

ALFALFA PRODUCTION

IN NORTH CAROLINA



- ★ Good Hay Is Needed In Any Balanced Feed Program
- ★ Alfalfa "King of the Hay Crops," Can be Grown in North Carolina
 - Rich in Proteins, Minerals, Vitamins A and D
 - Especially Good for Dairy Cattle and All Types of Young Growing Stock
 - Grows Four Years or More—Yields Three Tons of Hay Each Year

Prepared by

S. H. Dobson, W. W. Woodhouse, D. S. Chamblee, C. H. Hanson
Department of Agronomy

Published By

THE NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

North Carolina State College of Agriculture and Engineering of the University of North Carolina and the U. S. Department of Agriculture, Cooperating. State College Station, Raleigh, N. C., D. S. Weaver, Director. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914.

July, 1954

(Revised) Extension Circular No. 307

ALFALFA PRODUCTION

Alfalfa is a deep rooted perennial legume. It will produce 3 to 4½ tons of high quality hay per acre each year for several years on many soils in North Carolina. Alfalfa is rather exacting in its requirements for good growth; therefore, if you are planning to seed alfalfa you must do the job right or you will be disappointed.

SOIL SELECTION

Alfalfa grows best on well-drained clay soils. However, it will grow satisfactorily on light sandy soils, especially if the sandy soil has a clay subsoil.

Alfalfa is very sensitive to poor drainage and will not live long if planted on a soil that has a high water table or poor drainage. It cannot stand "wet feet."

The field should be fairly fertile, reasonably free of weeds, and be as near as possible to the barn or hay shed.

Alfalfa is a good erosion control crop on the steeper cultivated land.



Fig. 1. Because of its long tap root, alfalfa needs a well-drained soil.

LIMING

Take a soil sample and send it to the Soil Testing Laboratory, State Department of Agriculture, Raleigh, North Carolina, for definite lime recommendations.

Experiments show that an adequate amount of lime may be spread on the land but unless it is worked into the soil, it will not maintain the stand. If the soil needs over one ton of lime, it will be worth about one ton of hay extra on each acre each year to mix the lime in the soil before seeding.

METHOD OF LIMING ALFALFA IS MORE IMPORTANT THAN RATE

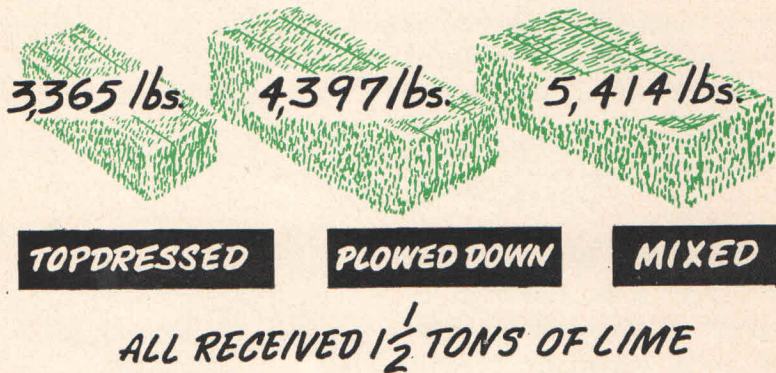


Fig. 2. In these tests, mixing lime in the top 4 inches of the soil gave the best results. The lime should be worked in BEFORE seeding.

As a general rule, soils that have not been limed previously will require $1\frac{1}{2}$ to $2\frac{1}{2}$ tons of finely ground dolomitic limestone per acre.

Uniform spreading is necessary. Poor distribution gives too much lime on some spots and too little on others.



Fig. 3. Correct liming makes a big difference. Left—lime applied to top of soil. Right—lime worked into top 4 inches.

FERTILIZATION

Fertilization is the key to successful alfalfa production. The less fertile the soil the more commercial fertilizers you must apply to get a good yield. However, even the best soils require fertilization to maintain a good stand and get a good yield over a period of several years.

Ten to 15 tons of stable manure disked into the soil before planting is a good practice. Then, apply 800 to 1,000 pounds per acre of a 2-12-12 fertilizer and 20 to 35 pounds (no more) granulated agricultural borax at seeding.

