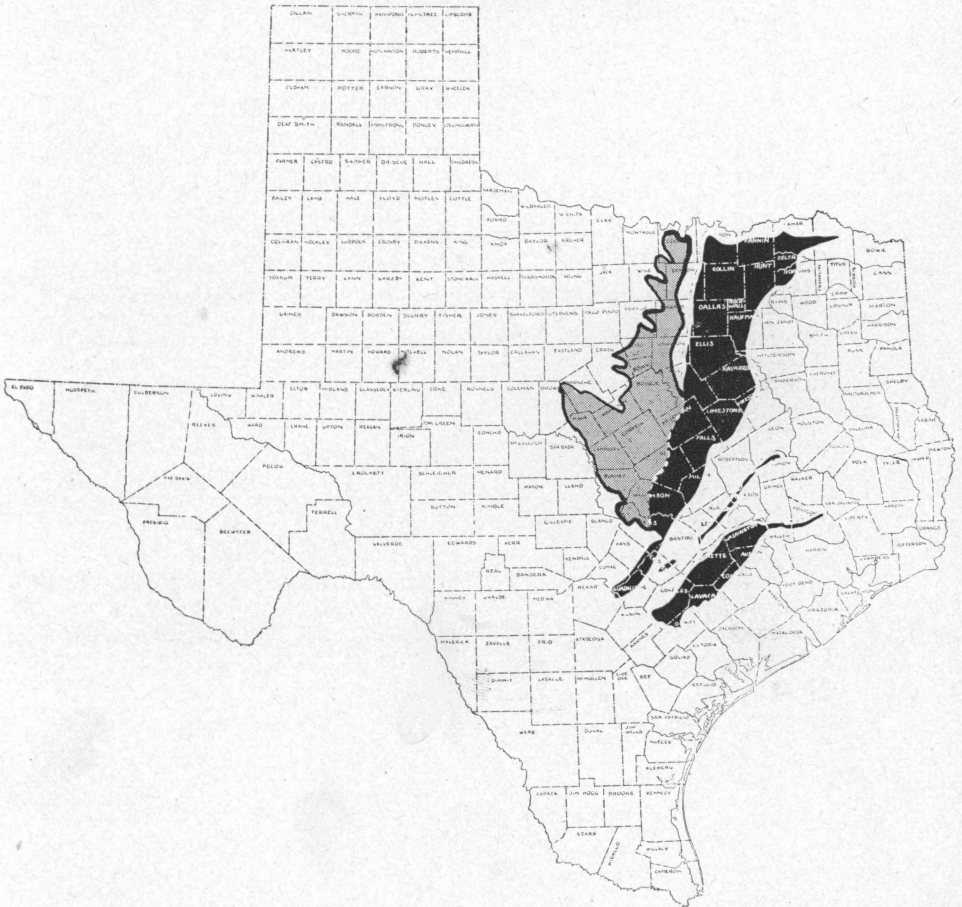


BLACKLAND PASTURES

SUGGESTIONS FOR THEIR IMPROVEMENT AND ESTABLISHMENT



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ABOUT THIS BULLETIN

This bulletin was prepared by **William Sherrill**, Subject Matter Specialist, Department of Agricultural Education, School of Agriculture, Texas A. & M. College in cooperation with the Texas State Board of Vocational Education. It is reprinted with the permission of that Department so that the information contained herein may be made available to additional farmers in the Blacklands.

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CONTENTS

GENERAL	5
RECOMMENDED PASTURE PLANTS	6
Base Pasture Grasses	6
Bermuda grass	6
Buffalo grass	6
Other Grasses	7
Rescue grass	8
Dallis grass	8
Yellow beard grass	9
Johnson grass	9
Pasture Legumes	10
White Dutch clover	10
Black medic	11
Bur clover	11
LAND SUITABLE FOR PASTURES	12
USE OF ORGANIC MATTER AND FERTILIZERS	13
PREPARATION OF THE SOIL	14
ESTABLISHING THE PASTURE PLANTS	14
Bermuda Grass	14
Buffalo Grass	15
Rescue Grass	16
Yellow Beard Grass	17
Dallis Grass	18
Bur Clover	19
White Dutch Clover	19
Black Medic	20
PASTURE MANAGEMENT	20
Controlling Weeds	20
Controlling Grazing	21
Protecting new pastures	21
Avoiding undergrazing	21
Avoiding overgrazing	22
Supplementary Feed	23
Managing Johnson Grass for Pasture	24

BLACKLAND PASTURES

Suggestions for Their Improvement and Establishment

There are relatively few improved pastures in the Blacklands of Texas. During the past 50 or 60 years a great part of the 15 million acres in the fertile Blacklands has been brought under cultivation. Farming in this area has been highly specialized, with cotton as the principal cash crop, and with corn, small grains, and sorghums as important secondary crops. As a result of this type of farming, much land has been brought under the plow that was not suitable for cultivation. And much other land, which might have been suitable for cultivation with proper soil-conserving practices, has been tilled without protection from erosion until it has been damaged so severely that it is no longer fit for cultivation.

These conditions are especially true in the Black Prairie¹ itself. Here 85 per cent of the land is in cultivation, and much of the remainder is in farmsteads and wastelands. Very little is in improved pastures.

There is an urgent need in the Blacklands for more good permanent farm pastures. These pastures are needed first of all because they provide one of the best means of conserving and utilizing land that is too severely eroded or otherwise unsuitable for cultivation. They are needed also to fit into changing farm conditions in the Blacklands, where cotton is now being grown less exclusively, and crop rotations and livestock are increasing in importance.

