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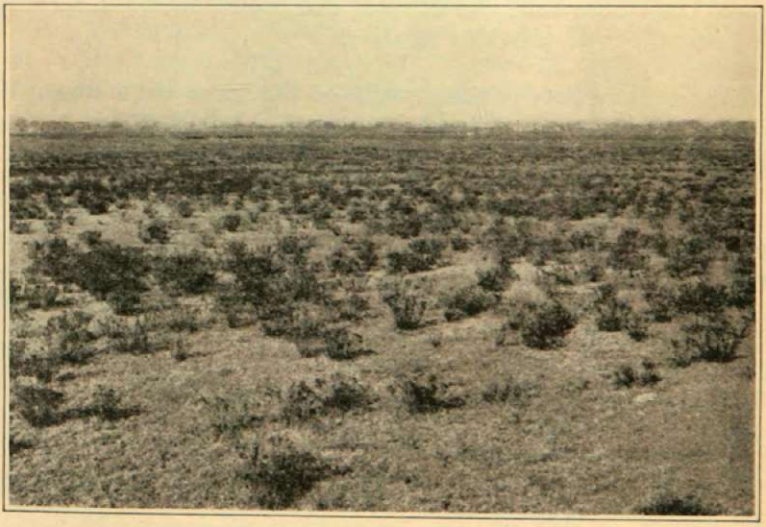
CAN WE IMPROVE OUR RANGE?



A continuously grazed pasture, October 14, 1930. Grama grass and buffalo grass of low forage production for cattle have become established under continuous grazing. Snakeweed, a worthless and slightly poisonous plant is taking a large percentage of the range.

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Summary

The deferred and rotation system of grazing is a practical method of improving the range.

Under this system the range is divided and the stock alternately grazed on different sections. The animals are kept off part of the range until the grasses can produce seed and recover from the effect of previous grazing.

The system favors the growth of the more valuable grasses and other forage plants and reduces the poorer-quality plants and poisonous weeds.

Where high-yielding grasses such as western wheat grass and needle grasses are present, the range produces green forage earlier and for a longer period.

Forage plants, on ranges where deferred and rotation grazing are practiced, are taller and produce more seed and show increased yields.

Ranges grazed under this system show as much as 53 percent increase in abundance of wheat grass and a like increase in other valuable forage plants.

Deferred and rotation-grazed ranges will yield 36 percent more forage and have 22 percent fewer weeds than ranges that are continuously grazed.

The deferred and rotation system of grazing can be used in the mountain parks, the forest, the foothills and the plains and can be satisfactorily applied to meet different range conditions.

CAN WE IMPROVE OUR RANGE?

BY MELVIN S. MORRIS*

The biggest crop in Colorado is grass. In spite of the enormous acreage of grass and its importance in our western agriculture, it is the poorest cared-for crop in the state. However, improvement of the range can be brought about. One of the most practical methods of range improvement is by deferred and rotation grazing. What does that mean?

Deferred and rotation grazing means the division of a range so that stock may be grazed alternately on different sections; also, that the animals are kept off part of the range until the plants produce seed and are allowed to recover from the effects of previous grazing. It is a method of management of range livestock based upon the requirements of the plants that make up the pasture.

Range land is the basis of the livestock industry and should be utilized in such a manner as to maintain a continuous supply of forage. Continuous grazing often results in complete destruction of the palatable and nutritious range plants, their place being taken by worthless or even poisonous weeds.

Our native pastures can produce more forage under the deferred and rotation method than under continuous grazing. Good native pastures produce the largest and cheapest gains, and they can be maintained and improved and the yield of native forage plants increased by the deferred and rotation system of management.

The Deferred and Rotation Grazing Method

This method is based primarily upon the normal requirements of the most desirable plants on the range and the complete utilization of forage produced. The movement of stock is based upon the following conditions which are considered important in the life of the plant and the needs of the rancher: (1) Date plant growth begins in the spring, (2) date of seed maturity or plant maturity, (3) time required for seedlings to become established, and (4) utilization of forage produced.

