OPERATIONAL PROCEDURES OF KANSAS CATTLE FEEDYARDS

by

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A MASTER'S REPORT

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MASTER OF SCIENCE

Department of Animal Science

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SUMMARY

Twenty-four Kansas feedyards, participated in a survey on operational procedures pertaining to specific management practices utilized in their operation. The survey included five topic areas: processing, animal health, rations, facilities, and marketing.

Sixty-eight percent of the feedyards surveyed processed all new cattle within two days. The most prevalent vaccines administered were infectious bovine rhinotracheitis, bovine viral diarrhea, and leptospirosis in one combination injection with blackleg and malignant edema in a second combination injection. Cattle were wormed during processing at eighty-three percent of the feedyards surveyed. The first 21 days in the feedyard was designated as the most critical animal health period. A medicated starter ration was used in 74 percent of the feedyards surveyed, providing an average level of 660 mg. antibiotic per head per day. One growing and four finishing rations were used by the feedyards. The concentrate percentages in the four finishing rations (90 percent dry matter basis) were 50, 65, 75 and 87 percent respectively. Average one time capacity of the feedyards surveyed was 18,000 head with a labor requirement of 1.1 persons per 1,000 head on feed. Marketing of slaughter cattle is accomplished by selling direct to packer representatives on a live weight and grade basis. Only 18 percent of cattle fed in the 24 Kansas feedyards were hedged on the live cattle futures market.

INTRODUCTION

Cattle finishing has been one of the most rapidly expanding industries in Kansas during the past two decades. This expansion has resulted in large cattle feeding operations, requiring a high degree of specialization.

A descriptive study was conducted to determine the present management practices of the feedlot industry in Kansas and to provide a basis from which alternatives could be derived. This report emphasizes methods of caring for cattle during the feeding period immediately prior to slaughter. Results of this survey do not claim to represent total view of the cattle feeding industry in Kansas because many factors unrelated to animal husbandry influence management decisions.

SURVEY PROCEDURES

The survey was introduced July 15, 1976 at the Kansas Cattle Feeder's Conference in Wichita, Kansas, where copies were made available to cattle feeders. Questionnaires were also mailed to feedyard managers, to assure adequate coverage of the state. A total of 24 feedyards responded to the lengthy survey and all respondents were included in the final summary. Analysis was based upon the percentage of feedyards that responded in the same manner to a particular question. Eighty-eight questions, distributed among five topic areas were included in the survey. The summary represents the most popular management practices used by the 24 feedyards rather than individual operations. The complete survey is included as Appendix 1.

RESULTS

I. Processing Procedures

Time of processing and drugs administered varied among the 24 feedyards. All cattle are processed within two days at sixty-eight percent of the feedyards surveyed. The most prevalent vaccines administered consisted of infectious bovine rhinotracheitis, bovine viral diarrhea, and leptospirosis in one combination injection with blackleg and malignant edema in a second combination injection. All of the feedyards implanted 100 percent of the cattle and 26 percent of the feedyards implanted twice

(provided the cattle were fed 180 days or longer). Forty percent implanted heifers with Synovex H and steers with Diethylstilbestrol, 30 percent used Diethylstilbestrol, in steers and heifers, 25 percent implanted steers with Synovex S and heifers with Synovex H, and the remaining 5 percent used Ralgro for both steers and heifers. Eighty-three percent of feedyard operators wormed cattle during processing by administering an oral (41% feedyards) or subcutaneous injectable worming agent (42% feedyards) and 17 percent included the worming agent in the ration. Sixty-three percent of the feedyards applied insecticides by means of a dipping vat with 37 percent using the pour on method. Castrating and horn tipping during processing was practiced by 53 percent of the operators. The degree of stress the cattle had undergone prior to arrival at the feedyard was the main factor determining whether bulls were castrated during processing or at a later date. At the time of this survey, no heifers were aborted during processing because no approved drug was available for this purpose.

II. Animal Health

The first 21 days in the feedyard was designated as the most critical period in terms of animal health. Cattle originating from the Southeastern states routinely had the greatest incidence of health problems. Sixty-three percent of the feedyards indicated fall to be the season of the year when animal health was of most concern. A representative starter ration was formulated, based upon the five most common ration ingredients among the 24 feedyards surveyed. The starter ration consisted of alfalfa hay, steam flaked corn, corn silage, molasses, and supplement (table 1). A medicated starter ration was used in 74 percent of the feedyards surveyed and provided an average level of 660 mg. antibiotic per head per day.

Sick animals were treated by administering various drugs for three consecutive days. Symptoms and drugs most commonly used are listed in table 2. Treatment plan was altered in all feedyards if no response was obtained by using certain drugs.

