Pelleted Alfalfa

new form of feed supplement for beef heifers on protein-deficient dry range

K. A. Wagnon, J. H. Meyer, and F. D. Carroll

Alfalfa pellets hand-fed to weaner beef heifers at the rate of 1.5 pounds or more per head per day were as effective in promoting weight gains as were cottonseed meal pellets fed at the same rate. However, when the daily feeding rate was only 1.0 pound per head per day, the heifers gained more on cottonseed meal pellets than on alfalfa pellets.

The alfalfa pellets used in this study were made from hay produced at Davis. The alfalfa was cut when slightly past the 50% bud stage, sun-cured, then finely ground and pressed into 3/8" pellets. Chemical analysis of these pellets revealed a content of 96.2% dry matter, 23% crude protein, and 6.1% lignin.

The study was conducted at the San Joaquin Experimental Range with heifers from the station's grade Hereford breeding herds. The heifers, uniform in quality, were weaned July 1–3, 1957. They were maintained in the weaning lot until July 11, when three groups of 10 heifers each were sorted out and moved to separate 90-acre range pastures not previously grazed that season. The weights of the heifers were taken at weaning time and subsequently at about monthly intervals, after the animals had been confined to corral lots overnight without food and water. Groups *1* and *2* were rotated in their pastures at weighings; Group *3*—the control—remained in the same pasture throughout the supplement period.

Group *1* received supplements of 41% protein cottonseed meal pellets to promote moderate average weight gains of about two-thirds pound daily for the entire supplement period. This involved feeding 1.0 pound of cottonseed pellets per head daily from July 15 to September 4—Period *1*. By that time the calves had eaten most of the more nutritious forage in their pastures, so the daily supplement was increased to 1.5 pounds of cottonseed meal per head until October 4—Period *2*. At that time the continuing loss in quality of the dry forage consumed warranted a further increase in daily supplements, and on October 4 the ration was increased by 0.5 pound rolled barley per head. During October 13 and 14 about 1.21" of rain fell, terminating the dry forage period and initiating the germination of a new forage crop. On October 16 the daily feeding was increased to 1.5 pounds each of cottonseed pellets and rolled barley per head. Thus, the interval—Period *3*—between the October 4 and November 5 weighings was a transition from dry forage to new forage in limited amount. The average daily supplement during this third period was 1.5 pounds cottonseed pellets and 1.12 pounds rolled barley. Originally, supplements were to be continued for the entire winter period—Period *4*—at the rate established on October 16, but the supply of rolled barley was exhausted on January 1, 1958, and the supplements for the remainder of the period were 3.0 pounds of cottonseed pellets per head daily. The average daily supplement for the fourth period was 1.79 pounds cottonseed pellets and 1.21 pounds rolled barley.

Group *2* received the 23% protein alfalfa pellets, fed at the same poundage rate per head daily as the total daily supplements for Group *1* heifers. The amounts were 1.0 pound of alfalfa pellets for Period *1;* 1.5 pounds for Period *2;* 2.0 pounds and later 3.0 pounds—average 2.62 pounds—for Period *3;* and 3.0 pounds for Period *4*.

Group *3* subsisted on the natural forage without benefit of supplements.

During the 198 days of the four experimental periods, the average initial weight per heifer—489 pounds—was increased to 639 pounds for Group *1*, fed cottonseed meal with or without barley, and to 616 pounds for Group *2*, fed alfalfa pellets. Average weights for Group *3*, the control, without supplement, decreased to 486 pounds.

The average weight gains of Group *1* heifers for each of the four periods were comparable to the results of previous studies of the same class of cattle fed for moderate weight gains on a similar type of range forage. The average daily gain of 0.76 pound for the entire 198-day supplemental period is above the predetermined objective—a result due, in part, to an above-average winter season. The control animals—Group *3*—ended the 198 days with an average weight almost identical to the average at weaning.