In applying the above factors, a range area or native pasture can be divided into two or three parts of equal carrying capacities. (See Figures 1, 2 and 3.) If the pasture is divided into two parts we have a simple application of the method. For

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convenience let us call one half area "A" and the other half area "B." The procedure is then as follows: Area "A" is grazed thruout the grazing season while area "B" is protected from grazing from the time the plants appear green in the spring until they have matured seed (bunch grasses) or have completed their growth for the year (sod grasses) and are turning yellow in color. This protected or deferred area "B" is then opened to grazing along with area "A" to be grazed the remainder of the season. This is repeated for another year in order that seedlings that become established the first year will receive a year of protection and the pasture itself will have 2 years of rest during the growing season. The third year the procedure is reversed (rotated). Area "A" which was allowed to be grazed during the whole of the grazing season the previous 2 years, is protected from grazing (deferred) during the growing season for 2 years, while "B" is grazed continuously during the growing season for the same time.

The procedure is reversed (rotated)at the end of every 2 years, until the pasture is returned to a satisfactory grazing condition and then the rotation can be of 1-year intervals. (See Figure 1.)

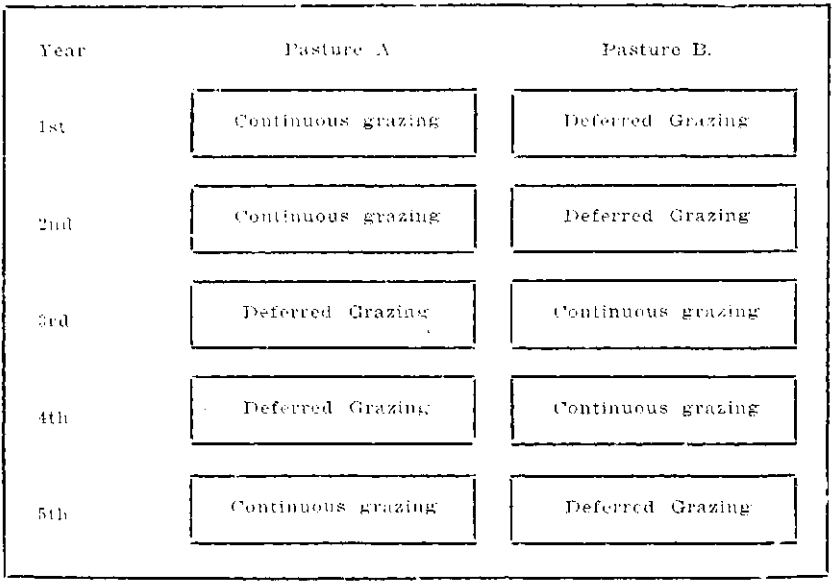

Fig. 1.—Diagram of arrangement of pasture for deferred and rotation grazing where pasture is divided into two parts.

Modifications of the Deferred and Rotation Method

The deferred and rotation method of grazing is of general value in that it can be applied to different types of ranching and to different kinds of native pasture. Hay meadows and tame pastures as well as winter feeding will fit into this method.

Where long winter feeding of hay and grain is necessary as in our mountain areas or on range land which provides grazing for about 6 to 9 months, the method already outlined can be used. The grazing season is supplemented by late fall and spring grazing on tame pastures and hay meadows. The period the pasture is deferred is based upon the same factors as for range which has a longer grazing season.

A method developed by the United States Forest Service may be applied to regions where the grazing period is about 6 months. A diagram of this method is shown in Figure 2.

In this method the pasture is divided into three parts and each is grazed according to seasonal periods. The corresponding periods for Colorado do not differ widely from the limits for sections where the method has been applied. The grazing periods described by Sarvis are quoted:

"The grazing periods at Mandan, North Dakota, have been as follows: Spring, from May 15 or June 1 to July 1 or 15; Summer, July 1 or July 15 to September 1 or September 15; Fall, September 1 or September 15 to October 15 or November 1. These periods of grazing fit the requirements of the vegetation in a satisfactory manner. In the spring the vegetation has made a good growth by May 15 or June 1 and makes rapid growth during the grazing period, so that the cattle obtain plenty of feed. In the summer period there is still some growth taking place and a few species have matured. By the time the fall period is reached all the valuable species in the divisions unpastured to this time have matured their seeds and are ready for harvest."

