

Making Hay in North Carolina



HAULING HOME THE CURED HAY.

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POINTS IN MAKING GOOD HAY

1. Use a well adapted crop.
2. Prepare a good seed bed, fertilize well, lime if needed, use plenty of seed, plant on time.
3. Harvest early, before full bloom for most legumes; in the milk stage for small grains.
4. Cure rapidly. Take steps to avoid weather damage.
5. House as soon as well cured.

MAKING HAY IN NORTH CAROLINA

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To be satisfactory, any hay crop must produce high yields of good quality. High yields require adapted crops, fertile soils, and good methods of culture. Quality is attained by harvesting at the right time, and curing in the right way.

HIGH YIELDS

Adaptation. A hay crop should yield at least a ton per acre, and yields of three tons are possible. Most North Carolina hay crops do well in all parts of the State.

Soil Fertility. All hay crops, however, respond to a fertile soil. They take large quantities of plant food from the soil. The non-legumes get all their food from this source. Legumes, if inoculated, can draw about two-thirds of their nitrogen from the air, the other third necessarily coming from the soil. The ability of legumes to take nitrogen from the air makes it possible for them to draw more heavily on the soil for phosphoric acid and potash than do non-legumes. Under average conditions, not over half the plant food removed in hay is returned to the soil in manure.

For these reasons, hay crops should be grown in rotations in which legumes are turned under (See Extension Circulars 165 and 188) and should be well fertilized.

The presence of plenty of usable plant food and lime in the soil not only results in bigger yields, but also in hay of higher feed value. Such hay contains more protein, vitamins and mineral matter than the same kind of hay grown under conditions of soil poverty. Animals fed on this hay grow faster, develop better bones, and are healthier than those fed on hay low in these materials.

Good fertilizers for hay crops are as follows—amounts are for one acre:

	Legumes	Non-legumes
Coastal Plain:	400 lbs. 2-8-6, or 400 lbs. 0-8-6	400 lbs. 4-8-4 and 100 lbs. nitrate of soda or similar material
Piedmont and Mountains:	400 lbs. 2-10-6, or 400 lbs. 0-10-6	400 lbs. 4-10-4 and 100 lbs. nitrate of soda or similar material

Stable manure is always a valuable supplement to fertilizers, or it may be used alone at the rate of 5 tons per acre.

Lime will materially increase the yield and mineral content of hay, if the soil needs it. While certain crops, such as alfalfa and red clover, refuse to grow satisfactorily on most soils without an application of lime, others will grow without it, but are benefited by moderate amounts. On

the other hand, too much lime is harmful, and may cause a crop failure, especially on sandy soils. The safest way to use lime is to have the soil tested, and then apply the amount needed.

Cultural Methods. The seed bed should be well prepared. This applies also to small grains, where the seeds of hay crops are to be sown on the grain later.

Broadcast crops, where possible, should be put in with a grain drill; otherwise sow the seed and cover with a weeder or harrow. Row crops can usually be planted with a corn planter, and should be cultivated enough to control weeds. Small seeds such as lespedeza should be covered one-half to one inch deep; large seeds (except soybeans) one to two inches.

Always sow plenty of seed; it pays in both yield and quality of the crop.

GOOD QUALITY

Good hay must be leafy, and green in color. The stems must be small, soft, pliable, and free from woodiness. It must possess a fragrant aroma; and be free from dust, mold, and musty odors. It must contain little or no foreign material, such as weeds and stubble. This hay has much higher feeding value, especially of minerals and digestible protein, than hay of poor quality.

To make good hay, early cutting and careful curing are necessary.

Early Cutting. Most of the hay made in North Carolina is too nearly mature when harvested. There is an idea prevalent among farmers that good hay must contain lots of "grain". Much so-called hay is nothing but a mixture of ripe seeds and straw. In fact, some animals have to tough it out all winter on the stalks alone, the seed having been shattered or threshed out. Farmers forget that in waiting for the "grain" to develop, they may lose more nutrients from the stems and leaves than they gain from the seeds.

