of Lot 2 had no effect on gains. Also, the gains of the steers in Lots 3 and 4 were nearly equal. Thus, stilbestrol did not affect gains in either comparison (with and without milo).

The steers fed milo gained 21 lbs. more per head than those not fed milo. The value of the increased gain was not equal to the cost of the milo fed.

There were noticeable differences in the behavior of the steers implanted with stilbestrol and those not implanted. The implanted steers appeared to be more nervous and when confined to the corral for weighing would paw the ground excessively with more than usual bellowing. Their behavior was quite similar to that of an active bull. Most of the implanted steers had noticeably higher tail-heads. When some of these steers were marketed the buyers purchased them at $1-$2 per cwt. less than the control steers. This change in conformation and the behavior on test suggest that the implanted dosage (45 mg.) of stilbestrol may have been too high.

This test was conducted during a season of abnormally low rainfall, therefore, both the quantity and quality of grass in the pastures should be considered abnormal.

At the end of this experiment many of the steers were used in a test to determine the value of various supplements to high-silage rations for fattening two-year-old steers. All steers were fed stilbestrol in the dry-lot fattening phase and they were allotted in a manner which would allow a study of the carry-over effect of the stilbestrol implant during the summer. The summer treatment (implant or no implant, feeding milo) apparently had no effect on subsequent gains of fattening cattle.

Summary

Implantation of 45 mg. stilbestrol did not increase the gains of yearling and two-year-old steers grazing native grass with and without supplemental feed.

Nutritive Value of Various Protein Supplements for Lambs

WALTER R. WOODS, WILLIS D. GALLUP & ALLEN D. TILLMAN

Many feeders show a preference for one protein supplement over another in rations for cattle and sheep. The opinion generally held among research workers is that protein supplements when compared at equal protein intake are about the same in nutritive value for ruminants, although they may differ widely for non-ruminants, such as swine. A series of feeding and digestion trials with lambs were initiated in the Spring of 1955 to study differences in protein quality

which might be the basis for the above preference. The limitations of this study in matters of final choice of supplements for lambs are recognized.

Procedure

Rations were formulated so that 67% of the total protein was furnished by the supplements to be tested. Among the supplements tested were two samples of cottonseed meal, one was of low nitrogen solubility (39.6%) and the other of high nitrogen solubility (70.1%). These were specially prepared products furnished by National Cottonseed Products Association, Inc. The solubility of the nitrogen indicated a reasonable difference in protein quality. Sesame meal was tested in a third ration, and a combination of two-thirds soybean meal and one-third sesame meal was tested in a fourth ration. All rations contained, in percent: cottonseed hulls, 50; blackstrap molasses, 20; corn oil, 0.2; salt, 0.5; and the protein supplement, 12.3 to 13.6, depending on its protein content. Cerelose (sugar) was added in amounts to bring the total to 100 percent. The rations were equalized in calcium and phosphorus content by adding $CaCO_3$ and $CaHPO_4$. Vitamin A and D were added in the form of Quadrex "10" Type IV. These rations contained approximately 8 percent protein.

The first test consisted of a growth trial using 24 wether lambs as the experimental animals. The lambs were kept in individual pens and were fed all they would consume daily for a period of 56 days. Following the growth trial two digestion trials were conducted with the lambs using essentially the same rations.

Results

The average daily gain, feed efficiency and crude protein digestibility are shown in Table 1. Lambs fed the special cottonseed meals gained less than the lambs fed either sesame meal or a combination of soybean and sesame meal. However, neither this difference nor the difference in gains made by the lambs fed the two cottonseed meals was statistically significant. Thus, nitrogen solubility did not appear to be an important contributing factor in the outcome of these results. On the basis of feed efficiency, the lambs fed the sesame meal ration or a combination of soybean and sesame meal were significantly more

Table 1.—Average daily gain, feed efficiency and crude protein digestibility for lambs fed various protein supplements

	Daily gain lb.	Feed per lb. gain	Crude Protein Digestibility, %
Cottonseed Meal—LNS	0.26	13.90	29.0
Cottonseed Meal—HNS	0.30	12.58	27.6
Sesame Meal	0.34	10.32	36.6
Soybean—Sesame Meal	0.36	10.65	37.5

efficient than those fed the two cottonseed meal rations. The digestibility of the protein was significantly lower in the two cottonseed meal rations than in the soybean-sesame meal combination or sesame meal ration. This difference in digestibility is believed to be one reason for the difference obtained in feed efficiency. However, other ration factors very likely are involved, and it is the purpose of experimentation of this type with simplified rations to sort out those factors and their influences and bring them under control in practical feeding operations. With this in mind, further tests are being made with these and other supplements which will lead to practical recommendations in selecting protein sources for sheep and cattle. As a brief summary of these initial results it may be said that in a single trial with simplified rations, lambs fed sesame meal or a combination of soybean and sesame meal made more efficient use of their feed than lambs fed two specially prepared cottonseed meals of low and high nitrogen solubility. The protein in the cottonseed meal rations was low in digestibility.

The Effect of Level of Wintering Upon the Production of Two-Year-Old Slaughter Steers

By A. B. NELSON and GLEN BRATCHER

For several years the Oklahoma Agricultural Experiment Station has conducted studies on the effect of level of wintering steer calves upon their subsequent performance as yearlings, two-year-olds, and three-year-olds. The best level of wintering apparently depends upon the management system used during the summer and the age at which the steers are sold. Should steers which are to be sold as two-year-olds be wintered at a "high" or a "low" level?

The most recent study relating to this problem was started in 1954 and completed during the summer of 1956. This test was part of an experiment initiated in 1952 with the following objectives:

1. To determine the effect of level of wintering for two successive winters upon the performance of two-year-old steers fed corn on grass during the second summer grazing season.
2. To compare two levels of feeding corn on grass to two-year-old steers which have been wintered at the same level of nutrition.
3. To compare the management systems of producing two-year-old feeder and slaughter steers.

The first two trials of this experiment were completed in the summer of 1954 and 1955 and the results were summarized in Oklahoma Agricultural Experiment Station MP-43 and MP-45, respectively. The results of the third and last trial are reported here.

Procedure

Fifty head of choice-quality grade Hereford steer calves were divided into two groups on October 30, 1954 (30 in one group and 20 in the