The additional expense required in fencing was more than offset by the increase in forage. It was found that the acreage required for one head of stock could be reduced to 5 acres where it formerly took 7 acres.

For some sections where grazing is year-long and reserve pastures are left for the winter months, the following method is suggested: (See Figure 3.) In this system the pasture is divided into three parts of equal grazing capacities. Pasture 1 is grazed from June 1 to August 1 while pasture 2 and pasture 3 are protected. August 1, pasture 2 is opened to grazing along with pasture 1 while pasture 3 is left for winter reserve. Pasture 1 and pasture 2 are grazed together until February 1 when

Year	Pasture A	Pasture B	Pasture C
1st	Spring	Summer	Fall
2nd	Summer	Spring	Fall
3rd	Fall	Spring	Summer
4th	Fall	Summer	Spring
5th	Summer	Fall	Spring
6th	Spring	Fall	Summer
7th	Spring	Summer	Fall

Fig. 2—Plan of deferred and rotation grazing study at the Northern Great Plains Experiment Station and in U. S. Forest Service studies.

pasture 3 is opened to grazing with the other two pastures for the remainder of the winter and spring, except that the pasture that is to be grazed from June 1 to August 1 of the second year is closed on April 1 to permit the forage plants to make some protected growth for the next grazing period.

The dates suggested above are not fixed. The exact date would vary from year to year depending upon the weather during the growing season tho the dates would be nearly that of the suggested ones.

On one well-managed ranch in Larimer County, an excellent deferred and rotation method is used. The cattle graze on the range in the Colorado National Forest during the summer period until about the middle of October; they are then allowed to graze on one-half of the ranch until March. From March 1 to the opening of the grazing on the forest allotment, they graze on the

other half. In this manner half of the range is protected during the critical spring period and, with the summer growing period, allows the plants to get a good start and make ample food reserves for storage and growth. The desirable grasses react to this treatment and increase in numbers. They are able to produce more and better seed and thereby improve the range.

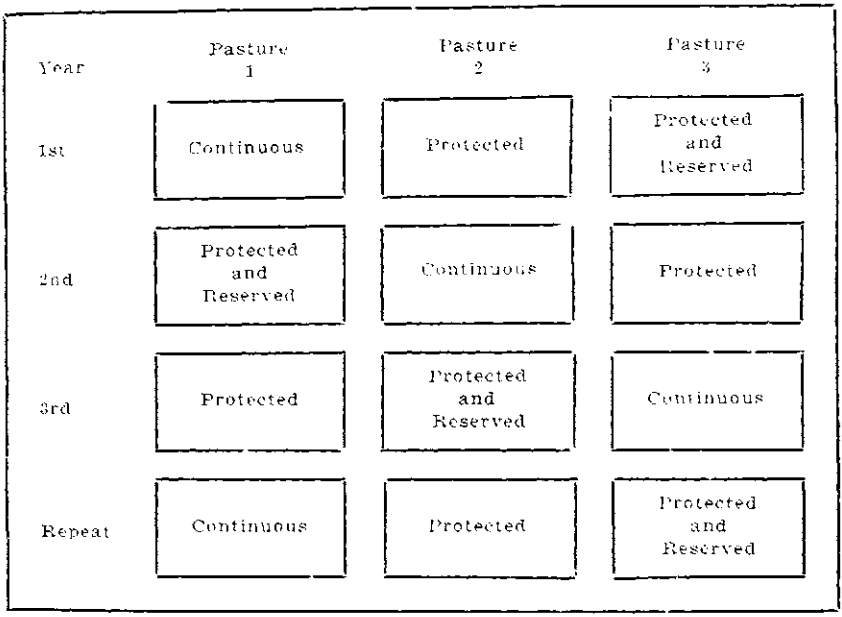

Fig. 3.—Plan of deferred and rotation grazing where reserve pasture is desired on year-long ranges.

