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Dehorning Yearling Beef Cattle

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dehorning yearling beef cattle

AGRICULTURAL EXPERIMENT STATION, ANIMAL HUSBANDRY DEPT.
SOUTH DAKOTA STATE COLLEGE, BROOKINGS



RESULTS OF DEHORNING TRIALS

1. Dehorning yearling beef cattle by clippers resulted in dehorning shrinks of approximately 30 pounds per head the first 24 hours after dehorning.
2. Dehorning shrink was recovered between 11 and 19 days after dehorning.
3. Dehorned cattle made faster and more efficient gains in two of three fattening trials.
4. Feedlot disturbances were prevalent in the horned lots during the fattening period.
5. Ten of 27 horned steers and three of 24 dehorned steers were bruised on the surfaces of the carcasses.
6. Dehorning shrink was not reduced nor was recovery more rapid when a tranquilizer was injected at the time of dehorning.

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Dehorning Yearling Beef Cattle

By RICHARD M. LUTHER¹

Slaughter plants report a high percentage of bruised carcasses and extensive hide damage in shipments of horned cattle. A check of steers and heifers slaughtered at a South Dakota commercial meat packing plant during January and February 1959 revealed from 2% to 23% (average 9.1%) of the daily receipts were horned cattle. Carcass value may be reduced materially because horn bruises generally require trimming from the more valuable regions of the carcass. Horned animals as well as those without horns in the same load are sometimes discounted as much as \$1 to \$2 per hundred pounds.

Horned cattle also tend to be aggressive or "bossy" in the feedlot, resulting in disturbances which may reduce rate of gain and feed effi-

ciency as well as causing hide and carcass damage. Horned cattle require more feed bunk space.

Most cattle intended for fattening are dehorned as calves. However, a large number are not dehorned until after weaning. Plans for dehorning calves in the fall may be postponed because of unfavorable weather conditions, flies, shipping fever, and other disease outbreaks. As a result these calves may be carried over to the following spring without dehorning. Animals retained for replacement purposes may not have been dehorned as calves. These animals which do not develop into desirable herd replacements may enter commercial feedlots as horned cattle.

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The cattle feeder is interested in information on dehorning yearling cattle since many cattle reach the yearling age without being dehorned. Information on losses from dehorning, shrinkage following dehorning, rate of recovery of this shrink, and comparative rate of gain during the feeding period will help the feeder to determine how profitable it will be to dehorn yearling cattle. To answer some of these questions, five experiments were conducted using yearling steers and heifers.

EXPERIMENTS ON EFFECTS OF DEHORNING YEARLING CATTLE

A total of 54 horned Hereford yearling steers and 75 heifers were used in experiments conducted during 4 successive years to study the effects of dehorning yearling cattle. The cattle were trucked to Brookings in the fall and fed a wintering ration of 2 pounds oats, 2 pounds shelled yellow corn, and 15 pounds of alfalfa hay daily. The grain was rolled and mixed.

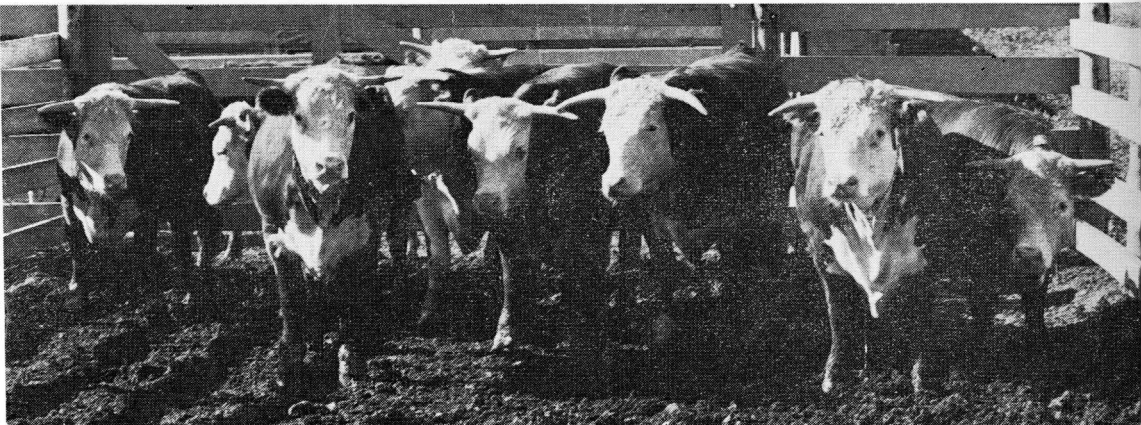
The cattle were allotted and dehorned in early April of each year. They were dehorned with clippers (except in one trial with heifers where three methods of dehorning

were compared.) In one experiment with heifers, the value of using a tranquilizer with dehorning was also studied.

