been summarized. These results indicate that the cow-calf producer may operate between two "danger areas" in the nutrition of the beef female. Too low a plane of nutrition results in delayed growth and body development, retarded calving date, smaller and weaker calves at birth, poor milking heifers, and calves that wean off decidedly lighter than those from better wintered dams.

In contrast, the Very High level treatment, as practiced here, demonstrates the effect of excessive feed levels in hastening maturity and in causing large stores of body fat. Excessive feed levels may also have a depressing effect on growth of the fetus and milk production. With the tremendous costs of production involved in carrying females at the Very High level, this system is not to be recommended, although it is frequently practiced in farm herds and purebred establishments.

A Medium to High level appears to be most desirable in terms of growth and development of the female and size of her calf at weaning. Of these two, the Medium level which allows the beef heifer to gain approximately 0.5 lb. per head daily the first winter as a weaner calf, and lose less than 10 percent of her body weight each subsequent winter has seemed most desirable and profitable in previous trials due to the advantage in calf crop percentage, weaning weights, and development of the female. In the trials summarized in this paper, however, the Low level resulted in no decrease in calf crop percentage and thus these females were more profitable because of the much lower cost of wintering.

It must be remembered, however, that all cattle had year-round access to approximately six acres of high-quality native grass which permitted remarkable recovery during the summer.

Studies With Sheep Receiving Compounds Having Estrogen Activity

L. H. Harbers and Allen D. Tillman

Stilbestrol and hexestrol have been widely used in feeding ruminants because of increased gains and feed efficiencies when these compounds are given orally or implanted subcutaneously. More intensive studies have indicated that these increases resulted from more efficient storage of dietary calcium, phosphorus, and nitrogen. In many studies, however, undesirable side effects from these compounds have been noted. Diallyldiethylstilbestrol and diallylhexestrol, derivatives of stilbestrol and hexestrol, are of interest because of indications that they contain the potency of the parent compounds without causing the undesirable side effects. The purpose of the following experiments was to

study the effect of diallyldiethlystilbestrol and diallylhexestrol upon digestibility of ration components and the retention of dietary calcium, nitrogen, and phosphorus by sheep.

Procedure

Trial I

Fifteen uniform wethers weighing an average of 70 lbs. each were, on the basis of weight, divided into three approximately equal groups of five animals each and were fed the following basal ration:

Ingredient	Percent
Cottonseed hulls	25.00
Cottonseed meal	5.00
Ground milo	59.45
Alfalfa meal	10.00
Sodium chloride	0.50
Vitamins A & D	0.05
Total	100.00

The treatments were as follows:

Ration 1 Basal diet

Ration 2 Basal diet plus 4 mg. of 3, 3'-diallylhexestrol daily

Ration 3 Basal diet plus 4 mg. 3, 3'-diallyldiethlystilbestrol daily

The animals were confined to metabolism stables during successive 14-day preliminary and 10-day collection periods. Feces and urine were collected by standard procedures. Feed and feces were analyzed for proximate components by methods approved by the Association of Organic Agricultural Chemists. In addition the urine was analyzed for nitrogen and the feed, feces, and urine were analyzed for calcium and phosphorus by using acceptable procedures.

Trial II

The second trial was a duplication of the first trial except only four animals in each group were given the following treatments:

Ration 1 Basal diet

Ration 2 Basal diet plus 4 mg. 3, 3'-diallylhexestrol daily

Ration 3 Basal diet plus 4 mg. 3, 3'-diallyldiethylstilbestrol daily

Ration 4 [illegible]

Results and Discussion

The results of the first trial are shown in table 1. It is apparent that the added hormones had no significant effects upon the digestibilities of ration components, or upon the retention of calcium, phosphorus or nitrogen.

Table 1.—The Effects of Estrogen-like Compounds Upon Digestibilities of Ration Components and Upon the Retentions of Calcium, Phosphorus, and Nitrogen (first trial).