This bulletin is intended to indicate some of the opportunities for establishing and improving permanent farm pastures in the Blacklands, and to set forth some of the general recommendations that have been found most suitable for this section.

"Farm" pasture, as the term is used in this bulletin, means a relatively small or moderate sized pasture on a Blackland farm, as distinguished from the more extensive grazing or range lands found in the rougher and more broken parts of the Grand Prairie and occasionally elsewhere in the Blacklands. Wherever the term "pasture," "improved pasture," "permanent pasture," or "improved permanent pasture" is used without qualification, it means "farm" pasture; and all the recommendations given are for pastures of this type.

¹The Blacklands of Texas include: (1) The Black Prairie (size about 9,000,000 acres) starting about 100 miles northeast of Dallas and extending southwestward almost to San Antonio; (2) three smaller prairies (combined size about 2,000,000 acres) situated east of the southern part of the Black Prairie; and (3) the Grand Prairie (size about 4,000,000 acres) lying west of the Black Prairie.



Fig. 1. High-grade Jersey cows grazing good buffalo grass pasture.

RECOMMENDED PASTURE PLANTS

Only a relatively few plants have been found satisfactory enough to recommend for permanent pastures in the Blacklands. A discussion of these follows.

Base Pasture Grasses

The most important plant in a permanent pasture is the base pasture grass. To be satisfactory, a base pasture grass must be so well adapted that it will form a complete, soil-holding sod. In addition, it must be so hardy that it will thrive under close grazing.

Tests over a period of years show that for the Blacklands there are only two outstanding base pasture grasses. These are Bermuda and buffalo grass.

Bermuda grass. Bermuda is better adapted to lowlands and creek bottoms, and in general to the more fertile and moist lands. It is also better adapted under conditions where erosion control may be difficult, as in terrace outlets, ditch banks, waterways and other places where water is concentrated.

When it is young and succulent, Bermuda makes excellent pasture. As it matures, it becomes more tough and wiry, and lower in feed value; and is eaten less readily by livestock. This means that to get the greatest value from a Bermuda pasture, it must be kept closely grazed.

Buffalo grass. Buffalo grass is better adapted to the higher, drier,

and more eroded lands. Under such conditions it will grow better than Bermuda, and thus furnish more grazing and better erosion control.

Buffalo is the predominant short grass in most native pastures on the black and mixed lands in Central and North-Central Texas. It is a low-growing, drouth-resisting, sod-forming perennial grass which spreads by seed and by numerous surface runners.

Buffalo is sometimes incorrectly called "mesquite grass." Curly mesquite, the grass with which it is confused, occurs largely in Southwest and West Texas. Buffalo is easily identified by its large, bur-like seed. The seed are borne down among the leaves, close to the ground. (See Fig. 3). Most of the seed are produced on female plants, which produce only seed, and not pollen. These female or seed-bearing plants are usually in spots which make up about half of the area covered. Most of the other half is occupied by male plants, which produce only pollen. The male plants may be distinguished during the blooming season by their flag-like tassels, which extend an inch or two above the leaves. (See Fig. 4). Contrary to the general rule, a few plants occur which bear both pollen and seed on the same plant.

Buffalo is especially noted for its high palatability and feed value. Like Bermuda, its feed value is highest when it is kept closely grazed. With buffalo, close grazing is also especially important in establishing and maintaining a pure, vigorous stand.

Other Grasses

A few other grasses have considerable value for pastures, either as supplemental grasses grown along with the base grasses, or under

Fig. 2. This Bermuda pasture on rich bottomland has a high carrying capacity. The land was retired from cultivation because overflows and wet seasons made cropping too uncertain.





Fig. 3 A female or seed-bearing buffalo grass plant. Note the seed burs between the hands. Buffalo grass bears its seed burs well down among the leaves.

special conditions. These include rescue, Dallis, yellow beard, and Johnson grass.

Rescue grass. Rescue is a very desirable winter pasture grass, and is one of the few winter grasses that will survive under pasture conditions. It behaves in this region as a winter annual, maturing a crop of seed in the spring. From this crop of seed, another crop of grass comes the following winter. It grows best in lowlands, bottoms, and other fertile locations. Where conditions are favorable, it provides valuable grazing.

Dallis grass. Dallis grass is a valuable supplementary pasture grass. It is a deep-rooted, perennial bunch grass which spreads only by seed. It produces many leaves close to the ground, grows well with other grasses, and is palatable and nutritious.

Dallis grass is especially adapted to lowlands and bottoms, where it makes a very rapid growth. It starts its growth several weeks earlier than Bermuda in the spring, and is the last grass to be stopped in the fall by frost.

In the Blacklands, however, Dallis grass is not as drouth-resistant as Bermuda, and is rarely found in areas of less than 30 inches annual rainfall. Also, it has proved less cold-resistant in the Blacklands than

Bermuda, and in areas north of Dallas and Ft. Worth is subject to winterkilling. Aside from these, its chief limitations are that it is relatively hard to establish, and does not spread very rapidly.

Yellow beard grass. Yellow beard grass (*Andropogon ischaemum*), also known as yellow bluestem, is a promising new pasture grass. It is a perennial bunch grass which spreads rapidly from volunteer seed. It grows during the spring, summer, and fall; and produces an abundance of fine, tender leaves that are relished by livestock. It makes good grazing, either in pure stands or growing in combination with other grasses. It is also valuable as a meadow grass.

