

# *The Prophylactic Use of Antibiotics in the Prevention of Bovine Respiratory Disease Complex*

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In that none of the proposed vaccination programs for the prevention of shipping fever has been successful, a search for other means of preventing this cattle problem was initiated. The investigation reported in this paper was undertaken to evaluate the prophylactic benefits against the shipping fever syndrome of antibiotics or combinations of antibiotics administered to feeder calves at placement or within 24 hours of placement in a feed lot environment.

## **Introduction**

For decades the suggestive etiological agent for the respiratory syndrome usually referred to as shipping fever in feeder calves was the *Pasteurella* spp. bacteria (5-8, 14, 19, 24, 29). Vaccination with the Pasteurella bacterin has not been of demonstrable benefit in preventing the respiratory syndrome (16, 18, 20, 22, 25-27). Recently, it has been suggested that viral agents were the primary invaders, decreasing the local immunity to a degree that permitted the secondary bacterial infections (13, 21, 23).

Numerous investigators have demonstrated that the attenuated parainfluenza-3 vaccines will increase the blood titer of the recipient following intramuscular administration, but minimum or variable protection of the respiratory mucous epithelium appears to be provided (1-4, 9, 10). Extensive field investigations have demonstrated minimum prevention of the shipping fever syndrome in calves in feed lot environments following the recommended procedure of vaccination with the parainfluenza viral vaccines (11, 12, 15, 17-25, 27, 28, 30, 31-33).

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## **Materials and Methods**

The calves utilized in this investigation were of beef breeding and weighed approximately 300-475 pounds. They were home ranch raised calves, except those of lot 5 which were purchased in a nearby local sales ring and transported 60 miles to the feed lot. All involved feed lots were within a 10-mile radius in southeastern North Dakota. The conventionally recognized management procedures of castration, dehorning, branding and vaccination for blackleg, malignant edema and Pasteurella were done during May and June by all cooperating investigators. Available records indicated like management procedures had been exercised on purchased calves used in lot 5.

The initial feeding practices consisted primarily of free access to native hay, some silage feeding and variable concentrate preparations. No chemotherapeutics were provided in the feed or water. All calves received a single administration prophylactic antibiotic preparation subcutaneously within 24 hours after arrival in the feed lots with the exception of the calves in lot 1, which received the antibiotics during the unloading process. All calves appeared healthy and vigorous upon entry into the lots. All calves were placed in the feed lots during late November and early December.

Twice daily observations were made of the calves for three weeks following admittance to the lots by the owners, and approximately every three days by the veterinarian associated with the investigations.

The antibiotics used in this investigation included a combination of procaine penicillin G, 150,000 units per cc, and benzathine penicillin G, 150,000 units per cc of suspension referred to as



Typical shipping fever symptoms: droopy head, watery eyes, arched back.

Longicil Fortified\* (Longicil-F). Another penicillin combination investigated consisted of procaine penicillin G, 150,000 units per cc, benzathine penicillin G, 150,000 units per cc, and dihydrostreptomycin base (as a sulfate), 250 mg per cc of suspension and referred to as Longicil-S\*. Dihydrostreptomycin sulfate solution, 500 mgs per cc administered alone was also investigated.

Each calf received 4,000 units of penicillin suspension per pound of body weight of Longicil-F or 4,000 units penicillin suspension and 3.3 milligrams dihydrostreptomycin base per pound body weight of Longicil-S. Dihydrostreptomycin sulfate solution was administered at the rate of 3.3 milligrams per pound of body weight.

#### Results

In this investigation, 1,167 calves were distributed in five lots.

Lot 1 consisted of 263 calves, of which 11.00 per cent required medication. There were no deaths in the lot. The calves were vaccinated with Electroid 7<sup>R</sup> upon entering the lot. No other vac-

cines were used at the time of entering the lot. Prophylactics were administered during the unloading at the lot.

Most of the calves in lot 1 were housed in an oversized lot where fence walking was common for the first several days of occupancy. The operator observed the calves closely, and calves that were considered ill and were medicated likely would have gone unnoticed by some of the other cooperating operators.