The very best hay is made from plants that are cut before they bloom. However, as these plants are sappy, and hard to cure, and as slightly later

TABLE 1.—EFFECT OF TIME OF CUTTING HAY ON DIGESTIBLE PROTEIN.

CROP	Pounds Digestible Protein Per Ton*		
	Early cutting Before bloom for most crops	Medium cutting In Bloom for most crops	Late Cutting After blooming for most crops
Cowpea.....	350	246 ¹	138 ²
Alfalfa.....	284	220 ³	172
Red Clover.....	240	156	146
Lespedeza.....	214	202	178
Sudan Grass.....	134	94	50
Timothy.....	112	64	42

¹ Between bloom and early pod.

² When seeds are ripe.

³ When 1/10 in bloom.

*Data from Morrison's "Feeds and Feeding".

cutting makes a higher yield with little or no loss in total feed value per acre, it is good practice, with most crops, to delay harvest until the plants approach full bloom. But as the plants mature, they lose more and more of their protein, vitamins, and minerals; the leaves begin to shed; and the stems become hard, woody, and inedible.

Since the percentage of digestible protein is the best criterion of the value of hay, the influence of time of cutting on this nutrient is given for several representative crops in Table 1.

Curing Hay. Hay should be cured so as to preserve the leaves (which contain most of the nutrients), to preserve the natural green color, to avoid damage from rain or dew, and to avoid damage from mold.

The leaves are the first part of the plant to dry out after cutting. They may become so brittle that they shatter off in ordinary handling, while the stems are still green. As long as the leaves are kept alive, they help cure the stems by drawing the moisture out of them. For this reason,



USE OF SIDE DELIVERY RAKE IN MAKING CRIMSON CLOVER HAY.

hay should not be left on the ground long after cutting, but raked into small windrows when the leaves begin to wilt. This is usually after three or four hours of bright sunshine. Very heavy crops often dry out on top, with little curing next to the ground. This makes windrowing soon after cutting still more important, since the raking exposes the moist portion to the air and sunlight. Windrows of heavy crops should be turned over again with the rake later in the afternoon. The side delivery rake and hay tedder are excellent implements for stirring and hastening the curing of heavy hay crops.

Another reason for raking hay early is that long exposure to the sunlight will bleach the green color from the leaves thus lowering the food value.

If the weather appears settled, the hay may be left in the windrow overnight. But rain will damage hay more in the windrow than on the ground; so, if there is any indication of rain, the windrowed hay should be put into cocks for the night. In the mountain section, where the dew is heavy enough to discolor the hay, cocking up this way is always advisable. The



SOMETIMES CANVAS CAPS ARE USED TO PRESERVE HAY.

cocks should be about four feet in diameter, five to six feet high, and well capped and smoothed down, so they will shed water. Additional protection from both rain and sun may be provided by covering with pieces of canvas about a yard square.

The next day, after the dew is off, hay left in the windrow should be turned over, as an aid to more rapid curing. Cocked hay should be spread out loosely. In most cases the hay will be dry enough to put into the barn during the afternoon of the second day. If not, repeat the curing process for another day.

In wet climates, such as the lower Coastal Plain, it is sometimes advisable to stack the hay on frames, or poles with cross-arms, as soon as it is wilted. These stacks should be made as nearly waterproof as possible and the hay left there until cured.

In Case of Rain. If rain falls on freshly cut hay there will be little damage, provided good curing weather follows. Half-cured or well-cured hay will be discolored, but will not mold if rain comes before it is raked up. The greatest damage is done to hay in the windrow, or in loose, irregular piles. Such hay should be spread out as soon as the weather will permit. Well cocked hay will stand considerable rain; but should it be wet through, spread it out.