The cattle were housed in a shed open to the south with outside lots. The hay mangers and mineral feeding boxes were located inside the shed, but the feed bunks for grain feeding were located in the outside lots.

Each trial consisted of a recovery phase and a fattening phase. During Trials I and II the recovery phase lasted 40 days. The steers and heifers continued to receive the previous wintering ration, hand-fed twice daily. Individual filled weights were recorded at dehorning and 1, 3, 5, and 7 days after dehorning. The cattle were also weighed individually on the 11th, 19th, 28th, 33rd, and 40th day after dehorning. The heifers were not continued beyond the recovery phase. At the end of 40 days the steers were full-fed a fattening ration. The grain portion of the ration consisted of 1 part oats and 2 parts shelled yellow corn, both rolled. Linseed oil meal was the protein supplement. Good quality alfalfa hay was fed during the first 5 weeks of Trial I. Because one animal died of bloat and others bloated fre-

Horned Cattle in Feedlot.



quently, the hay was changed to mixed brome-alfalfa (largely brome) for the remainder of the trial. Brome-alfalfa hay was fed during Trial II. A mineral supplement consisting of 3 parts bone meal, 1 part limestone, and 1 part iodized salt was offered free choice in both trials.

Trial III differed from the preceding ones in that the cattle were placed on a fattening ration immediately following dehorning and brought up to full feed. Recovery of dehorning setback was recorded at intervals for 28 days. The fattening phase continued for the steers an additional 150 days. The rations fed were the same as in Trial I except brome-alfalfa hay was fed from the beginning of the trial. All the steers and heifers in this trial were implanted with 36 milligrams of diethylstilbestrol prior to dehorning. Dynafac (tetra alkylammonium stearate) was included in all rations in Trial III.

Feed consumption was recorded during the recovery periods of Trials II and III and during the fattening phase of each trial.

The cattle were weighed prior to loading for shipment to slaughter at a commercial packing house. A par-

tition was placed in the truck between the lots during transit. On arrival at the market the cattle were weighed and penned separately. The cattle were killed on the day of shipment except in Trial III when they were allowed hay and water overnight in the packer's yards.

RESULTS OF TRIAL I

Twenty-one yearling steers averaging 658 pounds and 7 heifers averaging 621 pounds were used in this trial conducted during the spring and summer of 1956. The steers were divided as evenly as possible with 11 in one lot and 10 in the other lot. The heifers were placed in a third lot. The cattle in lots 2 and 3 were dehorned after the initial weighing while those in lot 1 were not dehorned. One steer from the dehorned lot became a "fence jumper" and was removed early in the experiment. Results of the recovery and feeding phases are summarized in table 1 and Appendix Table 1.

The dehorned steers showed their greatest loss—35 pounds—3 days after dehorning. This loss was recovered between 11 and 19 days later. At 19 days the dehorned lot averaged 18 pounds gain per steer compared to 41 pounds for the horned

Dehorned Cattle in Feedlot.

