

# REED CANARY GRASS *for* MEADOWS AND PASTURES.

A.C.Army

*Division of Agronomy and Plant Genetics  
Minnesota Experiment Station*

R.E.Hodgson

*Southeast Experiment Station*



REED CANARY AT TIME SEED STARTED TO MATURE

BRARY

L 6 1931

H. S. P. A.

This archival publication may not reflect current scientific knowledge or recommendations.  
Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>

UNIVERSITY OF MINNESOTA  
AGRICULTURAL EXTENSION DIVISION

Published by the University of Minnesota, College of Agriculture, Extension Division, F. W. Peck, Director, and distributed in furtherance of the purposes of the cooperative agricultural extension work provided for in the Act of Congress of May 8, 1914.

**R**EED CANARY GRASS (*Phalaris arundinacea*) is comparatively new among the tame forage and pasture crops in Minnesota altho it grows wild in many parts of the state. Farmers, mainly in the south central part of the state, find that it fills a definite need for a high-yielding, nutritious hay and pasture crop on numerous comparatively small areas of low-lying, poorly drained lands mostly of a peaty or mucky nature, which have been bringing in practically no return. The success of reed canary grass in south central Minnesota on land too wet to produce other crops has led to trials in other parts of the state.

The first known plantings in the United States of reed canary grass as a tame hay and pasture crop were made in Minnesota in 1899. Two fields sown that year on peat soil in Blue Earth and LeSueur Counties are still highly productive.

### ADAPTATION

In Minnesota, reed canary grass is not now an important constituent of the wild hay crop. In the fairly numerous areas where it grows wild it is usually found on low-lying, poorly drained lands on which water often stands in the spring and for short periods at other times. It thrives in locations where the water table is practically at the surface of the soil all of the time and above the surface part of the time. Where stagnant water covers the land most of the time it does not grow successfully. It is found in the beds and along the banks of shallow streams, having been started from seed carried by the water.

No other forage crop, seed of which is available in quantity, will thrive so well on highly productive lands that are too wet for most other crops. On such lands, which would otherwise bring low returns or none at all, reed canary grass has yielded hay and pasture as valuable as, or more valuable than, the crops from equal areas of adjoining well-drained soils. Reed canary grass may be left undisturbed for several years and the best returns obtained from the investment in seed.

It should not be inferred that it is adapted only to peaty and mucky lands or that it will be equally successful on such lands in any part of the state. Conditions may appear similar, but trial often proves that results differ. Reed canary grass appears to be well adapted to growing on well-drained mineral soils, but here it must compete with a large number of other successful forage crops.

Yields of reed canary grass hay in comparison with those from other hay crops on well-drained mineral soil at Ames, Iowa, proved superior to timothy, brome grass, meadow fescue, and tall meadow oat grass.<sup>1</sup> It is well adapted to wet mineral lands and should be a desirable hay and pasture crop on the mineral soils subject to overflow along the banks of the Minnesota and Mississippi rivers.

<sup>1</sup> Unpublished data, Iowa Experiment Station.

## GROWING THE CROP

### Securing a Stand

For planting in the northwest native grown seed is preferable to that grown in warmer climates.

Where low-lying land is so drained that a good seedbed can be prepared, less seed per acre is required. Starting the preparation of the seedbed by plowing the ground in the fall makes it possible to seed earlier in spring. If difficulty in getting on the fields in the early spring is expected, owing to standing water, the plowed surface may be worked down well in the fall and the seed sown in October. If sown late in the fall, the seed will not germinate until spring.

Where large numbers of broad-leaved weeds will grow rapidly, reed canary grass should be sown either as early in spring as possible so the seedlings may be well established before the weeds begin to grow or the seeding should be delayed until the weeds have been largely killed by cultivation. The seedlings of reed canary grass are as hardy as those of timothy and similar grasses, hence there is little danger of loss by freezing after growth has started. Where weedy land makes early seeding impractical, it may be delayed until the last week in June or the first part of July. This gives ample opportunity to plow the land in the spring, if it has not been fall-plowed, and to disk the land throughout the spring months in order to kill out the weeds before the seed is sown.