Storing Hay. Hay that is apparently air-dry will continue to cure after being stored in the barn. Storing green hay in the barn will cause it to mold, and sometimes spontaneous combustion will develop. But hay that is nearly air-dry will cure rapidly in the barn, if spread out over the entire floor surface. It is better to spread this sort of hay in the barn than to have it spoiled by rain.

There is always some loss from stacked hay, hence this method of storing should never be resorted to if there is room in the barn. If neces-



CURING SOYBEAN HAY ON FRAMES.

sary to stack hay, first set a stout pole at least four feet deep. Then build a base for the stack by laying poles criss-cross around the stack pole. Pile the hay in even layers around the pole, and tramp it well, especially close to the pole. At the same time keep the middle somewhat higher than the edges. Have the stack taper outward to about half the desired height, and then gradually draw it in to a peak. The total height of the stack should be at least twice its diameter at the ground. Stacks of coarse hay, such as soybeans, should be capped with straw, crabgrass, or similar material that sheds water readily. If desired, the hay can be put into an oblong stack, called a rick.

Hay should not be baled until thoroughly cured, otherwise it is likely to mold in the bale.

CLASSES OF HAY

From a cultural standpoint, there are seven classes of hay grown in North Carolina: summer legumes, perennial legumes, winter legumes, cereals, perennial grasses, annual grasses and mixtures. The outstanding points of the principal kinds of hay are dealt with in the following paragraphs. Further information will be found in Table 2.

SUMMER LEGUMES

Soybeans. This is one of the most popular kinds of hay in North Carolina. For best results use fine stemmed varieties, such as, Ootootan in the Coastal Plain, Laredo in the Piedmont, and Virginia in the Mountains. When the Tokio, Mammoth Yellow, Biloxi, or other coarse-stemmed varieties are used, sow very thickly to reduce the size of the stems. Do not



SOYBEANS FOR HAY.

cover soybeans over one inch deep in planting. In the Mountains and Coastal Plain, soybean hay should be cultivated in rows—or the weeds may choke it out. In the Piedmont drilling gives good results.

Soybean hays should be cut as soon as the pods begin to form.

Soybean hay is hard to cure, because of its large stems. Where labor is plentiful, it is sometimes stacked on frames, or poles with several cross arms, immediately after cutting, and left to cure.

The greatest objection to soybean hay is that the coarse stems are refused by livestock.

Cowpeas. The culture of cowpeas is similar to soybeans. The stems are less woody than soybean stems, but contain more sap, making the hay hard to cure. Ventilated stacks, as described for soybeans, are often used.

The period for cutting is longer than with soybeans, but the best time is when most of the pods are half grown. There is little waste in feeding well cured cowpea hay. Good varieties are Groit, Whippoorwill, Taylor, Clay, Iron, and Brabham, the last two being resistant to wilt and nematodes.

Lespedeza (annual). This is now the most widely grown hay crop in North Carolina. It is adapted to practically all soils except light sands. It is generally drilled or sown on small grains in February and March, and harvested in the late summer. The weeds and grain stubble on lespedeza fields should be mown in July (and left on the ground), to prevent their ruining the quality of the hay.

Lespedeza should be cut when in early bloom, or when twelve inches high, whichever occurs first. To leave it longer results in loss of the



STACKS OF LESPEDEZA HAY.

lower leaves, and a poorer grade of hay. Lespedeza hay is very easily cured, sometimes being housed the same day it is cut. It is eaten without waste by all kinds of livestock.

Lespedeza may be used as a perennial by simply letting it reseed itself; or by discing, and sowing small grain after the seed matures, and allowing the lespedeza to volunteer in the grain. Lespedeza, if cut early for hay, and if a few green leaves are left on the stubble, will make enough seed during the fall to reseed the land.

Peanuts. Peanut hay is a by-product of growing the nuts for sale or for hogging off. The quality is excellent if cured properly.

However, peanuts are often dug and stacked green without taking the trouble to shake the dirt from the vines; and the stacks are not built to protect the hay from rain. Such hay is of low value.

