

*Managing*

# MISSOURI PASTURES



B750  
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# MISSOURI PASTURES

—E. MARION BROWN

## Continuous Grazing Is Poor Management

The simplest way to manage a pasture is to turn out as many cattle in April as the grass will stand for a season and leave them until October or November. Unfortunately, this also is the system used most.

The trouble with this method is it doesn't give as many pounds of gain or milk as possible when the grass is lush in the spring and it will probably overload the dry summer grass.

Here are the chief drawbacks of such a system:

1. The cool season perennial grasses we use most in Missouri are bluegrass, bromegrass, orchardgrass, redbud, tall fescue, and timothy. These grasses grow vigorously in late April, May and June. They grow slowly during July and early August and at an intermediate rate in late August and September. Growth is slow again in October.

Thus if you gauge the number of cattle you put on pasture by the number it will carry in July, a lot of spring growth will go ungrazed and mature. Grass changes in composition as it advances in maturity. Its crude fiber and lignin content increase and its protein content decreases. Grass missed in the spring will approximate straw in digestibility and palatability by summer.

Cattle will eat more young grass or regrowth of grazed or mowed grass than they will of mature grass, and more of what they eat will be converted into meat or milk.

2. Cattle *spot graze* areas of herbage they like and avoid others.

As the herbage the cattle avoid matures, it becomes less and less palatable to them and they keep returning to the areas grazed previously.

Thus it is possible to have both overgrazing and undergrazing in the same pasture; both can be harmful. Overgrazing weakens and sometimes kills pasture grasses and legumes. Undergrazing poses another kind of problem. Some pasture legumes, especially ladino clover and lespedeza, do not tolerate the shading and competition of undergrazed tall grasses.

Merely adjusting the number of grazing animals is no solution. Understocking the pasture in spring to save reserve herbage for summer merely increases the fraction of the pasture damaged by undergrazing. It doesn't decrease the injury caused by overgrazing the selectively grazed areas.

## Answer—Supplemented Grazing and Rotation Grazing

The best method of obtaining the most pounds of meat or milk from pasture is through supplemented grazing and rotation grazing. In supplemented grazing, enough cattle are put in the pasture to make full use of the peak spring growth; then, when pasture growth slows down in summer, it is supplemented with extra pasture, harvested forage, or grain.



Understocking in the spring to save grass for summer caused a waste of pasturage and reduced the stand of lespedeza in this bluegrass-redtop-lespedeza pasture.

This bulletin considers only the supplementation with extra pastures. Under normal Missouri farm conditions this is cheaper than supplementing with grain or harvested forages.

Supplemented grazing alone is not enough for highest production per acre. If you put enough cattle on pasture in April to make the most gain possible per acre, they will begin to cause damage through their spot grazing.

The way around this is to include rotation grazing in your pasture management plan. If the pasture is fenced into three or more areas, the areas can be grazed in succession for short periods—5 to 14 days—with an intensity that will force grazing over most of it. And the 20 to 30 days of rest after each grazing will permit regrowth in the selectively grazed areas.

Rotation grazing does not completely prevent spot grazing. The only way cattle can be forced to graze over every foot of pasture is by overstocking to a degree that both animals and plants become partially starved.

But rotation grazing will reduce both the number and size of the ungrazed spots so the pasture can be mowed without much waste. Mowing the grazed field a day or two before or immediately after the herd is removed benefits the legumes in the ungrazed spots and removes herbage which cattle would still refuse at the next grazing.

One big advantage of rotation grazing is that it helps preserve the legume stand in grass-legume

mixtures. Ladino clover does not survive long in brome grass, bluegrass, orchardgrass, or tall fescue if subjected to severe spot grazing. Continuous close defoliation weakens and kills it in the grazed spots. Tall grass in the ungrazed spots also injures the clover by shading and competing for moisture and soil nutrients.

Alfalfa is even less tolerant than ladino to continuous close defoliation, though less likely to be outgrown by the taller grasses.

Spot grazing reduces the productivity of a grass-Korean lespedeza pasture but usually does not eliminate the lespedeza. Kobe and earlier strains of *Lespedeza striata* grown with bluegrass do not survive continuous spot grazing.

We have evidence that the carrying capacity of a pasture is greater under rotation grazing than under single-field grazing, whether the pasture includes a legume and a grass or grass alone.\* But this does not necessarily hold true for the poorer pastures.