Another method, on small areas, is to sow the seed in drill rows so that the weeds can be killed by cultivation. This has the further advantage of requiring less seed per acre than the broadcasting method.

Bogs that are too wet to bear up horses and machinery during the open season of the year and are not covered with water in the spring may be burned over either in fall or early spring to free the surface of all previous growth that hinders in the preparation of the seedbed and in establishing a stand. The burning should be done when the grass is dry and a brisk wind blowing so the fire will pass over the field quickly and make a clean burn. Where there is danger of burning peat land, attention must be given to places where fire starts in it, as soon as the surface has been burned over. In spring as soon as 3 or 4 inches of the surface is thawed out, while the ground below is frozen enough to bear up horses and machinery, the disk should be used to smooth the surface and work up a fair seedbed. Even if the land is wet, this practice levels the surface and makes conditions more favorable for the germination of the seed and the establishment of the plants.

### Rate, Method, and Depth of Seeding

At the present price of seed, it is much more economical to broadcast from 4 to 6 pounds or drill 2 to 3 pounds per acre in 16- to 18-inch rows and let the sod form more slowly through growth of the underground parts than to sow at a higher rate. Four pounds of seed germinating 80 per cent or more, sown evenly over an acre, means at least 40 good seeds per square foot. Reed canary grass seed may be sown along with grain crops wherever such crops can be grown to advantage. Lodging of grain will often kill out the seedlings of reed canary grass as it does those of other grasses and clovers.

The seeds of reed canary grass are small, therefore they should not be covered to a greater depth than half to three-fourths of an inch. On peat lands, the use of a heavy roller after the seed is sown firms the surface and provides better conditions for germination and growth.

### Care After Seeding

If a thick stand of broad-leaved or other quick-developing weeds is growing more rapidly than the reed canary grass seedlings, the weeds should be clipped back. This sets the weeds back more than the grass.

Reed canary grass ordinarily should not be pastured at all the season it is sown. If a luxurious growth is made on spring seedlings, it may be cut high as hay rather than to use it for pasture. On wet lands, newly established stands of reed canary grass should not be grazed by cattle or horses until sod has become firm enough to prevent their cutting through. Maximum pasture and hay crops are not produced until after a good sod is established. Reed canary grass needs the same fertilizers as other grasses on the same kind of land.

### UTILIZING THE CROP

After a good reed canary grass sod is formed, animals do not sink in fields that were difficult to traverse before and ordinary hay making machinery may be used without difficulty.

### Pasture

Reed canary grass starts early in spring, even before the water that may cover it disappears, and continues growth later in fall than some other grasses. Where the necessary plant foods are abundant and the water in the soil is adequate, it produces an abundance of pasturage throughout the entire growing season. When Kentucky bluegrass pastures on high lands are often dry during August, this grass on low lands continues to furnish large amounts of pasturage. Its use for pasture lengthens the grazing season.

In Oregon, where the sod is well established on lands where the moisture supply is abundant and other conditions are favorable, pasture was provided for four mature dairy cows per acre for seven months each year. Close grazing is advised to keep the grass from becoming old and tough. In Minnesota a stand established 31 years ago, cut for hay for several years and pastured for the last 17 years, has a smooth sod, providing good grazing. Hogs relish reed canary grass, especially if it is kept fairly short.

### Hay

Seed of reed canary grass is produced in quantity only on the first growth of the season. Up to the time the panicles begin to appear, about the first ten days of June in southern Minnesota, the crop is comparatively fine-stemmed and leafy. With the appearance of the panicles, the stems elongate up to the time the first seed is mature—about the last of June. The stems may double in length during this short period and at the same time they become more fibrous. The second and third crops do not produce panicles in any numbers. Hence, the hay of these crops does not become stemmy and resembles that of the first crop at the time the panicles begin to appear.

Growers who wish to harvest the seed crop must let it stand until the seed has matured. As soon as the seed has been gathered, the hay crop should be cut. Each day of delay in getting this crop off the fields holds back the second crop by that much. Cut at this stage of maturity, large yields of comparatively coarse hay are obtained.

