THE EFFECT OF MASS-MEDICATION, LASALOCID OR DECOQUINATE, AND MEDICAL TREATMENT ON THE GAINS AND HEALTH OF NEWLY-ARRIVED STOCKER AND FEEDER CATTLE

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Story in Brief

Eleven loads of newly-received steer and bull calves and yearlings (1047 head) averaging 474 pounds were divided into two groups; one received routine processing on arrival, and the other received the routine processing plus long-acting oxytetracycline and sustained release sulfadimethoxine. Morbidity was reduced ($P<.05$) from 33.5 percent in the non-mass medication cattle to 14.7 percent in those receiving mass-medication at processing. The 524 head of non-mass medicated cattle had 1179 sick pen days, while the 523 mass-medicated cattle had 424 sick pen days, a reduction ($P<.05$) from 2.25 to 0.81 sick days per head. Average daily gains of the mass medicated cattle were significantly higher than those not receiving mass-medication (1.57 vs 1.45 lb/day). The above cattle were fed supplements containing no drugs, lasalocid (150 mg/head/day) or decoquinate (100 mg/head/day). Daily gains were not significantly altered by feed treatments (1.52, 1.56, and 1.47 lb/day, respectively). Sick cattle in the group not mass medicated at processing were assigned to one of four treatments: (1) negative control, (2) R05-0037, an experimental drug, (3) oxytetracycline and sulfamethazine boluses, or (4) amoxicillin. Recovery rate was 91% for R05-0037, 85% for oxytetracycline and sulfamethazine, and 47% for amoxicillin. Responses of 70% to the first treatment is considered excellent in previous studies. The negative controls (animals not administered antimicrobials on signs of sickness) were sick for more ($P<.05$) days than either of the treated groups and death losses were higher (4.7 vs 2.9% of the sick cattle).

(Key Words: Lasalocid, Decoquinate, Bovine Respiratory Complex, Newly-Arrived Cattle.)

Introduction

Between 2 and 5 percent of newly-received stocker cattle received in Oklahoma die of stress related diseases, primarily the Bovine Respiratory Disease (BRD) complex, shortly after shipping. Morbidity ranges from 0 to 100 percent, with an average probably between 25 and 30 percent. Cattlemen receiving stressed cattle must be prepared with a complete health program to prevent excessive death loss and decreased performance. Most cattleman and their veterinarians follow programs similar to the one outlined in OSU RP-9104 0481, treating sick animals as they are detected. Another approach is to mass-medicate all animals on arrival based on the premise that a high percentage of the cattle will get sick shortly after arrival and that sickness is not easily identified on arrival.

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Bristol (1969) showed that if treatment was started early, most of the approved antimicrobial drugs were very effective, but if treatment was delayed the response to antimicrobial drugs could be very poor. Early attempts to reduce the incidence of BRD by the injecting a single antibiotic at the point of origin before shipping were not successful (Addis et al., 1973). But more recently developed long acting oxytetracycline and sustained release sulfonamides can provide more prolonged medication and have shown promise when administered at processing time (Lofgreen, 1983; Swafford et al., 1983).

Materials and Methods

All eleven loads of cattle used in this study were assembled by order buyers with the majority coming from auction barns in the southeastern United States and trucked to Pawhuska, Oklahoma. Newly-received cattle were weighed individually off the truck and ear tagged. The ear tag number pre-assigned the medical treatment if the animal became sick. Cattle were poured with famphur systemic insecticide and randomly assigned by pen to mass-medication (MM) or non-mass medication (NMM) groups. Following weighing and tagging, cattle were placed in one of nine pens of 20 to 25 animals in each pen. Water and native bluestem grass hay were provided free choice. On the morning following arrival, cattle were processed by pen as follows:

1. Body temperature and time were recorded.
2. Cattle were vaccinated with IBR-PI$_3$ (IM MLV) vaccine, Leptospira pomona bacterin, and 4 Way Clostridia bacterin (Cl. chauvoei, septicum, novyi, sordellii)
3. Branded.
4. Dewormed with levamisole gel.
5. Cattle in the MM group received an injection of long-acting oxytetracycline[a] (10 mg/lb) and sustained release sulfadimethoxine boluses[b] (label dosage).
6. Sick cattle received antibiotic treatment if clinical signs of illness were detected or if body temperature exceeded 104° F (non-mass medicated cattle).
7. Hospital card was initiated (NMM).
8. Animals from the NMM group which were not sick and all MM cattle (sick or well) were returned to their home pen. Sick animals from the NMM group were placed in the hospital pen.