Johnson grass. Any consideration of pasture grasses for the Blacklands must include Johnson grass. It is so widely distributed in the Blacklands, and produces such an abundance of high quality forage, that its value for pastures cannot be overlooked.

It is doubtful if anyone would recommend that Johnson grass be seeded on land that is now free of it, because it is so aggressive and so hard to get rid of. But on land where the grass is already set, its very aggressiveness can be converted into an asset by using the grass for pasture (as well as for hay) instead of trying to eradicate it.

There is a mistaken impression that Johnson grass does not make a satisfactory pasture. It is true that Johnson grass will become un-

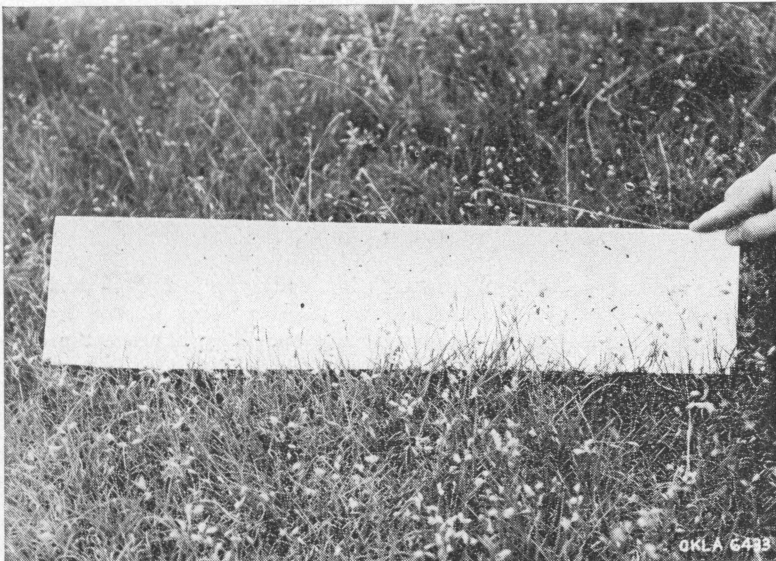


Fig. 4. Male or pollen-bearing buffalo grass plants in bloom. Note the numerous flag-like tassels or male blooms. The male blooms are borne an inch or two above the leaves.

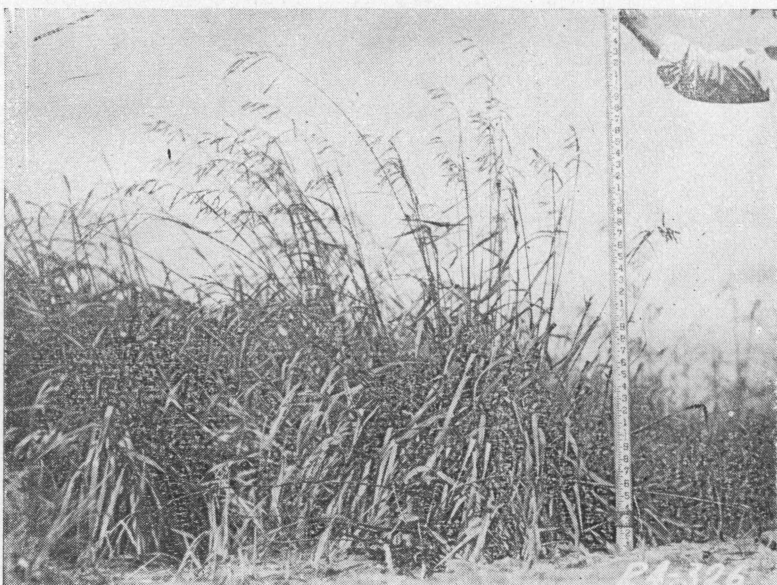


Fig. 5. Dallis grass. An individual plant, showing natural habit of growth of this bunch grass.

productive in two or three years on uncultivated land that has been turned into a pasture. Methods have been worked out, however, for maintaining the productivity of Johnson grass pasture. These methods are discussed under Pasture Management.

Pasture Legumes

One of the greatest pasture needs in this region is for adapted pasture legumes. Pasture legumes are valuable in many different ways. They extend the length of the grazing season. They improve the quality of grazing by increasing the protein content. They also improve the fertility of the soil by adding organic matter and nitrogen. This in turn stimulates the growth of the grasses themselves.

No completely adapted pasture legumes are yet available for the Blacklands. The legumes which at this time seem to have the most promise are white Dutch clover, black medic, and bur clover.

White Dutch clover. Although white Dutch clover has heretofore been considered adapted only to areas of higher rainfall, recent tests indicate that it also has possibilities in the Blacklands. Initial trials at the Temple Experiment Station have been promising. Likewise have been trials by farmers cooperating with soil conservation districts.

White Dutch clover appears particularly promising for bottomlands and other more moist pasture locations. The Louisiana-grown strain of seed has given better results than those grown elsewhere.

Black medic. Black medic has been found a fairly dependable legume for upland pastures in the northern part of the Blackland area. At the Denton Experiment Station during the past 15 years it has been found to survive much better than bur clover on thin hill land. On the better soils there, bur clover furnishes more fall and winter pasture but less spring pasture than black medic.

In the southern part of the Blackland area, black medic does not appear to be as well adapted and has proved rather erratic and undependable.