When hay is the only product desired, cutting time should be determined by the yield, the composition of the hay, and its palatability.

Part of the data obtained in Blue Earth, Le Sueur, and Waseca Counties during the summer of 1929 is presented in Table 1 with additional data.

Table 1

Average Yields of Reed Canary Hay per Acre, Crude Protein in per Cent and Pounds per Acre Cut at Different Stages of Maturity

Stage of maturity when cut	Date cut	Height	Dry matter at cutting	On a 15 per cent moisture basis		Crude protein per acre
				per acre	Crude protein	
		in.	per cent	ton	per cent	lb.
First cuttings						
None to 8 per cent panicles showing	6/8	20	22.4	1.10	13.99	312.6
50 to 100 per cent panicles showing	6/18	45	25.4	1.66	12.37	406.9
Seeds at tips of panicles ripe	6/30	50	27.8	2.58	11.11	573.2
All seed mature	7/7&7/9	50	29.6	2.48	10.98	525.8
All seed shattered	7/15	50	28.4	2.41	10.88	524.4
All seed shattered	7/21	50	26.9	2.38	10.84	516.0
Second cuttings						
From fields cut the first time on						
June 30	8/27	26	27.8	1.92	12.11	468.9

## COMPOSITION OF REED CANARY HAY

Percentages and pounds per acre of crude protein for a part of the hay harvested at different stages of maturity, during the summer of 1929 in the Mankato district, are given in Table 1. The samples analyzed were dried without exposure to rain or dew. Hay bleached in drying has a distinctly lower crude protein content.

Considering only yield and quality of hay for feeding to dairy cattle, it appears desirable to harvest the first crop of reed canary grass between the time the panicles begin to appear and the time the majority of them are out. This results in a medium yield of hay high in crude protein content and with a palatability very similar to second crop hay. Harvesting the first crop during that period has the further advantage of giving the second crop an early start with the possibility of obtaining a third crop or considerable fall pasture after the second cutting. Harvesting the first crop as early as this often has the disadvantage that it competes for labor with corn cultivation.

Growers who are able to utilize the first crop of hay largely for feed for work horses and the second crop for dairy cows, may find that it fits in better with their work to cut the first crop a few days before the seeds in the tips of the panicles mature, which in southern Minnesota is during the last week in June or the first of July. Except when seed is to be gathered, there is nothing to be gained by putting off the hay harvest longer than this. Table 1 shows that the hay harvested later than June 30 dropped off in both yield and protein content. Observations indicate that the hay was coarse, which makes it less palatable. Second and third crop hay should be cut as soon as it has ceased making comparatively rapid growth.

In 1929, reed canary yielded 286.3 pounds more crude protein per acre in the first crop than slough hay growing on the same type of land. Compared with blue-joint (*Calamagrostis canadensis*), one of the best wild hay plants for wet lands in Minnesota, the yields of hay from two cuttings were about equal. However, there were 346 pounds more crude protein per acre in the reed canary than in the blue-joint hay.

In 1930, on 23 reed canary meadows in south central Minnesota, the average yield of hay per acre was 2.6 tons from the first cutting and 2.0 tons from the second—4.6 tons for the season. On fewer fields, reed canary averaged 4.7 tons, blue-joint 4.5, and slough grass 3.7 tons per acre of hay on a 15 per cent moisture basis.

Nitrogen fertilizers were applied at a rate of 320 pounds per acre to parts of one field in the Mankato district in May, 1929. The crude protein content of the hay from the untreated portions cut on July 15 was 10.88 per cent and from the portions treated with 320 pounds of nitrogen fertilizers, 12.86 per cent. For the second crop, cut Sep-

tember 5 on the untreated portions, the crude protein content was 12.79 per cent and on the treated portions 14.25 per cent. These percentages are for hay on a 15 per cent moisture basis. These results are in line with numerous previous findings that applications of nitrates made at the proper time usually increase the protein content of grass crops.