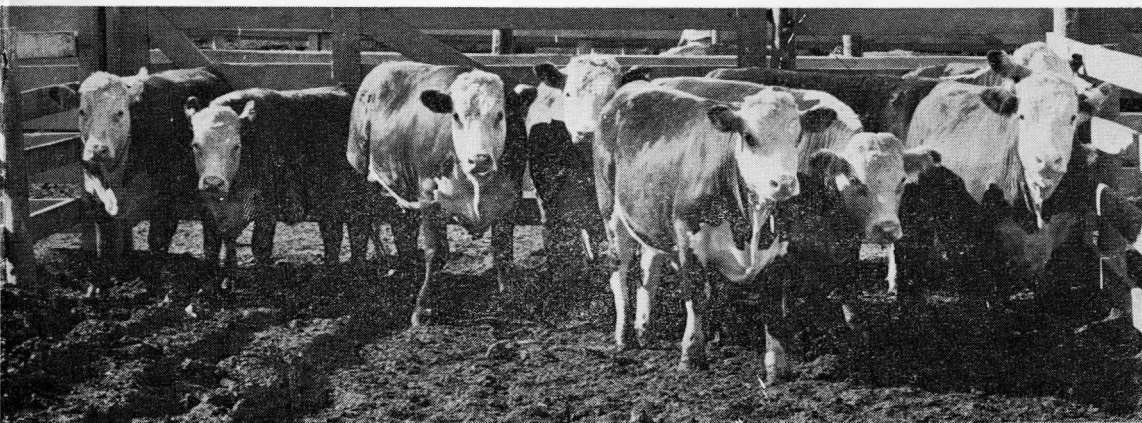


Table 1. Recovery and Fattening Results of Trial I

	Lot 1 Horned steers	Lot 2 Dehorned steers	Lot 3 Dehorned heifers
Recovery phase: (40 days)			
Number of cattle.....	11	9	7
Average weight at dehorning, lb.....	676	680	621
Average daily gain, lb.....	2.50	1.25	1.21
Fattening phase: (92 days)			
Number of cattle.....	11	7*	†
Average initial weight, lb.....	776	742	—
Average daily gain, lb.....	1.44	1.91	—
Recovery and fattening phases: (132 days)			
Average final weight, lb.....	909	917	—
Average daily gain, lb.....	1.87	1.85	—

*Two steers were removed.

†Heifers were not carried beyond recovery phase.

steers. The average daily gain during the 40 day period was 2.50 pounds for the horned steers and 1.25 pounds for the dehorned steers. This difference gave the horned lot a 50 pound per steers advantage in gain over the dehorned lot when the recovery phase ended.

Heifer losses were also greatest 3 days following dehorning and the rate of recovery followed a pattern similar to that of the steers.

During the fattening phase, the dehorned cattle gained 1.91 pounds per head daily compared to 1.44 for the horned cattle. The dehorned steers also consumed the most feed and made the most efficient gains.

Over-all gains during recovery and fattening phases (132 days) were 1.87 and 1.85 pounds per head daily for horned and dehorned steers, respectively. Although shrinkage due to dehorning was large, gains during the fattening period exceeded those of the horned steers resulting in the dehorned and

horned steers making nearly identical gains from the time of dehorning to market weight.

A summary of the marketing and slaughter data is shown in table 2. The dehorned steers, which were sold on a live-weight basis, brought \$1.84 per hundredweight more than the horned steers.

Live grade scores for the dehorned lot averaged two-thirds of a grade higher than the horned animals. Differences in dressing percentage were small between the two lots. Farm-to-market shrink amounted to 0.39% more for the horned steers than for the dehorned steers.

RESULTS OF TRIAL II

This trial, conducted during 1957, was similar to Trial I. Nineteen steers were divided into lots of 9 and 10 steers each. Table 3 gives the results of the recovery and fattening phases.

Lot 2, the dehorned steers, lost 27 pounds per steer during the first 24

Table 2. Marketing Results of Trial I

	Lot 1 Horned steers	Lot 2 Dehorned steers
Number of steers	11	7
Average selling price/100 lb., \$	20.73	22.57
Average selling price/head, \$	184.36	203.44
Average live grade score*	5.3	7.0
Average dressing percent, %†	58.7	58.9
Shrinkage, %‡	2.25	1.86
Number of steers bruised§	2	0

*Live grade scores: High Choice, 9; Average Choice, 8; Low Choice, 7; High Good, 6; Average Good, 5; and Low Good, 4.

†Based on slaughter weight and warm carcass weight shrunk 2.5%.

‡Shrinkage includes transit loss during a 60 mile haul.

§Surface bruises were not serious enough to score or devalue the carcass.

hours after dehorning. This shrink was recovered between 11 and 19 days following dehorning as occurred in Trial I. During the 40-day recovery period, the steers in the horned lot gained 0.43 pounds more per day than those in the dehorned lot. This difference in gain amounted to 18 pounds more per steer.

After dehorning, both lots were fed a good quality brome-alfalfa hay in slightly greater amounts than they would clean up. Refused hay

was weighed daily. During the first 12 days, the horned steers consumed 18.6 pounds and the dehorned steers 10.7 pounds of hay daily. The dehorned steers were hesitant in coming to the hay rack but consumed all the grain offered in an outside bunk.