After digging, the vines should be cured on the ground for several hours, the loose dirt shaken off, stacked with the nuts next to the pole, and capped well.

Velvet Beans may be used for hay on light, sandy soils. However, on most soils this crop makes such a tangled mass of vines that it is almost impossible to handle it. It should be mixed with a small amount of corn, (or Biloxi soybeans) to help hold it up.

Kudzu, a perennial legume, makes hay similar to that of soybeans and cowpeas. It is started by setting out crowns, which cover the ground with runners within two or three years. Then upright shoots are formed, which are used for hay. This crop, also, is difficult to handle.

PERENNIAL LEGUMES

Perennial legumes, all are small seeded crops that should be drilled in lightly or broadcast and covered shallow. The amounts of seed given in Table 2 are for drilled crops and should be doubled if broadcast.

Alfalfa produces one of the best of all hays. It is particularly adapted to the heavy red clays, such as the Davidson, Cecil, and Clifton series or other soils in a high state of fertility and well drained. In the Coastal Plain it does well for two or three years on the better soils, but is usually



ALFALFA MAKES THE BEST HAY.

choked out by grass and weeds after this period. In the Piedmont and Mountains it should persist from five to eight years. Cultivation with the alfalfa harrow and occasional fertilization will lengthen its life.

In growing alfalfa, the seed bed must be carefully prepared and harrowed at intervals for several weeks to kill germinating weed seeds. Two tons or more of lime per acre, and liberal amounts of fertilizer are required. But the crop will pay handsomely if put in properly on the right kind of soil. The Kansas common variety is best adapted to the Piedmont, and Grimm to the Mountains.



ALFALFA LIMED AT LEFT—UNLIMED AT RIGHT.

Red Clover was once widely used in Piedmont North Carolina, then it gave way to lespedeza, but is now coming back. It may be drilled on small grain in March, or seeded alone in October. In the Mountains, it is



MOWING RED CLOVER HAY IN WAKE COUNTY.

sometimes sown in corn in July and August. Under Piedmont and Mountain conditions red clover makes one crop the first year (in September) and two crops the second year, (in May and July). The last crop, under good farming practice, is turned under for soil improvement. In the Coastal Plain it may be sown in the fall, and will make two or three crops per year for two years.

Red clover requires fertile, fairly heavy, well drained soil, an application of 1,000 to 3,000 pounds of lime per acre, and good fertilization. Native seed, or those produced in Virginia, Tennessee, Ohio, Indiana, and neighboring states must be used to avoid the destructive disease known as anthracnose. This crop and lespedeza make a good combination.

Sweet Clover is used in a similar manner to red clover, except that the principal cutting comes in September of the first year. It makes an abundant crop in May of the second year, but cutting this crop kills the stand unless about a twelve inch stubble is left. For this reason, some farmers are combining seed from the second crop and turning it under. Sweet clover and lespedeza make a desirable mixture.

Sweet clover hay should be cut before the plants bloom, to prevent excessive woodiness. This crop should be well fertilized, and receive 1,000 to 3,000 pounds of lime per acre. There are two biennial varieties—white and yellow. The Hubam is an annual white variety, inferior to the biennial varieties.

Alsike Clover is a good substitute for red clover on wet soils. It needs less lime than red clover, makes good quality hay, and works well with lespedeza.

Lespedeza Sericea is a perennial crop which may be sown alone or on small grain. It usually requires three years to make sufficient growth and



LESPEDAZA HAY IN EASTERN CAROLINA.

stand to warrant cutting for hay. Then one or two cuttings per year may be taken, leaving later growth to develop the root system. The hay should be cut when the plants are 12 to 15 inches high, to secure a high percentage of leaves, and to avoid woodiness. Early cutting will also reduce the content of tannin, which in large amounts decreases the feeding value of the hay.

