CIRCULAR 57 JANUARY 1931

KUDZU IN ALABAMA

By
R. Y. BAILEY AND E. L. MAYTON

AGRICULTURAL EXPERIMENT STATION
OF THE
ALABAMA POLYTECHNIC INSTITUTE

M. J. FUNCHESS, Director
AUBURN

CONTENTS

Kudzu in Alabama

By
R. Y. BAILEY, Assistant Agronomist
and
E. L. MAYTON, Assistant in Agronomy

THERE is a need for a perennial forage plant which will produce large yields of hay, which is adapted to grazing by livestock, and which is sufficiently drouth-resistant to produce high yields when other crops fail. Kudzu has shown more promise of meeting these requirements than any other plant now being grown in Alabama.

Kudzu is a perennial legume which is known locally in Alabama as "Porch Vine" or "Telephone Vine" and is used extensively as a shade plant around farm houses. As a forage plant, kudzu, in either the green or cured state, is eaten readily by all classes of livestock. In feeding value it compares favorably with other legumes.

KUDZU AS A HAY AND GRAZING CROP

Feeding Value.—A comparison of the feeding values of kudzu and alfalfa in both the cured and green states is presented in Table 1. A study of the table reveals the fact that kudzu in both states has a silghtly higher feeding value than alfalfa.

Table 1.—Comparative Feeding Values of Kudzu and Alfalfa.(1)

	Total dry matter in 100 pounds	Digestible nutrients in 100 pounds			
		Crude protein	Carbo-hydrates	Fat	Total
Kudzu hay	92.9	11.4	39.8	1.2	53.9
Alfalfa hay	91.4	10.6	39.0	0.9	51.6
Green kudzu	30.6	4.2	13.9	0.5	19.2
Green alfalfa	25.3	3.3	10.4	0.4	14.6

(1) Henry and Morrison's "Feeds and Feeding". Seventeenth edition, 1920.

Grazing.—All classes of livestock graze kudzu readily and a field of it may be used effectively as a temporary pasture when regular summer pastures fail on account of drouth. The Department of Animal Husbandry and Dairying at the Alabama Experiment Station has done some preliminary grazing work with this plant. During the severe drouth of July 1930, the milk flow of dairy cows was maintained by changing them from grass pasture to kudzu a part of each day. Unfortunately, the area was too small for the number of cows used and no record was obtained which would indicate the grazing capacity of an acre of kudzu. No unpleasant odor or flavor of milk resulted from grazing kudzu.

Observation of kudzu which has been grazed and results of mowing experiments to date indicate that it should not be grazed

closely throughout the growing season. However, the most desirable time for grazing this crop and the extent to which it may be grazed will be determined by additional experiments. In order to maintain a stand, it may be necessary to allow kudzu one year out of every three or four to recover from the effects of mowing or grazing; this would more likely be necessary on poor land than on rich land.

Green Feed for Poultry.—Another use for this crop is as a summer green feed for poultry. Although it would probably not be well adapted as a grazing crop in poultry yards, due to its heavy growth, kudzu may be cut from the field and fed throughout the growing season. It would be especially valuable during periods of extremely dry weather when other green crops fail.

Yields of Hay.—A well-established planting of kudzu on sandy loam soil at Auburn was cut for hay during the six-year period, 1920-1925. Approximately the same area was cut each year. However, the size of the area varied slightly due to runners growing across the borders of the original area. The yields of hay and the number of cuttings made each year are presented in Table 2.

Table 2.—Yields of Kudzu Hay at Auburn.

Year	Number of cuttings	Date of cutting	Yield of hay per acre
			Lbs.
1920	1	September 10	5,114
1921	2	July 28 September 2	5,410
1922	2	August 4 September 23	5,240
1923	2	August 2 October 10	5,665
1924	2	July 29 October 10	4,722
1925	2	July 8 August 10	3,100
Average			4,875

The results presented in Table 2 show that during the first four years the yield was never below 5,000 pounds of hay per acre. The low yield in 1925 was due to the fact that during the period from February to August, inclusive, the rainfall was 20.57 inches below normal. When the weather is taken into consideration, the yield for 1925 was remarkably high.

Another area which was cut twice in 1930, a dry year, produced 5,647 pounds of hay per acre. This area was sandy, but part of it was more moist than average upland. No fertilizers were applied to either of the areas mentioned.

FIGURE 1.—Kudzu on sandy loam soil at Auburn over-running bushes, briars, and small trees.

FIGURE 2.—An enormous crop of kudzu at the Alabama Experiment Station on land which would not have produced more than ten bushels of corn per acre.

Effect of Time and Frequency of Cutting on Yields of Kudzu Hay.—An experiment was started on Norfolk sandy loam soil at Auburn in 1926 to study the effect of time and frequency of mowing on the growth of kudzu. Plants of uniform size were planted in the spring of 1926 and mowing was started in 1928 after the plants had become well established. The number of cuttings, dates of cutting, and the yields of hay produced in this experiment are presented in Table 3.

Table 3.—Effect of Time and Frequency of Cutting on Yields of Kudzu Hay.