The dehorned steers stayed on feed better than the horned steers during fattening resulting in greater daily feed consumption. Average daily gains for the two groups were

Table 3. Recovery and Fattening Results of Trial II

	Lot 1 Horned steers	Lot 2 Dehorned steers
Recovery phase: (40 days)		
Number of steers	9	10
Average weight at dehorning, lb.	693	686
Average daily gain, lb.	1.99	1.56
Fattening phase: (92 days)		
Number of steers	9	10
Average initial weight, lb.	773	748
Average daily gain, lb.	2.13	1.94
Recovery and fattening phases: (132 days)		
Average final weight, lb.	969	927
Average daily gain, lb.	2.09	1.82



Horned Cattle at Feed Bunk.

about the same during this period.

Results of the over-all trial are shown in Appendix table 2. Gains and feed efficiencies from dehorning to marketing did not differ greatly between the two lots; however, the horned steers had a slight advantage.

Slaughter and marketing results are summarized in table 4. The horned steers sold for \$0.24 per 100 pounds (live-weight basis) more than those in the dehorned lot. This resulted in a return of \$7.60 per head over the dehorned group. Carcass

grade scores were not different for the two lots, both grading High Good. The dehorned steers yielded 1.3% more than horned steers and shrank 0.44% less in transit.

Three steers in Lot 1 and two steers in Lot 2 were bruised on the surface of the carcass. However, bruises were not serious enough to devalue the carcass.

RESULTS OF TRIAL III

Fourteen yearling steers and 19 heifers were used in the 1958 trial. The steers were allotted to Lots 1

Table 4. Marketing Results of Trial II

	Lot 1 Horned steers	Lot 2 Dhorned steers
Number of steers	9	10
Average selling price/100 lb., \$	21.44	21.20
Average selling price/head, \$	195.33	187.73
Average carcass grade score*	5.8	6.0
Average dressing percent, %†	59.7	61.0
Shrinkage, %‡	3.87	3.43
Number of steers bruised§	3	2

*Carcass grade scores: High Choice, 9; Average Choice, 8; Low Choice, 7; High Good, 6; Average Good, 5; and Low Good, 4.

†Based on slaughter weight and warm carcass weight shrunk 2.5%.

‡Shrinkage includes transit loss during a 60 mile haul.

§Surface bruises were not serious enough to score or devalue the carcass.



Dehorned Cattle at Feed Bunk.

and 2 while the heifers were allotted to Lots 3 and 4.

The cattle in Lots 2 and 4 were dehorned by clippers. The average weight loss of 8 pounds per steer the first 24 hours following dehorning was considerably less than in previous trials and less than heifers dehorned on the same day. One reason for less weight loss in this lot of steers may have been due to the fact that three of the steers in this lot had stub horns and it was im-

possible to remove them as close to the skull as desired. Bleeding was less serious with the steers with stub horns than with the cattle having normal horns.

Recovery of dehorning shrink for the steers was reached on about the 5th day following dehorning (Appendix table 3). Horned steers then averaged 19 pounds gain per steer while dehorned steers averaged only 1 pound heavier than at the time of dehorning. Recovery was more

Table 5. Recovery and Fattening Results of Trial III

	Lot 1 Horned steers	Lot 2 Dehorned steers	Lot 3 Horned heifers	Lot 4 Dehorned heifers
Recovery phase: (28 days)				
Number of cattle	7	7	9	9
Average weight at dehorning, lb.	588	585	573	572
Average daily gain, lb.	3.90	3.86	3.25	2.98
Fattening phase: (150 days)				
Number of cattle	7	7	*	*
Average initial weight, lb.	679	693	—	—
Average daily gain, lb.	2.45	2.57	—	—
Recovery and fattening phases: (178 days)				
Average final weight, lb.	1,065	1,079	—	—
Average daily gain, lb.	2.68	2.77	—	—

*Heifers were not carried beyond recovery phase.

rapid in this trial because the cattle were being brought on full feed and also had less weight to recover. The average daily gains for the 28-day recovery period were not greatly different between the two lots.

Heifer losses were recovered by 7 days following dehorning. Dehorned heifers gained less during the period than horned heifers; however, both lots gained less than the steers.

The results of the fattening phase show that the dehorned steers gained slightly faster and were more efficient than the control steers; however, the differences were not large.

The average daily gain from dehorning to marketing (178 days) was 2.68 pounds for the horned steers compared to 2.77 for the dehorned lot (see table 5). Feed per 100 pounds gain was less for the dehorned lot.

