Injectable Vitamins For Range Beef Cows And Calves[1]

Robert Totusek

There has been much renewed interest in the vitamin A nutrition of beef cattle in recent years. One reason is that synthetically produced vitamin A is now very cheap. Another reason is that several experiments conducted at other experiment stations have indicated a beneficial effect from the addition of vitamin A to beef cattle rations which were considered to be adequate in carotene content.

A considerable amount of earlier research at the Oklahoma Agricultural Experiment Station indicated that vitamin A nutrition was not a serious problem for spring calving cows in normal years. The research showed that the addition of feeds rich in carotene, such as dehydrated alfalfa meal, to a wintering ration of dry range grass and cottonseed meal was without benefit. The beef cow is apparently able to store sufficient quantities of vitamin A while on summer pasture to carry her through the wintering period even when the ration is low in carotene. It is recognized, of course, that deficiencies are much more apt to occur after a summer drouth and in the case of the call calving cow that secretes vitamin A in milk and consequently depletes her body reserves.

Reports of symptoms typical of a vitamin A deficiency are heard quite frequently in the field. It is known that beef cattle are relatively poor convertors of carotene to vitamin A. Synthetic vitamin A is very cheap, as previously mentioned, and is also very easy to administer. It can be provided in the feed, or it can be injected directly into the cow with the assurance that each has received the intended dose of the vitamin. For these reasons it was considered desirable to investigate the value of injectable vitamin A for range beef cows.

The previous research at the Oklahoma Station demonstrated that a ration low in carotene did not produce serious consequences as far as the beef cow is concerned. However, it was observed that calves born to cows subsisting on a vitamin A deficient ration, although normal at birth, very quickly developed symptoms characteristic of a vitamin A deficiency, such as scouring and watering of the eyes. Consequently, it was also considered desirable to investigate the value of injecting a vitamin preparation into calves at birth.

Experiment 1. Injectable Vitamin A for Range Beef Cows

Procedure

A total of 155 Angus cows, 2, 3 and 4 years of age, were used in this study. Seventy-seven of the cows received no vitamin A and 78 received an intra-ruminal injection of vitamin A. The cows used in this experi-

[1] The vitamin A used in this study was generously provided through the courtesy of Dr. Jess N. Henson, Commercial Solvents Corp., Terre Haute, Indiana.

ment were also used to progeny test Angus bulls in the beef cattle breeding project. The cows were allotted to the vitamin A experiment in equal numbers by sires so that the vitamin A experiment would not confound the results of the progeny test. By the same token, since the sire of each expected calf was known, it was possible to inject one half of the cows bred to each bull and thereby reduce variation among the calves due to sire.

The cows were wintered on dry native range and were fed an average of 2½ lbs. of cottonseed cake from November 10 to April 20. An average of approximately 10 lbs. per head daily of prairie hay was fed from February 10 to April 10. All cows had access to a mineral mixture of equal parts of salt and dicalcium phosphate.

Vitamin A was injected on January 31 and the cows started calving in early February. Almost all of the cows calved within a 90 day period in February, March and April. Rebreeding of the cows was started on May 8. One million international units of vitamin A was administered per cow. The vitamin A was injected directly into the rumen at a point approximately midway between the last rib and the hip bone with a 4-inch 16-gauge needle. The cows were injected while crowded into a chute and were not restrained in a head gate or a squeeze chute. Information was obtained on weight of cows and calves and subsequent conception rate and rebreeding performance of the cows as measured by calving date the following year.

Results and Discussion

A summary of results showing the influence of injected vitamin A on beef cows and their calves in each of the three age groups is given in Table 1. An overall summary comparing all untreated cows with all

Table 1. Effects of Vitamin A Injected into Cows Before Calving, By Age and Treatment

	Age of cows, yrs.					
	2		3		4	
Vitamin A	No	Yes[1]	No	Yes[1]	No	Yes[1]
No. cows	21	21	23	24	33	33
Av. wt. cows 1-31-63, lb.	776	792	886	850	935	947
Av. wt. cows 5-7-63, lb.	708	724	822	805	847	847
Wt. change, lb.	—68	—68	—64	—45	—88	—100
No. calves born	20	21	23	23	30	31
No. calves at 112 days	17	20	21	21	28	30
Wt. calves at 112 days, lb.[2]	193	204	203	215	230	249
Date cows calved following year, March	19	21	9	10	1	1
No. cows open following year	6	4	2	0	7	5

[1] One million I.U. vitamin A injected into rumen 1-31-63.
[2] Average of steers and heifers

injected cows is shown in Table 2. Vitamin A apparently had no influence on the spring weight of the cows. The 3-year-old cows which were injected with vitamin A lost slightly less weight from the time of injection in late January to spring weighing but the reverse was true in the case of the 4-year-old cows, and the differences in weight changes were not large enough to be significant.

The number of calves born in each group of cows is shown but is not a reflection of winter treatments. All of the cows used in the experiment were pregnancy checked and believed pregnant when allotted to winter groups. The vitamin A was injected immediately before the cows started calving and, consequently, could not have influenced the number of calves born. The number of calves surviving to 112 days of age, slightly in favor of the cows injected with vitamin A, was not believed to be due to the vitamin treatment of the cows (see Footnotes 2 and 3 in Table 2) because some of the calf losses were of an accidental nature.