Rations	Basal	Diallylhexestrol	Diallyldiethyl-stilbestrol
Percentage Digestibility:			
Dry matter	77.4(1.7)[1]	76.2(6.0)	74.8(2.5)
Organic matter	80.7(2.2)	75.2(14.4)	75.4(2.5)
Crude protein	62.7(2.8)	58.0(5.6)	66.1(5.3)
Crude fiber	52.0(5.3)	54.5(11.6)	43.9(8.1)
Nitrogen free extract	87.0(2.2)	86.4(6.1)	85.3(1.2)
Percentage of intake retained:			
Calcium	28.9(13.1)	28.4(12.5)	41.1(9.5)
Phosphorus	42.6(8.2)	41.1(7.9)	44.7(5.8)
Nitrogen	47.8(10.0)	44.4(5.3)	45.6(4.9)

[1] Numbers in parenthesis are standard deviations of means.

The results obtained in the second trial are shown in table 2. As noted in the first trial, differences between treatment means are not significant.

Table 2.—The Effects of Estrogen-like Compounds Upon Digestibilities of Ration Components and Upon the Retentions of Calcium, Phosphorus, and Nitrogen (second trial).

Rations	Basal	Diallyl-hexostrol	Diallyl-diethyl-stilbestrol	Diethyl-stilbestrol
Percentage Digestibility:				
Dry matter	61.8(2.6)[1]	65.9(2.0)	60.8(5.6)	61.1(8.3)
Organic matter	62.5(2.9)	66.8(1.9)	61.8(6.6)	61.4(7.0)
Crude protein	37.7(3.1)	43.9(1.8)	39.0(6.3)	39.4(5.6)
Crude fiber	29.8(3.4)	32.6(2.9)	23.7(6.7)	20.8(9.2)
Nitrogen free extract	75.3(3.2)	77.9(2.4)	73.4(6.0)	73.6(7.0)
Percentage of intake retained				
Calcium	18.0(4.8)	18.8(13.8)	19.4(11.5)	20.8(7.5)
Phosphorus	26.1(12.9)	18.6(10.6)	19.3(13.8)	28.3(20.7)
Nitrogen	22.5(8.8)	27.1(8.2)	26.3(3.5)	20.8(7.5)

[1] Numbers in parenthesis are standard deviations of means.

It is apparent that neither 3, 3'-diallylhexestrol nor 3, 3'-diallylethylstilbestrol significantly affected protein, calcium, or phosphorus metabolism in these trials, thus it is assumed that under a longer growth trial, gains likewise would not have been affected. In the second trial, diethylstilbestrol was used as a positive control group because many workers have found that this compound promotes increased gains and feed efficiency in sheep. Further work indicated that these effects are realized because diethylstilbestrol increased the efficiency of calcium, phosphorus, and nitrogen metabolism. Since diethylstilbestrol had no effect upon any of the above criteria, it might be assumed that the basal ration was a poor one for this type of study. Failure to obtain growth responses to diethylstilbestrol when added to sheep rations has been noted by other workers, thus it is not likely that this compound will stimulate gains under all conditions under which animals are maintained. Whether, in the present trial, failure to obtain significant response was caused by the ration or by the extreme amount of animal variation within each treatment is not known.

Summary

The oral consumption of 4 mg. daily of 3, 3'-diallylhexestrol, 3, 3'-diallyldiethylstilbestrol, or diethylstilbestrol in two trials involving thirty-one sheep did not affect ration digestibility, or the retentions of ration calcium, phosphorus, or nitrogen.

A Preliminary Summary of the Performance of Raised One-Half Dorset Vs. Purchased Western Ewes

Joe V. Whiteman, Don G. Brothers,

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For many years the majority of the sheepmen in Oklahoma have secured replacements for their ewe flocks from the west. These ewes may have been grade Rambouillets or various crosses of Rambouillets with Panamas, Columbias, Corriedales or Merinos. The ewes vary in their willingness to lamb during the fall, in their prolificacy, in their willingness and ability to care for and nurse their lambs and in the amount of wool produced. At the time of purchasing these ewes (usually as shorn yearlings) one cannot evaluate them for any of the above characteristics. Consequently, it is the usual practice to buy big, smooth-bodied, open-faced ewes and hope that they are what is wanted. Results (Whiteman *et al.* 1960[1] have shown that Rambouillet ewes are superior to several crosses of Rambouillet with Columbia, Panama or Merino for fall lambing.

[1] Whiteman, Joe V., Richard Pittman and Kenneth Urban. 1960. The lambing performance of