III. Rations

One growing and four finishing rations were used by the feedyards. The concentrate percentages for the four finishing rations (90 percent dry matter basis) were 50, 65, 75 and 87 percent, respectively. Gustafson and Van Arsdall (1970) reported similar concentrate levels for cattle being fed finishing rations in the Northern Plains, including Kansas. Ration ingredients and percentage of each ingredient in the ration were not consistent among the 24 feedyards. Concentrates most commonly fed were corn, sorghum grain, and wheat while corn silage, hay, and crop residues were the main sources of roughage. Although ration ingredients and percentages differed for each feedyard, nutrient content of the rations was consistent among the 24 feedyards surveyed. A representative analysis for each of the four finishing rations most commonly used by surveyed feedyards is shown in table 3. At the time this survey was taken, 58 percent of the operators were including Rumensin in the ration 14 days after the cattle were placed on feed. An analysis of rations was routinely calculated once per month by 46 percent of the feedyards and 90 percent of the feedyards employ a consulting nutritionist. A veterinarian is employed on a regular basis by 58 percent of the lots covered in this survey. Length of time cattle are on each ration depends mainly upon consumption of feed, type of cattle, and weight of cattle. Fifty-three percent of the feedyards reported they had fed cows during the year. Cows were fed the number four finishing ration for a period of 60 to 90

days. This is contrary to findings by Gustafson and Van Arsdall (1970), who reported cows were fed high roughage diets by feedlot operators. Steam flaking, the most popular method of grain processing, was used in 58 percent of the feedyards surveyed. Eighty-nine percent of the feedyards fed either two or three times per day. Percentage of steers, heifers, bulls and cows normally fed by the 24 lots was 64, 34, 1.5 and .5, respectively. In a survey conducted by Burke (1969) feedlot operators reported they were feeding 69 percent steers and 31 percent heifers with no further breakdown as to sex being reported.

IV. Feedyard Facilities

Average one time capacity of the feedlots surveyed was 18,000 head with a turnover rate of 2.2 times per year. Koudele et al. (1975) reported a turnover rate of 1.9 for Kansas feedyards having a one time capacity in excess of 10,000 head. The greater turnover rate may result from marketing cattle at lighter weights and placement of heavier feeders in the feedyards at the present time. The average pen provided each animal 220 square feet of lounging area and 12 inches of bunk space. Manure was disposed of by selling to local farmers with excess runoff being contained in lagoons. Feed storage consisted of horizontal silos for silage with an average capacity of 32,000 tons and steel bins for grain with an average capacity of 120,000 bushels per feedyard. On an average, the feedyards surveyed maintained a 35 day inventory of grain. Labor required to operate the average feedlot was 1.1 persons per 1,000 head on feed. Feedyard managers repeatedly stressed the importance of minimizing the turnover rate of employees by compensating them according to their ability. Eighty-three percent of the managers felt there would be an increased number of college graduates employed by feedyards in the future.

TABLE 1. COMPOSITION OF REPRESENTATIVE STARTER RATION

	% Dry matter basis
Ration Ingredients	
Flaked Corn	39.5
Alfalfa Hay	30.7
Corn Silage	19.9
Supplement	5.1
Molasses	4.8
Ration Analysis	
Roughage	50.8
Concentrate	49.2
Crude Protein	11.4
Calcium	.55
Phosphorus	.28
NE_m Mcal/lb.	.75
NE_g Mcal/lb.	.47

TABLE 2. SYMPTOMS AND DRUGS COMMONLY USED FOR TREATMENT

Symptom	Drug[a]
Pneumonia	Liquamycin
	Tylosin
	Sulfamethazine
Foot Rot	Sulfapyridine
	Penicillin
Fever	Liquamycin
	Terramycin
	Sulfa Boluses
	Tylosin
No fever	Gallimycin
(sick appearance)	Tylosin
	Amoplex Boluses

[a]Certain feedyard representatives referred to commodities by trade names. This report does not reflect endorsement of trade name products over competing ones. Read and follow label directions.

TABLE 3. ANALYSIS OF RATIONS DURING FOUR FINISHING STAGES

(90% Dry matter basis)	1	2	3	4
Concentrate %	50	65	77	87
Crude Protein %	11.8	11.7	11.5	11.4
Urea[a], lb.	.1	.1	.1	.1
Calcium %	.58	.56	.50	.47
Phosphorus %	.29	.29	.30	.31
Salt %	.5	.5	.5	.5
Vitamin A[b]	30,000	30,000	30,000	30,000
MGA[a], mg.	.4	.4	.4	.4
Antibiotic[a], mg.	70.	70.	70.	70.
Rumensin[a], mg.	200.	200.	200.	200.
DES[a], mg.	10.	10.	10.	10.
NE_m, Mcal/lb.	.75	.78	.82	.85
NE_g, Mcal/lb.	.46	.49	.53	.54

[a]Additives when used supply the level specified above per head per day.

[b]Formulated to supply 30,000 IU per head per day.