Calves out of the vitamin A treated cows were heavier at 112 days than those out of the untreated cows in all three comparisons. The advantages in weight were 11, 12 and 19 pounds for the 2, 3 and 4-year-old cows, respectively. The overall average advantage in weight of calves at 112 days was 14 pounds for vitamin A treated cows. The reason for this difference in weight is not apparent. The cows showed no symptoms of a vitamin A deficiency and were not themselves benefited by the vitamin A injection. Consequently, additional intakes of vitamin A would not be expected to increase milk production. Furthermore, calves in a subsequent trial (see Experiment 2) were not benefited by a vitamin injection which included vitamin A.

Table 2. Effects of Vitamin A Injected into Cows Before Calving, by Treatment

Treatment	No Vitamin A	Vitamin A[1]
No. cows	77	78
Avt. wt. cows 1-31-63, lb.	866	863
Av. wt. cows 5-7-63, lb.	792	792
Wt. change, lb.	—74	—71
No. calves born	73	75
No. calves at 112 days	66[2]	71[3]
Wt. calves at 112 days, lb.[4]	209	223
Date cows calved following year, March	10	11
No. cows open following year	15	9

[1] One million I.U. vitamin A injected into rumen 1-31-63.
[2] Calf losses in the untreated groups were due to the following causes: dead at birth—2, predatory animals—3, scours within one month after birth—2.
[3] Calf losses in the vitamin A group were due to the following causes: dead at birth—1, lack of milk—1, scours within one month after birth—2.
[4] Average of steers and heifers.

Vitamin A treatment did not influence the rebreeding performance of cows as measured by the date of calving the following year. However, fewer vitamin A treated cows were open the following year (9 vs. 15). It would seem that if reproductive performance were affected by vitamin A treatment it would also be manifested in the date of calving the following year. Numbers of cows in this comparison were not sufficiently large to allow a definite conclusion concerning reproductive performance as affected by vitamin A injections. More research is needed.

Results from a more extensive three year comparison now in progress should provide additional and meaningful information concerning both reproductive performance and weight of calves as influenced by vitamin A injection of cows.

Experiment 2. Injectable Vitamins A, D and E for Range Beef Calves

Procedure

The value of a preparation of vitamins A, D and E was investigated by injecting approximately ½ of a group of calves with the vitamins at birth. A total of 113 calves were used in the study, 59 of which received no vitamins and 54 of which received the vitamins A, D and E. Both Angus and Hereford calves were used. The procedure was to inject alternate calves within each group of the same breed, sex and sire. The vitamin preparation which was used had a potency of 500,000 international units vitamin A, 50,000 international units vitamin D and 50 international units of vitamin E per c.c. Two c.c. were injected making a total dosage of the vitamins of 1,000,000 international units of vitamin A, 100,000 international units of vitamin D and 100 international units of vitamin E. Information on the survival rate and weight of the calves at 210 days of age was obtained.

Results and Discussion

The influence of vitamins A, D and E injected into calves at birth is shown in Table 3. Neither survival to weaning at 210 days of age

Table 3. Effects of Vitamins A D E Injected into Calves at Birth

	Control (No vitamins)	Vitamins A D E[1] Injected
No. calves	59	54
No. calves survived to 210 days	58	53
Wt. of calves at 210 days[2]	459	460

[1] 1,000,000 I.U. vitamin A, 100,000 I.U. vitamin D and 100 I.U. vitamin E injected at birth.
[2] Average of steers and heifers.

nor weaning weights were influenced by the vitamin injections. As previously mentioned, the reason for heavier calves out of vitamin A injected cows as observed in Experiment I cannot be explained on the basis of the results of this trial.

Summary

1. The intra-ruminal injection of one million I.U. of vitamin A into range beef cows before calving had no apparent influence on:
   a. Spring weight of cows.
   b. Time of rebreeding of cows.
   c. Survival of calves to 112 days of age.
2. Fewer cows injected with vitamin A were open the following year than untreated cows. Additional research information is needed before general conclusions can be made on this point.
3. Calves from cows which had been injected with vitamin A tended to be heavier at 112 days of age than calves from untreated cows.

   Additional data concerning the observations reported above are now being obtained in a more extensive 3 year study concerning the value of injectable vitamin A for range beef cows.
4. Vitamins A, D and E injected into range beef calves at birth were without apparent affect on the survival and weight of calves at 210 days of age.

Winter Feeding Studies With Range Beef Cows: Value Of Zinc And Constant Vs. Increasing Level of Protein

Robert Totusek

The expense of winter supplement represents the biggest cash cost of maintaining a cow for a year and is a sizeable part of the total yearly cow cost, often accounting for 20 to 25 percent of the total. Any practice which will increase the productivity of the cow enough to more than pay the possible additional cost of the practice should be considered.

The practice of feeding supplemental protein falls into two categories. Either the supplement is fed at a constant level throughout the winter or it is fed in increasing amounts as the winter progresses. It