The summary of the marketing results is shown in table 6. Steers from both lots appeared to be similar in conformation and finish when slaughtered. The steers in both lots graded Choice on foot, but only one of the horned cattle and two dehorned cattle graded Choice in the carcass.

The carcass grade differences appeared to be due to marbling. The higher carcass grades and yields for the dehorned lot resulted in a selling price of \$0.93 a hundredweight more than the horned lot. This amounted to an average of \$10.71 per steer more than horned steers.

During transit the horned steers shrank 2.19% compared to 3.05% for the dehorned steers. Weight losses overnight were greater in the horned lot. Total shrinkage (transit and overnight) amounted to 3.58% for dehorned and 2.87% for the horned cattle.

Table 6. Marketing Results of Trial III

	Lot 1	Lot 2
	Horned steers	Dehorned steers
Number of steers.....	7	7
Average selling price/100 lb., \$.....	23.69	24.62
Average selling price/head, \$.....	246.74	257.45
Average carcass grade score*.....	5.6	6.0
Average dressing percent, %†.....	60.2	61.8
Shrinkage, %		
Transit‡.....	2.19	3.05
Overnight§.....	0.68	0.53
Total.....	2.87	3.58
Number of steers bruised 	5	1

*Carcass grade scores: High Choice, 9; Average Choice, 8; Low Choice, 7; High Good, 6; Average Good, 5; and Low Good, 4.

†Based on slaughter weight and warm carcass weight shrunk 2.5%.

‡Includes a 4 hour shrink plus a 75 mile haul.

§Held over night in packer's yards on hay and water (15 hours from feed lot to slaughter weight).

||Surface bruises were not serious enough to score or evaluate the carcass.

Both lots of cattle were handled with care prior to slaughter. Surface bruises were noted on five carcasses in the horned lot and on one carcass in the dehorned lot. However, bruising was not serious enough to devalue the carcass.

METHODS OF DEHORNING

In 1957, 23 heifers averaging 604 pounds were divided into three groups for the purpose of comparing dehorning shrink by three methods of dehorning. Eight heifers were dehorned by clippers, seven by saw, and eight by clippers with the artery pulled (a procedure to hasten the stoppage of bleeding by seizing the severed end of the artery with artery forceps and breaking it off deep in the skull). All heifers were fed and housed together during this study and they were fed the same rations as offered the steers (Trial II).

There was no difference in weight loss between the three methods of dehorning. There appeared to be less bleeding in the group dehorned by clippers with the artery pulled; however, the shock was serious as evidenced by the unstable appearance and staggering gait after the operation. Initial rate of recovery was similar for each group of heifers and the initial weights were equaled

between 11 and 19 days following dehorning. However, the heifers dehorned by saw did not gain as rapidly as the other groups after the 11th day of the recovery period. For the entire 40-day recovery period, the greatest average daily gain (1.66 pounds) was made by the heifers where the horns were clipped with the arteries pulled. This was 0.14 pounds more than those dehorned by clippers and 0.47 pounds more than the heifers dehorned by saw (table 7 and Appendix table 4).

TRANQUILIZERS IN DEHORNING SHRINK

In the spring of 1959 an experiment was conducted to determine the effect of a tranquilizer (tetrahydrozoline²) on dehorning shrink, shrink recovery, and subsequent gains. Twenty-seven horned yearling heifers were divided as equally as possible into four lots. The heifers in Lots 1 and 4 were injected intramuscularly with the tranquilizer at the level of 0.05 milligrams per pound of body weight at the time of dehorning. The heifers in Lots 2 and 3 were not injected when dehorned and served as controls. All lots were weighed 1, 6, 14, 21, and 28 days after dehorning to note

²Tetrahydrozoline furnished by Chas. Pfizer and Co., Inc., Terre Haute, Ind.

Table 7. Methods of Dehorning, Heifer Trial, 1957

Recovery phase: (40 days)	Clippers	Saw	Clipper— artery pulled
Number of animals.....	8	7	8
Average dehorning weight, lb.....	613	612	616
Average final recovery weight, lb.....	674	659	682
Average daily gain, lb.....	1.52	1.19	1.66

shrink recovery. The ration fed to all lots consisted of a grain mixture (2 parts corn and 1 part oats, both rolled) soybean oil meal, and prairie hay. Feed consumption was recorded. Results of this experiment are shown in table 8 and Appendix table 5.

