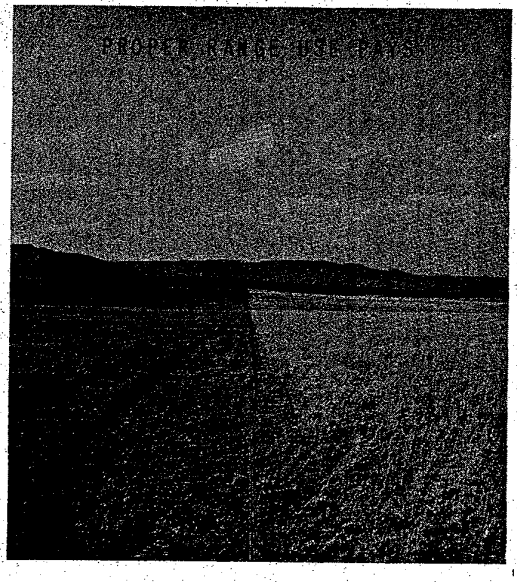
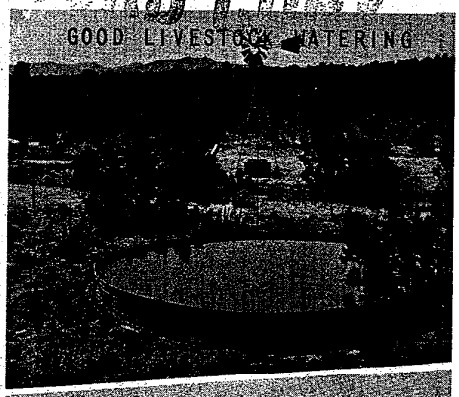
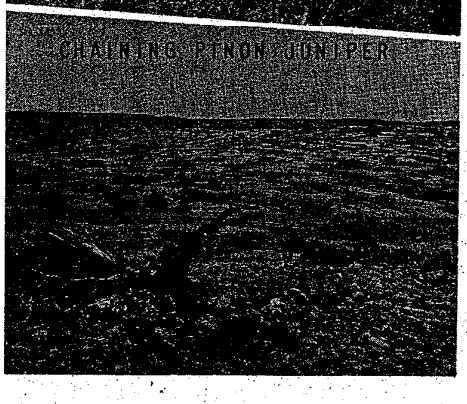
RANGE CONSERVATION - TECHNICAL NOTES







U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NEW MEXICO

TECHNICAL NOTE NO. 6

September 7, 1966

SUBJECT: RANGE INFORMATION - Grazing Management Systems

The attached paper was presented at the Fourth Annual Cattle Breeders' School held at New Mexico State University February 24 and 25, 1959, by Dr. Gerald W. Thomas. Dr. Thomas is presently Dean of Agriculture at Texas Technological College but formerly served as a Range Conservationist with the Soil Conservation Service. He presents some ideas on rotation-deferred systems of grazing with special reference to southwestern range conditions.

This paper is particularly gratifying to those who have observed vegetative improvement on New Mexico Ranches operating under a deferment system.

This material is useful as a quick review of workable deferred-rotation systems that may be presented as alternatives to interest ranchers in the development of conservation plans. At any rate, the possibility of practical application of a knowledge of plant physiology through the use of deferred-rotation grazing management syatems should be considered in ranch planning, and technicians should be familiar with any reliable information presented.

Attachment

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GRAZING SYSTEMS FOR SOUTHWESTERN RANGES

Gerald W. Thomas
Dean of Agriculture, Texas Technological College

One of the most controversial and little-understood range management practices is that of "grazing systems." By "grazing systems" I am referring here to four possible alternatives: (1) continuous or year-long grazing, (2) rotation grazing, (3) deferred grazing, or (4) deferred-rotation grazing.

Most of us understand the common practice of continuous or year-long grazing. However, some clarification may be necessary for the other classifications. Rotation grazing to me means a systematic movement of livestock, usually on a fixed time-period basis. For example, movement every two months or every three months. Deferred grazing usually means resting any pasture or the entire ranch until after seed-set in the fall, whereas deferred rotation grazing implies a systematic deferment. In other words, deferred-rotation means deferring all pastures at different times of the year on a rotation basis. I will spend most of my time here discussing deferred-rotation grazing as compared to continuous grazing.

Most ranchmen in the Southwest practice year-long or continuous grazing and yet we know that the plant is not well-adapted to this type of use. Grass-clipping experiments and seasonal grazing studies show two distinctly critical periods of grazing grass plants. One is during the early stages of growth and the other is during the dough stage of seed formation. We have some data that indicate the late fall period may also be important.

I know that we cannot talk Southwest ranchmen into seasonal grazing, and I doubt that we would want to, but we should be able to adapt our grazing system to a seasonal vegetational growth pattern by practicing deferred-rotation grazing.

