

COBALT BULLETS

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Cobalt supplements in the form of "bullets" did not significantly improve sheep gains in a series of tests conducted in five northern California counties.

The element cobalt is essential in the feed of sheep in minute amounts. Whether or not it needs to be provided as a special supplement depends on the amount present in the natural feed normally consumed by the sheep. Although cobalt can be measured chemically, the small amount required for sheep is difficult to assay. Feed or forage containing more than 0.07 parts of cobalt per million of feed on a dry matter basis has been shown to prevent the deficiency.

The cobalt "bullet" was developed in Australia to provide a continuous source of cobalt for sheep. The bullet consists of a cobalt salt and a special clay. The bullet is deposited in the esophagus of the sheep. It then drops into the reticulum—one of the compartments of the sheep's stomach. Due to its weight it remains in the forestomach, gradually dissolving and giving off the minute amount of cobalt needed by the animal.

The seven tests with nursing lambs were all conducted in approximately the same manner, with matched sets of from 15 to 35 animals each. From March 3 to April 1, 1959, half of each group of lambs

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selected at random received a cobalt bullet. The other half of the lambs received no treatment and served as controls. Otherwise, the treated and control lambs received identical treatment. The trials were terminated when the owner decided to market his lambs, which caused some variation in trial length. When possible, the individual weight of each lamb was obtained. In these cases it was possible to test the difference in gains statistically.

Hardinggrass plots

Two trials were conducted after the lambs were weaned. In a Glenn County trial, ewe lambs were well grown at the start of the trial and were maintained at about the same weight until the next shearing. Wool data also were obtained on this group of yearling ewes. In the trial conducted at Davis, the wethers were maintained for a year on a small plot of a pure stand of Hardinggrass (*Phalaris tuberosa*). This plant under Australian conditions at times produces a condition known as Phalaris staggers, which is prevented by cobalt.

None of the tests indicated that the cobalt treatment appreciably improved gains of the lambs. In some of the trials the change in weight was slightly in favor of the treated animals. However, when it was possible to test these differences statistically, it was shown that these small differences could be due to chance. In the group trials, the treated lambs slightly outgained the control lambs in two trials; in one trial there was no difference, and in the fourth the controls gained more than the treated lambs. In a Glenn County trial with yearlings, the control group produced slightly more wool than the treated group.

No advantage

While these results showed there was no advantage in treating sheep with cobalt bullets, it is possible that cobalt may be deficient in other areas of the state and that animal responses might be detected in the future. To date no legume

responses to cobalt fertilization have been reported in California.

The cobalt bullets have been reported to become ineffective under some conditions, due to the formation of a coating or glaze on the surface. The continued availability of the cobalt can be assured by administering a steel pellet such as an engineers' $\frac{1}{2}$ " $\times$ $\frac{1}{2}$ " grub screw along with the bullet. The constant abrasion on the bullet by the threads of the screw keeps the surface clean and the cobalt available. Tests are currently being conducted in Mendocino County to determine if this device affects the results. As the coating takes some time to limit the availability of the cobalt from the bullet, it is considered unlikely that this phenomenon appreciably influenced the trials reported in this paper.

SUMMARY OF SHEEP GAINS WITH AND WITHOUT COBALT BULLETS

	NO. OF LAMBS IN TREATMENT	AVG. INIT. WT. (LB)	AVG. GAIN PER LAMB (LB)	AVG. DAILY GAIN (LB)
LAMB TRIALS				
Glenn County:				
Finch Ranch, Plaza—March 3 to April 23, 1959—51 days				
Treated	29	74.0	35.3	0.69*
Control	29	72.0	34.0	0.67
Mendocino County:				
Johnson Ranch, Boonville—March 5 to May 21, 1959—77 days				
Treated	24	33.9	33.6	0.44**
Control	24	33.7	32.8	0.43
Thomsen Ranch, Ukiah—March 7 to June 6, 1959—91 days				
Treated	25	37.8	38.7	0.42*
Control	24	38.5	37.0	0.41
Walsh Ranch, Pt. Arena—March 12 to September 1, 1959—173 days				
Treated	25	33.2	52.2	0.30**
Control	25	30.4	52.8	0.30
Hopland Field Station, Hopland—April 1 to May 26, 1959—55 days				
Treated	34	48.8	21.7	0.39*
Control	35	49.1	21.8	0.40
Tehama County:				
Sutfin Ranch, Corning—March 7 to May 17, 1959—71 days				
Ewe lambs				
Treated	15	60.7	44.0	0.62**
Control	15	60.3	43.7	0.62
Wether lambs				
Treated	15	64.7	46.6	0.66**
Control	15	62.7	46.0	0.65
LAMB TO YEARLING TRIALS				
Glenn County:				
Sexton Ranch, Artois—July 10, 1959 to March 21, 1960—255 days				
Treated	44	92.0	2.2	0.01*
Control	46	91.3	3.3	0.01
Yolo County:				
University of California, Davis Campus—December 10, 1958 to December 17, 1959—372 days				
Treated	5	79.9	47.2	0.13*
Control	5	84.0	43.8	0.12

* Differences between treatments not significant statistically.

** Group trial.