On soils high in potash and low in phosphate, use 1,000 pounds superphosphate and 500 pounds 2-12-12. Alfalfa that is properly fertilized at seeding will not require top-dressing the first year.

One ton of hay removes about 11 pounds P_2O_5 (phosphate) and approximately 45 pounds K_2O (potash). Thus we can see that a normal yield of three tons of alfalfa hay per acre removes the equivalent of about 400 to 500 pounds of an 0-9-27 fertilizer.

The phosphate level should be kept high by replacing the amount removed each year. Many red soils supply some potash, so a good topdressing program does not require complete replacement of potash. On the lighter soils most of the potash removed should be replaced annually.

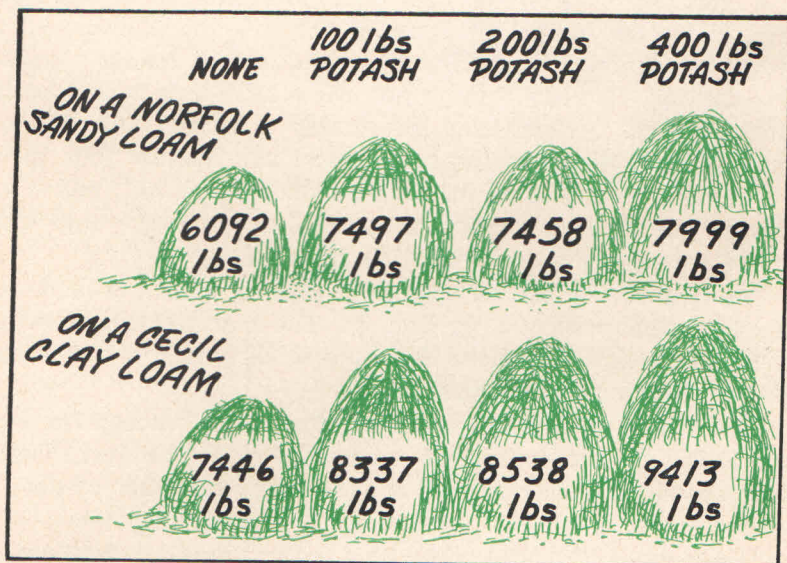


Fig. 4. One hundred pounds of potash per acre gave an increase of 900 and 1,400 pounds of hay in these tests. Alfalfa should receive potash annually.

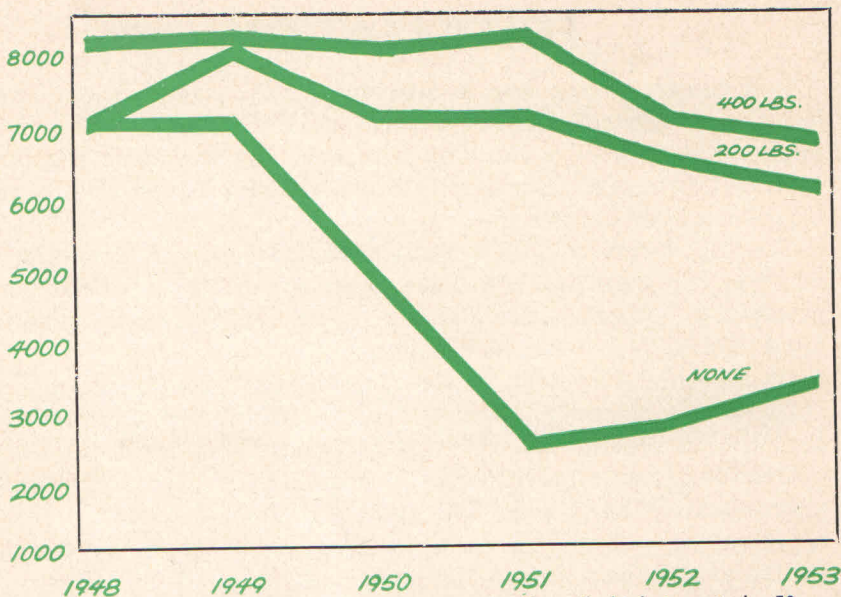


Fig. 5. Here's the response of alfalfa to potash. On soils high in potash, 50 per cent muriate of potash was applied at various rates. You can see the results in pounds of dry forage per acre.