This sounds reasonable from the standpoint of plant physiology, and yet much of the published information on grazing systems indicates no particular advantage of rotation over continuous grazing. (Journal of Range Management, Volume 4, 1951.) For example, the Experiment Station at Woodward, Oklahoma, has recommended moderately-stocked continuous grazing for the South Plains area over the rotation system which they have studied. Other investigations have also produced the same general conclusion. Why, then, should we be concerned about any system other than continuous grazing, with the probability of additional cost and trouble?

To answer this question, I should like to point out that there are many kinds of rotation and deferred-rotation systems of grazing. Systems can be designed with any number of pastures (over 2) and livestock movement can be based on a fixed calendar time, the degree of utilization, or a flexible time in accordance with pasture size or carrying capacity.

In my opinion, much of the data which reflect no particular advantages of deferred-rotation grazing are inconclusive, due to the fact that the system studied has not been properly designed for Southwest range conditions. Many investigators have studied systems imported from high-rainfall areas or adapted from irrigated pasture rotations. These systems cannot be expected to increase production on our semi-arid range lands.

The primary requirements of a good system of deferred-rotation grazing are:

(1) Base the herd size on the entire area to be included in the system at a conservative stocking rate.

(2) Be sure to set up a deferred period of sufficient time to allow plants to gain vigor and produce seed. (This is a point on which more research information is needed. Data from studies in the Southwest indicate a rest period of 4-6 months as most desirable.)

(3) Provide for a year-round water supply in each pasture.

(4) Alternate or rotate the deferred pasture to give all plant species and all pastures the advantage of resting at different seasons. (Set up the practice on a systematic basis.)

(5) Provide for flexibility for adverse weather conditions or for other unforeseen factors. Be prepared to cull severely during drouth or hold over if surplus forage is available. Keep a reserve feed supply and make full use of supplemental pastures.

A properly-designed deferred-rotation system can be adapted to any ranch with two or more pastures following these principles. If the ranch is presently stocked to full capacity and the vegetation is short, it may be hazardous to defer a portion of the grazing area and put the full grazing load on the remainder. The damage possible on the grazed area in this instance may more than off-set the gain obtained from deferment. Leo Merrill, Range Specialist at the Ranch Experiment Station, Sonora, Texas, recommends that a good grass cover be built up before initiating the deferment system.

Basically, there are two general types of deferred-rotation systems; one I shall call intensive and the other extensive. Using four pastures, the following diagrams will illustrate these types. Let us assume that the normal stocking rate for an entire four-pasture area is 120 cows. With the intensive system, the total herd is placed on one pasture, and with the extensive system, the herd is divided into three groups and placed on three pastures. (Figure 1)

In the first case, one pasture is grazed with a heavy rate for a short period of time. For example, in Figure 1 each pasture is grazed two months and rested six months. This system has some advantages and meets the basic requirements for rest periods, but livestock movement every two months is not very desirable.

Gerald N. Thomas (cont. - 3)

The extensive deferred-rotation system shown in Figure 1 was designed by Leo Merrill at the Sonora Experiment Station in Texas. Under this system each pasture is grazed for twelve months and then rested for four months. Livestock are moved from one pasture at the end of each four-month interval. Rest periods are alternated so that each pasture is rested at a different time of the year in each rotation cycle. In this manner, all plants have an opportunity to gain vigor and set seed at least once during a four-year period. The first period of rest allowing seed production is followed by a second rest period one year later which favors seedling establishment.

Results of nine years of study of the Merrill System at the Sonora Station looks very good, as compared with continuous grazing at three different rates of stocking. During this nine-year period, seven years have been characterized by severe drough. The heavily-grazed pastures reacted as it was expected they would and today are somewhat drough-stricken and in poor condition. During the same period, the moderately-grazed year-long pastures have maintained a fair condition. The deferred-rotation pastures have improved in vegetative condition to the extent that they are now capable of carrying 5-10 more animal units per section than the other pastures. (See Figure 2) Production per acre has been slightly higher than on the pastures grazed continuously at the same stocking rate. As Leo Merrill has stated, this improvement took place during a period of the worst drouth West Texas has ever recorded.

The Sonora study was made with mixed cattle, sheep, and goats, but it seems likely that similar results could be obtained from straight cattle on many of the Texas and New Mexico ranges.

On the Texas Range Station, Barnhart, Texas, this same deferred-rotation system has been tested for a shorter period of time. The vegetation at Barnhart differs from that at Sonora and is predominantly tobosa, buffalo, and curly-mesquite grasses. The Barnhart Study has been conducted as a cow-calf operation. Calf production per acre under deferred-rotation grazing has been consistently greater during the drouth than under continuous grazing at the same stocking rate. During the period in which direct comparisons can be made with the same rate of stocking, the deferred pastures have produced 1.1 pounds of beef more per acre than pastures grazed year-long.