Bur clover. Bur clover grows more satisfactorily in the Blacklands than any other pasture legume. Where it has been established, it furnishes considerable fall, winter, and spring grazing. It is fairly winter hardy, although in the northern part of the region it winterkills on an average of one year in three.



Fig. 6. Fat calves in early spring on bur clover pasture.

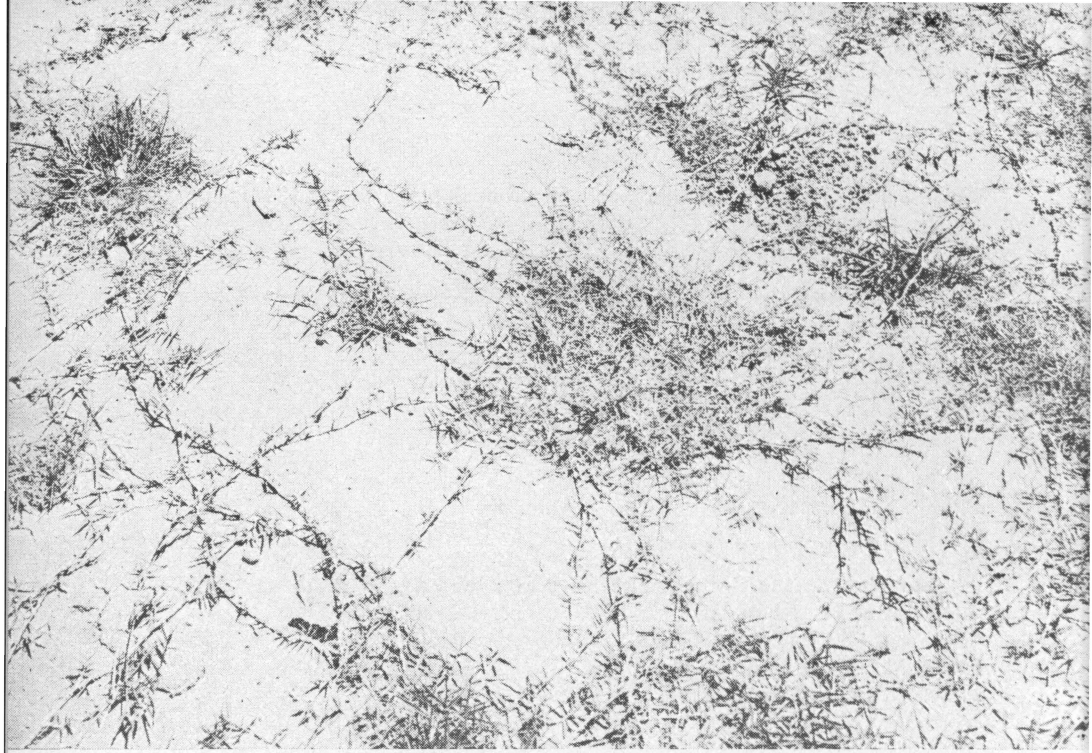


Fig. 7 How Bermuda grass spreads from a central root planting. The runners reaching out in all directions will soon have the soil solidly grassed.

The chief objection to bur clover is that the burs get in the wool of sheep, lowering the grade. Some farmers report that they avoid this trouble by keeping the pastures closely grazed in the early spring.

Button clover, a spineless variety of bur clover, offers some possibilities as a pasture legume, and is deserving of further trial. It seems fairly well adapted, but does not reproduce itself well under close grazing, as the large spineless burs or "buttons" are readily eaten by livestock. It is possible that there could be developed a spineless variety with smaller burs which might more easily escape being eaten by livestock. One difficulty in developing a spineless variety is that spined varieties are becoming naturally widespread, and hybridize readily with the spineless varieties.

LAND SUITABLE FOR PASTURES

Practically all of the Blacklands are suited to pastures. The first land selected for pasture ordinarily should be land that is not suited for cropping, or on which cropping is uncertain. Creek bottoms and other areas too wet for cultivation can be used to produce a valuable grass crop which can be economically marketed through livestock.

Also, in the case of land that is too severely eroded for cultivation, the best way to protect it and use it is to convert it into pasture—

with limited grazing, where necessary. Other areas that may be used for controlled grazing include diversion ditches and waterways that have been sodded and fenced.

On farms where such special areas do not provide enough pasture, it will usually be found profitable to convert some of the steeper or less productive cultivated land to pasture. A greater total profit can be secured from most farms by providing adequate pasture for all livestock. Also, the reverse of this is true. On farms where a great deal of the land is better suited to pasture than to crops, a greater total farm profit can usually be secured by converting the land to pasture and by keeping enough livestock to utilize it properly.

USE OF ORGANIC MATTER AND FERTILIZERS

Pasture yields are increased by applications of organic matter. Where it can be done economically, the preparation of land for pasture may profitably include the addition of organic matter in the form of green manure crops, crop residues, or barnyard manure.

The best adapted legumes for green manure crops are the hubam and Madrid varieties of sweetclover. Hubam is somewhat preferred for the area south of Waco, and Madrid for north of Waco.

Phosphate is also necessary for the good growth of pasture legumes. Until recently it had been thought that the Blacklands did not respond to commercial fertilizers, but tests at the Temple Experiment Station show that an application of phosphate is essential to the best

Fig. 8. Good seedbed preparation is important in establishing Bermuda grass. A cover crop has just been turned under on this land, which is to be retired from cultivation. Later it will be sodded with Bermuda grass.