SEEDBED PREPARATION

A good seedbed is not only firm and well pulverized with organic matter in the top layer of the soil but it also has the proper amounts of lime, fertilizer and stable manure worked into the soil. The best way to get this condition is to spread the lime, then cut a cover crop, preferably a legume, into the soil with a heavy disk such as a bush and bog harrow four to six weeks before seeding time. This pulverizes the soil, mixes the lime in the top four to six inches, and leaves enough vegetation in the surface to prevent the soil from baking.

The land can be settled by lightly disking with a tandem disk and harrowed with a drag harrow. The manure should be applied before this operation. Usually a settling rain or two occurs between disking and seeding time.

Either disk lightly or use a drag harrow to smooth the land, and to kill the weeds that have come up since the first disking. This should be followed with a cultipacker or roller to get the seedbed firm.

The fertilizer can be drilled into the soil anytime between the heavy disking and the firming of the seedbed. On sloping land,

the operations should be on the contour. In fact, contour strips of alfalfa alternating with small grain and row crops on a large field are effective means of controlling runoff and erosion, and at the same time, increasing the organic matter and nitrogen content in the soil for a successful rotation.

SEEDING

Sow 20 to 25 pounds of inoculated Atlantic, or Oklahoma Common seed per acre and cover lightly (not over $\frac{1}{2}$ inch). A cultipacker equipped with an alfalfa seeder attachment is one of the best methods. Many farmers have gotten successful stands of alfalfa with a cyclone seeder or with a grain drill. Many grain drills have special alfalfa and clover seed hoppers on them.

When seeding with any method other than the cultipacker, sow one-half the seed in one direction and the other half at right angles to the first. The seed should be covered with a cultipacker. However, a spike tooth harrow, weeder, or brush may be used and should be followed with some type of roller.

As a general rule, the common varieties or selections from those varieties which are grown in the seed producing area due west of this state are recommended. This includes the general area of Oklahoma and Kansas. The more southern varieties have a longer growing season but winter-kill in the western part of the state. The more northern varieties are usually less productive.

In other words, select the most southern variety that will survive our worst winters, which are the Atlantic and Oklahoma Common varieties. The variety Buffalo is a wilt resistant selection from Kansas Common and should be used where wilt is a problem. The yields are about the same as Oklahoma Common.

One to 10 per cent of the seed in a bag from foreign countries are colored for your protection, and are not recommended.

Inoculation is one small step which is both inexpensive and easy, yet necessary for success. Commercial preparations are

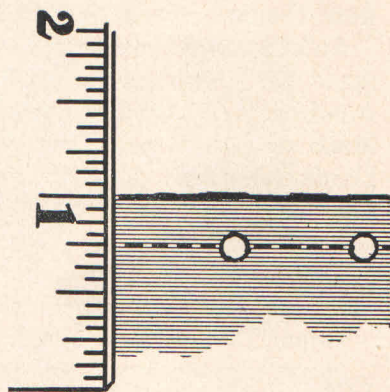


Fig. 6. Never plant alfalfa deeper than $\frac{1}{4}$ inch. Only one-fourth as many seeds germinated when planted 1 inch deep as when planted $\frac{1}{4}$ inch deep.

available and directions on the cartons should be followed carefully. Inoculate and sow during a cloudy day or late in the afternoon and cover immediately because exposure to the sun kills the inoculum.

The addition of syrup or molasses to the water used in moistening the seed before the inoculation is added will help hold the inoculation to the seed. The syrup will also help feed the bacteria until the seeds germinate and the plants start growing.

Late summer seedings are preferred. The seeding must be made early enough to get the plants established before cold weather. This usually assures a better stand and eliminates much of the danger from weed competition. In addition, the plants are ready to start growing early the following spring, and the first cuttings of hay are much larger. Following are the best planting dates:

Coastal Plains—September 15-30

Lower Piedmont—September 1-15

Upper Piedmont—August 15-31

Mountains (below 2,500 feet)—August 1-31

Mountains (above 2,500 feet)—July 20-August 15

Although late summer seedings are more satisfactory, spring seeding can be done on land that is not too weedy and where late summer seeding was impossible. March is best in the Piedmont and April in the Mountains.