Plot No.	Cutting treatment	Dates of cutting	Pounds of hay per acre			
			1928	1929	1930	3-year average
1	2 Early	June 1, August 15	5,749	4,333	1,815	3,966
2	2 Late	June 1, October 15	5,374	4,077	2,595	4,015
3	3 Early	May 1, July 1, August 15	4,256	2,834	1,515	2,868
4	3 Late	May 1, July 1, October 15	3,570	4,300	2,366	3,412
5	4 Early	May 1, June 1, July 1, August 15	3,406	2,944	851	2,400
6	5 Late	May 1, June 1, July 1, August 15, October 15	3,820	2,829	1,205	2,618

The data presented in Table 3 show that yields declined on all plots, except Plot 4, the second year and on all plots the third year; the loss was greater the third year. The smallest yields were made on plots which received three early cuttings, four cuttings, and five cuttings per year, respectively. In addition to this, observations made in the field during the growing season showed that there was a corresponding thinning of the stand on these plots. Plots cut June 1 and October 15 produced slightly more hay than those cut June 1 and August 15. Although the differences in the average yields were small, the yields declined more rapidly the second and third years on the plots cut June 1 and August 15 than on those which were cut June 1 and October 15. Also, the loss in stand was more pronounced on the plots cut June 1 and August 15 than on those which were cut June 1 and October 15. These preliminary results seem to indicate that October 15 is a more desirable date for the last cutting in the latitude of Auburn than August 15, but this problem is to be studied further in order to determine the best dates of cutting.

When to Begin Mowing.—Kudzu should be well established before mowing begins. It should be allowed to grow at least two full seasons before mowing is started. In case the soil is very poor, three seasons may be required before it will be advisable to begin mowing.

Harvesting.—One of the objections to kudzu as a hay crop is the difficulty of mowing. This is especially true of plantings which are being cut the first time. The long vines are caught by the divider board and dragged along by the blade, making it necessary to stop frequently to clear the blade. However, later cuttings are less difficult to make. Although the first cutting is difficult, it may be delayed without serious loss in the quality of hay until the cultivation of other crops is completed and time is not an important factor in the regular farm operations.

This plant sheds its leaves very badly when cured in the swath; it should, therefore, be raked into windrows after the leaves are wilted and allowed to remain there until dry enough to put in the barn. Another method of curing is to stack on racks such as are used for soybean and cowpea hay.

KUDZU FOR SOIL IMPROVEMENT

In an experiment at Auburn kudzu was planted in the early spring of 1916 and turned under in the spring of 1919. The kudzu made little growth in 1916, covered the ground in 1917, and made a dense growth in 1918. From 1919 through 1929, two crops of sorghum hay, four crops of corn, and seven crops of oats were grown on the area devoted to this experiment. The average yields of sorghum hay, corn, and oats are presented in Table 4.

Table 4.—Influence of Kudzu on the Yields of Succeeding Crops.

Plot	Average yields of following crops		
	2 crops sorghum hay. Pounds per acre	4 crops corn. Bushels per acre	7 crops oats. Bushels per acre
1 No kudzu	3,264	14.7	16.6
2 Kudzu	5,800	34.0	24.5

The results in Table 4 show that the residue from kudzu produced an average increase of 2,536 pounds of sorghum hay per acre in 1919 and 1920. The average yield of four crops of corn following kudzu was more than double the yield on the plot that had not grown kudzu. The average yield of seven crops of oats on the kudzu plot was 7.9 bushels per acre more than that on the plot which had grown no kudzu. In 1929, ten years after the kudzu was turned under, the kudzu plot produced 9.2 bushels of oats per acre more than the plot on which kudzu had never grown.

CULTURAL METHODS

Kudzu seldom produces seed and, therefore, must be propagated by plants which are usually called crowns; these are formed by the vines taking root at the nodes. A good crown has a bud, or growing point, and well-developed, fleshy roots eight

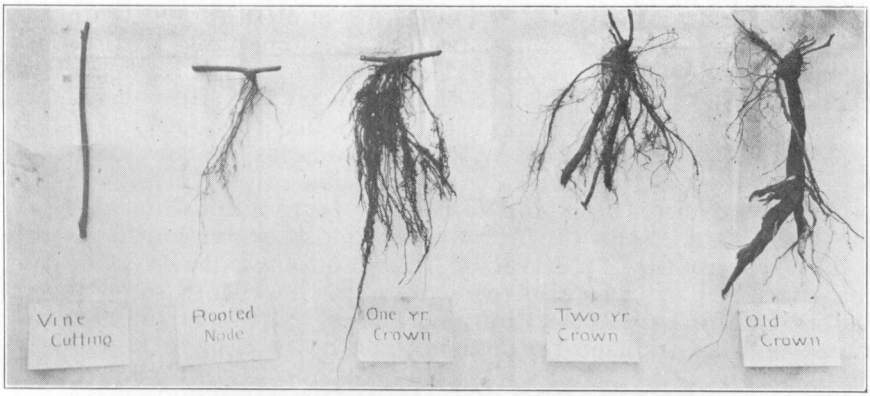

FIGURE 3.—Showing different kinds of kudzu plants. Only the two on the right are recommended.

or ten inches in length; this development requires two or more years (Figure 3). Some successful plantings have been made with vine cuttings, but this method usually results in failure and is not recommended. Some growers advertise plants and fill orders with vine cuttings. Those who order plants should examine them when they arrive and refuse to accept vine cuttings. If crowns are properly set before they dry out, practically all of them will grow. On the other hand, if they are shipped a long distance and allowed to dry out before planting, a large percentage of them will fail to grow. Therefore, it is desirable, wherever possible, to obtain crowns locally.

