Well Managed PASTURES

MORE FEED AT LOW COST

A well-planned pasture program should provide for continuous green pasturage from spring to fall.

A choice pasture is one with dense, leafy growth—half legumes and half grasses. From such a pasture a cow can readily harvest the 125 to 150 pounds of pasturage needed per day.

Good succulent pasturage is palatable and unexcelled in digestible feed nutrients, vitamins, and minerals. The yield of feed nutrients from pasture crops compared with harvested crops is high and costs much less per unit.

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Well-Managed Pastures

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MANY Minnesota farmers believe that a good pasture will yield more feed nutrients per acre and at a lower cost than harvested crops. Information furnished by the Minnesota Agricultural Experiment Station shows that the total yield of feed nutrients per acre of common pasture crops is about the same as that of the common harvested crops. The yield in tons or bushels, the total digestible nutrients, and the relative cost per 100 pounds of nutrients are shown in the following table.

Yield and Cost of Feed Nutrients*

Crops	Yield per acre	Total digestible nutrients	Cost per 100 pounds TDN
PASTURE			
	Tons	Pounds	
Kentucky bluegrass	1.2	1,469	$0.45
Sweet clover	2.0	2,448	0.31
Alfalfa and brome grass	2.3	2,815	0.29
Sudan grass	1.5	1,836	0.63
AVERAGE	.....	2,142	$0.42
HARVESTED			
	Bushels		
Corn	50	2,212	$0.78
Oats	50	1,144	1.38
Corn silage	8 (tons)	2,784	0.79
Alfalfa hay	2.5 (tons)	2,515	0.64
AVERAGE	.....	2,164	$0.90

* Data from A. C. Arny, Division of Agronomy and Plant Genetics; 1942 Report, Farm Accounting Route, Nicollet County, by S. A. Engene and G. A. Pond, Mimeographed Report 137, Division of Agricultural Economics; and "Feeds and Feeding" by F. B. Morrison.

There is a wide range in production per acre of total digestible nutrients for the various pasture and harvested crops. The average cost per 100 pounds of digestible nutrients for the four pasture crops noted was only $0.42 while the cost of the four harvested crops averaged $0.90 per 100 pounds. The pasture crop is harvested by livestock which saves hours of valuable man labor. On a good pasture a dairy cow can maintain her body weight and produce a pound of butterfat per day without additional feeding. A beef animal will gain 1 to 2 pounds or more a day.

THREE TYPES OF PASTURE

A well-planned pasture program should generally include three types: permanent, rotation, and supplementary pastures.

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Permanent pastures are usually located on land that is difficult to plow or grow cultivated crops on because of irregularly shaped fields, trees, stones, steep slopes, or wet areas. Pasturing this sort of land is the best way to utilize it. On fertile land, Kentucky bluegrass and white clover make an excellent pasture when the plants are growing rapidly and are succulent, but these crops do not produce well during the summer months, particularly if the rainfall is limited. Reed canary grass makes a satisfactory permanent pasture on wet land. Brome grass, widely adapted in Minnesota, may be used for a permanent pasture, but should be used with sweet clover and the sweet clover allowed to reseed each year.

Rotation pastures are grown on cultivated or plow land and usually fit into the crop rotation scheme followed on the farm. Rotation pastures should consist of a mixture of legumes and grasses. The mixture may be a short rotation mixture such as medium red and alsike clover and timothy, good for one or more years, or a long rotation pasture such as alfalfa, brome grass, and timothy, good for 3 to 5 years. Rotation pastures generally yield much more than permanent pastures. A mixture of alfalfa and brome grass is one of the very best combinations. This or similar combinations with alfalfa yield about twice as much as permanent pastures and produce pasturage of good quality. Other combinations may be used to suit best the type of rotation, the soil, and the farmer's needs.

Supplementary pastures are those which can be used to produce pasturage during periods when permanent or rotation pasture is insufficient to the needs of the farm. Winter rye, Sudan grass, spring-sown small grain, and rape are commonly used, largely because they can be used conveniently and profitably in emergency situations. Second-crop alfalfa can often be used profitably for supplementary pasture during July and August.