For example, at Sni-A-Bar Farms in west central Missouri cattle gained only 5 percent more from 1931 through 1945 on a bluegrass pasture under rotation grazing than on a comparable pasture under continuous grazing. The legume content was small in both pastures. Gains were only 138 and 145 pounds per acre compared with gains of 300 to 400 that can be obtained from improved pastures. The more productive a pasture is the more beneficial rotation grazing is likely to be.

\*R. E. Blazer et. al., *Agronomy Journal* 51:238-241

# How to MANAGE Supplementary Pastures

1. Turn enough cattle on the regular pasture to use most of the herbage by the middle of June. This "regular" pasture may be a permanent type or one of the two- to four-year types often used in crop rotations. Such pastures are fitted in after small grains and before a row crop in crop rotations.
2. When the cattle can no longer obtain a fill easily from the pasture, move some of them to a supplementary pasture.

## Some Good Supplementary Pastures

**Korean Lespedeza grown with small grain.** This is excellent for summer and early fall. Lespedeza not needed for pasture can be harvested for hay or seed.

The acreage of reserve pasture required for summer and fall varies with rainfall, so hold the herd by a temporary fence on just as much of the supplementary pasture as they can use. This fence can be moved to make more pasture available as needed.

The acreage of lespedeza should equal the acreage of permanent or rotation pasture to insure adequate supplementary pasture. Many of you probably do not grow that many acres of small grain. If not,



This 5-acre field of sudangrass sown June 1 produced 53 tons of silage by July 22 and pasture for 10 steers from August 18 to September 13.

you may be more interested in the following supplementary pasture suggestion.

**Sudangrass.** Sudangrass sown in mid or late May will furnish good pasturage by the end of June. One acre of sudangrass pasture is equivalent to two or three acres of lespedeza pasture. Surplus sudangrass makes good grass silage. (See Missouri Agricultural Extension Circular 659 for suggestions on growing sudangrass.)

It is neither necessary nor desirable to remove all cattle from the regular pasture in summer, except during drouth. Summer annual weed grasses, ever-present in Missouri pastures, are nutritious if grazed as they grow.

If these weed grasses are not grazed or mowed during the summer, they will be too tough and stemmy in September to attract the cattle. Such mature plants will also retard the growth recovery of pasture plants. Pasture grasses and legumes get little benefit from complete protection from grazing during summer in Missouri, though overgrazing should be avoided at all times.

## How to Manage ROTATION GRAZING

Three or more separate pastures of approximately equal size are needed for rotation grazing. You may already have this many separate pastures under permanent fence. If not, a single pasture can be divided into three or more equal parts with temporary fences.

The fields are grazed one at a time while the others are given a rest. Figure 1 is a grazing chart that can be followed in a three-field rotation.

Under this three-field arrangement, each field would be grazed two weeks and rested four weeks during each grazing cycle, except near the beginning



Spot grazing reduced the vigor but not the stand of lespedeza in this blue-grass-lespedeza pasture under continuous grazing.



Rotation-supplemented grazing makes efficient use of pasturage and maintains a balanced stand of grasses and legumes.

and end of the growing season. The time is shortened at the beginning and end because of the slower growth of the grass.

Under six-field rotation grazing, each field would be grazed five or six days and rested 25 to 30 days. With eight fields, each would be grazed four days and rested 28 days in each grazing cycle.

The most intensive type of rotation grazing is called strip grazing. In strip grazing, the section being grazed is enclosed by two movable fences. Only enough pasture to feed the cattle one or two

days is enclosed between the two fences. Each day or two the fences are moved to enclose a new strip. When grazing has crossed the entire pasture, the fences and the herd are moved back to the first strip and the cycle is repeated.

The strip-grazing cycle is timed to last about four weeks, giving each strip a four-week rest. If strip grazing does not cross the entire field in 28 days, the remainder is harvested for hay or grass silage.

Field A.		Field B.		Field C.	
April 15 - April 22	May 16 - May 30	June 28 - July 12	Aug. 9 - Aug. 23	Sept. 20 - Sept. 30	
April 22 - May 2	May 30 - June 14	July 12 - July 26	Aug. 23 - Sept. 6	Sept. 30 - Oct. 8	
May 2 - May 16	June 14 - June 28	July 26 - Aug. 9	Sept. 6 - Sept. 20	Oct. 8 - Oct. 15	

Fig. 1 An example of a three-field rotation grazing schedule for permanent or rotation pastures. Location and weather will determine when grazing begins in the spring and ends in the fall.