A new project to be initiated by cattlemen in Throckmorton County, Texas, has been designed to study, among other problems, two systems of deferred-rotation grazing on the Rolling Plains. You may be interested in knowing that the Texas cattlemen are in the process of raising $95,000 from private sources to set up this study. The SES Ranch is also furnishing cattle and eleven (11) sections of land for this research. This type of cooperation on our mutual problems is really encouraging to me and shows the kind of progressive thinking the cattlemen are now doing.

Although deferred-rotation grazing is only one of the many problems of livestock-vegetation relationships on which we need more research information, it is my firm belief that these systems will benefit our livestock industry. A properly designed grazing system can be adapted to almost any ranch situation in the Southwest, usually without additional fencing or other capital outlay. Tentative research results indicate that this practice merits very careful consideration.

INTENSIVE DEFERRED-ROTATION SYSTEM

First Period Possibly 2 Months		Second Period Possibly 2 Months		Third Period Possibly 2 Months		Fourth Period Possibly 2 Months	
(1) 120 Cows	(2) Rest	(1) Rest	(2) 120 Cows	(1) Rest	(2) Rest	(1) Rest	(2) Rest
(3) Rest	(4) Rest	(3) Rest	(4) Rest	(3) Rest	(4) 120 Cows	(3) 120 Cows	(4) Rest

EXTENSIVE DEFERRED-ROTATION SYSTEM (MERRILL SYSTEM)

First 4-Month Period		Second 4-Month Period		Third 4-Month Period		Fourth 4-Month Period	
(1) Rest	(2) 40 Cows	(1) 40 Cows	(2) Rest	(1) 40 Cows	(2) 40 Cows	(1) 40 Cows	(2) 40 Cows
(3) 40 Cows	(4) 40 Cows	(3) 40 Cows	(4) 40 Cows	(3) 40 Cows	(4) Rest	(3) Rest	(4) 40 Cows

Figure 1 - Examples of an intensive and an extensive deferred-rotation system using four pastures with a total carrying capacity of 120 animal units.

SWITCHBACK DEFERRED - ROTATION GRAZING SYSTEM (2 pastures)