By processing only one pen at a time, cattle were seldom out of their pen for more than 35 minutes. Consequently, body temperatures should be more useful to identify sick animals. As soon as cattle were placed in their pens, they had ad libitum access to prairie hay and were offered a pelletted feed supplement (Table 1) at a rate of two lb/hd/day for the first 21 days and one lb/hd/day during days 22-28. The supplements contained (1) no added drugs, (2) lasalocid[c] (75 mg/lb), and (3) decoquinate[d] (50 mg/lb). Three hospital pens were maintained so that sick animals received their assigned feed while out of their

[a] LA-200®, Pfizer, Inc., New York, NY 10017.
[b] Albon-SR®, Hoffman-LaRoche, Inc., Nutley, NJ 07110.
[c] Bovatec®, Hoffman-LaRoche, Inc., Nutley, NJ 07110.
[d] Deccox®, Rhone-Poulenc, Inc., Monmouth Junction, NJ 08852.

home pen.

Mass-medication was assigned at random to either 4 or 5 pens in each trial. In each trial, each feed medication was fed to at least one pen. Numbers of pens assigned to treatment were balanced between trials. Non-mass medicated cattle were placed in the remainder of the nine pens. Mass-medication was administered at processing time and cattle were returned to their home pen even if the cattle were detected as sick at that time. If the mass-medicated cattle were detected sick 24 hours or more after processing they were removed from their home pen and treated with the second drug in the sequence of antibiotics (Table 2).

Table 1. Composition of feed supplement.

Ingredient	Percent
Soybean Meal	88.9
Salt	3.0
Vitamin A-30000 IU / Gram	.22
Premix[a]	.18
Cottonseed Meal	5.0
Dicalcium Phosphate	2.75

[a] to provide: 0 for control, 75 mg. lasalocid per pound, or 50 mg. decoquinate per pound.

The medication schedule assigned to non-mass medicated cattle were (A) no treatment (negative controls), (B) a sequence of antimicrobial drugs (Table 2), or (C) an experimental potentiated sulfa (RO5-0037[e]). Cattle treated by schedule B were treated with the first drug in the sequence. If body temperature dropped 2°F or to less than 104°F, or clinically improved within 24 hours, the first drug was continued for at least two more days. If no improvement was apparent after 24 hours, the next drug in the sequence was used and the process was repeated until improvement was detected as outlined in OSU RP-9104 0481. In trials 3, 4, and 5, treatments 1 and 3 were reversed in order so that the first treatment was amoxicillin. Cattle treated by schedule C were administered RO5-0037 boluses orally at 30 mg/lb on day one and 15 mg/lb on days 2-5, regardless of response to therapy. If additional treatment was required at the end of the 5 day treatment with RO5-0037, they were started on the second drug in the sequence (Table 2).

After processing, cattle were checked twice daily for signs of illness. If an animal was sick it was taken to the processing area where its body temperature was taken and a severity of illness score (slight, moderate or severe) was assigned. If the body temperature was over 104°F or if the animal exhibited clinical signs, it was considered sick and treated.

At the end of the 28 day trial, the cattle were held overnight without feed or water, weighed the following morning and, when necessary, castrated and horns were tipped. They were then returned to their owner.

Results in this study are reported as least square means. This

[e] Primor®, Hoffmann-LaRoche, Inc., Nutley, NJ 07110.

technique corrects for variations due to the trial (origin and possibly the time of year), truck (origin), treatment interactions, and unequal sample sizes. Models for the variables studied (gains, sick days and morbidity) originally included truck, feed treatment, mass vs non-mass medication and all two way interactions and were adjusted for initial weight. The final models for each variable included only those interactions having probabilities less than 0.20. Initial weight was also only included if its probability was less than 0.20.

Table 2. Sequence of drugs used for treatment of BRD.

Treatment No 1:	OXYTETRACYCLINE (Biomycin-C®) subcutanously - 5 mg/lb.
	Plus
	SULFAMETHAZINE BOLUSES (Sulmet® - 15 gm) 1 bolus/150 lb on day 1. One bolus/300 lb on subsequent days.
Treatment No 2:[1]	ERYTHROMYCIN (Gallamycin®) deep in the muscles - 10 mg/lb
Treatment No 3:[1]	AMOXICILLIN (Amoxi-ject®) subcutanously 5 mg/lb.
Treatment No 4:[1]	Procaine Penicillin G subcutanously - 30,000 IU/lb.
Treatment No 5:[1]	TYLAN 200 - 10 mg/lb.
Treatment No 6:[1]	SPECTINOMYCIN (Spectam®) - 5 mg/lb.