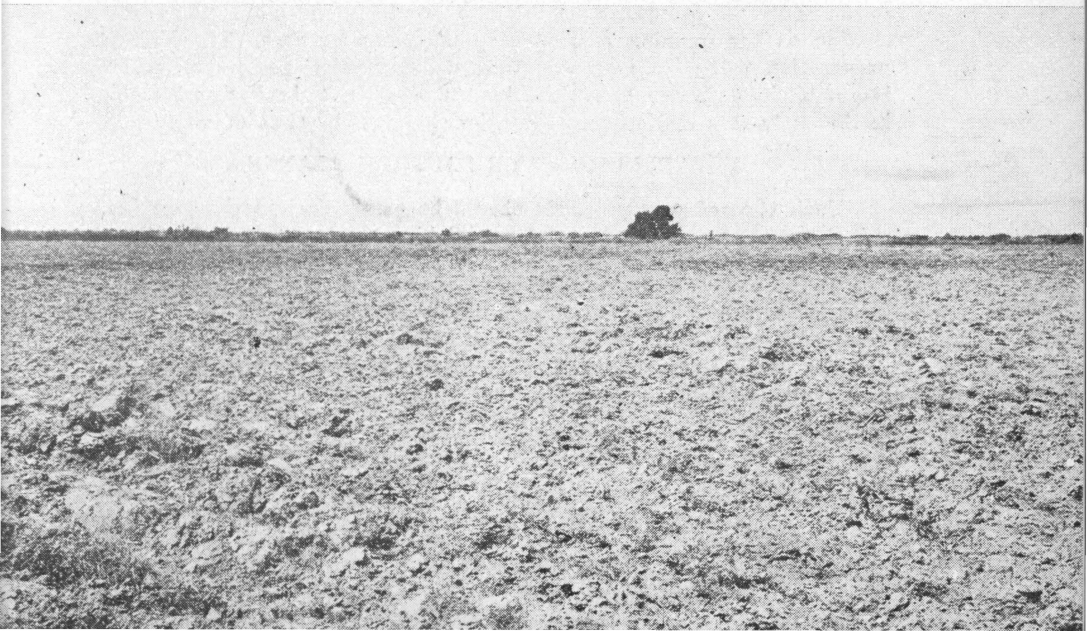




Fig. 9. Gullies in a poorly managed pasture. This pasture of native tall grasses was overgrazed and weeds were not controlled. See in Fig. 10 how gullies were brought under control.

growth of legumes. Application of phosphate was found to increase greatly the formation of the nodules of nitrogen-fixing bacteria on the roots of legumes. The large increase in the number of nodules on the roots caused a big increase in the amount of nitrogen that the legume bacteria fixed from the soil air. This, in turn, brought about a much larger top growth of the plants.

For pasture legumes, apply 200 pounds of 20 per cent superphosphate per acre. This may be broadcast before seeding the legumes, or it may be mixed with barnyard manure and the legume seed, as suggested under "Establishing White Dutch Clover" on page 19.

PREPARATION OF THE SOIL

Probably the most easily overlooked job in pasture development is the preparation of the seedbed. This is especially true in establishing Bermuda grass. For Bermuda the land should be given the same preparation as for growing a good crop of cotton or corn. The kind of preparation will go a long way toward determining success or failure in establishing the pasture. The land should be flatbroken, preferably in the early fall, and other preparation done at the time of planting.

ESTABLISHING THE PASTURE PLANTS

Each type of pasture plant should be established in the way best suited to that plant. Methods of establishing the various plants follow.

Establishing Bermuda Grass

Contrary to general opinion, Bermuda grass must be handled just as carefully as any other grass when being established.

The best results in planting Bermuda are usually secured by setting roots. Establishing by seeding is uncertain because of the diffi-



Fig. 10. Gullies shown in Fig. 9 have been brought under control. The steep banks of the gully channels are protected by Bermuda grass. The area surrounding the deep cuts is covered with a good stand of buffalo grass. Sodding and good pasture management have halted erosion. Mowing is needed in the remainder of the pasture to control weeds.

culty of maintaining the necessary soil and water conditions for the length of time necessary for the tiny seed to germinate and get started.

Bermuda roots may be set either by sprigging or sodding. Sprigging is the setting out of relatively small pieces of roots that have been shaken free of dirt. Sodding is setting out whole chunks of roots that still have the dirt adhering. Sprigging is therefore easier and cheaper, but in either case the method is essentially the same.

In getting the roots for sprigging, it will usually pay, if possible, to go to sandy land. In such land it is relatively easy to plow up the grass and shake off the dirt. After the roots are shaken, they should be placed in sacks or, if placed loose in a truck bed, should be covered to protect from the sun and from excessive drying. For the best results the roots should be kept moist, and should be planted within 24 hours after digging.

A good method of planting is to shallow bed the flatbroken land in three-foot rows. Then drop the sprigs in the middles at intervals of two or three feet, and press each piece firmly into the ground with the foot, or by rolling with a rubber-tired tractor. Then cover the sprigs not more than two or three inches deep by re-bedding, or by cross harrowing.

Bermuda roots may be set by this method at any time during the year when moisture conditions are suitable, but the most satisfactory time is early in the spring while the grass is still dormant. In cases where the grass is set after the growing season starts, and the setting is followed by a three to four week dry spell, results may be poor.

Establishing Buffalo Grass

Buffalo grass may be established either by sodding or seeding. Discussion of the two methods follows.