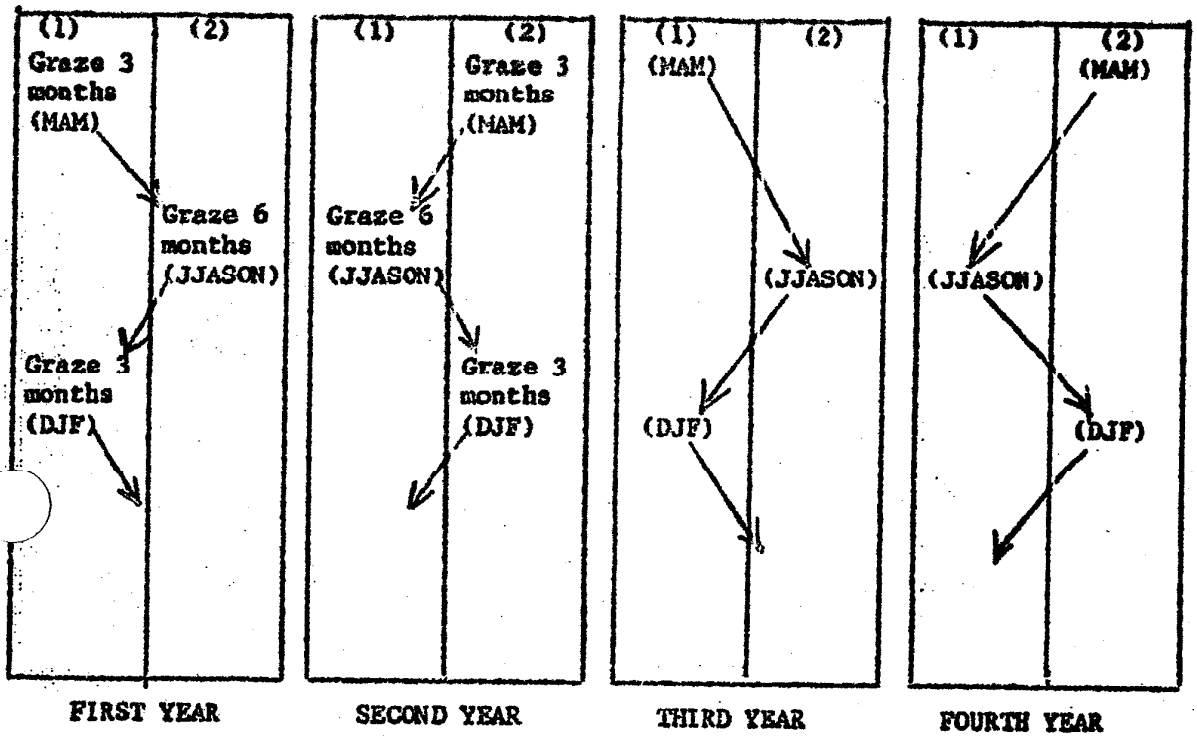
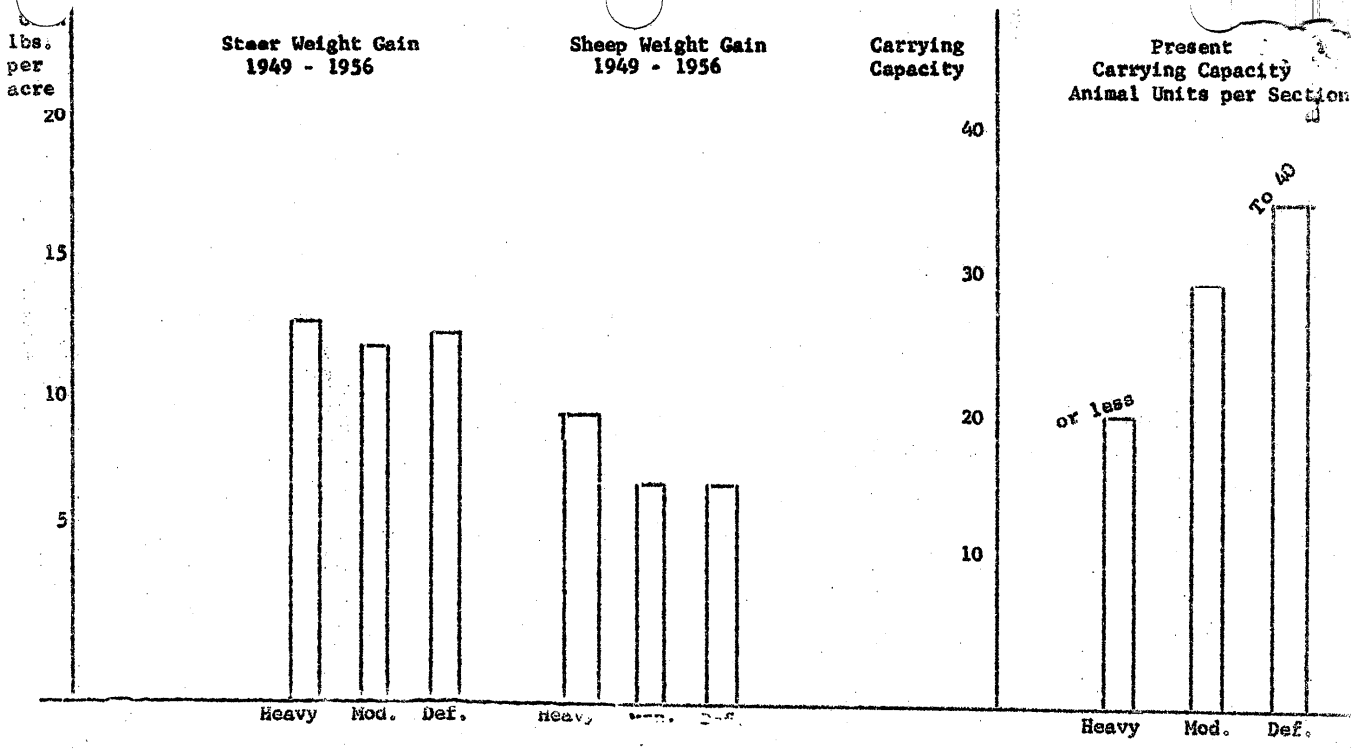


Figure 1a

This is a 2 pasture system patterned after the physiological requirement of plants. It has produced more per acre in South Africa than continuous grazing but has not been adequately tested in this country. The most important feature in the design is the choice of the critical spring 3-month grazing period which is probably March, April and May in the Rolling Plains. The system should allow for seed set in most years.

One cow herd is used for both pastures based upon a moderate rate for the entire area in the system.



Gains in pounds per acre from steers and sheep under three types of grazing use: Heavy - 48 animal units per section, Moderate - 32 animal units per section, and Deferred rotation grazing also at 32 animal units, per section.

Present carrying capacity of pastures in animal units per section when pastures were grazed heavily, moderate and under deferred rotation.

Figure 2. Results of studies on the Ranch Experiment Station at Sonora, Texas, showing comparisons of continuous grazing at heavy and moderate rates of stocking with deferred-rotation grazing.