Table 4.—Feed consumption of experimental cattle (lbs.)

Lot number Source of supplement phosphorus	1 None	2 Reagent-grade dicalcium PO_4	3 Deflourinated rock PO_4	4 Feed grade dicalcium PO_4	5 Monosodium PO_4
Avg. daily feed consumption Period 2	9.1	9.2	9.6	9.4	7.8
Avg. daily feed consumption Period 3	8.5	14.4	14.9	15.0	13.8

below that in Lots 2, 3 and 4, but this lower intake was sufficient to promote apparently normal plasma inorganic phosphorus levels.

Summary

Feed grade dicalcium phosphate, deflourinated rock phosphate, reagent grade dicalcium phosphate and monosodium phosphate are apparently satisfactory sources of supplemental phosphorus for beef cattle as measured by weight gain, plasma inorganic phosphorus and feed consumption. The results indicated that the feed grade sources of phosphorus were equal or superior to the relatively purified sources of phosphorus.

Apparently rations containing .12 percent phosphorus are suboptimum with respect to this element and .15 percent phosphorus more nearly approached the minimum requirement of these animals.

Some Factors Influencing Ewe Conception During Late Spring

JOE V. WHITEMAN, RICHARD S. PITTMAN and K. I. BROWN

Much of the commercial sheep production in Oklahoma is unique because it involves breeding the ewes during an unnatural season (spring). Problems involved with breeding during spring, gestation during the summer, lambing during the fall and lactation during the winter have not been studied by experiment stations to an appreciable extent. The commercial breeding ewe project at Ft. Reno was started in order that we might study some of the problems inherent in this system of milk lamb production. Among these problems are the following:

1. What is the best kind of a ewe to buy?
2. How should ewe flocks be culled?
3. Should one buy or raise replacements?
4. What management practices will cause an increased lamb crop?

This study was started in April and May of 1955 with the purchase of two hundred yearling ewes from the Del Rio area of Texas. Therefore, at the present time the latter problem is the only one which has yielded reportable results. Certain management practices have consistently increased the percentage lamb crop produced under the conditions that have prevailed during the last two breeding seasons.

Management of the Flock

The ewe flock was composed of 100 grade Rambouillet and 100 ¼ Panama X ¾ Rambouillet (RPR) backcross ewes. All rams used have been good commercial grade yearling Dorsets. The breeding season was started about May 20 and lasted for 48 days. Ewes that have not conceived during this period have been considered as dry ewes. All breeding has been done at night with the flock managed in such a manner that the sire of most of the lambs is known.

The flock was handled as a commercial flock. During the late spring and summer Bermuda grass was the principal feed. Supplemental feed was added during the late gestation and early lactation periods. The lactating ewes grazed on wheat pasture during the winter and were moved to cheat grass pastures in early March. Dry ewes and rams were wintered on winter grass (principally cheat grass) in the small lots and paddocks around the Ft. Reno headquarters. The lambs were creep fed a mixture of one part chopped alfalfa hay and two parts of cracked kafir grain. Lamb weights were taken every two weeks starting when the first lambs born were about six weeks old. When lambs reached a weight of 90 pounds, they were sold on the Oklahoma City market and carcass weights and grades were obtained.

Procedure and Results

Rams used in the study were purchased in pairs from one to three months prior to the breeding season. The rams of a pair were half brothers or closer in relationship and as much alike in age, size, and type as could be obtained. A proportionate number of the ewes were mated to each pair of rams. One ram of each pair was used for four nights then the other ram was used for a like length of time.

To study the effect of temperature on ram performance, one ram of each pair was maintained in a cooled room from 8:00 a.m. until 5:00 p.m. daily whereas the other ram of each pair was kept in a stall of the same size. Feed and water were available to the rams during the day. In 1955 an evaporative cooler was used which lowered the temperature only 3 to 8°F. Maximum temperatures in the stall reached 88 to 93°F. and the temperatures were 83 to 86° in the cooled room while outside temperatures were 97 to 103°F. during the latter part of the season. In 1956 a half ton refrigerated cooler was used which succeeded in keeping the cooled room 10 to 20 degrees cooler than the stall. Maximum temperatures in the stall were 94 to 96°F. while those in the

cooled room were 82 to 83° F. during the hot spells in June and July. Table 1 gives a summary of the breeding performance of the rams during these two breeding seasons.