LEGUME AND GRASS MIXTURES

Mixtures of legumes and grasses make excellent pastures and greatly excel grasses grown alone. The mixture is more palatable and less likely to cause bloat than pure stands of legumes. Well-inoculated legumes obtain a large part of their nitrogen from the air, part of which becomes available to grasses growing with the legumes, resulting in a more vigorous growth of the grass. Common white clover usually grows with bluegrass in permanent pastures. When sweet clover is grown in a bluegrass sod it supplies nitrogen which stimulates the growth of grasses. Alfalfa, sweet clover, and other clovers, when mixed with grasses, make growth during July and August when most permanent pastures are short. The legumes are high in digestible protein, and legume-grass mixtures excel grasses alone in protein content.

USE ADAPTED PASTURE PLANTS

Best results are obtained with well-known legumes and grasses that have been found to be well adapted in the different sections of the state. For example, timothy is well adapted to many sections of Minnesota but is not as satisfactory in west central and northwestern Minnesota as brome grass and meadow fescue.

The legumes which are most satisfactory for pasture purposes in Minnesota are sweet clover, alfalfa, medium red clover, alsike clover, and white clover. Ladak alfalfa is recommended in preference to Grimm because it has been found to yield higher and is more resistant to alfalfa wilt. Lespedeza, bird's-foot trefoil, and Ladino clover have not been satisfactory in Minnesota.

The grasses most suitable for pasture include Kentucky bluegrass, brome grass, timothy, meadow fescue, reed canary, and Sudan grass. Meadow fescue seed should be northern grown, tracing back to comparatively recent

importations from Canada. Seed tracing to other sources is not recommended. The Fairway strain of crested wheat grass is satisfactory in areas of limited rainfall. Red top and Canada bluegrass have very limited value in Minnesota.

GOOD PASTURE MIXTURES

There are many combinations that may be used satisfactorily; nevertheless some legumes and grasses in combinations are more valuable and economical than others. Many "shotgun mixtures" are often of questionable value. A few examples of good pasture mixtures are listed below:

Short Rotation Mixtures

	Pounds per acre
MIXTURE A	
Medium red clover	4
Alsike clover	2
Timothy or meadow fescue	6
MIXTURE B	
Dwarf Essex rape	4
Oats (thin seeding)	16 to 24

Long Rotation Mixtures

MIXTURE A	
Alfalfa	6
Brome grass	6
Timothy	2
MIXTURE B	
Alfalfa	6
Meadow fescue or brome grass	8

Permanent Pasture Mixtures

MIXTURE A	
Medium red clover	4
Alsike clover	2
White clover	1
Timothy	6
Kentucky bluegrass	1
MIXTURE B	
Sweet clover	6
Brome grass	8
Kentucky bluegrass	1
White clover	1