Previous studies have shown that when cattle are first turned into an ungrazed field of recently matured dry forage, they select forage above average in nutritional values. Therefore, it is not uncommon for unsupplemented animals to show small weight gains until the limited supply of good forage is exhausted. In this study, control Group *3* heifers barely maintained their weight through the first two months, or weighing intervals—Period *1*. During the same forage period, Group *1*—receiving 1.0 pound of cottonseed pellets per head daily—made 0.31 pound greater daily weight gain than did Group *2*, fed 1.0 pound of alfalfa pellets per head daily. Thus, it appears that the protein content of the forage was so low that the amount of protein in 1.0 pound of alfalfa pellets was inadequate to promote the same weight gains as 1.0 pound of cottonseed meal pellets. Although the cottonseed pellets have a higher energy value than alfalfa pellets, it seems unlikely that this difference contributed much toward the weight gains, because there was ample forage and previous work has shown that matured dry forage, typical of the forage grazed in this experiment, is deficient mainly in protein and phosphorus and not in energy.

By the start of September, the nutritive value of the forage being consumed was inadequate to maintain weight gains, as is evident by the 23-pound average weight loss of control Group *3* for September—Period *2*. The supplements for Group *1* had been increased to 1.5 pounds of cottonseed pellets and for Group *2* to 1.5 pounds of alfalfa pellets per head daily. This supplement feeding rate was not adequate to maintain the 0.69 pound daily rate of gain made by Group 1 during the first forage period, but the average daily gain of Group *2* increased from 0.38 to 0.53 pound. Thus, the daily rate of gain for the second forage period was almost identical for Groups *1* and *2*, indicating equal feed value of the two supplements at the 1.5 pounds feeding rate under September forage conditions.

The transition from mature dry forage to leached dry forage and the initiation of new forage growth from seed germination occurred in October—Period *3*. The rains received in mid-October were much heavier than usual for the initial

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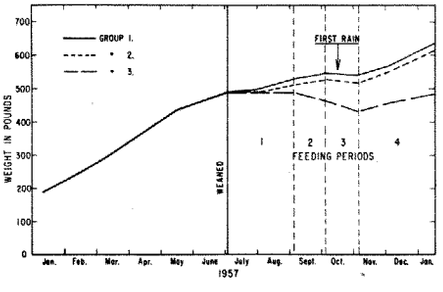
Growth curves of heifers supplemented on the range after weaning: Group 1 supplemented with cottonseed pellets and rolled barley; group 2 supplemented with alfalfa pellets; and Group 3 unsupplemented controls.



Fowl Tick on Turkeys

control by organic phosphates sprayed on wooden feed troughs just before use

John L. Rodriguez and L. A. Riehl

Proper timing and selection of insecticides determine the effectiveness of sprays against the fowl tick, *Argas persicus* (Oken).

This tick, occasionally found on turkeys in southern California, causes unsightly skin blemishes that reduce the market price and make an important difference in profit. Heavy infestations may also affect the vitality of the birds.

Fowl ticks usually hide near the turkey roosts, in joints between pieces of wood, in cracks or similar places where they are not disturbed. They come out of hiding at night, find the roosting birds, and return to their hiding places after feeding. During the first instar—larval stage—about a week, young ticks stay on the host.

Investigation of infested flocks on a large commercial turkey ranch near Perris showed that ticks were hiding in the cracks of wooden feed troughs—8′ long, 1.5′ wide and 2.5′ deep—set on the ground. Roosts were not provided and the turkeys crowded on the feed troughs at night.

Nine range-type pens of turkeys were used in an experiment to test insecticides for tick control. Each pen had an area of from 1.0 to 1.5 acres and contained about 800 turkeys. Two separate pens were assigned at random to each of four treatments and one pen was left untreated.

The troughs were treated in September. All feed was removed with special care before spraying. Insecticides in aqueous mixture, containing 1.0% actual chemical, were mixed and applied by power-driven spray equipment, with agitation in the tank and a high-pressure pump operated at 400 pounds per square inch. The spray gun was adjusted to furnish a hard-driving stream, directed against the trough at close range to force the insecticide mixture into the cracks. A sufficient volume of material was used on each trough to allow runoff. Treated troughs were placed out of reach of the turkeys and were returned to use as soon as they were dry. To minimize absorption of insecticide by the feed, the first week, only the amount of feed which would be consumed in a short period was placed in the treated troughs.

