

# Time of Processing Effects on FEEDLOT CALVES

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Approximately two million head of stocker cattle and calves are shipped annually to California for growing, finishing, or both. More than half of these animals are weaned calves weighing less than 400 pounds. Between 75 and 80 percent of them arrive as bulls.

California feedlot operators, concerned about reducing their costs, have posed the question as to when these animals should be processed (castrated, branded, vaccinated, and immunized). Should they be processed before shipment to California, immediately upon arrival here, or not until they have completely recovered from the stress of shipping, weaning, and being without feed and water for 30 to 36 hours during transport?

The purpose of the three studies reported upon here was to evaluate animal response and economics of gain in relation to processing: (1) at the point of the calves' origin, immediately prior to shipment, (2) upon arrival in California, and (3) after several weeks following their arrival (delayed processing).

## Procedure

The trial design was the same for all three studies: 120 calves were randomly assigned to one of the three time-of-processing groups with 40 calves per group (20 bulls and 20 steers). Designations used for all three studies were: Group I, processed at point of origin; Group II, processed upon arrival in California; Group 3, processed several weeks after arrival.

Processing activities specifically included castration as needed, hot iron branding on the left rib, vaccination for Blackleg-malignant edema and IBR, applications of a grubicide and Vitamin ADE, and ear tagging for individual animal

Delayed processing of calves following their shipment from other states to California for growing resulted in a higher cost per pound weight gain and poorer performance than processing calves at their point of origin or immediately upon their arrival. In two of the three studies, conducted at the University of California Imperial Valley Field Station, calves processed before shipment showed the best response at the lowest cost.

identification. All calves also received Terramycin injections before shipment and upon arrival in California.

All treatment groups received 72 percent concentrate ration during the receiving phase of each study. A 55 percent concentrate ration was fed to them during the post-receiving period in each study.

Test animals in the first study were No. 1 Angus calves averaging 350 pounds in body weight. No. 2 Okie calves averaging 228 pounds each were used in the second study, and crossbred calves averaging 207 pounds each were the test animals in the third study. All calves were provided by cooperating feedlots. The California Cattle Feeders Association supported the studies financially.

Group I animals were processed immediately before being shipped to California. Group II animals were processed the first full day after their arrival in California. Group III animals were processed during the second week following their arrival in the first study, three weeks after arrival in the second study, and during the second week in the final study.

## Discussion and results

Two responses to processing in the first study proved to be typical for the three trials:

(1) Water consumption by Group II calves for the first 24 hours following processing dropped an average of more than 40 percent. By the end of the first week following processing, consumption had risen slightly. The seven-day average daily water consumption data show that calves processed on arrival consumed only about three-quarters the amount of water consumed by those in Groups I and III. (See table 1.)

(2) During the animals' first overnight stand, Group I calves ate about 10 percent less feed in proportion to their average body weight than those not yet processed (Groups II and III). Group II calves averaged 3.2 pounds per head feed consumption their first 14 hours after arrival. The first full day after processing, however, their feed consumption dropped to 0.9 pound per head. It did not increase to the first night's consumption level until

TABLE 1. WEEKLY WATER CONSUMPTION  
Gallons/Head/Day

Group	Weeks after arrival				Average
	1st	2nd	3rd	4th	
I	4.1	6.6	7.7	6.2	6.2
II	3.3	5.4	6.7	6.0	5.1
III	4.5	7.4	7.9	6.1	6.5

TABLE 2. DAILY FEED CONSUMPTION  
Pound/Head/Day

Where Group processed	Week after arrival	Week after arrival				Average
		1	2	3	4	
I At place of origin		4.2	7.0	9.0	10.0	7.2
II Upon arrival		2.9	5.3	7.3	9.3	6.7
III Delayed		4.2	7.2	6.9	9.4	6.9

TABLE 3. ANIMAL RESPONSE  
Total 87-Day Period

Total Period (Days 1-82)	Group		
	I	II	III
Daily gain from purchase, lb	1.81	1.66	1.71
Feed lb/lb gain	6.11	6.63	6.35
% Increased gain of steers over bulls	9.6	9.2	9.4

