to scrape away some brush with a bucket-loader on a tractor, though most tractor loaders don't take kindly to being treated as a bulldozer. Sometimes, it is easiest to use animals to clear the brush. Goats are specialists, often preferring brush to grass and clover. Sheep love poison ivy and bittersweet. The real masters of brush

clearing are pigs, who will eat roots and all if they are put out without nose rings. The trick to getting animals to clear brush and weeds is to confine them to a relatively small area with a tether or temporary fences. If they have an entire pasture to roam, animals seek out tasty new grass, clover or buds. When they are confined to a small area, they eat everything in sight, including brush and weeds.

Once you have the trees and brush cleared, it's time to upgrade the pasture. See question 4 below.

4. How do I improve the quality of my pasture from the present mix of native grasses and weeds?

The first step is a soil test. In many areas of the country, pasture land has a pH too low to support the better forage grasses and legumes. The soil test will tell you how much lime to add. Applications of more than two tons/acre may need to be split over a period of a year or so. You can spread lime yourself with a fertilizer spreader on a tractor, but it may be easier and cheaper to have a local blending plant spread it by truck.

For low-input passive improvement, you can introduce clovers and other desirable forage species by feeding mature hay on the pastures. The animals will trample the seeds into the ground as they feed, and distribute seeds in their manure. You can also change the balance between native clovers and grasses, or the balance of grasses in a pasture, by tilting the fertilization mix and timing, or by modifying the pH. Adding nitrogen-rich fertilizer, and early fertilizer application (see question 6 below), favors grasses; heavier applications of potash and phosphate and later applications favor the clovers. Higher pH from applied lime generally favors native clover and other

legumes. Timing your grazing and mowing can also improve the pasture. Grazing heavily in early spring, when grasses come up before the legumes, will favor the legumes. Grazing heavily or mowing when jointed grasses like bromegrass have their growing point close to the ground will retard their growth. Alternately, if grasses are allowed to reach boot stage, when seed heads have formed inside the stems, cutting or grazing encourages rapid regrowth.

For more aggressive improvement, once you have the pH up where you want it -- usually close to neutral for alfalfa or clovers, a little lower for grasses -- you have a choice of reseeding from clean tillage or over-seeding. For lush mono-culture grass pastures, or for planting legumes like birdsfoot trefoil or alfalfa that don't compete well, clean tillage may be the only possibility. You may need to plow under the old turf; you will certainly need extensive discing. It's hard dusty work, and the animals will have no use of the pasture until the new seeding is well-established. In some cases you may have better results if you plant an interim crop before a final discing and seeding with the desired grass or legumes. Buckwheat that you can harrow in as green manure works well to choke out weeds, or you can plant dwarf Essex rape, turnips, oats or rye, and let your animals graze down the temporary pasture before a final seeding. Keep your animals off the newly seeded pasture until it is well established.

Most native grass pastures can be renovated without plowing and harrowing to clean tillage. Soil test results will tell you what fertilizer to apply for the new seeding. You can then over-seed with a no-till seeder (some agricultural extension offices rent or loan them). If you don't have access to a no-till seeder, a few passes with a disc or a field cultivator will incorporate the fertilizer and lime, and disturb from 50% to 100% of the existing grasses. If your soil has some clay content and shows frost

cracks in late winter, you may not need to disc if you `frost seed' in late winter, after the snow is off but while the ground is still frozen. Broadcast the new seed at a heavy rate and either roll, harrow lightly, or drag with branches or a wooden drag to set the seed. A temporary mob stocking with sheep will also set seed.

If you are spring seeding legumes to upgrade your pasture (see question 5 below), when grass growth begins, and as soon as the soil is dry enough to avoid tracking, graze the newly seeded fields with enough animals to keep the grass short. This will open the field to provide light to the new legume seedings. (If you cannot graze down the early grass with animals, you may have to mow it to allow light down to the legumes.) Keep the animals on the pasture until you see them starting to eat the newly seeded legumes. Then pull the animals off and let the legumes grow undisturbed for 6-8 weeks for clovers, 8-12 weeks for alfalfa. At this stage, don't worry about the weeds; it's more important to get the new seedings established. When the legumes are vigorous, you can begin a regular grazing program.

5. What should I seed in pastures?

Mono-culture grass pastures are sometimes used on picture-book horse farms, and mono-culture legumes are sometimes used for aggressively rotated paddocks or where a cutting of high quality hay is taken off the pasture in the spring. In general, the most productive and lowest maintenance improved pastures are mixed legumes and grass.