Complete control was obtained in one day with the organo-phosphorus compounds Malathion and Diazinon. The chlorinated hydrocarbons Chlorobenzilate and Kelthane reduced the tick population, but control was not complete. The upper table gives numbers of live ticks found on treated troughs. Ticks were counted as they emerged to feed.

When ticks were eliminated, earlier injuries on the turkeys healed and disappeared in 3–4 weeks. When slaughtered for market, turkeys from pens where the troughs were treated with Malathion and Diazinon were free from tick-feeding skin blemishes.

The same insecticides were tested during the clean-up period after Christmas, when turkey pens were empty. Diazinon was used at 0.5% actual chemical, Malathion at 1.0%, Chlorobenzilate and Kelthane each at 2%. Each treatment was applied to six troughs, with the same thoroughness as before. There was rain on the sixth, eighth, eleventh, and fourteenth days after spraying, and probably some of the spray residue was washed away. The lower table gives tick counts during the 77 days after spraying, until the pens were put back into service for a new brood of turkeys. When troughs were out of service, it was necessary to pry apart the cracks of the troughs in order to find and count the live ticks.

Ticks were not controlled completely by any of the after-Christmas treatments. Direct spray does not reach many of the ticks in cracks, and for the remaining ticks to be killed they must crawl over the residual film of insecticide. Only the presence of roosting birds stimulates this activity. While pens were empty and ticks inactive, the continuous weathering by rain, sun, and wind destroyed much of the effectiveness of the insecticides. By contrast, the first experiment was successful because troughs were used for feeding as soon as the sprays had dried, and emerging ticks came into contact with a film of effective insecticide.

Mean Numbers of Live Ticks Found on Feeding Troughs Sprayed with Insecticides and Returned to Service

Spray material 1%	Before treatment	Days after treatment					
		1	4	7	11	14	21
None	1.3	20.5	12.2	10.7	6.0	12.7	6.7
Chlorobenzilate	2.4	42.5	0.8	2.2	0.5	0.9	1.0
Kelthane	5.0	5.4	0.6	0.4	1.3	2.3	0.7
Diazinon	6.8	0.0	0.0	0.0	0.0	0.0	0.0
Malathion	6.7	0.0	0.0	0.0	0.0	0.0	0.0

Mean Numbers of Live Ticks Found in Cracks of Sprayed Troughs During the Out-of-Service Periods

Spray material	Before treatment	Days after treatment						
		7	14	21	35	46	56	77
2% Chlorobenzilate	34.0	7.0	10.0	6.6	4.6	2.8	1.8	1.0
2% Kelthane	55.0	14.0	55.8	35.1	11.5	2.5	0.7	0.7
0.5% Diazinon	56.5	21.5	9.3	7.0	4.1	6.0	3.1	3.1
1% Malathion	59.2	0.8	1.6	2.0	6.0	6.0	8.0	8.0

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fall of rain, and occurred before the mean air temperatures had dropped to where they markedly restricted new forage growth. Thus, the new forage crop was off to a better start than usual.

The cattle immediately began to graze the scant new growth and took no more of the old than was necessary to obtain the new. With the change in cattle diet there was also a change in nutrient deficiency from protein to total energy, resulting from a shortage of total feed intake. That was why the supplements for Groups *1* and *2* were increased on October 16.

The winter period of this study—Period *4*—was more favorable than average in that the usual lower winter temperatures did not prevail in December and January. Also, whereas the average winter period terminates about February 1, this one ended January 16 and possibly could have ended even two weeks earlier. Control Group *3* made average daily gains of about 0.72 pound for the fourth period. Average daily gains of about 1.34 pounds—almost identical for Groups *1* and *2*—are evidence that 3.0 pounds of alfalfa pellets per head daily were as effective as 1.5 pounds each of cottonseed pellets and rolled barley.

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