Another variation of rotation grazing has producing dairy cows or fattening beef steers (herd A) "top graze" each strip of pasture and non-producing dairy cows or stock beef cattle (herd B) "bottom graze" each strip.

Examples: Under six-field rotation grazing, each field would be grazed three days by herd A, three days by herd B, and rested 27 days until herd A returned.

Under a strip-grazing plan, three movable fences would enclose two adjacent pasture strips. Herd A would move each day to a fresh strip. Herd B would follow along behind but their fenced space would be twice as wide. Thus herd B each day would be grazing one space that both they and herd A had grazed plus the one grazed the previous day by herd A.

When correctly managed, eight-field rotation grazing or strip grazing will produce more meat or milk per acre than three-field rotation grazing. But whether the difference will be profitable or not depends on your farm and your skill. For most Missouri farms the three- and six-field rotations are likely to be more practical.

## Combining ROTATION and SUPPLEMENTED Grazing

Rotation grazing must be combined with supplemented grazing to accomplish the three principal objectives of good grazing management:

1. Maintain grass-legume balance.
2. Prevent wasteful accumulation of maturing grass in the spring.
3. Reduce spot grazing.

One way to combine the two practices to achieve these objectives is to rotation-graze only two-thirds of the pasture fields during April, May, and June. A spring hay or grass silage crop can be harvested from the remainder; then it serves as supplementary pas-

ture for summer and fall, being brought into the regular rotation.

Figure 2 shows how this is done with six fields.

Fig. 2 An example of a grazing schedule for six-weather will determine the dates when g

<b>Field A</b>	<b>Grazed</b>
	April 15 - April 22 May 18 - May 27 June 30 - July 7
<b>Field B</b>	<b>Grazed</b>
	April 22 - April 30 May 27 - June 5 July 7 - July 14
<b>Field C</b>	<b>Grazed</b>
	April 30 - May 9 June 5 - June 14 July 14 - July 21
<b>Field D</b>	<b>Grazed</b>
	May 9 - May 18 June 14 - June 23 July 21 - July 28
<b>Field E</b>	<b>Harvested</b>
	once for hay or grass silage
<b>Field F</b>	<b>Harvested</b>
	twice for hay or grass silage

The area set aside as the summer and fall supplementary forage need not be a part of the main pasture or contain the same grass-legume mixture. For example, if fields A, B, C, and D, in Fig. 2 con-

Field rotation-supplemented grazing. Location and grazing begins in the spring and ends in the fall.

Grazed
Aug. 11 - Aug. 18 Sept. 22 - Sept. 29
Grazed
Aug. 18 - Aug. 25 Sept. 29 - Oct. 6
Grazed
Aug. 25 - Sept. 1 Oct. 6 - Oct. 13
Grazed
Sept. 1 - Sept. 8 Oct. 13 - Oct. 20
Grazed
June 23 - June 30 July 28 - Aug. 4 Sept. 8 - Sept. 15
Grazed
Aug. 4 - Aug. 11 Sept. 15 - Sept. 22

tain grass-lespedeza or grass-ladino mixtures, the meadow-reserve, E and F, could contain a grass-alfalfa or a grass-birdsfoot trefoil mixture.

The supplementary pasture can also be on cropland: lespedeza seeded in small grain; sudangrass; or a field seeded to grass-legume meadow mixture. Examples of meadow mixtures include:

orchardgrass, tall fescue, or reed canarygrass  
+  
alfalfa

timothy or orchardgrass  
+  
annual lespedeza

bromegrass, timothy, or orchardgrass  
+  
birdsfoot trefoil

Two crops of hay usually can be harvested from the grass-alfalfa mixture and one from the grass-lespedeza or grass-birdsfoot trefoil mixture before supplementary pasture is needed.

■ ■ ■

Rotation grazing did not prevent excessive growth of orchardgrass in this understocked orchardgrass-ladino clover pasture.