[1] Some of the antimicrobial drugs used in this study were used for extra-label purpose or at extra-label dosages and require a veterinarian-client-patient relationship before use.

For statistical analysis on all cattle, the model for average daily gain included truck, feed treatment, medical treatment, truck-medical treatment interaction, and was adjusted for initial weight. The model for sick days included truck, feed treatment, medical treatment, truck-feed treatment interaction, and truck-medical treatment interaction. The model for morbidity was the same as that for sick days except that an adjustment for initial weight was included. Those cattle in trial 4, truck 1 were not included in the analysis for sick days and morbidity because of an error in allocation to feed treatment.

For statistical analysis of the sick cattle, the model for average daily gain included truck, feed treatment, sick treatment, and was adjusted for initial weight. The model for re-pulls and morbidity were the same except initial weight was not included. Mass vs. non-mass medication was not included in these models because it caused too many empty cells.

Data on feed intakes and efficiencies were analyzed using pens as the experimental unit since feed records were kept on a pen basis. The model for feed intake included trial, medical treatment, feed treatment, and trial-feed treatment interaction. The model for feed efficiency was the same except a correction for initial pen weight was also included.

All cattle dying during this trial were submitted to the Oklahoma Animal Disease Diagnostic Laboratory for gross and histological examination, virus isolation, bacterial culture and antibiotic sensitivity testing.

Results and Discussion

Gains were significantly affected by truck (Table 3). Initial weight on trial also affected gains ($P<0.0001$)with lighter calves gaining at a faster rate than the heavier calves, the opposite of what was expected. Cattle buyers apparently were purchasing older, heavier, lower quality calves to reduce the purchase price per pound.

The administration of mass-medication reduced ($P<.0001$) sick days (2.25 vs 0.81) and morbidity (33.5% vs 14.7%). Gains in the 28 day receiving period were significantly increased ($P<.01$) by mass-medication (1.57 vs 1.45 lb/day). These reductions in morbidity, hospital pen days and improvements in gain are consistent with results from other research stations. The effect of feed treatment, while not significant, was most apparent in the cattle that were sick.

Table 3. Rate of gain, sick days and morbidity--all cattle.

Item, Origin & Date	No.[b]	In Wt	Daily Gain[a]	Sick Days[a]	Morbidity[a]
Trial 1					
Truck 1 FL 9/15/83	101	429	2.25^{h}	2.25^{f}	37.2^{f}
Trial 2					
Truck 1 OK 10/20/83	95	439	1.90^{g}	0.59^{cd}	9.6^{c}
Truck 2 FL 10/20/83	92	484	1.47^{ef}	0.91^{d}	20.5^{d}
Trial 3					
Truck 1 OK 12/1/83	104	438	2.15^{h}	1.63^{e}	28.9^{e}
Truck 2 OK 12/8/83	88	440	1.63^{f}	0.20^{c}	3.3^{c}
Trial 4					
Truck 1 TN 1/10/84	93	491	1.58^{ef}	----	----
Truck 2 TN 1/12/84	99	482	1.40^{e}	4.06^{g}	49.9^{g}
Trial 5					
Truck 1 AK 2/18/84	79	532	1.07^{d}	1.58^{e}	27.8^{def}
Truck 2 AK 2/24/84	90	538	0.83^{c}	3.93^{g}	59.8^{h}
Trial 6					
Truck 1 MO 3/21/84	101	471	1.13^{d}	0.11^{c}	3.3^{c}
Truck 2 MO 3/28/84	105	487	1.20^{d}	0.05^{c}	1.7^{c}
Medical Treatment					
No Mass	524		1.45^{c}	2.25^{c}	33.5^{c}
Mass-Medication	523		1.57^{d}	0.81^{d}	14.7^{d}
Feed Treatment					
Control	343		1.52		
Lasalocid	348		1.56		
Decoquinate	356		1.45		

[a] Gain, Sick Days and Morbidity expressed as LSMEAN.
[b] Original number of calves on trial.
[c-h] Means with different superscripts differ ($P<0.05$).