CUTTING AND CURING

Alfalfa should be cut in the early bloom stage—1/10 to 1/4 in bloom or when the new basal shoots appear, whichever condition occurs first. It is at this early stage that the protein content is highest.

Cutting too early weakens the plants, and delayed cutting results in excessive shedding of the leaves. At least three, and in most cases four, cuttings can be made each season. Make the last cutting early enough to allow 12 to 18 inches of new growth before the first killing frost.

Last Cutting. The curing method should be such as to preserve the green color and prevent the leaves from shattering. The leaves are important because they contain 23 to 25 per cent protein while the stems contain only 10 to 11 per cent.

Regardless of how well the hay is grown, if the leaves are lost much of the protein is lost. The same holds true for calcium and phosphorus.

PROTEIN CONTENT OF HAY

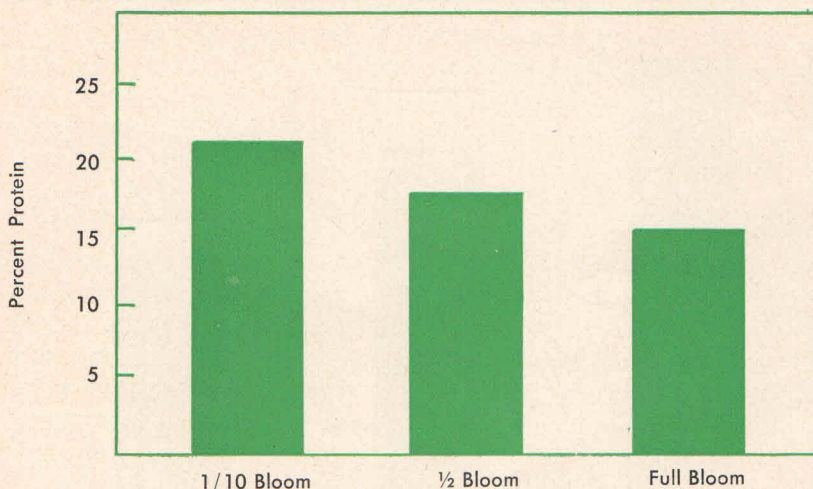


Fig. 7. The later you cut alfalfa at each cutting, the less protein it has.

Rake the hay into windrows as soon as it is wilted and before the leaves are brittle to prevent shattering. The moisture content at which hay can be stored depends on whether or not an artificial drier is used.

For loose storage in a barn or hay shed, a good rule-of-thumb to follow is to twist a handful of the hay to see if there is any moisture. If the tightly twisted stems show little or no evidence of moisture, the hay can be stored satisfactorily.