## When to Start Grazing in Spring

- Avoid grazing cattle before the pasture grasses and legumes begin active growth. It is not necessary or desirable, however, to wait until much spring growth accumulates. The growth rate of cool-season grasses increases rapidly in late April and reaches a maximum in May. If grazing begins much later than when grasses begin vigorous growth, undergrazing in May will be unavoidable.

Grass-legume mixtures, except those which include alfalfa, are ready to be grazed when the average height of the grass is 3 inches. *At this average height some grass will be 6 inches and some only 1 inch tall.*

## How Close Should Pastures Be Grazed

- Closeness of grazing is difficult to determine and to control. The way cattle pick some grass to graze to the ground while bypassing other grass makes an estimation of average height difficult and meaningless.

The ratio of the grazed to the ungrazed fraction of a pasture is the most dependable measure of grazing intensity. If more than 25 percent of the entire area is ungrazed by June, the pasture is understocked. If less than 10 percent of a pasture is ungrazed, cattle will be unable to obtain the quantity of pasturage required for maximum production.

It is difficult to estimate the carrying capacity of a pasture at the beginning of the grazing season. But that's when we have to make the decision.

Pasture capacity depends not only on the unpredictable weather of the current year but also on the weather and grazing to which the pasture was subjected the preceding year, especially during the fall.



Bluegrass-lespedeza, orchardgrass-ladino, and timothy-bluegrass-birdsfoot trefoil pastures are usually ready to be grazed by April 15 in central Missouri. Seldom, if ever, should grazing begin more than one week before or one week after April 15 in the central region.

Tall fescue-legume pastures or grass fertilized liberally with nitrogen in March will be ready one or two weeks earlier than other pastures.

In southwestern Missouri grazing should begin one week earlier than in central Missouri. In the southeast it can begin two weeks earlier.

At Lathrop, 40 miles north of Kansas City, orchardgrass-ladino, timothy-bluegrass-birdsfoot trefoil, bluegrass-ladino, bluegrass-lespedeza, and bromegrass-ladino pastures usually are ready to be grazed by April 21. Grazing of similar pastures should begin one week later in the northern tier of Missouri counties.

Alfalfa, because of its erect growth and its sensitivity to early or close defoliation, should be at least 12 inches tall before spring grazing begins on grass-alfalfa mixtures.

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<u>Kind of Pasture</u>	<u>Capacity</u>	
	<u>Apr. to July</u>	<u>July to October</u>
Bluegrass-lespedeza. Orchardgrass-lespedeza. Tall fescue-lespedeza.	1 steer or cow per 3/4 to 1 acre	1 steer or cow per 1 1/2 to 3 acres
Bromegrass-ladino clover. Bluegrass-ladino clover. Orchardgrass-ladino clover. Tall fescue-ladino clover.	1 steer or cow per 1/2 to 3/4 acre	1 steer or cow per 1 to 1 1/2 acres
Bromegrass-alfalfa. Bluegrass-alfalfa. Orchardgrass-alfalfa.	1 steer or cow per 3/4 to 1 acre	(same as Apr.-July) (remove cattle end Sept.)
Good bromegrass, Bluegrass, orchardgrass, or tall fescue heavily fertilized with nitrogen in March.	1 steer or cow per 1/2 acre to late June	1 steer or cow per 1 1/2 acre late June to mid-Aug. 1 steer or cow per acre mid-Aug. to October

# When to End

■ Grass and legume leaves feed the plants of which they are a part as well as the animals which eat them. That's why it is important to control grazing—so the plants will get sufficient food, too.

Carbohydrates (sugar and starch) are synthesized in green leaves when they are exposed to light. The light intercepted by the leaves supplies the energy required to manufacture carbohydrates from the raw materials, carbon dioxide of the air, and water from the soil. This is photosynthesis.

Respiration, the opposite chemical reaction to photosynthesis, also takes place in plants (and animals). In this process, carbohydrates are oxidized to carbon dioxide and water, with a release of energy.

If carbohydrate synthesis exceeds a plant's requirements for both growth and respiration, reserve carbohydrates are stored in basal stems, rhizomes, stolons, or roots. Such reserves are essential for regrowth after grazing, mowing, or freezing has reduced leaf area.

Most farmers are well aware of the beneficial effects of protecting alfalfa from fall mowing or grazing during the 30 days before the average date of the first killing frost.