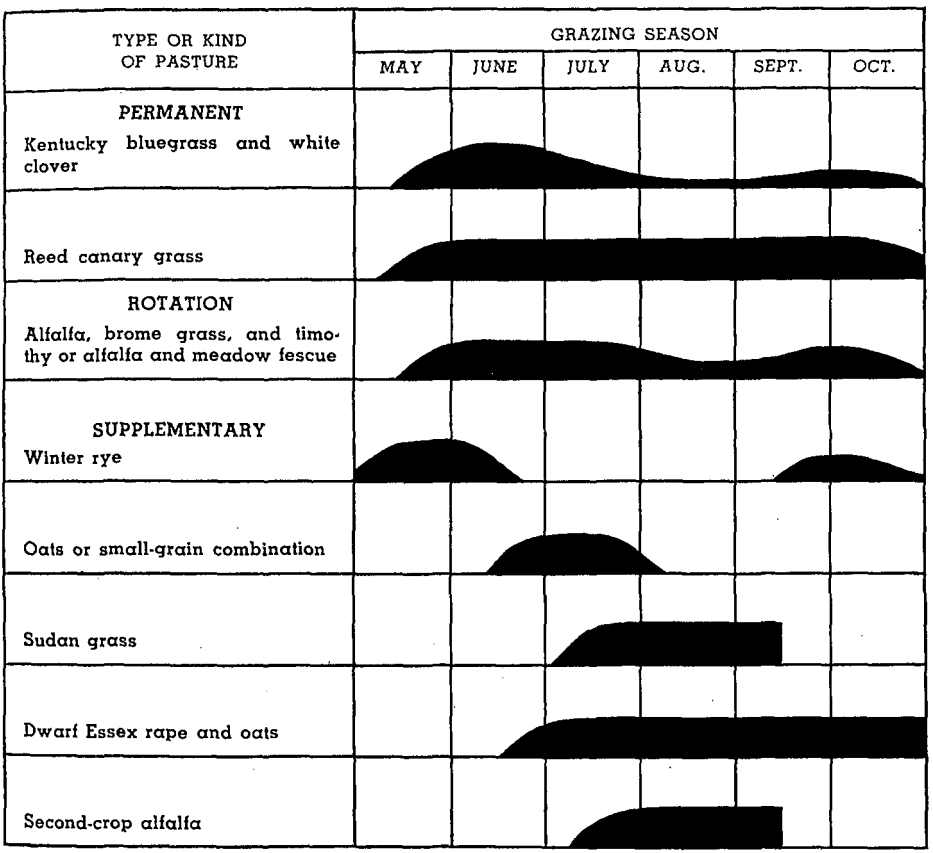
Wet-Land Pasture Grasses and Legumes—On many farms there are some parts which are too wet to plow and raise harvested crops. Grass waterways, river bottom land subject to overflow, and low places should be left in grass or permanent pasture. The most suitable grasses for wet land are reed canary grass, brome grass, and red top. The legumes which do fairly well on wet land are alsike and white clover. Where land is too wet for cropping and water does not stand for more than a short time, brome grass does well. Reed canary grass should be used on land where water stands for a considerable time during the year. On productive land where water does not stand long, a mixture of brome grass and alsike clover may be used satisfactorily. Brome grass and white clover do very well alone on soil which is too wet for the regular crop rotation.

FOLLOW A PASTURE CALENDAR

The pasture season in Minnesota generally extends over a period of 5½ to almost 6 months, beginning in early May and ending in late October. One type of pasture is seldom sufficient for the whole season. Careful planning is necessary to provide an adequate supply of good quality pasturage during the whole pasture season. The accompanying pasture calendar chart indicates the periods when several different pasture crops or combinations are most productive. The period of heavy and low production for each crop is shown by thickness of the bars.

A Kentucky bluegrass and white clover pasture should be ready to turn on about May 15 in southern Minnesota and a little later farther north. This furnishes excellent pasturage during the last half of May through June and the first part of July. It then generally becomes dormant and furnishes little feed during the summer months. A limited supply of fall pasture will be available when there is ample rain-

PASTURE CALENDAR



fall. Reed canary grass on wet or low land furnishes pasturage from May to the end of the pasture season.

Alfalfa and grass mixtures furnish a high yield of excellent pasturage from about the middle of May into October. There is usually some reduction in yield during August and early September when rainfall is limited.

Winter rye seeded in August may furnish a limited amount of fall pasture in October and produces a high yield of early spring pasture from late April through May. Following winter rye, oats or a combination of small grains will furnish grazing the last half of June and through July. Sudan grass yields an abundance of feed from the middle of July through August and September until killed by frost. It should be ready for pasturing about the middle of July in the corn-growing area of Minnesota. Dwarf Essex rape with a thin seeding of oats yields well and can be used from the latter part of June through September into October. Second crop alfalfa can be used for pasture from the latter part of July until early September.

Permanent pastures should be allowed to make good growth before livestock is turned on. Greater returns will be realized from permanent Kentucky bluegrass pasture if allowed to make good growth in the spring. Very often there is a need for extra pasture,

early, before permanent pastures are ready. Reed canary grass is well adapted to wet land, but not all farmers have much land where this grass can be grown. Under favorable conditions good rotation pastures furnish a high yield of excellent quality feed from about the middle of May to the end of the pasture season, with some falling off in production during August and early September, particularly during a period of drouth. On most farms a good acreage of rotation pasture to supplement the permanent pasture should supply most of the pasture requirements. As a general thing there is not enough land seeded to rotation pastures. Winter rye produces a good yield of early spring pasture, supplying valuable green pasturage before turning on the permanent or rotation pasture. If seeded in August, it supplies some pasturage in late September and early October. Oats or a small-grain combination should be used only when there is a real pasture shortage.

