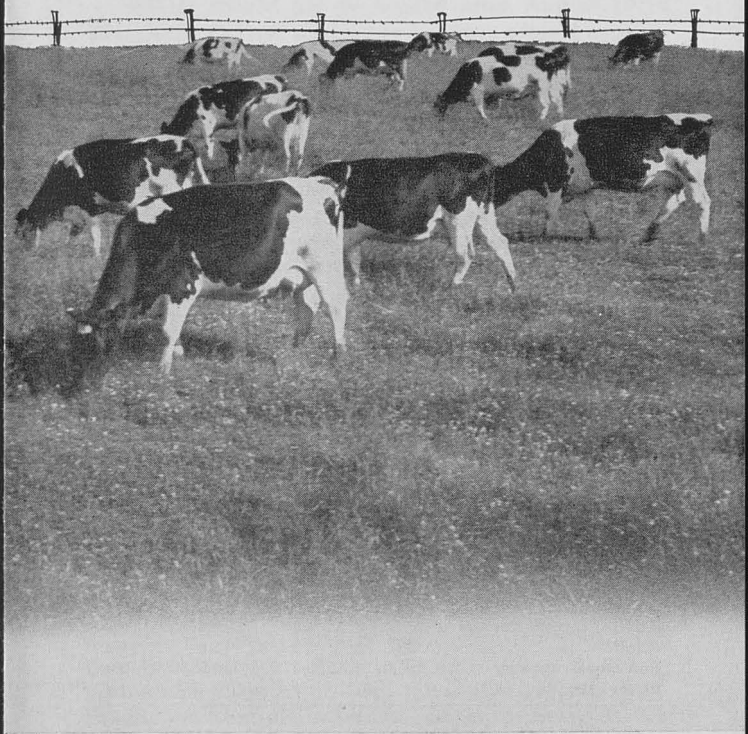
Extension Folder 182
Revised September 1955

Forage Mixtures



A. R. SCHMID
H. E. JONES
R. A. BRIGGS
R. E. BENNETT

UNIVERSITY OF MINNESOTA
Agricultural Extension Service
U. S. DEPARTMENT OF AGRICULTURE

Use Legume - Grass Mixtures for Pasture, Grass Silage, Hay

HIGH QUALITY FORAGES in our livestock feeding program can lower the cost of production and increase profits from livestock. Forages provide returns as a livestock feed and for soil improvement. Quality forages yield three times as much protein and equal total digestible nutrients per acre as good corn for livestock feed.

Forages have great conservation value, for they increase soil tilth, aggregation, and organic matter, improve water infiltration and drainage, and effectively decrease soil erosion.

To achieve high forage production, it is necessary to grow adapted grasses and legumes of productive species. To choose the proper mixture, it is necessary to know something about the soil on which it is to be grown and the use to be made of the forage.

Legumes and Legume-Grass Mixtures Best

Mixtures of legumes and grasses are best for maximum production of quality forage as well as being most favorable for maximum soil improvement. Table 1 shows hay yields from alfalfa and mixtures grown on seven farms during the period 1950 to 1952. The highest yields are shown for the alfalfa-grass mixture followed by alfalfa, then red clover-grass mixture, and finally grass alone. Even with large amounts of nitrogen fertilizer, it is difficult to bring the yields of grass up to the yields of legume-grass mixtures. The legume-grass mixture is higher in protein content than grass alone.

Table 1. Tons of Hay per Acre from Various Meadows for a Two-Year Period. Averages from Seven Farms in Minnesota.

Meadow	Tons per acre at 15 per cent moisture		
	First year	Second year	Average
Alfalfa, brome, timothy	3.5	3.8	3.6
Alfalfa	3.2	3.5	3.4
Red clover, timothy	3.2	3.0	3.1
Brome, timothy	1.2	1.5	1.4

Crops following legumes or legume-grass mixtures will yield more than crops following grasses alone unless proper amounts of nitrogen fertilizers are applied to the straight grass sods and to the crops following the grass sods.

Choosing the Mixture

In general, alfalfa and bromegrass are the highest yielding plants we can put into a mixture. However, alfalfa needs a well drained soil that is not too acid. It is fairly long-lived, and drouth resistant. Bromegrass is one of the best deep-rooted, drouth-resistant grasses. Therefore, on well drained and on thin, drouthy soils the major emphasis should be toward alfalfa and bromegrass.