One method of planting that has been used successfully consists in digging holes about 12 inches deep with a post-hole digger and setting the crowns, the roots of which have been cut back to about 12 inches in length, in these holes. The soil should be packed around the roots so that the bud of the plant is left slightly above the surface. Another method that has been used very successfully is the furrow method. In this method the crowns are set in open furrows so that the buds are just above the soil surface. This method requires less hand labor and has resulted in better first-year growth than the post-hole method, due probably to the fact that the roots are planted whole without trimming. Crowns are usually spaced about 10 feet apart each way, which requires 435 plants per acre. A good start may be made in less time by spacing 5 feet apart each way. This thicker spacing is desirable if plenty of home-grown crowns are available; if they must be purchased, the thicker spacing is expensive.

Since kudzu plants are scarce and rather high in price, it is advisable for farmers to obtain enough plants to set a small area of good land which will produce a dense growth in a short time.

From this area crowns may be procured for further planting. An ideal place for such a planting is on low land where soil has been washed in above a terrace or rock dam. A heavy application of manure and phosphate on this area will stimulate growth and insure a large crop of plants.

The time of planting kudzu has not yet been studied; however, plantings made early in the spring, February 15 to March 15, have been very satisfactory.

Kudzu plants make little growth the first year and may be smothered out by weeds or destroyed by rabbits. The young plants may be protected from weeds by planting some cultivated crop between the rows of kudzu the first year. If soybeans are used as the interplanted crop the rabbits will feed on them and do less damage to kudzu plants.

SOIL AND FERTILIZER REQUIREMENTS OF KUDZU

Soil Requirements.—Kudzu has grown well on soils varying from sandy loams to heavy clays, but has not done well on poor sand. Like other crops it has grown more successfully on good land. Moist land is especially well adapted to kudzu, but nothing is known about the effect of water standing on the crop for one or more days in case of overflow by streams. All of the experiments and observations relative to kudzu here reported have been made on non-lime land; therefore, nothing is known of its adaptation to lime soils.

The remarkable growth of kudzu on land too poor and rough for other crops, together with its high feeding value, shows beyond a doubt that there is a place for this crop on Alabama farms. Figures 1 and 2 show kudzu crowding out bushes, briars, and small trees on land which was too poor to produce more than 10 bushels of corn per acre. The possibilities of kudzu on thousands of acres of similar land in Alabama are almost unlimited. The forage that would be produced on this waste land by a crop like that shown would go far toward supplying the feed and pasture needed for successful livestock production.

Fertilizers.—No studies have been made at Auburn to determine the fertilizer needs of kudzu; all of the plantings discussed in this circular were unfertilized. Some plantings in other parts of the State have been fertilized with phosphate, potash, and manure. Although these plantings are not old enough to warrant definite conclusions, indications are that this plant responds well to phosphorus and manure.

KUDZU AS A PEST

One of the chief reasons why kudzu has not been grown more generally in Alabama was the prevailing idea that this crop was a dangerous pest. Farmers were told by some agricultural workers that if this plant were allowed to become established in

cultivated fields it would be impossible to eradicate it. They were also warned against it on account of the possibility of its spreading to fields where it was not desired. As evidence that this warning is unfounded, kudzu on a small area at Auburn gave no trouble on the adjoining cultivated fields over a period of more than 25 years. This area was plowed in the spring of 1930 for the purpose of obtaining crowns for new plantings, and corn was grown on the land during the summer. The plants which came up on the area did not seriously interfere with the cultivation of the corn. Results of the experiment on time and frequency of cutting indicate that close grazing followed by plowing will eradicate kudzu.

SUMMARY

1. Kudzu is a perennial legume which may be cut for hay, grazed by livestock, or used as green feed for poultry.

2. During a six-year period, kudzu produced an average yield of more than two tons of hay per acre without fertilizer.

3. Close grazing or frequent cutting will destroy the stand of kudzu.

4. The growing habits of kudzu make the first mowing difficult. Later cuttings are easier to make.

5. Kudzu turned under in 1919 increased the average yield of two crops of sorghum hay by 2,536 pounds per acre, four crops of corn by 19.3 bushels per acre, and seven crops of oats by 7.9 bushels per acre.

6. Only strong plants, which have not been allowed to dry out, should be planted. Soybeans planted between the rows of kudzu the first year, and cultivated, will protect the young kudzu plants from weeds and rabbits.

7. Kudzu is not a dangerous pest. No trouble was encountered in preventing its spread to adjacent lands over a period of more than 25 years. It may be eradicated by heavy grazing followed by plowing.