Table 1.—The breeding performance of cooled and non-cooled rams during the 1955 and 1956 breeding seasons.

	Cooled	Uncooled
	1955 results	
Effective matings	68	58
Known conceptions	43	32
Percent conception	63	55
	1956 results	
Effective matings	129	111
Known conceptions	89	72
Percent conception	69	65
No. twin births	33	19

It is usually believed by sheepmen that sheep do better immediately after being shorn. To determine if shearing the ewes just before the breeding period would improve their performance, a test was conducted in the spring of 1956. One half of the ewes were shorn on April 7 and the other half shorn on May 12. Table 2 shows the results of this study.

Table 2.—The performance of ewes shorn 10 days prior to breeding as compared to those shorn six weeks before the breeding season.

	Shorn 4/7	Shorn 5/12
Number of ewes	97	98
Number of ewes that conceived	78	84
Number of ewes that twinned	16	36
Percent ewes lambing that twinned	20	43

As indicated before, one half of the ewe flock is of Rambouillet breeding and the other one half are of ¼ Panama breeding. Many sheepmen prefer ewes of part Panama or Columbia breeding because they are usually larger and more open faced. The lambing performance of the two kinds of ewes has not been adequately tested under spring breeding conditions. The two groups of ewes in the breeding flock are from different flocks in the same area of Texas. The Rambouillet ewes have consistently out performed the part Panama ewes under the conditions of this experiment as shown in Table 3.

Discussion and Summary

The two years results obtained to date represent findings which certainly do not represent all conditions. During each of the breeding seasons the average temperatures have been high during the latter part of the period. The results represented here indicate rather conclusively that under conditions of heat during the breeding season, management practices to prevent the rams from getting too hot will improve their performance. Likewise, delayed shearing of the ewes caused a significant

Table 3.—The performance of two groups of ewes of different breeding and origin.

	RXPR Backcross	Grade Rambouillet
	1955 results	
Number of ewes	98	100
Number of ewes mated	80	96
Number of ewes that lambed	57	80
Number of lambs born	73	91
Number of lambs 20 days of age	47	77
Percent lambs born dead or lost	36	15
Percent lamb crop	48	77
	1956 results	
Number of ewes	97	98
Number of ewes mated	92	94
Number of ewes that lambed	78	84
Number of lambs born	99	115
Number of lambs at 20 days of age	77	104
Percent lambs born dead or lost	22	10
Percent lamb crop	79	106

increase in the percentage of multiple births. The results obtained in the comparison of the part Panama ewes with the grade Rambouillet ewes is more difficult to interpret. The difference in performance may be due to the breeding of the sheep or it may be due to the way the sheep were handled before they were obtained for the experiment. A conclusion can be drawn however, i.e., different groups of ewes perform quite differently under the same conditions. Therefore, it is imperative that the cause or causes of these differences in performances be determined.

Reproductive Efficiency of Range Beef Cows

DOYLE CHAMBERS, GARY O. CONLEY and J. A. WHATLEY, Jr.

The number of beef cows two years of age and older in Oklahoma on January 1, 1957 was estimated by the United States Department of Agriculture to be more than one and one-fourth million head. These cows are being kept for the production of beef calves, most of which are marketed at weaning time either as feeder calves or as fat slaughter calves. In this system of production the success of the operation depends greatly upon the costs of maintaining the cow herd and the productivity of the individual cows in the herd.

In a recent survey conducted by the Research Committee of the American National Cattlemen's Association it was reported that only 79 per cent of the beef cows and heifers bred for 1954 calving actually dropped live calves and that only 63 percent of them raised calves to weaning. Other estimates by the United States Department of Agriculture indicate that, for the ten years 1945-54, 84 percent of cows on