Effect on Forage of Continuous and Deferred-Rotation Grazing

In comparing the results of continuous grazing versus deferred and rotation grazing over a period of time, the most important consideration is the abundance of the good forage plants surviving under the two systems. Careful measurement has been made on uniformly distributed areas of typical wheat-grass pasture to determine the effect of the grazing under the different methods. The areas studied were grazed for 9 years under the two systems of grazing.

It has been found from measurements that western wheat grass, one of our most valuable forage grasses, is 53 percent more abundant in the deferred and rotation pasture than in the continuously grazed pasture. Other desirable plants, tho not as abundant as western wheat grass, showed an increase.

The abundance and distribution of the valuable plants gives a striking illustration of the differences in forage under the two grazing systems. The total stand on the deferred and rotation pasture was greater than on the continuously grazed pasture. The greater number of desirable plants and the more general distribution of most of the plants showed better use and uniform grazing of the deferred and rotation pasture. Figure 4, a photograph of a deferred and rotation pasture, shows the excellent condition of the forage. Western wheat grass makes a heavy cover and is uniformly distributed.

Figure 5, a photograph of a continuously grazed pasture, is a contrast to the other. Buffalo grass, that yields less forage to cattle, is patchy and prominent while the wheat-grass stand is very thin.

The picture on the cover is a photograph of a continuously grazed pasture; it is an even better illustration of general grazing conditions. Lower-yielding grama grass and buffalo grass are the principal forage plants while snakeweed, a slightly poisonous plant, is rapidly increasing. Where grazing is not defer-

Fig. 4.—A deferred and rotation pasture on May 28, 1930. Western wheat grass is the principal plant. The stand is good and the wheat grass and the desirable weedy plants are uniformly distributed in the pasture.

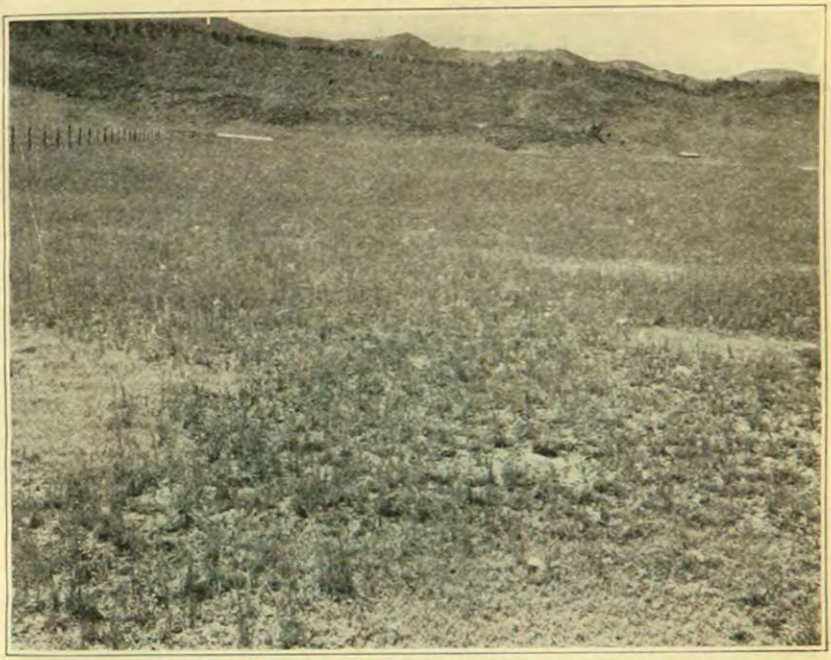

Fig. 5.—A continuously grazed pasture on May 28, 1930. Buffalo grass patches which furnish little forage to cattle are seen invading the pasture. The wheat grass stand is very thin here.

red and stock has access to the pasture too early in the season year after year, serious damage may be done. The soft ground is cut by the hoofs of the animals so the roots of the plants are cut or exposed and early cropping prevents seed production and the normal reproduction of the grass crop (Figure 6). Repeated treatment of this kind will result in nothing but an inferior pasture.

A general comparison of the yield of a deferred and rotation-grazed pasture and a continuously grazed pasture shows that the continuously grazed pasture yields 64 percent of the former in desirable plants and has 22 percent more weeds than the deferred and rotation-grazed pasture.