Shrinkage due to dehorning was about the same for the tranquilized and control lots. Average daily gains from the initial treatment to the final weight varied between the two control lots and also between tranquilized lots. Pooled data show gains of 1.47 for the controls and 1.50 for the tranquilized heifers. All lots refused large amounts of hay the first day; however, total feed consumption during the entire period was about the same for both treatments.

DISCUSSION OF RESULTS

Three recovery and fattening trials were conducted in which 54 steers and 26 heifers were used to study dehorning shrink, rate of shrink recovery, and feedlot performance of yearling beef cattle.

In two trials where dehorning was accomplished by clippers and where wintering rations were fed, beef cattle suffered losses of approximately 30 pounds the first 24 hours after dehorning. Dehorning shrink

was recovered between 11 and 19 days after the operation. Horned steers had the advantage in average daily gain at the end of the recovery period.

There was considerable variation in the amount of shrink and in the recovery patterns for both dehorned steers and heifers under fattening conditions. Steer losses were lower because some animals had only stubs of horns. Losses of 18 pounds per heifer were lower than in previous trials. Dehorned heifers gained 0.27 pounds less per day than horned heifers and dehorned steers about the same as horned steers during the recovery period.

Loss of blood does not often appear to be a serious factor in dehorning setback. Because the animal's head remains sore for several days after the operation it avoids contact with other animals at the feed bunk or hay rack. As a result, feed intake is reduced which is largely responsible for the losses in body weight or the slowness of recovery.

Results show that the dehorned steers made faster and more efficient gains in two of three fattening trials. In the other trial the horned steers gained 0.2 pound more per day than the dehorned steers and required less feed per 100 pounds of gain. A considerable amount of feed lot dis-

Table 8. Results of Tranquilizers in Dehorning

Recovery phase: (28 days)	Lot 1 Tranquilized	Lot 2 Control	Lot 3 Control	Lot 4 Tranquilized
Number of heifers.....	7	7	6	7
Average weight at dehorning, lb.	595	597	586	586
Average final recovery weight, lb.	635	633	633	630
Average daily gain, lb.....	1.42	1.30	1.67	1.58

turbance was observed in the horned lots in all trials. This was believed to be due to aggressive or "bossy" animals that kept timid animals away from the feed bunk. This resulted in animals going off feed from over-eating grain.

Carcass grade and dressing percentage slightly favored the dehorned cattle but cannot be directly attributed to the effects of dehorning. Dehorned cattle shrank less from farm-to-market in two trials but more in a third trial.

Generally, bruising is not a serious problem when horned cattle are shipped relatively short distances and are not over-crowded in livestock cars and trucks. This was true with the cattle in these experiments. Ten of the 27 horned steers and three of the 24 dehorned steers exhibited bruises on the surface of the carcasses. Because the bruises did not require extensive trimming the carcasses were not scored or devaluated.

One trial was conducted using heifers to study methods of dehorning. Because of the small number of cattle dehorned by the different methods conclusions cannot be made as to whether one dehorning method is better than another.

Dehorning shrink was not reduced nor was feed consumption

and subsequent weight gains improved when a tranquilizer was injected at time of dehorning. Sedation was apparent in the injected lots but hemorrhaging was about the same in all lots.

Whether cattle should be dehorned when they go into the feed lot will depend on the length of time they are to be fed. The feeding periods used in these experiments were 92 days in two trials and 150 days in a third and may be considered as short term feeding. Results show no improvements in rate of gain and only slight improvement in feed efficiency in dehorned cattle over horned cattle. There may be some advantage in dehorning cattle that are to be fed periods of 6 months or longer.

It is desirable to dehorn cattle at as young an age as possible. Dehorning as yearlings regardless of the length of feeding period would also have several advantages. They are: (1) dehorned slaughter cattle command a higher selling price than horned cattle of similar quality because bruising and hide damage is less prevalent; (2) removing horns from "bossy" animals tends to curb aggressiveness resulting in less feedlot disturbance; and (3) dehorned cattle are more quiet, safer to handle, and easier to manage.