In 1930 the increases in yields of first crop hay from the application of 160 pounds of sodium nitrate per acre varied from 13.6 to 47.6 with an average of 26 per cent for four reed canary meadows. There was no increase in yields of second crop hay from the nitrated plots. On one field, barnyard manure applied in spring brought about an increase in yield of 64.3 for the first crop and 41.4 per cent for the second crop over those obtained from adjacent unfertilized areas.

### **PALATABILITY AND FEEDING TRIALS OF THE HAY**

Farmers who have been feeding reed canary hay cut before it becomes too coarse have found it palatable to all classes of livestock.

At the Southeast Experiment Station, at Waseca, good second crop reed canary hay was as palatable to cattle, after they became accustomed to it, as good timothy and was superior to wild hay. It was less palatable than alfalfa hay.

A brief feeding trial indicates that cows did not like a sudden change from alfalfa to reed canary hay. They ate only half as much at first and their production dropped. Gradually they ate more of the hay but not enough to keep up the milk flow maintained on alfalfa. Whether this was because of the change in hay or of lack of food nutrients is not known. The crude protein content of the second cutting reed canary hay used in the trial was 12.7 per cent.

At the Iowa Experiment Station reed canary hay, harvested 10 days after the seed was ripe and fed to a group of brood mares in comparison with good quality timothy hay, was consumed to the last straw when timothy was hardly touched. One of the apparently desirable characteristics of reed canary grass is that it retains its leafiness and apparent succulence long after the seed ripens.

### **SEED PRODUCTION**

From the data given in Table 1, it is evident that the yields of the first crop of reed canary hay in tons and protein in pounds per acre increase about up to the time the seed begins to ripen; the percentage of crude protein decreases only moderately up to that time. Therefore, farmers who are equipped to harvest and care for the seed can increase their profits by gathering it from the first crop before cutting for hay.

The seeding habit of reed canary grass makes it difficult to harvest large amounts by hand. Maturing of the seed in the panicles is progres-

sive. When the first seeds at the top of the panicles are mature, as indicated by fully colored gray or brown hulls, other seeds lower down range in color to only a trace or none. The first mature seeds drop out and are lost before the rest are ready to harvest.

Table 2  
Maturity, Weight per 1,000, and Germination of Reed Canary Seed

Color of hulls	Seeds of the various grades of color present	Weight per 1,000 seeds	Weight per 1,000 seeds	Germination 16 days
	per cent	grams	per cent	per cent
Entirely gray or brown . . . . .	48.5	0.865	100.0	91.0
Down to 75 per cent gray or brown . . . . .	23.5	0.775	89.8	83.5
Down to 50 per cent gray or brown . . . . .	13.2	0.691	79.9	83.0
Down to trace gray or brown . . . . .	8.2	0.574	66.4	72.5
Entirely green . . . . .	4.1	0.452	52.3	51.5
Trace of green . . . . .	2.5	0.358	41.4	36.5

From these data it is evident that the more mature seeds, as shown by the amount of gray or brown on the hulls and plumpness as indicated by weight per 1,000, give a higher percentage of germination.

When to begin gathering the seed crop depends on how rapidly the work can be completed. If gathered by machine and the acreage is not too large, it probably is best to wait until the seed in the upper half of the panicle is gray to brown in color. If gathered by hand, it may be advisable to start a day earlier. On a field where daily harvests were carried out on a series of plots in 1929, yields of more than 100 pounds of seed per acre were obtained over an eleven-day period starting when the first seeds were ripe at the tops of the panicles. The highest yields were 163.3 and 160.3 pounds per acre on the third and fourth days of the eleven-day period. Gathering the panicles by a special machine made from an old binder is a fairly rapid process. When the larger hopper of this machine is filled with the panicles, they are transferred to a wagon having a box rack lined with canvas in which they are hauled to the drying sheds.

Seed from wild plants, tho attractive looking is slow in germinating and low in germinating power. It is not economical to grow seed for sale in fields started with such seed.

### Drying the Seed

The method used in drying large amounts is to spread the panicles 4 to 8 inches deep on canvas or other material under cover and to turn about 6 times a day to prevent heating. When panicles are fairly dry the seed is beaten out and spread in a thin layer on canvas to dry further. Seed germinating 90 per cent has resulted from this method