This cool period of decreasing day length is also favorable for carbohydrate storage in perennial cool-season grasses: bluegrass, bromegrass, orchardgrass, redtop, reed canarygrass, tall fescue, and timothy. Ladino clover, birdsfoot trefoil, alsike clover, first-year red clover, and first-year sweet clover also benefit from protection from grazing or mowing during late September and October.

Rotation-grazed pastures are rested 25 to 30 days between grazings. If a different field of the rotation-grazed pasture is grazed first each year, each field will get a month's rest every third or fourth fall and a shorter rest all but one year.

Pastures undamaged by overgrazing, spot grazing, drouth, disease, or insects may be grazed without injury as late as they supply enough pasturage to satisfy the animal's feed requirements.

Damaged pastures should rest from mid-September to November. The build-up of carbohydrate reserves will increase winter survival and spring growth.

Fall rest also will improve the stands of species which spread by rhizomes (bluegrass, bromegrass, reed canarygrass, and redtop), by stooling (orchardgrass and tall fescue), or by stolons (ladino).

Little or no plant storage of carbohydrates will occur when abnormally dry weather severely limits fall growth.

On the other hand, if the fall season is normal and the pasture has been rested during late September and October, grazing in November and December will not injure the pasture. The growth which accumulates during September and October need not be wasted. Unmowed, ungrazed grass does not ma-

## Late Fall,

Feeding grain and harvested forages to livestock costs more than pasturing them. Any extension of the grazing season in the fall, winter, and early spring, without too much expense, will reduce cost of production.

### Ways to Extend Grazing Season:

1. Sow cereal grains for late fall pasture. Rye or a variety of wheat resistant to Hessian fly sown in August will supply pasture during October and November in northern Missouri and October, November, and December in southern Missouri.

Winter barley makes good fall pasture in central and southern Missouri and winter oats is good in the southern one-fourth of Missouri.

The principal objections to cereal crops as pastures are the occasional delayed seedings or stand failures caused by too much or too little rain, and muddy footing in wet weather.

# Grazing in the Fall

ture in the fall like it does in the spring. The fall-grown herbage is both palatable and nutritious until browned by a hard freeze.

It is sometimes desirable to weaken bluegrass, brome grass, or tall fescue by close summer and fall grazing. This helps when lespedeza or ladino is to be sown the following spring without tillage in a dense sod of these grasses. Reducing the competi-

tiveness of the grass helps the legume seedlings survive.

Orchardgrass or timothy pastures should not be grazed close in the fall unless the pasture is to be plowed up. Orchardgrass and timothy do not tolerate close fall-grazing as well as tall fescue, and they do not renew depleted stands by vegetative spread like bluegrass, brome grass, and reed canarygrass.



## Winter & Early Spring Pasture

2. First year sweetclover that is allowed to grow during September will provide good pasturage during October and until frozen in November.
3. Tall fescue harvested for seed, mowed to remove the straw (which may be baled and fed when snow covers the pasture), and allowed to grow from July to November makes good fall and winter pasture. Tall fescue sod also provides firm footing in wet weather.
4. Grass-legume pastures that are protected from early fall grazing to increase their vigor and stand may be grazed during November and early December. Tall fescue remains palatable and nutritious longer in winter than other grasses because its leaves resist freezing and retain their green color longer.
5. Rye supplies spring pasture earlier than other grains or grasses. In northern Missouri, rye is ready to be grazed two weeks earlier than grass-legume mixtures. In southern Missouri, it is ready four weeks earlier.

Muddy fields frequently delay spring grazing of rye until it joints or heads and becomes unpalatable, except on sandy soil. Rye is well adapted to sandy soils.

6. Perennial grasses will be ready for grazing one or two weeks earlier if you fertilize them with nitrogen in March. Tall fescue will give the earliest spring pasture among the perennial grasses under such treatment, though it will still not be as early as rye.

Nitrogen fertilizer should not be applied to a well-balanced grass-legume mixture. The additional nitrogen increases the vigor of the grass, causing it to crowd out the legume. Then, without the legume, the grass soon declines in productivity unless fertilized annually or more often with nitrogen.





Summer and fall growth of tall fescue makes good winter pasture.

**FRONT COVER**

Four weeks of rest between grazings increased the survival of alfalfa two years in this rotation grazed orchardgrass-alfalfa pasture.

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