The clovers such as red clover, alsike clover, and Ladino clover will tolerate moderately drained soils. Alsike clover and Ladino clover are a little more tolerant to poor drainage than red clover. Therefore, when combined with alfalfa-grass mixtures, they provide a legume which will grow well on the low-lying areas where alfalfa kills out. On moderately drained soils, where alfalfa may not do well because of poor drainage, it is wise to omit alfalfa and depend on clovers for the legume in the mixture.

For sod crops to be left down only one or two years, more emphasis can be placed on the shorter-lived species. Clovers, timothy, and meadow fescue are considered short-lived plants. Alfalfa and bromegrass are long-lived plants. There is, however, no reason why the longer-lived species cannot be handled as short-time sods.

The use to be made of the crop may influence the kind of mixture to use. If a mixture is to be used for hay, silage, or pasture, it should contain tall-growing legumes and grasses, such as alfalfa and brome, and should contain enough grass to prevent bloat if pastured. For strictly hay production more legume and less grass may be used in the mixture. It also might be wise to decrease the brome in favor of timothy or meadow fescue as these grasses will not overload the hay with grass.

Maintaining the Mixture

To keep mixtures in a productive condition for several years, fertilize properly and manage the grazing and cutting to maintain a good balance of the desirable legumes and grasses.

Productive mixtures need fertilizer and the kind and amounts applied can alter the composition of a mixture one way or another. The nitrogen in a fertilizer favors growth of grass. Phosphorus and potash favor legumes. Nitrogen can be supplied in the form of manure or commercial fertilizer. On pastures low in legumes, liberal applications of phosphorus and potash will stimulate the legumes.

Alfalfa stands in a mixture can be severely damaged by close continuous grazing, by grazing too early in the spring, or by grazing too close in the fall. Alfalfa is favored by rotational grazing which allows the alfalfa to grow to a height of about 8-10 inches before each grazing. Management which allows this regrowth also favors the more desirable grasses such as brome, timothy, and meadow fescue.

For maximum yields and persistence, cut alfalfa at the 1/10-1/4-bloom stage and red clover at the 1/2-bloom stage. Avoid cutting in September and October. If grasses predominate, cut when grass is in head but before flowering.

Guarding Against Bloat

Fifty per cent grass in a legume-grass mixture will greatly aid in preventing bloat. Several ways can be used to get more grass in the mixture. One is to use better seeding methods. Many times a fair stand of legumes is obtained but no grass. Where bromegrass is mixed with the grain and seeded from the grain box of the drill, a better stand of brome may be obtained by cultipacking ahead of the drill to prevent seeding too deeply. If, during the first production year, the percentage of grass in a mixture is low, it may be used for hay and pastured next year when the grasses have thickened.

In pasturing legumes and grasses, bloat hazard may be reduced: (1) by not turning cattle on when they are very hungry, (2) by providing some dry material, such as hay, while on pasture, and (3) by providing plenty of salt and water. Supplying hay in the pasture for the cattle is a good practice.

Tips About Getting Stands

Early spring seedings are desirable in most areas of Minnesota. Bromegrass seeded in the spring with oats or other grain should be drilled in shallow on a cultipacked seedbed. Don't, however, cultipack when soil is too wet. Seed companion crops, such as oats, at one-half to two-thirds of normal seeding rate. Flax is an excellent companion crop and may be seeded at the normal rate. Seed all legumes shallow on a firm seedbed.

If it appears that a companion crop, such as oats, is endangering the new seeding by excessive lodging, shading, or competition for moisture, cut the grain for silage or hay. It may mean the difference between a good stand and no stand. Grazing off a companion crop with cattle or sheep will give a good stand if grazing is carefully controlled. Do not graze continuously or when the ground is soft. Grazing once or twice to remove some of the top growth of the companion crop is beneficial.

Alfalfa should not be seeded after August 10 in Minnesota. Do not seed other legumes after August 1. Reed canarygrass should not be seeded in the fall except after the ground has frozen. It may be seeded on frozen ground in the spring.

Fertilization with phosphate and potash will aid in more rapid establishment and prevent winterkilling of legumes. Fertilization of reed canarygrass will normally increase its palatability. In all instances, when establishing grass and legume stands, have your soil tested. Soil tests will help you decide the kind and the amount of fertilizer to use and also the amount of lime needed if the soil is acid.

Mixtures for Pasture, Silage, or Hay

Many of the following mixtures can be used for pasture, grass silage, or hay. They provide for grass and legume combinations which will produce high-yielding forage crops. In the selection of a mixture choose one that will "fit your soil and livestock needs."