The advantage of mixing legumes and grass on a pasture is that the clover and grass grow at different times of year, providing good feed through the seasons. And once inoculated clover or other

legumes are established, they will generate nitrogen that will in turn fertilize the grass -- saving the expense of added nitrogen fertilizer. There is also some recent interest in the use of herbs in pasture mixes. Animals love the herbs, and some have beneficial medicinal properties. Chicory and lotus are favorites in New Zealand. Rosemary and garlic in the pastures would give you pre-seasoned lamb; it takes anywhere from a few weeks to a few months for flavors to begin to affect the meat (pine is quick, apple is slow). Be careful with herbs if you're using or selling the milk from your animals: Thomas Hardy's _Far From the Madding Crowd_ is a good example of the perils of garlic in a pasture for dairy cattle. Most herbs cannot tolerate heavy grazing.

Typical legumes for pasture seeding are red, ladino, alsike, or white clover; birdsfoot trefoil; and alfalfa. The latter two are tough to establish except in clean tillage. For renovation seeding, a combination of ladino and red clover works well in many areas. Red clover can handle shading by grasses better than most other clovers; ladino clover has small seeds that do well in partially tilled soils. Some extension and soil conservation services may recommend white clover instead. Some tests have indicated that red clover can retard ovulation in ewes, so it may not be a good choice for a pasture used for flushing sheep before breeding. Ladino clover is too low to cut for hay, so it may not be a good choice on a pasture where you're planning to take an occasional cutting of hay. Make sure you inoculate legume seeds before seeding.

Predominantly legume pastures present the potential danger of bloating in ruminants. Bloat can generally be avoided if you condition animals to lush legumes gradually. Let them eat their fill of dry hay in the morning before they go onto an alfalfa or clover pasture, and limit their grazing the first few days.

Among the grasses, orchardgrass, bromegrass, timothy, bluegrass, and perennial ryegrass are all popular in pastures. Unless you've cleared to clean tillage, chances are your pasture will be a mixture of grasses. Some farms structure their grazing to provide a rotation between cool-season grasses (bluegrass, bromegrass), which do best in the spring and fall, and warm-season grasses like sudangrass. Reed canarygrass and orchardgrass grow all season, depending on the available moisture. Timothy grows well all season, but doesn't take well to continuous grazing. There is a danger of prussic acid poisoning from some varieties of sudangrass.

There is some recent research on cultivars of permanent grasses designed to grow in early spring, mid summer and late autumn. Local seed catalogues are the best source of cultivars for your area; most large farm supplies like Agway and many of the seed companies have pasture seed catalogues. The alternative for extending grazing seasons is annuals (see question 9 below).

6. What do I need to do to maintain my pastures?

To maintain their productivity, pastures need adequate nutrition, clipping or controlled grazing to eliminate weeds and over-ripe grass, and protection from overgrazing.

Fertilizers and added manure provide the nutrition. Trust your soil tests, but as a guideline, legume or mixed legume-grass pastures generally need 30-60 lbs of phosphate (P2O2) and 90-120 lbs of potash (K20) per acre once a year, with the lower rates for pastures where you spread manure or have fertile soils. Alfalfa and ladino clover profit from a little boron in the fertilizer. Good legume-grass pastures need no additional nitrogen (N). Straight grass pastures need 80-120 lbs of N per acre annually in

split applications (usually a first application in early spring, and a second application sometime after first cutting of hay in your area), 40-90 lbs of P2O5, and 60-100 lbs. of K2O per acre annually. If you spread manure on the pasture, applications as low as 40-60 lbs N, 20-30 lbs. P2O5, and 30-40 lbs K2O are probably sufficient. Taller grasses, like orchardgrass and reed canarygrass, generally need the higher rates.

If you don't have access to a blending plant, or don't have the equipment to use bulk fertilizer, you may have to select from available bagged fertilizer, or mix two or more blends of bagged fertilizer to get the formulation you need. A good starting point for legume or mixed legume/grass pasture is 300-600 lbs/acre of 0-10-40 or 0-15-30. A starting point for grass pastures is a split application (early spring, summer) of 400-600 lbs/acre of 15-8-12.

Applied manure, in addition to the animal droppings, is good for a pasture. Ten tons per acre of cow manure (two-thirds that amount of sheep manure), well-flailed and spread in the fall after grazing has stopped, is ideal. Chicken manure application should be no more than 3-4 tons per acre. If you don't have a manure spreader, you may be able to borrow one, or hire a neighbor to custom spread your manure.

Unless you are using a very aggressive rotation scheme on small paddocks, you will probably need to clip your pastures at least once per year to control weeds. Twice is better -- once in late spring to eliminate ungrazed old growth, and a second mowing in late summer to get the weeds. Pastures with tall-growing grasses like orchardgrass or reed canarygrass may need three clippings per year. Clipping after every rotation can do wonders to eliminate nasty weeds like thistles. Timing is all-important when you are mowing to eliminate weeds. Mow too late, and your brush hog will

actually distribute the weed seeds.