WINTER LEGUMES

Winter legumes are sown in the fall, act as cover crops during the winter, and make hay the next spring in time to be followed by most summer crops. They are often sown with small grains, the two making an ideal combination. The chief cause of failure with winter legumes is lack of inoculation (See Extension Circular 225).

Crimson Clover is better adapted to medium or heavy soils than to light soils. It may be sown in August, if unhulled seed are used, but it is usually best to sow cleaned seed in September or early October. They may be drilled later than is safe to sow by hand. Care should be taken to sow when there is plenty of moisture in the ground; otherwise, the young plants may die before they get a good start.

Crimson clover makes the biggest yield of the winter legumes, and the quality is good if cut while in early bloom. Late cut hay contains the seed hulls, which sometimes wad together and cause impaction of livestock.

There is considerable difference in the time of maturity of different strains. Native and Hungarian are the earliest and most satisfactory. The white blooming is about three weeks later than the ordinary crimson kind.

Vetch will grow on practically any soil that is inoculated for it. The hairy vetch is by far the best for North Carolina. Both American and European grown seed are satisfactory. The hay is very fine stemmed, and high in protein, but the yield is rather low. Vetch should be mixed with small grain to increase the yield and prevent the vines from tangling too much. Vetch should be cut for hay when in full bloom.

Austrian Winter Peas do well nearly everywhere, and are used in the same way as vetch. They are more easily inoculated than vetch, yield better, but are also less resistant to cold and disease. Whether to use winter peas or vetch depends mainly on the relative cost of seed.

Bur clover is used more for soil improvement than for hay. However, the burs used in sowing this crop contain several seed, so that occasionally a hay crop can be taken, and enough seed be left in the ground to make a stand the next fall—in which this is different from other winter legumes. A thick stand is required to produce hay. In thin stands the stems run along the ground. The crop may be started by mixing the burs with manure, and dropping in hills about four feet apart.

SMALL GRAINS

Oats, barley, wheat, and rye are good hay crops, except possibly the last. These crops, sown in the fall, cover the land during the winter and are removed in time for other crops. They should be cut when in the milk

stage, not later. Small grains should be fertilized at planting, and top-dressed early in March. (See page 3).

Oats are used more than other small grains for hay, and they grow well on nearly all soils. The best varieties are Lee, Fulgrain, and 33-47. All these are very cold-resistant, and the two last are also smut resistant.

Spring sown oats do not yield as well as fall sown. However, in some sections of the mountains spring sowing is necessary because of the cold winters.

On extremely wet soils, oats should be planted on ten foot beds to give better drainage.

Barley makes first class hay, but requires fertile soil, good drainage, and a fairly plentiful supply of lime. Always use a beardless variety for hay. Barley is somewhat less hardy than wheat or cold-resistant oats.

Wheat makes good hay, is hardy, and should be used more extensively for this purpose, especially in mixtures with other small grains. It has less foliage than oats or barley. Red Hart, Purple Straw, Leap's, Forward, and other beardless varieties should be used for hay.

Rye is a low yielder, has less foliage than other small grains; but it has the advantage of being at least a month earlier than other winter hay crops. It should be cut before the first heads appear. Rye will grow anywhere, and on poorer soils than other small grains. The Abruzzi is the best variety.

PERENNIAL GRASSES

Perennial grasses are grown for hay mainly in the Mountain section, but to some extent in the Piedmont. These grasses make a thick sod which checks erosion, and for this reason are especially good for steep lands. The seed is usually sown in combination with clovers, and left from three years in the Piedmont to forty years or more in some of the Mountain counties. In a few instances this class of hay has also been known to give good results in the Coastal Plain.

Timothy, the most important of these grasses, is widely used in the Mountains, where the climate is much like that of the great timothy belt stretching across the northern half of the United States. East of the Blue Ridge the summers are too hot for it to thrive.