Birdsfoot trefoil—Not recommended but suggested for trial. Present varieties lack productiveness and persistence, and are slow to establish. It is suited to permanent pastures on land not suited to other crop production. Simple mixtures do best. Seed at 5-8 pounds per acre if used.

If you plan to try birdsfoot trefoil, use the Empire variety. It is the most winter-hardy and persistent of

GOOD PASTURE IS YOUR CHEAPEST FEED

Mixtures for Biennial and Perennial Meadows

Mixture and pounds per acre	Comments
Well drained, nondrouthy soils	
1. Alfalfa 6-8 lbs. Grass 4-9 lbs. (may be brome 6 lbs.; or brome 6 lbs., timothy 2 lbs.; or brome 6 lbs., meadow fescue 3 lbs.; or timothy 4 lbs.)	Better for hay. Brome best grass for sods left longer than two years. For pasture brome plus timothy or meadow fescue best to help prevent bloat.
2. Clover 6-8 lbs. (may be red clover 8 lbs.; or red clover 5 lbs. and alsike 2 lbs.) Timothy 4 lbs.	Use for silage or hay in short rotation. Not as productive as alfalfa-grass mixture.
3. Alfalfa 5 lbs. Clovers 3 lbs. (may be mixture of red clover 2 lbs., alsike ½ lb., and Ladino ½ lb.) Grass 8 lbs. (may be brome 8 lbs.; or brome 6, timothy 2; or brome 5, meadow fescue 3)	Best mixture for flexible use, pasture, grass silage or hay. Alsike and Ladino good for low areas in field where alfalfa kills out. Double rate of Ladino if primary use is for poultry or hog pasture.
4. Sweetclover 10-12 lbs.	For green manure or pasture. Especially suited to high lime areas.
Moderately drained soils	
5. Clover 6-7 lbs. (may be red clover 6 lbs.; or red clover 4 lbs., alsike 2 lbs., Ladino ½ lb.) Grass 6-8 lbs. (may be brome 6-8 lbs.; or brome 6 lbs., timothy 2 lbs.; or brome 5 lbs., meadow fescue 3 lbs.)	For pasture, silage, and hay.
Poorly drained soils	
6. Reed canarygrass 6-8 lbs. (timothy may be added at 2-4 lbs. rate)	For pasture or early cut for silage or hay.
Drouthy soils	
7. Alfalfa 8 lbs. Brome 6-8 lbs.	For pasture, silage, and hay.

CHOOSE A FORAGE MIXTURE TO FIT YOUR SOIL AND LIVESTOCK NEEDS

* All seeding rates are based on good seedbed preparation. On a poorly prepared seedbed it may be wise to increase seeding rates. Where precision planting is coupled with excellent seedbed preparation, seeding rates may be decreased.

the varieties available. In growth habit it is somewhat prostrate or spreading as compared to the European strains which are erect.

Ladino clover—Although not very winter-hardy it usually survives most winters sufficiently well to contribute to the mixture. Do not use Ladino as the only legume in a legume-grass mixture.

Under conditions favorable for its growth and development, it may become very aggressive and increase the bloat hazard.

Timothy—Timothy should never be used as the only grass in a mixture seeded for pasture.

Bluegrass—Never use bluegrass in a mixture. It will volunteer in most stands rapidly without seeding.

Supplementary Crops and Mixtures

Crop or mixture	Seeding rate per acre	Comments
1. Oats	2 to 3 bu.	For spring pasture. Use lower rate if under seeded with grasses and legumes.
2. Oats Peas	1 to 2 bu. ½ to 1 bu.	For grass silage. Difficult to cure for hay. Cut at late milk or early dough stage.
3. Oats Rape	1 to 2 bu. 6 lbs.	Excellent for hog or poultry pasture.
4. Millet	25 to 30 lbs.	For grass silage. Where adapted, sudangrass or sudan with soybeans will normally outyield millet.
5. Rye	2 to 2½ bu.	Provides the earliest spring pasture.
6. Sudangrass	25 to 30 lbs.	For midsummer pasture, silage, or hay.
7. Sudangrass Soybeans	10 to 15 lbs. 1 bu.	For silage or hay.

UNIVERSITY OF MINNESOTA, INSTITUTE OF AGRICULTURE, ST. PAUL 1, MINNESOTA

Cooperative Extension Work in Agriculture and Home Economics, University of Minnesota, Agricultural Extension Service and United States Department of Agriculture Cooperating, Ski[illegible] tur[illegible] ...ce of Agricul-

10M—9-55