Appendix Table 1. Summary of Recovery and Fattening Phase of Trial I

	Lot 1 Horned steers	Lot 2 Dehorned steers	Lot 3 Dehorned heifers
Recovery phase: April 10-May 19, 1956 (40 days)			
Number of cattle	11	9*	7
Average weight at dehorning, lb.	676	680	621
Average gain or loss after dehorning, lb.			
1 day	2	-33	-27
3 days	-8	-35	-44
5 days	34	-9	-14
7 days	28	-22	-15
11 days	45	-15	-10
19 days	41	18	24
28 days	74	39	36
33 days	89	53	51
40 days	100	50	48
Average final recovery weight, lb.	776	730	669
Average daily gain, lb.	2.50	1.25	1.21
Fattening phase: May 19-August 19, 1956 (Steers only—92 days)			
		Lot 1 Horned steers	Lot 2 Dehorned steers
Number of steers		11	7†
Average initial weight, lb.		776	742
Average final weight, lb.		909	917
Average daily gain, lb.		1.44	1.91
Average daily ration, lb.			
Shelled corn		6.50	7.17
Oats		3.20	3.53
Linseed oil meal		0.68	0.68
Alfalfa hay‡		2.72	2.74
Brome-alfalfa hay		5.61	5.43
Mineral		0.27	0.26
Feed per 100 lbs. gain, lb.			
Shelled corn		452.1	376.0
Oats		222.7	185.2
Linseed oil meal		47.0	35.5
Alfalfa hay‡		189.1	143.9
Brome-alfalfa hay		390.1	285.0
Mineral		18.6	13.6
Feed cost per 100 lb. gain, \$		25.20	20.14
Feed cost per head, \$		33.35	35.34
Recovery and fattening phases: April 10-August 19, 1956 (132 days)			
Average daily gain, lb.		1.87	1.85

*One steer became a "fence jumper" following dehorning and was removed from the experiment.

†One steer died of bloat. One poor doing steer was removed from the experiment.

‡Fed during first 5 weeks.

Appendix Table 2. Summary of Recovery and Fattening Results of Trial II

	Lot 1 Horned steers	Lot 2 Dehorned steers
Recovery phase: April 13-May 23, 1957 (40 days)		
Number of steers.....	9	10
Average weight at dehorning, lb.....	693	686
Average gain or loss after dehorning, lb.		
1 day	4	-27
3 days	8	-22
5 days	15	-20
7 days	7	-23
11 days	21	-14
19 days	37	27
28 days	57	46
33 days	70	42
40 days	80	62
Average final recovery weight, lb.....	773	748
Average daily gain, lb.....	1.99	1.56
Average daily ration, lb.		
Shelled corn	2.00	2.00
Oats	2.00	2.00
Brome-alfalfa hay	15.01	13.57
Fattening phase: May 23-August 23, 1957 (92 days)		
Number of steers.....	9	10
Average initial weight, lb.....	773	748
Average final weight, lb.....	969	927
Average daily gain, lb.	2.13	1.94
Average daily ration, lb.		
Shelled corn	7.24	7.11
Oats	3.55	3.49
Linseed oil meal	2.37	2.33
Brome-alfalfa hay	8.08	8.14
Mineral	0.12	0.10
Recovery and fattening phases: April 13-August 23, 1957 (132 days)		
Number of steers.....	9	10
Average daily gain, lb.....	2.09	1.82
Feed per 100 lbs. gain, lb.		
Shelled Corn	384.5	406.4
Oats	211.8	220.0
Linseed oil meal	111.0	119.8
Brome-alfalfa hay	684.7	723.4
Mineral	7.5	7.3
Feed cost per 100 lb. gain, \$.....	24.26	25.62
Feed cost per steer, \$.....	47.60	45.77