Orchard Grass is the best perennial grass for the Piedmont section. When sown with red or alsike clover the yield is heavy. The quality is good if cut just before the orchard grass reaches full bloom.

Tall Oat Grass is a rank growing grass, which is good in mixtures with orchard grass and clover.

Redtop is the best of these grasses for wet lands, where it makes an ideal combination with Alsike clover, but it will grow almost anywhere, and should be used in practically all grass mixtures. The hay is of good quality, but the yield is smaller than that of timothy or orchard grass.

ANNUAL GRASSES

The chief advantages of these grasses are that they resist drought, mature quickly, and on good soils make very large yields. They can be planted in mid-summer and will still make a good crop, which makes

them invaluable where other crops have been ruined, as by hail. They do best under rather dry conditions, and will not stand excessive moisture. Care should be taken not to let livestock graze the green plants after they have been subjected to drought, frost, or when half wilted. Under such conditions, prussic acid may develop. While this poison is deadly, curing the grass into hay destroys it.

Sorghums are the most used of these crops in North Carolina, and have made five tons or more of hay per acre on fertile land. Only the sweet varieties are recommended, such as the Honey, Amber, and Texas Seeded Ribbon. The grain sorghums, used all over the Great Plains, are not adapted to this state.

Foxtail millet is a very rapid growing, short season crop making good yields. The German, Italian, Hungarian, and common millets are varieties of this crop. The hay is good for cattle; but not for horses, causing disorders of the kidneys, joints, and bones.

Japanese millet, barnyard millet, or billion dollar grass is a coarse, rank growing plant, making enormous yields, of good quality if cut early. It does well all over North Carolina.

Sudan grass is probably the best of this class of hay plants. If sown early it makes two or three good cuttings, and will make one when planted late in July. It does best on heavy, fertile soils, and requires hot weather for its best growth. It may be broadcast, or planted in narrow rows and cultivated. The crop should be cut as soon as the first heads appear, especially if a second crop is expected. The hay is nutritious and palatable.

In buying Sudan grass seed, the greatest care should be taken not to get any Johnson grass seed. The best way is to deal only with reliable seedsmen, and to have the seed tested before sowing.

Johnson grass, a notorious pest, is identical in appearance to Sudan grass, except that the Johnson grass is a perennial that propagates itself by underground rootstocks, as well as by seed. The hay of Johnson grass is similar to that of Sudan grass in yield and quality, but it is next to impossible to get rid of Johnson grass.

Crabgrass is a wild grass that often volunteers in thick stands in the late summer; usually after small grains, or after tobacco in the Coastal Plain. The stems are very fine, and the hay is of good quality if cut early. Mixtures of soybeans and volunteer crabgrass are very common.

HAY MIXTURES

Mixtures of several crops are often used for hay to increase the yield; to give variety and thereby improve the hay's palatability; and to change the nutritive ratio of the hay.

Small Grains and Winter Legumes are both improved by being mixed. The grains prevent bedding down and excessive tangling of the legumes, while their hollow stems make the hay easier to cure. The legumes make the hay higher in protein. An almost endless variety of these mixtures can be concocted. The general rule should be to combine a full seeding of grains with two-thirds of a full seeding of legumes. The time to cut such mixtures is when the grain is in the milk stage, regardless of the

legume. Two good mixtures are given below, the amounts being for one acre:

1. Oats -----	1½ bu.
Wheat -----	1 bu.
Vetch -----	15 lbs.
Austrian Winter Peas -----	10 lbs.
2. Oats -----	1½ bu.
Barley -----	1 bu.
Crimson Clover -----	20 lbs.

For further information, see Extension Circular No. 187.



MIXTURE OF CEREALS AND LEGUMES—OATS, WHEAT, VETCH AND AUSTRIAN WINTER PEAS.

Summer mixtures usually consist of soybeans or cowpeas with some of the annual grasses. They should be cut when the first grass heads appear.