Establishing by sodding: The surest way of establishing buffalo is by chunk sodding on a well prepared seedbed. Sodding requires a great deal of labor, but is a practical method for farmers who already have buffalo grass or can obtain sod nearby. Sodding can be done during the late fall, winter, and early spring, when more labor is available.

The pieces of sod should be from 4 to 6 inches square and from 3 to 4 inches thick. Rows 6 feet apart should be opened with a sweep, with the dirt falling back into the sweep furrow. The sod pieces should be dropped top-side up and roots down, at intervals of three feet. To keep the sod pieces from drying out, dirt should be pulled around them with some implement, or with a hoe, care being taken **not** to cover completely the face of the sod. The sod pieces should then be rolled with a truck or rubber-tired tractor to firm the soil. Sodding should preferably be done while the grass is dormant.

Establishing by seeding. Buffalo grass may also be established from seed. Until recently buffalo grass seed have not been available commercially, but improved methods of harvesting the low-growing seed are now making them generally available. Prices at this time range around 90 cents to one dollar per pound.

In buying seed, it is advisable to get treated seed (seed soaked in a solution of potassium nitrate, and then chilled for several weeks). Treated seed germinate better and quicker, and cost only a few cents more per pound.

Planting should be done in high-bedded rows three feet apart. The seed-burs may be planted with an ordinary corn planter. The same plate used in planting corn will seed between 5 and 7 pounds of burs per acre in three-foot rows. This is about the recommended rate for planting fairly clean treated seed in the bur. Seed that have not been treated or that contain considerable foreign material should be planted at a somewhat higher rate. The depth of planting **must not** be more than one-half inch. Time of planting should be between March 1 and April 15.

Since seed planted in the bur are slow in germinating, and since the grass grows rather slowly during the first two or three months, frequent cultivation is necessary in the beginning to keep down weeds and prevent shading. If weeds appear cultivation should begin before the grass comes up, the beds being cultivated just as if the grass were there. In the early cultivations, fenders must be used on the cultivator to prevent the covering of the small seedlings. Cultivation should continue until the grass has begun to spread. Then weeds should be kept down by mowing or grazing. Excellent results have been obtained at the Denton Experiment Station by beginning grazing as soon as the growth of the grass is well started, and using a sufficient number of livestock to keep all vegetation grazed very short.

Establishing Rescue Grass

The most economical method of establishing rescue grass is to seed



Fig. 11. Setting Bermuda grass by sprigs. The man with the sack is dropping sprigs of Bermuda grass roots three feet apart in the furrow.

it lightly on those parts of the pasture best adapted to its growth. This includes waste places, fence rows, bottomlands, and other exceptionally fertile soils. If the grass is established in these places, it will gradually spread to other parts of the pasture to which it is adapted.

Seed should be drilled or broadcast in late September or early October at the rate of 15 to 20 pounds per acre. Wherever possible, the seed should be drilled, so that they are placed in or against the soil, as broadcasting by hand is very wasteful of seed. All the common makes of ordinary grain drills will handle rescue grass seed satisfactorily.

Establishing Yellow Beard Grass

Scarcity of seed is one of the difficulties in establishing yellow beard grass. Where seed hay is available, one of the best methods is to cut and scatter the hay where desired.

Where harvested seed are available, the grass may be established by preparing the land in the same way as for cotton or corn, except that the beds may be spaced six feet apart. Seeding should be done from March 15 to April 15. Seed may be planted with an ordinary picker-wheel type cotton planter. Seeding should be at the rate of 3 to 4 pounds uncleaned seed (50% purity) per acre. The rate of seeding may be regulated by soldering or otherwise stopping some of the holes in the cotton plate. The depth of planting **must not** be more than one-half inch.

The rows should be cultivated the first year to keep down weeds, and the grass should be allowed to mature a full seed crop. This seed

crop, if left to scatter by natural means, ordinarily will provide enough seedlings to fill the middles, so that at the end of the second year there will be a practically solid stand of grass.

Establishing Dallis Grass

Dallis grass is very difficult to establish by ordinary broadcast seeding.

Dallis grass seed have a low percentage of germination and are rather slow to germinate. In order to be successful, any method of seeding must provide for the seed to lie where they are sown during the time for them to germinate and take root. The difficulty of doing this with Dallis grass seed is increased by the fact they are relatively light in weight for their size.

The most effective methods of establishing Dallis grass are: (1) seed-hay method, (2) shallow-furrow method.

Seed-hay method: One of the most satisfactory, practical, and economical methods of establishing is by mowing mature Dallis grass, raking and hauling the seed hay, and scattering it directly over the pasture areas where it is desired to establish the grass. The hay should be scattered at the rate of one ton to every three or four acres. Seed hay may be harvested from stands along highways, or from pastures, or, if necessary, from special seed plots. The first and most important harvest of seed hay is sometime in June. One or more additional crops will develop later if rainfall is sufficient.

Shallow-furrow method: Tests show that seeding Dallis grass in shallow furrows with the seed slightly covered is ten to twelve times more effective than broadcasting.



Fig. 12. Buffalo grass spreading by runners.



Fig. 13. Sheep and cattle grazing buffalo grass pasture. Close grazing is necessary to establish and maintain a pure, vigorous stand of buffalo grass.

The shallow-furrow method is adapted to use where Bermuda grass has already been established. Shallow furrows should be laid off three to five feet apart in the Bermuda sod with a small shovel plow. Four to six pounds per acre of Dallis grass seed should be sown one-fourth inch deep in the furrows, using a small seed attachment.¹ Seeding should be done in February or early March.