Appendix Table 3. Summary of Recovery and Fattening Results of Trial III

	Lot 1 Horned steers	Lot 2 Dehorned steers	Lot 3 Horned heifers	Lot 4 Dehorned heifers
Recovery phase: April 11-May 9, 1958 (28 days)				
Number of cattle	7	7	9	9
Average weight at dehorning, lb.	588	585	573	572
Average gain or loss after dehorning, lb.				
1 day	0	-8	-2	-19
3 days	10	-4	5	-10
5 days	19	1	-1	-7
7 days	16	20	14	2
11 days	33	32	38	29
19 days	80	75	64	57
28 days	109	108	91	83
Average final recovery weight, lb.	697	693	664	655
Average daily gain, lb.	3.90	3.86	3.25	2.98
Average daily ration, lb.				
Shelled corn	7.56	7.56	7.18	7.18
Oats	3.84	3.84	3.65	3.65
Linseed oil meal	0.99	0.99	0.94	0.94
Brome-alfalfa hay	5.93	5.73	5.86	5.82
Mineral	0.10	0.10	0.10	0.10
Dyna-fac premix (grams)	1.86	1.86	1.77	1.76
Fattening phase: May 9-October 6, 1958 (Steers only—150 days)				
			Lot 1 Horned steers	Lot 2 Dehorned steers
Number of steers			7	7
Average initial weight, lb.			679	693
Average final weight, lb.			1065	1079
Average daily gain, lb.			2.45	2.57
Average daily ration, lb.				
Shelled corn			9.74	9.59
Oats			4.85	4.87
Linseed oil meal			1.25	1.26
Brome-alfalfa hay			5.67	5.70
Mineral			0.10	0.09
Dyna-fac premix (grams)			2.35	2.36
Recovery and fattening phases: April 11-October 6, 1958 (178 days)				
Number of steers			7	7
Average daily gain, lb.			2.68	2.77
Feed per 100 lbs. gain, lb.				
Shelled corn			344.9	334.1
Oats			199.5	169.8
Linseed oil meal			45.2	43.8
Brome-alfalfa hay			213.2	205.6
Mineral			3.7	3.3
Dyna-fac premix (grams)			84.8	82.2
Feed cost per 100 lb. gain, \$			13.95	13.48
Feed cost per steer, \$			66.52	66.53

Appendix Table 4. Summary of Methods of Dehorning

	Heifer trial—1957 method of dehorning		
	Clippers	Saw	Clipper— artery pulled
Number of animals.....	8	7	8
Number of days.....	40	40	40
Average weight at dehorning, lb.....	613	612	616
Average gain or loss after dehorning, lb.			
1 day.....	-25	-25	-25
3 days.....	-21	-17	-20
5 days.....	-13	-10	-2
7 days.....	-8	-8	-3
11 days.....	-9	-8	-9
19 days.....	25	8	28
28 days.....	41	21	42
33 days.....	44	32	50
40 days.....	61	47	66
Average final recovery weight, lb.....	674	659	682
Average daily gain, lb.....	1.52	1.19	1.66

Appendix Table 5. Effect of Tetrahydrozoline in Dehorning Shrink and Shrink Recovery, April 21-May 19, 1959 (28 days)

	Lot 1 Tranquilized	Lot 2 Control	Lot 3 Control	Lot 4 Tranquilized
Number of heifers.....	7	7	6	7
Average weight at dehorning, lb. 595	595	597	586	586
Average gain or loss after dehorning, lb.				
1 day.....	-29	-33	-29	-31
6 days.....	-16	-8	-9	-4
14 days.....	2	3	-4	6
21 days.....	29	30	32	26
28 days.....	40	36	47	44
Average final recovery weight, lb. 635	635	633	633	630
Average daily gain, lb.....	1.42	1.30	1.67	1.58
Average daily ration, lb.				
Shelled corn.....	2.97	2.97	2.97	2.93
Oats.....	1.46	1.46	1.46	1.45
Soybean oil meal.....	0.57	0.57	0.57	0.57
Prairie hay.....	13.57	13.14	12.85	13.30
Feed per 100 lb. gain, lb.				
Shelled corn.....	208.1	228.0	178.4	186.0
Oats.....	102.1	112.3	87.1	91.1
Soybean oil meal.....	40.1	43.9	34.3	53.6
Prairie hay.....	953.6	1009.8	771.1	843.7

Appendix Table 6. Feed Ingredient Prices per Hundredweight Used in Calculating Feed Costs

	1956	1957	1958
Shelled corn	\$2.45	\$2.20	\$1.92
Oats	1.94	2.29	1.76
Linseed oil meal	3.80	3.56	3.30
Alfalfa hay	1.25	—	—
Brome-alfalfa hay	1.12	1.00	1.00
Ground limestone	2.00	1.15	1.12
Bonemeal	6.00	4.50	4.50
Iodized salt	1.75	2.00	2.06
Dynafac premix	—	—	150.00
Rolling, mixing13	.13	.18*

*Includes delivery.

It is generally recommended that beef cattle be dehorned as soon as possible after birth. When dehorning is done early in the calf's life the operation less seriously affects the animal and less restraining equipment and labor are required. The best time to dehorn is in early spring or late fall when cold weather or flies are not likely to cause trouble.

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