Examples are as follows:

1. Sudan Grass -----	20 lbs.
Laredo soybeans -----	30 lbs.
2. Sorghum -----	20 lbs.
Cowpeas -----	30 lbs.

Perennial mixtures of clovers and grasses have the same general advantages as the annual mixtures. Red clover in such mixtures makes a large part of the crop for the first year or two; but if the seeding is to stand longer, alsike clover or lespedeza should also be included, as they will persist for several years. Cut these mixtures when the grass is ready.

Good mixtures are:

1.	Orchard grass -----	10 lbs.
	Redtop -----	5 lbs.
	Tall Oat Grass -----	4 lbs.
	Red Clover -----	6 lbs.
	Alsike Clover -----	3 lbs.
2.	Timothy -----	8 lbs.
	Red Clover -----	6 lbs.
3.	Orchard grass -----	10 lbs.
	Redtop -----	4 lbs.
	Red Clover -----	5 lbs.
	Alsike Clover -----	2 lbs.
	Lespedeza -----	7 lbs.

TABLE 2.—INFORMATION ABOUT VARIOUS HAY CROPS.

CROP	Best Time to Plant	Rate of Seeding per Acre	Digestible Nutrients Average Pounds Per Ton*	
			Protein	Carbohydrates and Fats
Summer Legumes:				
Soybeans	May-June	½-1 bu. rows 1-2 bu. bdest.	222	770
Cowpeas	May-June	½ bu. rows 1 bu. bdest.	252	736
Lespedeza	Feb.-March	25-50 lbs.	184	860
Peanuts	May		126	630
Velvet Beans	May	1 bu.	246	794
Kudzu	February	500 crowns	240	776
Perennial Legumes:				
Alfalfa	Aug. 15-Sept. 15 March 1-April 1	25 lbs.	212	794
Red Clover	March or Oct.	6-8 lbs.	140	898
Sweet clover	March or Oct.	10-15 lbs.	210	790
Alsike clover	March or Oct.	4-5 lbs.	154	826
Lespedeza Sericea	March- April	8-10 lbs. rows 15-20 lbs. bdest.	214	824
Winter Legumes:				
Crimson Clover	Aug. 15-Oct. 15	20-30 lbs.	194	782
Vetch	Sept. 1-Nov. 1	15-25 lbs.	306	834
Austrian Winter Peas	Sept. 1-Oct. 15	20-25 lbs.	232	906
Bur Clover	Aug. 15-Sept. 15	1 bu. (burs)	268	820
Small Grains:				
Oats	Oct. or Feb.	3 bu.	90	836
Barley	October	2 bu.	98	984
Wheat	Oct. 10-Nov. 15	1½-2 bu.	64	866
Rye	Sept. 1-Nov. 15	1½ bu.	56	838

TABLE 2—Continued

CROP	Best Time to Plant	Rate of Seeding per Acre	Digestible Nutrients Average Pounds Per Ton*	
			Protein	Carbohydrates and Fats
Perennial Grasses:				
Timothy	March 15-April 15 Sept. 1-Oct. 1	10-15 lbs.	58	880
Orchard Grass	March 1-April 15 Sept. 1-Oct. 15	12-20 lbs.	92	900
Redtop	March 1-April 15 Sept. 1-Oct. 15	8-10 lbs.	90	982
Tall Oat Grass	March 1-April 15 Sept. 1-Oct. 15	30-40 lbs.	76	888
Annual Grasses:				
Sorghums	May 1-June 15	5-6 lbs. rows 20-25 lbs. bdst.	72	982
Foxtail millet	May 1-Aug. 15	20-35 lbs.	104	926
Japanese millet	May 1-Aug. 1	20-35 lbs.	102	844
Johnson Grass	A wild plant		58	948
Sudan Grass	May 1-Aug. 1	5-8 lbs. rows 15-25 lbs. bdst.	86	884
Crabgrass	A wild plant		70	846

*Data from Morrison's "Feeds and Feeding".