Effect of Grazing on Height of Grass and Rate of Growth

The effect of grazing on the size of forage plants is also of importance. Measurements of western wheat grass on both continuously grazed pasture and on deferred and rotation-grazed pasture shows that in the latter the grass is 22 percent taller. Measurements on western needle grass, another valuable forage

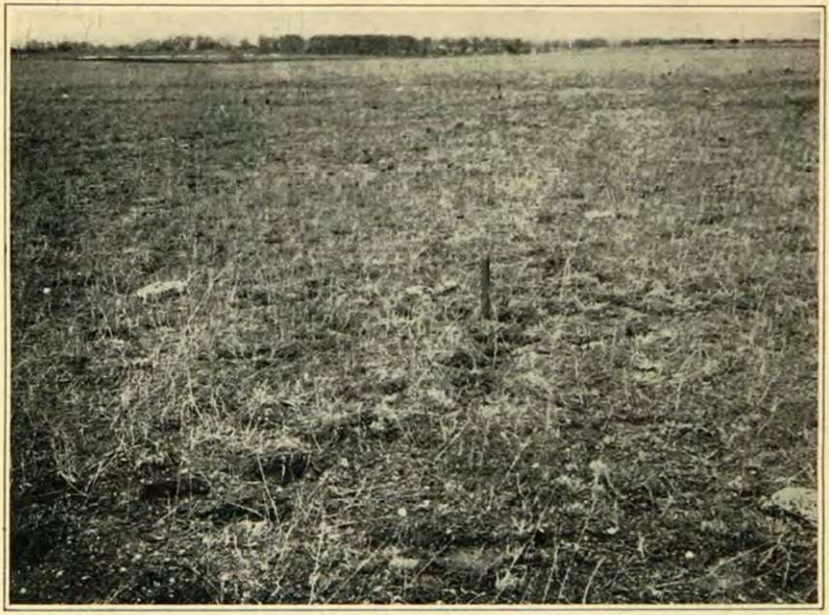

Fig. 6.—Effect of grazing on wet pastures in the spring. Cattle cut up the soil and plants, exposing roots, with the resulting death of the plants. Repeated treatment of this kind year after year, will result in a very inferior pasture. The stick indicates cutting by hoofs of cattle.

plant, showed an increase of 33 percent in growth on the deferred and rotation pasture. These two valuable grasses not only furnish more forage but make the most rapid growth in the spring and mature a week to 15 days later. It is desirable to encourage these grasses that furnish a longer period of green forage. Spring growth is retarded by continuous grazing and suitable forage under this system is late in appearing.

Vitality of Seed Produced

Needle grass is one of the important grasses in these pastures that produces seed year after year. It is highly desirable as a forage plant before seeds form and after seeds drop. It is the first grass to appear and is eagerly sought by livestock. Germination tests made on seed collected from grasses on continuously grazed pastures and on deferred and rotation-grazed pastures showed that the seed from the former was lighter and had much poorer germination.

Seed from grasses on a continuously grazed pasture weighed 28 percent less than that from a deferred and rotation-grazed