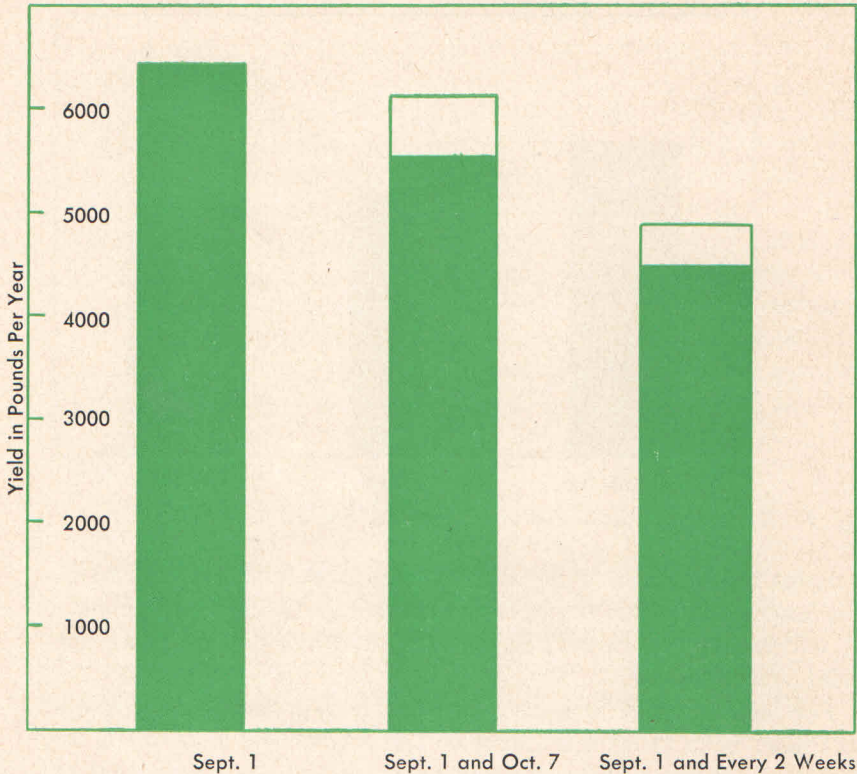
MANAGEMENT

Once a stand of alfalfa is established it can be kept productive for several years by proper care.

(1) Remember! Three or more crops of hay are removed each year. This makes it necessary to topdress with 500 to 800 pounds 0-9-27, 0-10-20 or 0-14-14 annually after the first year's growth. This topdresser should contain 15 to 25 pounds of borax. On established stands that have not received borax, the above amount can be applied with a cyclone seeder. Even distribution of all fertilizer materials is necessary or there will be streaks throughout the field.

(2) Don't get "piggish" and insist on cutting too early or too late in the fall. The alfalfa must have a chance to store up food in the root system in order to live over the winter and start

DATES OF FALL CUTTING IMPORTANT



Green bar gives total through Sept. 1. White part of bar is yield from cuttings after Sept. 1. You can see how later cuttings reduced alfalfa yields the following year.

growth the following spring. Less than 12 to 18 inches of growth is an indication the fall cutting has been too late. Harvesting this last cutting just at frost time usually costs two pounds of hay the next year for each pound harvested in the fall. Grazing after the second killing frost, though, seems to be the safe, maybe even desirable.

(3) As a general rule, reseeding alfalfa to thicken the stand has not been successful. If a stand becomes thin, seed five pounds of orchard grass per acre after the last cutting. This will add a year or two to the life of the hay crop, will be better than cultivation in preventing the entrance of weeds and crabgrass, and will increase the yield of good hay. The alfalfa-orchard grass mixture can be used for grazing.

(4) The question of following alfalfa with alfalfa has been

raised a number of times. While we have little experimental data on this subject, there are reasons for not following this practice. Alfalfa is a good gatherer of nitrogen and increases the organic matter content of the soil. At one location in North Carolina, 127 bushels of corn per acre were harvested following four years of alfalfa. This yield was obtained without the use of commercial nitrogen as a topdresser. This alone would seem to justify the use of other crops in rotation with alfalfa.

(5) Alfalfa produces good grazing but careful management is necessary or the life of the stand will be short. It can be used as supplementary grazing by grazing an occasional crop of hay instead of mowing. This can be done most profitably when pastures are short and the alfalfa would be worth more for grazing than for hay. The grazing should be rather rapid (as near like cutting as possible), and the plants should be allowed to recover fully before grazing or cutting again.

(6) Alfalfa makes good silage and many farmers are putting the first cutting into the silo. Quite often haymaking is difficult at this time of year. The alfalfa should be wilted to 65 to 70 per cent moisture or a dry preservative should be used.



Fig. 9. This new, experimental line of alfalfa being developed shows the promising future there is for this crop.

For Better Yields...

Follow These Points

1. Select a well-drained soil of good fertility, fairly free of weeds, and conveniently located.
2. Apply lime on the basis of a soil test. Spread uniformly and work into soil before seeding.
3. Fertilize with 700 to 1,000 pounds 2-12-12 and 20 to 35 pounds of agricultural borax at seeding. (Regular alfalfa fertilizer contains 3-4 lbs. borax per 100 lbs.)
4. Prepare a firm, well-pulverized seedbed with organic matter in top layer of soil.
5. Seed 20 to 25 pounds inoculated Atlantic, or Oklahoma Common seed per acre in late summer. (Use Buffalo on wilt infested soils.) Cover lightly.
6. Cut in early bloom stage. Allow hay to wilt in the swath, but rake into windrows before leaves become brittle.
7. Manage properly by top-dressing annually after first year's growth with 500 to 800 pounds 0-9-27, 0-10-20 or 0-14-14 containing 15 to 25 pounds of borax.