Establishing Bur Clover

Bur clover should be seeded after Bermuda or buffalo grass has already been established.

One of the best methods of seeding is as follows: Mix seed in the bur with well-rotted manure at the rate of about 10 bushels of manure to one bushel of seed. Scatter this mixture over the pasture in July or early August, in piles of a shovelful or less, at intervals of five to ten feet, using from ten to twenty bushels of the mixture per acre. When seeding in the bur, it is not necessary to inoculate, as the burs carry their own inoculation. The manure helps to hold moisture, and furnishes the stimulation needed to get good growth started. Planting in July or August is advisable because most of the seed in the burs are hard, and require considerable weathering before they will germinate.

Establishing White Dutch Clover

White Dutch clover, like bur clover, should be seeded after the

¹For information on where a small-seed attachment for an ordinary planter may be obtained write Department of Agricultural Education, College Station, Texas.

base pasture grass has been established. An effective means of doing this is as follows:

Into a wagon or truck with corn frames or similar sides on it, throw about 10 inches of barnyard manure and approximately one-half sack of 20% superphosphate. Mix the manure and phosphate well together. Then over the top scatter about 1½ pounds white Dutch clover seed which have been well inoculated with commercial inoculant. Then, using a scoop or shovel, mix the seed in well with the layer of superphosphate and manure. Repeat this procedure, putting in another layer of manure and superphosphate, mixing, adding seed, and mixing, until the wagon or truck bed is completely filled. About 200 pounds superphosphate and 4 to 5 pounds seed will be required per wagon-load of manure.

Just before seeding, go over the grass area with a disc harrow with the discs set nearly straight so that they cut the sod but do not turn it. Scatter the above mixture over the freshly disced ground in small clumps by hand or shovel, or by other means. Apply at the rate of about one wagon-load per acre. Then go over with a brush or section harrow to scatter the mixture and brush it into contact with the ground.

The best time for seeding is in late October or early November, when the ground is fairly moist and when rain seems likely.

Establishing Black Medic

The method recommended for establishing black medic is the same as that given above for white Dutch clover. Use 6 to 8 pounds of black medic seed and 200 pounds of 20 per cent superphosphate per wagon load of barnyard manure. Inoculate the seed with the proper commercial inoculant before mixing with the manure and superphosphate. Seed in October or November under the same conditions and by the same method as recommended for white Dutch clover.

PASTURE MANAGEMENT

A farmer may prepare his land well, and do a good job of seeding or sodding, and still fail to get a good cover of desirable pasture grasses unless he manages his pasture well. Good management consists mainly in controlling weeds and in controlling grazing.

Controlling Weeds

Control of weeds is necessary both in establishing and in maintaining a pasture. During the early stages of establishment before grazing is advisable, weeds ordinarily must be controlled by mowing. In the case of grasses seeded in rows, cultivation may take the place of some of the early mowing.

After the pasture plants have become established well enough to permit regular grazing, most of the weed control may be done by sheep.



Fig. 14. Sheep are the best means of controlling most pasture weeds.

To control weeds with sheep, it is necessary to stock the pasture to capacity without overgrazing. Otherwise the sheep will tend to eat the grass and let the weeds go.

There are, of course, some kinds of weeds that sheep will not eat. Among these are croton weed, ragweed, night shade, and cocklebur. Usually these weeds tend to grow in patches rather than over the pasture as a whole. Where they occur, they must be controlled by mowing.

Controlling Grazing

Control of grazing is necessary both in establishing pastures and after they are established.

Protecting new pastures. New pastures should not be grazed until the base grasses are well established. After these grasses are growing well and spreading, some grazing and trampling when the ground is moist but not muddy is helpful in setting the runners. Livestock should be kept off the pasture when the ground is wet enough to permit serious injury to the new sod.

Under all conditions grazing should be light to moderate for the remainder of the first year, and for as long thereafter as is necessary. The carrying capacity of a new pasture is not high until the sod becomes thick and dense — which takes time.

Avoiding undergrazing. After the pasture is established, the objective should be to graze it closely without overgrazing.

It is not generally understood that undergrazing is harmful. If a pasture is not grazed closely enough, the grass becomes tall, tough, and

less relished by livestock. It also becomes lower in feeding value because of a decrease in the amount of protein. Still further, it slows down in growth and therefore decreases in yield. Thus we see that the results of undergrazing are lower quality and lower yields.

Where a pasture is undergrazed, livestock tend to graze only in spots and to return to these spots each day, leaving the tall growth in other parts ungrazed. Under such conditions only a small part of the productive capacity of the pasture is utilized.

Undergrazing also permits the growth of weeds and other less desirable plants. This is especially true in the case of buffalo grass. Heavy grazing with both cattle and sheep is essential in promoting a pure, healthy cover of this grass.

Avoiding overgrazing. Overgrazing may be detected by keeping a close watch on the livestock and the soil. When grazing is so close that animals lose weight or fail to gain, the pasture is overgrazed. Also when the grass is grazed so short that erosion takes place, it is overgrazed.

The best practice is to keep the pasture grazed just a little short of overgrazing. This may be done by keeping a close watch on the livestock, and shifting part of them on and off pasture as may be necessary. To follow such a practice, it is necessary: (1) to have enough livestock to graze the pasture to capacity in the spring, and (2) to have supplementary sources of feed for part of the livestock at other times of the year. In the summer and at other periods when the carrying capacity of the pasture is lower, as many of the animals as necessary should be

Fig. 15. Mowing is necessary to control weeds in pastures not fenced for sheep.