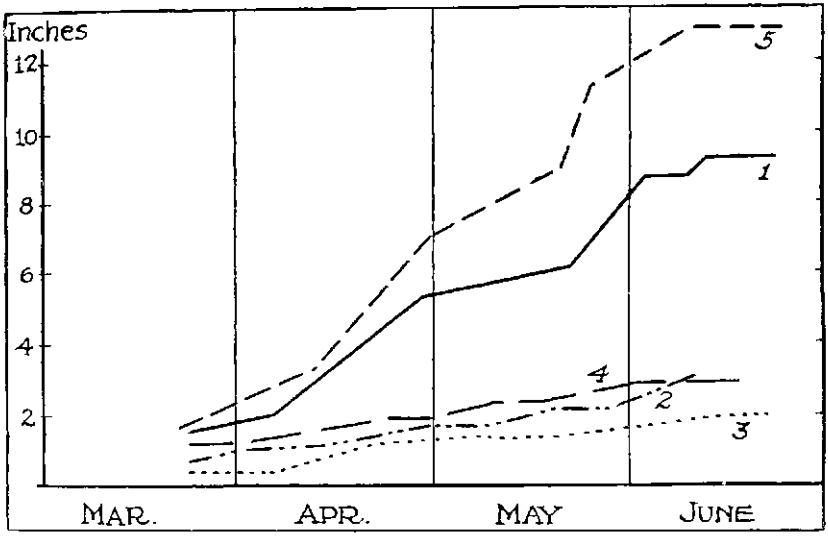

Fig. 7.—Growth rate and height of growth of five important grasses.
1.—Western wheat grass
2.—Grama grass
3.—Buffalo grass
4.—Three-awn grass
5.—Needle grass.

pasture, and germination tests showed 32 percent germination for seed from a deferred and rotation pasture but only 12 percent germination for seed gathered from the grasses in a continuously grazed pasture.

Forage Yields of Important Range Grasses

The value of the grasses of our ranges is determined by the earliness of starting growth in the spring, the height of growth and their yields in forage. These things must be considered in comparing results under different systems of grazing.

In Figure 7 is graphically illustrated the rate of growth and the height of growth of five of our commonest range grasses. It can be seen from this figure that grama grass, buffalo grass and three-awned grass not only start to grow late in the season, but are short grasses producing little forage for cattle. Western wheat grass and needle grass, on the other hand, start early in the spring and grow to considerable height and naturally produce more forage for cattle.

These grasses in our pastures are favored by deferred and rotation grazing. Yields of these grasses go to show what can be expected from them. The chart (Figure 8) illustrates the yield of four types of grass pasture. It may be seen from these

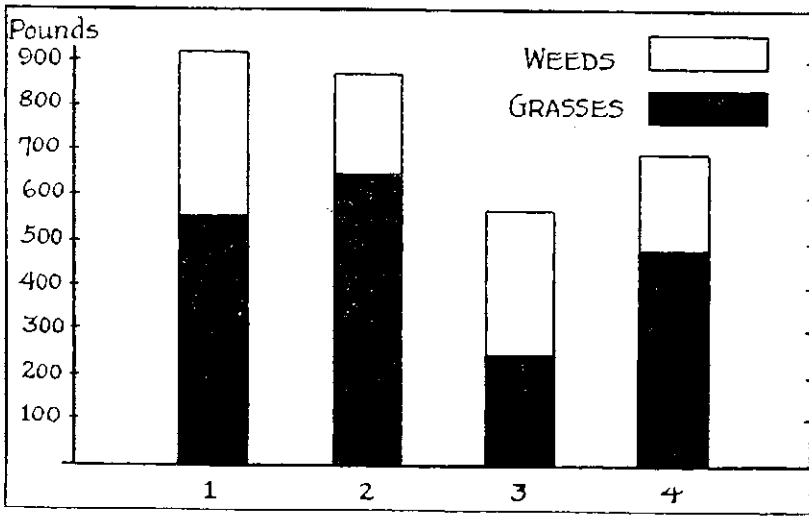

Fig. 8.—Forage yield of four types of pasture in pounds per acre.
1.—Western wheat grass pasture
2.—Needle grass pasture
3.—Grama grass pasture
4.—Buffalo grass pasture

figures that the western-wheat-grass type of pasture produces per acre 920 pounds of forage, 530 pounds or 58 percent of which is western wheat grass; the rest is from other less important plants, for convenience classed as weeds. The needle-grass areas yielded 890 pounds of forage per acre, 71 percent of which is needle grass. Grama-grass type of pasture yielded on equal areas, an average of 550 pounds per acre, only 230 of which were grama grass. This low yield of grama grass is due to its scattered growth. Buffalo grass yielded a total of 620 pounds, 465 of which were buffalo grass.

On the deferred and rotation pasture the more desirable western wheat grass and needle grass increase while under continuous grazing buffalo grass and grama grass increase with a resulting decrease in amount of forage. The extra yield and forage value are definitely in favor of the deferred and rotation system on pastures where the western wheat grass and needle grasses thrive.