Sudan grass is very satisfactory for supplementary pasture in the corn-growing area of the state. It produces an abundant growth through July, August, and September until killed by frost. With ample rainfall, Sudan grass may be seeded following the winter rye which can be plowed up during the last part of May or early in June after the rye has been pastured. Dwarf Essex rape with a thin seeding of oats makes an excellent supplementary pasture for sheep, swine, turkeys, and range chickens. When used for dairy cows, rape results in tainted milk.

CARRYING CAPACITY

Providing ample green feed continuously through the pasture season generally requires the use of different crops, each available when it is most needed. The table below will serve as a guide in planning an effective pasture program.

GRAZING MANAGEMENT

Overgrazing—The practice of overgrazing is very common and is one of the chief causes of low productivity, thin stands, and weed growth; particu-

CARRYING CAPACITY OF SEVERAL IMPORTANT PASTURES

PASTURE FOR CATTLE AND SHEEP		
Kind of pasture	Grazing season	Approximate acres required for one cow or 6 to 7 sheep
Winter rye	April 20 to June 15	½
Oats or small grain combination	June 10 to July 25	½
Sudan grass (18 inches high)	July 10 to Sept. 10 or 15	⅓ to 1
Kentucky bluegrass and white clover	May 12 to July 25	1 to 2
Alfalfa, brome grass, and timothy or alfalfa and meadow fescue	May 15 to Sept. 10 or 15	½ to 1
Second crop alfalfa	July 10 to Sept. 15	½ to 1
Medium red and alsike clover and timothy	May 15 to Oct. 20	¾ to 1¼
Sweet clover	May 15 to August 10	½ to 1
Reed canary grass	May 10 to Nov. 1	¾ to 1

PASTURE FOR SWINE*		
Kind of pasture	Grazing season	Approximate number pigs per acre
Alfalfa alone	May 10 to Sept. 10	25 to 30
Alfalfa and brome grass mixture	May 10 to Sept. 10	30 to 35
Medium red and alsike clover and timothy	May 10 to Oct. 10	20 to 25
Sudan grass	June 20 to Sept. 15	30 to 35
Dwarf Essex rape with thin seeding of oats	June 10 to Oct. 15	25 to 30

* When pigs are full fed grain.

larly on permanent pastures. The common permanent pasture should be allowed to make a growth of 4 inches and rotation pasture 6 to 8 inches before turning on in the spring. Continuous close grazing diminishes root reserves. In this weakened condition plants are unable to make satisfactory recovery and produce satisfactory yields. The common procedure is to turn on too early in the spring, overstock, and pasture late in the season. Under such treatment pasture plants do well to survive even with the most favorable soil and climatic conditions.

Close Grazing Kills Alfalfa—Frequent and close cutting of alfalfa kills or reduces the stand very rapidly, either alone or in pasture mixtures. Alfalfa, when pastured too closely, may be expected to die in one year. Close grazing has the same effect on alfalfa as frequent cutting with a lawn mower. It must have a chance to restore food reserves in the root system before winter. Alfalfa is a very valuable plant in rotation pastures and can be expected to live 3 to 5 years when grazed properly. When used in combinations with grasses and grazed continuously, it should not be pastured closer than 6 to 8 inches. It should not be pastured after the middle of September and not at all in October.

Controlled and Alternate Grazing—New seedings and new stands not well rooted should be protected from continuous and heavy grazing until they have become well established. This may be done by pasturing off the top growth, then removing the animals and pasturing again after the plants have recovered. Seeding legume and grass mixtures with small grain as a companion crop and pasturing off when the grain crop is 3 to 10 inches high has resulted in excellent stands. It is important to remove animals before the young growth has been grazed short.