A sickle bar mower set at 3 inches will do an excellent job of clipping a pasture. A brush hog will also do a good job if the blades are sharp; on a stony pasture, the brush hog will function as a missile launcher, so be careful. If your pastures are free of stumps and stones, you can use a heavy-duty finishing mower or lawn mower. The best time to mow is just after a heavy grazing cycle. Some mowers may scatter the manure, or you can use a spike harrow or drag to break up and distribute clumps of manure. An alternative or supplement to mowing is a wether goat or two in with your other animals, if you've got the fences and secure enough gates to hold a goat. For hard-to-mow nasties like Canada Thistles, try walking the field with a scythe or a metal-bladed weed-whacker.

Grazing too early in the spring, or too late into the fall, takes a toll on a pasture. When a pasture is grazed too early, the young shoots are quickly nibbled off, plant root systems are destroyed, and weeds move in. Animals then churn the wet sod searching for palatable plants, turning the pasture into a muddy, eroding feedlot. Grazing too late strips the fall growth that forage grasses and legumes need to build up root systems for the winter. Fields reserved for succession grazing on annuals (see question 9 below) can extend the grazing season.

7. What is the best fence for pastures?

Fences have two purposes: keeping animals in and keeping predators out. The wood fences of fancy horse farms or New England stone walls may succeed at the former, unless you're trying to keep a bull away from cows in season, or weaned lambs away from their mothers. To keep predators out, you will probably need woven

wire, high-tension, or electric fences. Stopping a mother coyote who is trying to feed her kit may require 48-inch woven wire with additional strands of barbed wire at ground level and above the woven wire, or 6-7 strands of high-tension electric fencing.

Cattle and horses that are trained well to electric fences can be fenced in with a single wire. Many horse farms prefer to use a highly visible wire or one of the wide braided conductors. Smaller animals and animals with heavy coats need multi-wire fences to contain them, and pigs need carefully-placed ground level wires -- barbed or electric -- to keep them from digging their way out.

Woven wire fences are relatively simple to install. Depending on local supplies and aesthetic needs, you can use metal T-posts, pressure-treated commercial posts, or homemade posts of a resistant wood like cedar or locust. T-posts or sharpened wooden posts can be started with a pry bar and driven in with a post pounder. Corner posts should be stout, dug deep and may need braces. Use a fence-stretcher or a tractor to tension the fence before you staple it to the posts, and leave the staples loose on intermediate posts to allow the fence some play. A convenient tool for fence-stretching is a pair of 2 x 6 boards, longer than the fence, drilled for 3 to 5 strong bolts. Sandwich the end of the fence between the two boards and tighten the bolts to hold the fence, then hitch a chain from the tractor or fence stretcher to the ends of the sandwich-boards to stretch the fence evenly.

High-tension fences work best for long runs on level land, where they require few intermediate posts. Because of the tension in the wires, the corner posts need to be well dug and braced; old telephone poles can be cut up to make good corner posts. In some cases high tension fences do not need to be electrified, but to look good and perform well, they require careful installation and

no stinting on tensioners and other hardware.

For temporary fencing, portable electric fences using `polywire' or electrified netting are quick to set up and move. The various reel devices are useful if you plan to move the fence often. Gallagher sells hardwood posts that require no insulators, at least in relatively dry climates, which are convenient as end and corner posts for temporary electric fences. Welded hog or cattle panels can also be used for temporary holding pens.

Premier Fence Systems (800.282.6631, fax 319.653.6304), Gallagher (usa 210.494.5211, nz 07 838 9800) and Kencove (???) distribute catalogs with excellent ideas for electric and high-tension fencing, including electric scare fences that can be used as an adjunct to stone walls or older woven or wooden fences. Reliable electric fences require adequate charger strength, good grounds, and some thought to gateways, streams, and abrupt changes in terrain.

8. What is rotation grazing and how do I do it?

Most pasture forage responds well to a cycle of heavy grazing, followed by a period of rest. Many animals, if they are confined to a limited area, will eat everything in sight, including weeds and coarse forage, instead of nibbling only the tender shoots that grew the night before. Rotation grazing takes advantage of the pattern of forage growth and animal habits to increase pasture productivity.

Rotation patterns can vary from super-aggressive `forward paddock grazing' which may move the animals daily, to a casual rotation between two pastures every three or four weeks. Two weeks is generally the minimum rest for a pasture; three or four weeks is

better. Some farms rotate different livestock onto pastures, taking advantage of the different grazing habits of cattle and sheep. After the cattle eat the coarse growth, sheep are brought in to eat the fine grasses and clovers the cattle missed.