TABLE 4. PERFORMANCE AND COSTS

Item	Processed		
	at origin	on arrival	delayed
Receiving phase of 36 days -- 72% concentrate ration			
Daily feed intake per head, lb	7.35	7.52	6.87
Daily weight gain, lb	1.75	1.85	1.64
Feed required per pound gain, lb	4.20	4.00	4.19
Feed, processing and medication cost per pound gain, ¢	18.46	19.16	20.19
Post-receiving phase of 28 days -- 55% concentrate ration			
Daily feed intake per head, lb	10.54	10.92	10.20
Daily weight gain, lb	2.43	2.29	2.18
Feed required per pound gain, lb	4.34	4.77	4.68
Feed and medication cost per pound gain, ¢	13.47	14.82	14.76
Entire 64 days			
Daily feed intake per head, lb	9.75	9.21	8.33
Gain from purchase, lb	121	132	120
Daily weight gain, lb	2.95	2.96	1.88
Feed required per pound gain, lb	3.27	4.37	4.43
Feed, processing and medication cost per pound gain, ¢	15.84	17.95	17.40

the sixth day. Daily feed consumption during the second week averaged 7.03 pounds for Group I calves, 6.32 pounds for Group II calves, and 7.20 pounds for Group III calves. The week following processing of Group III calves, their feed consumption dropped 5 percent. (See table 2.)

While on the 72 percent concentrate ration during their first 40 days after arrival in California, Group I calves in the first study gained significantly faster (1.5 lb/head/day) than those in Group II (0.85 lb/head/day) or in Group III (0.93 lb/head/day). During the entire 82-day test period, Group I calves made faster, though non-significant, overall average daily gains (1.81 lb) than Group II (1.66 lb) or Group III (1.71 lb) calves. Group I calves also showed the best feed conversion (6.11 lb feed/1 lb gain). Feed conversion averaged 6.63 lb feed/1 lb gain for Group II calves and 6.35 lb feed/1 lb gain for Group III animals. (See table 3.)

Calves purchased as steers (20 in each of the three groups) had a 9.4 percent greater overall gain during the 82-day test period than calves purchased as bulls and castrated later. This difference was significant. Processing adversely affected feed and water consumption regardless of where the operations were performed. (See table 3.)

A significant relationship between the arrival temperature of an animal in California and its future health was noted during the first study. For each 1 degree increase in arrival temperature above 100 degrees Fahrenheit, individual animal medication treatments increased by 0.81. No relationship was evident between time of administering vaccines and the im-

munity developed within the calves. Regardless of where the vaccines were administered, approximately 80 percent of all calves developed sufficiently high blood titers to provide protection.

During the second study, Group II calves gained 8 percent faster than Group I calves and 15 percent faster than Group III calves. Group III calves showed the lowest daily weight gain during this 64-day test period. Their inferior performance occurred during the days subsequent to their processing. Medication costs were lowest for Group I calves. Animals in this group also showed the best overall performance during the postreceiving phase of the study. For the entire 64-day test period, Group I calves were best with respect to performance, health and costs. More calves in Group III required treatment and for a longer period of time than those in Groups I and II. (See table 4.)

During the third and final study, Group II calves gained 21.2 percent faster than Group I animals and 25.8 percent faster than Group III calves. Feed per pound of body weight gain and the cost per pound of gain were lowest for Group II calves and highest for those in Group III. The percentage of cattle that became sick and required individual treatment was highest for Group I animals and lowest for Group II calves. As in the previous two trials, death loss due to hemorrhaging following castration oc-

curred when processing was delayed in California (Group III). Feed and water consumption was highest for the Group II calves.

### Summary

Results of the three time-of-processing studies show that delayed processing results in higher cost per pound of gain and poorer performance than processing at the point of origin or upon arrival in California.

Processing adversely affects feed and water consumption regardless of where the operations are performed.

Calves purchased as steers show significantly greater average weight gain than those purchased as bulls and castrated later.

Arrival temperatures of calves in California bore a significant relationship to the calves' future health during the studies. For each 1 degree increase in body temperature upon arrival, there was a corresponding substantial increase in individual animal medication treatments required.

Results from the study indicate no relationship between time of administering vaccines and immunity development within calves for the time periods studied. Regardless of when or where the vaccines were administered, most calves developed sufficiently high blood titer following vaccination to protect them.

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TABLE 5. PERFORMANCE AND COST

Item	Processed		
	at origin	on arrival	delayed
Daily gain from purchase, lb (3% shrink)	1.38	1.75	1.33
Feed per pound gain, lb	4.45	3.85	4.65
Feed, processing and medication cost per pound gain, ¢	20.99	16.52	21.49