Alternate grazing of rotation pastures is often practical and yields may be increased from 8 to 12 per cent over that of continuous grazing. The pasture may be divided by a temporary or electric fence. The advantage lies in allowing the grazed area to recover while the other is being pastured off. Dividing the pasture in this manner will often enable one to cut hay from a part of the pasture where growth is more abundant. The new growth will make very valuable pasture later in the season when most needed.

Reducing Bloat—Many farmers have experienced trouble with bloat when animals were pastured on alfalfa, sweet clover, and, to a less extent, on medium red, alsike, and white clover. Some have pastured alfalfa and sweet clover without any trouble, but no sure method of preventing bloat has been found. Some simple precautions which farmers have taken with quite satisfactory results include: (1) Having animals full and not hungry when turning them on alfalfa or clover pasture for the first time. (2) Keeping animals on the pasture continuously after pasturing has been started. (3) Using grasses in mixtures with legumes. (4) Providing plenty of water at a convenient distance. (5) Placing plenty of salt and minerals where animals can get them. (6) Placing dry hay or straw in the pasture. (7) Removing certain animals especially susceptible to bloat. The danger from bloat tends to be reduced as the plants approach maturity.

Reducing Prussic Acid Poisoning—The young fresh growth of sorghum and Sudan grass plants contain a rather large amount of prussic acid when small, when plants have been stunted from severe drouth, or when frosted. As the plants become taller and more mature, the danger from this cause is practically negligible. Cattle and sheep should not be turned on Sudan grass until it has reached a height of 18 to 20 inches. At this stage there is little or no danger. Animals have frequently died from eating the young fresh growth of sorghum after cutting. A veterinarian should be called for ani-

mals that become sick when pasturing on young Sudan grass or sorghum. If taken in time, they can often be saved. Hogs and horses are not often affected by prussic acid poisoning.

IMPROVING PERMANENT PASTURES

Permanent pastures respond surprisingly well to good care and management. Yields can be increased one third or more by following good management practices.

(1) Animals should be kept off in the spring until the growth has reached a height of at least 4 inches. Close grazing should be avoided through July, August, and September.

(2) Barnyard manure applied at the rate of 6 tons per acre on one fifth to one third of the pasture each year in regular rotation is very effective. Results show that this practice will frequently double the yield the first year.

(3) Animal droppings should be scattered in order to make the most effective use of the manurial value. It is advisable to spread twice during the growing season.

(4) Mowing surplus dead growth during the summer removes unpalatable dead material and stimulates new fresh growth. Weeds should be cut before going to seed.

(5) Thin, unproductive, or weedy stands of permanent pasture can be much improved by renovation and reseeding. The soil should be well worked with a disk, springtooth harrow, or field cultivator, early in the spring just after the surface frost has gone out and before spring seeding of small grain. Lime should be applied to acid soils for legumes. (See Extension Folders 115 and 62.)

NEW PASTURE SEEDINGS

Success in getting good stands of legumes and grasses depends to a large extent on the preparation of the seedbed, fertility of the soil, method of seeding, germination of the seed, proper soil treatment, and handling of the companion crop. Recommendations are:

(1) The seedbed should be well worked until the soil is fine and firm.

(2) It is highly important that all legume and grass seed except brome grass be covered no more than one-half inch deep. Good stands of brome have been secured when seeded as much as one inch deep.

(3) Flax is the best companion crop and may be seeded at the full rate. Heavy, rank growth of grain should be clipped to prevent lodging.

(4) Pasturing off small grain and the legume and grass mixture has been found to be the best way of getting successful stands, particularly in dry years. The grain should be pastured off when it is 8 to 10 inches high.

(5) Legume seed may be planted from early spring to August 1, and grass seed from early spring to September 15.

(6) Brome grass seed is very light and chaffy and should not be mixed with other grass and legume seed as it is extremely difficult to force through the seeder when mixed. When seeded without a grain crop, 2 pounds of cracked corn to one of brome grass seed may be used, setting the drill to sow 2 bushels of oats. This sows 10 pounds of brome per acre.

(7) Inoculation of alfalfa and sweet clover seed is advisable, particularly on land where they are being grown for the first time. Inoculation is inexpensive and easy to apply.

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