Livestock can be rotated between separate pastures, between paddocks carved out of pasture areas with stone walls or cross-fencing, or between areas of a pasture with portable electric fencing. Portable fencing is versatile, but requires more work to move and set up than the advertisements in the catalogs and magazines suggest. The alternative of permanently divided paddocks can be inconvenient for mowing, fertilizing, or taking an occasional cutting of hay. Whatever the rotation pattern, you will need shade, water, and mineral feeders in each paddock or pasture area; if you don't use portable fencing, you will need gates or bar-ways between the paddocks or pastures. Some farms save water piping and labor by arranging their paddocks around central islands with waterers and mineral/salt feeders; by opening and closing two gates, or moving a hog or cattle panel, they can rotate the stock to a new paddock.

Strip grazing uses one or two electric fences, moved as often as daily, to allow the livestock to graze fresh forage. On some operations, the lambs or calves are allowed to graze a paddock or strip first; when they move on to fresher grass and clover, the ewes or cows are brought in to clean up the old paddock.

Another advantage of rotation is parasite control. Many internal parasites cannot survive two or three weeks away from their hosts, especially in the hot sun on a close-clipped pasture. Before rotation onto a clean pasture is an optimum time to worm your animals. Even if you don't have a planned rotation scheme, when you see animals moving about restlessly in search of forage, it usually means the pasture is temporarily exhausted and needs a

rest. If you don't have an alternate pasture, it may be time to confine the stock to a feedlot until the pasture recovers, or at least to take pressure off the pasture by feeding supplementary hay or silage.

9. What about seasonal rotation, with alternate forages?

You can extend the grazing season, and gain maximum production (milk from cows, growth in lambs) by rotating stock to different forage depending on the season. On permanent pastures, you could rotate between grasses that grow better in the spring and fall (bluegrass, bromegrass) and mid-summer grasses (sudangrass). You can also rest pastures by turning animals into hayfields to clean up the aftermath. Some old-time dairy farmers developed sophisticated grazing programs to take advantage of the growth patterns of a variety of forage, and may be a good source of advice. One caution: ruminants and equines may develop scours when they are moved abruptly from one forage variety to another; it is generally a temporary condition and disappears when the stomach flora adapt to the new forage.

You can also extend the grazing season by reserving a field or portion of a field for annual plantings of supplemental grazing crops. Winter rye and/or wheat seeded in the fall can provide early spring grazing before the permanent pastures are ready. Oats seeded in the spring can provide grazing in the summer when regular pasture growth slows. On heavier soils, Japanese millet can provide mid- to late-summer grazing. Brassicas like rape or turnips can provide temporary grazing in 4 to 6 weeks, and allow sheep to graze well into the winter. Some brassicas can be heavily grazed, rested for a month, and grazed again. Sheep will trample and waste root crops if they aren`t confined to a few days worth of grazing with temporary fencing.

Supplemental pastures and/or grazing hay aftermath may allow you to bank grass (field hay) on your permanent pastures for late season grazing. Sheep and cattle can graze snow-covered pastures as long as there is no heavy icing. Banked pasture is generally low nutrition feed, and may need to be supplemented with grain or silage if the stock requires more than a maintenance ration.

With carefully planned succession grazing, rotation of permanent pastures, and banked grass, it is possible to extend the grazing season to as long as 10.5 months in a climate like Wisconsin, and possibly to all year in milder climates. The trade-off for the elimination of manure and hay handling is the time and fuel for harrowing and seeding supplementary grazing crops.

10. This all sounds like too much work. Why can't I just turn my stock loose in a woodlot or overgrown meadow?

You can, and if there are no poisonous plants or other dangers, the animals will browse grass and brush. Some species to watch out for: choke cherry and elderberry (the leaves are toxic if a branch is cut or knocked down by a storm), water hemlock, spotted hemlock, rhododendron, locoweed, lupine weed, jimson weed, horsenettle (nightshade), milkweed, and some laurels. Most stock will avoid poisonous plants unless they are hungry.

Unimproved pasture like woodlots or brushy slopes generally won't provide more than maintenance feed for cattle or sheep. But if you already have a regular feeding program and need only supplemental grazing, or if you are using animals to maintain the land, low-input grazing may be just the ticket. On some farms, feeding supplementary grain to animals on unimproved pasture may be more practical than improving pastures with heavy inputs of

lime, fertilizer, and tractor time.

11. Who wrote this FAQ. I'd like to be aware of regional and other prejudices.

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