Gains by the sick cattle (Table 4) were not significantly affected by any of the feed treatments, however, cattle receiving either lasalocid or decoquinate tended to gain faster. Sick cattle receiving treatment for sickness (schedule B or C) had higher gains than sick cattle receiving no treatment (schedule A, $P<0.0037$), and were sick for significantly fewer days.

Sick days in the sick cattle were reduced when supplements contained lasalocid or decoquinate ($P<0.0762$). Decoquinate tended to reduce sick days more than lasalocid. Sick treatment had a significant effect on sick days, with those cattle receiving treatment having fewer sick days than the negative control cattle. Death loss in the negative treatment cattle was 4.7% of those getting sick, compared to 2.9% of those becoming sick in the group that received medical treatment when ill.

Table 4. Rates of gain, sick days and re-pulls--sick cattle.

Item	Number	Daily Gain[a]	Sick Days[a]	% Re-Pulls[a]
Feed Treatment				
Control	82	0.95	6.48	13
Lasalocid	83	1.12	6.22	17
Decoquinate	88	1.21	5.42	2
Effect Of Sick Treatment				
Negative Control	43	0.84	7.56[d]	
Conventional	63	1.25	5.31[c]	7
RO5-0037[b]	68	1.28	6.01[c]	17
Mass-conventional	79	1.02	5.28[c]	15

[a] Gain, Sick Days and Re-Pulls expressed as LSMEAN.
[b] Protocol requires at least a 5 day treatment.
[c,d] Means with different superscripts differ ($P<0.05$).

Table 5. Feed intakes and feed efficiencies.

Item	Number of Pens	Feed Intakes, lb/day[a]	Feed/Gain[a]
Trial 1	6	12.13[b]	7.16[b]
Trial 2	9	13.36[c]	8.69[b]
Trial 3	9	16.05[e]	9.62[b]
Trial 4	9	13.50[c]	9.02[b]
Trial 5	9	14.60[d]	16.74[c]
Trial 6	9	15.57[e]	13.45[d]
Feed Treatment			
Control	17	14.35	11.52
Lasalocid	17	14.32	10.55
Decoquinate	17	13.94	10.27
Medical Treatment			
No Mass	26	14.68[b]	11.64[b]
Mass	25	13.72[c]	9.92[c]

[a] Feed Intakes, Feed Efficiencies expressed as LSMEAN.
[b,c,d,e] Means with different superscripts differ ($P<0.05$).

Feed intakes and feed efficiencies (Table 5) were significantly affected by the trial and the administration of mass-medication. Mass-medication reduced (P<.01) feed intakes from 14.7 to 13.7 lbs per day. Mass-medication improved (P<.04) feed efficiencies (11.6 vs 9.9 lb feed per lb gain).

Ten head died in the study, three of which died of causes not related to the experimental treatments. Post-mortem findings are presented in Table 6.

Table 6. Post-mortem findings.

Trial No./Calf No.	Cause of Death	No. of Days on Trial
1-710	Acute fibrinonecrotic pneumonia	4
2-65	Bovine respiratory disease syndrome (P. hemolytica)	13
2-85[a]	Chronic necrotizing and purulent arthritis with secondary lung abscessation (P. hemolytica and C. pyogenes)	29
4-47	Fibrinous pneumonia (P. hemolytica)	6
4-103	Acute fibrinopurulent pneumonia (P. hemolytica)	13
4-136	Bovine respiratory disease syndrome	15
4-163	Bovine respiratory disease syndrome (P. hemolytica)	15
4-100[a]	Castration hemorrhage	29
5-71	Acute fibrinous pneumonia (P. hemolytica)	10
6-145[a]	Bloat and peritonitis	20

[a] Died of causes not related to diseases being studied.
Death loss rate for the project this season was: overall .76%, mass-medication 0.76, and non-mass medication .76%

The economics of mass-medicating cattle depends on the cost and success of conventional treatment, availability of labor, ability to detect sick cattle early, and on the health status of cattle received. Mass medication at processing usually is not economical for fresh local cattle which experience peak illness at a later time (7-14 days after arrival). Mass medication should reduce labor and drug costs, and increase performance for long-haul, stale, or otherwise stressed calves.

The use of a coccidiostat in the diet or the drinking water for newly arrived shipped cattle has proven more beneficial in previous years at Pawhuska and in field trials reported elsewhere in this research report. No clinical coccidiosis was detected in any cattle during this study. Nevertheless, a coccidiostat should be included in the receiving ration for stale, stressed, or even local sale barn calves as subclinical coccidiosis even without clinical appearance can reduce performance.

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