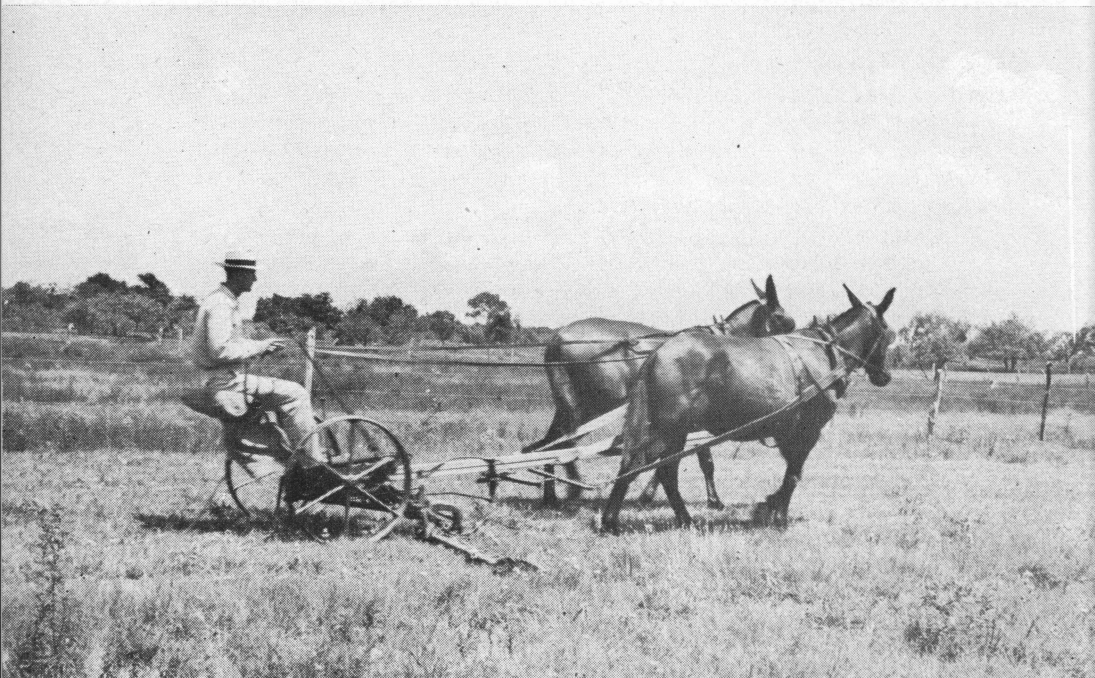




Fig. 16. Registered Herefords on volunteer hubam sweetclover and Johnson grass pasture. For best use, a sweetclover-and-Johnson-grass pasture should be kept grazed three to eight inches high.

shifted onto supplementary feed, leaving on pasture whatever number of animals it is estimated will be needed to utilize the grazing at that particular time.

This practice of shifting part of the animals on and off permanent pasture should be followed throughout the year, keeping on the pasture at all times the number of animals that will make the best use of it.

Supplementary Feed

Supplementary feed for animals taken off permanent pasture should be provided as far as possible by temporary pastures rather than by feed out of the barn or haystack.

A regular system of temporary pastures may consist of small grains for winter and spring, and of sweet sudan for summer. The small grains will furnish grazing from December to May or early June. The best use of small grains for grazing is obtained when they are kept grazed from four to six inches high. If it is desired to mature a grain crop, livestock should be removed from the small grains at approximately the following dates: From barley and wheat not later than March 7; and from oats not later than March 15.

Sweet sudan furnishes grazing from June until frost.

In addition to temporary pastures, there should also be provided some emergency supplemental feed in the form of cut or harvested forage, so that animals will not have to be thrown on the market if both permanent and temporary pastures fail.

Under this system the farmer is able at the end of the summer, when temporary pastures are exhausted, to decide whether to keep market animals and feed them out during the winter or sell them grass fat.

Managing Johnson Grass for Pasture

There is a general impression that Johnson grass does not make a satisfactory pasture. This is because uncultivated Johnson grass becomes unproductive after two or three years of heavy grazing.

It has been found, however, that if Johnson grass is given a rest period of about 30 days each fall, and is plowed following the rest period, it may be kept growing vigorously under pasture conditions. The rest period allows the grass to store up plenty of food in its root stocks and to mature a seed crop for replenishing the stand in the spring. The plowing loosens the soil and provides good growing conditions for the roots.

After the land is plowed, it should be planted to oats or barley. Seeding should be done at the rate of 6 to 8 pecks per acre. This small grain, if properly utilized, will furnish valuable winter grazing that will more than offset the cost of plowing.

Where desired, hubam or Madrid sweetclover may be added to the above combination of small grain and Johnson grass. The sweetclover will increase the fertility of the soil and will provide some grazing. Hubam sweetclover is perhaps better adapted to the area from Waco south, and Madrid sweetclover to the area from Waco north.

The sweetclover should be overseeded on the small grain at the rate of about 10 pounds per acre. In the area around Temple and south, it may be seeded in the fall immediately after the small grain is sown. North of this area, sweetclover should be seeded in February or early March, as fall sowing is likely to result in winterkilling. Spring-seeded sweetclover is likely to be severely damaged by root rot in areas infected by root rot.

The best use of this pasture is made when the small grain is kept grazed from four to six inches high, and the Johnson grass and sweetclover from three to eight inches.