Lot 2 consisted of 290 calves that received no vaccines for shipping fever before entering the feed lot or during the investigation. The operator of this lot was a very conscientious feeder and medicated calves exhibiting the milder form of clinical respiratory signs of illness. About 10 per cent of the calves exhibited signs of a deep dry cough, but feed consumption was not interrupted. No deaths occurred.

The calves of Lot 3 were vaccinated by the owner with an attenuated intramuscular IBR vaccine three weeks prior to admittance to the lot. The calves of this lot varied in size and were extremely nervous and difficult to handle.

Clinical signs of shipping fever were typical, but with a minimum of coughing being exhibited.

\* Fort Dodge Laboratories, Fort Dodge, Iowa.

<sup>R</sup> Jensen-Salsbury Laboratories, Kansas City, Missouri.

**Table 1. Summary of Results Obtained with Three Antibiotic Preparations Employed as Prophylactics in Five Feed Lots.**

	Longicil-F	Longicil-S	Dihydrostreptomycin Sulfate	Controls	Totals
Animals	303	277	253	334	1167
Number medicated	9	16	14	55	94
% medicated/group	3.0	5.8	5.5	16.5	
% Medicated/ total treated calves	9.6	17.0	14.9	58.2	8.1

Calves with severe enough signs of shipping fever to warrant medication in other lots were ignored by this lot operator and recovered without being medicated. No deaths occurred. There were no significant differences between the prophylactic antibiotic preparations employed or to the control group of calves in this lot.

Calves of Lot 4 were uniform in size. The signs observed were of the typical shipping fever syndrome, but coughing was of minimum occurrence. The predominance of respiratory signs was observed in heifer calves vaccinated for brucellosis upon entry into the feed lot, and death resulted in two of the vaccinated heifers. No vaccines other than Strain 19 brucellosis vaccine were administered to the calves.

The calves in Lot 5 received no shipping fever vaccines previous to or during the investigation. Medication was given only to those exhibiting acute clinical signs of shipping fever. Signs were typical of the shipping fever syndrome, with dehydration being particularly evident.

A summary of the data obtained in five lots of calves is presented in Table 1. The prophylactic effects of each antibiotic preparation was significantly different from the control group of calves, but not between each other when determined at the  $p=.01$  level.

The greatest incidence of shipping fever occurred during the first seven to 12 days the calves were exposed to the feed lot environment. A second medication to achieve successful therapy was necessary on 28 control calves, four calves that received penicillin combinations and three calves that received dihydrostreptomycin sulfate solution.

#### Discussion

Results of this investigation reconfirm earlier investigations which indicated that a combination of procaine penicillin G and benzathine penicillin G was an effective prophylactic to prevent the

respiratory syndrome of shipping fever under controlled practical environmental conditions (25-28). All prophylactic preparations used in this investigation appeared to provide some benefit as based on the incidence of clinical signs of shipping fever of treated calves compared to the incidence of comparable signs observed in the control calves. The calves which received Longicil-F penicillin combination were apparently provided the greatest benefit in preventing the shipping fever syndrome.

Variations existed between the operators as to evaluation of severity of clinical signs and the need for medication. Severity of signs was recorded through veterinary observations, but a minimum of veterinary influence was exhibited on operators as to their evaluation of severity and the need for medication. This policy was observed in an attempt to keep the investigation as practical as possible and on a level as nearly comparable to field conditions as possible.

The greatest incidence of severe signs of shipping fever occurred in the control group. This group also required the most repeat medication.

Based on this investigation and others previously reported, it becomes obvious that adequate dosage of procaine penicillin G and benzathine G suspension administered to calves upon entrance to the feed lot will aid in reducing the incidence of the shipping fever syndrome.

#### Summary

Feeder calves received a suspension of procaine penicillin G and benzathine penicillin G with and without dihydrostreptomycin sulfate, or dihydrostreptomycin sulfate only, within 24 hours after entrance into feed lots. Based on the observations of clinical signs of the shipping fever syndrome and the need for medication, it was demonstrated that the combination suspension of procaine penicillin G and benzathine penicillin G helped to prevent the shipping fever syndrome for the first 14 days the calves were in the feed lot environment.

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