V. Marketing

The marketing section of the questionnaire emphasized procurement practices for obtaining feeder cattle, market channels for slaughter cattle, and a categorization of quality grades for both feeder cattle and slaughter cattle. Based on a weighted average, 56 percent of the feeder cattle entering the lots surveyed were obtained through order buyers. Twenty-four percent of the feeder cattle were purchased at local auctions. Forty-four percent of the feeders entering the feedyards were native to Kansas. Considering the number of calves produced per year in Kansas versus the number marketed, this appears to indicate a high degree of importing and exporting of feeder cattle. Average quality grade of feeder cattle was reported to be 2 percent prime, 52 percent choice, 40 percent good, 5 percent standard and 1 percent utility. Feedyards involved in this survey sold all cattle on a direct basis as opposed to other options such as terminal markets. Ninety-five percent of the cattle were sold on a live weight and grade basis with a four percent pencil shrink at the feedyard. The remaining five percent were sold on the basis of rail weight and grade. The allocation for slaughter cattle was 1 percent prime, 72 percent choice, 22 percent good, and 5 percent standard. One-hundred percent of the feedyards surveyed indicated a certain percentage of cattle on feed in their respective lots were hedged on the live cattle futures market. This is in contrast to an earlier study conducted by Koudele et al. (1975) which showed 22 percent of the Kansas feedyard operators, with a capacity in excess of 10,000 head, were hedging cattle. On a weighted average basis, 18 percent of the cattle fed in the 24 feedyards were hedged on the live cattle futures market.

DISCUSSION

Processing techniques emphasized a broad spectrum vaccination program to insure against the spread of diseases within each feedlot. The primary goal during processing was to minimize the number of sick days per animal by establishing an immunization program against prevalent feedlot diseases. Ration ingredients were selected in an attempt to provide least cost gains. Grain processing continues to be popular but economic considerations, primarily energy costs, will determine its popularity in the future. The large number of feeder cattle imported to and exported from Kansas indicates production costs would be reduced, primarily because of less transportation, if more native cattle were fed. Cattle feeders, beef packers and consumers need to agree on an ideal market weight for slaughter cattle. Controversy will probably continue over days on feed and level of concentrates in the final ration.

This survey has emphasized that feedyard managers must evaluate their particular operation and select management techniques that will achieve specific goals. There were no two feedyards, of the 24 surveyed, in complete agreement as to the methods of feeding cattle. Even though complete agreement was not found among the feedyards (and was not expected), a high percentage of the feedyards gave similar responses to many of the questions. Results of this survey help document management practices preferred by a majority of the feedyard respondents.

LITERATURE CITED

Burke, R. L. 1969. Characteristics of beef cattle feedlots. California, Colorado, and western Corn Belt. U.S.D.A. Mktg. Res. Report 840.

Gustafson, R. A. and R. N. Van Arsdall. 1970. Cattle feeding in the U.S. E.R.S., U.S.D.A., Agr. Econ. Report 186.

Koudele, J. W., J. H. McCoy and Q. C. Smith. 1975. The Kansas-Nebraska cattle feedlot industry - feeder cattle procurement practices and operational characteristics. Ks. Agr. Exp. Sta. Bull. 583.

APPENDIX

Survey of Operational Procedures of Kansas Feedyards

I. Processing Procedures

A. How soon after arrival of new cattle do you process them:

1. 1st day
2. 2nd day
3. 3rd day (if longer than 3 days, state time period)

B. Drugs administered (vaccines, antibiotics, sulfas, vitamins, etc.)

1. List by specific disease, such as IBR, BVD, black leg, etc., or if for general animal health, place AH under the disease or purpose column.
2. Trade name of drug used.
3. Route of administration (I.M., IP, Sub Q, IV, oral).
4. Amounts given.
5. If wormer is given or heifers are aborted during inprocessing, list under disease or purpose column.

Disease or Purpose	Drug (trade name)	Rt. Admin.	Amts.

C. Is an oral drench used in the inprocessing procedure? If so, what is in the drench?

D. Implanting:

1. What % of cattle do you implant?
2. What trade name implant do you use?
3. Do you implant any cattle more than once?

E. Aborting of feedlot heifers:

1. What % of heifers do you abort?
2. When do you abort the heifer?
3. What drug is used?

F. 1. What insecticides are used? (trade names)

2. How are they used? (pour on, dip, etc.)

G. What type of pen identification is used on the cattle?

H. Do you castrate and dehorn in conjunction with inprocessing?

I. What % of new cattle do you temperature?

J. 1. Do you worm all incoming cattle?
2. If so, what wormer is used? (trade name)
3. How is the wormer administered? (orally, in the feed, Sub Q injection, etc.)
4. When do you worm cattle; during inprocessing or after they have been on feed?

K. Additional inprocessing procedures (particular to your operation).

II. Treatment of sick animals and general health concern.

A. Time period most critical with respect to animal health (first 30 days, etc.)

B. Is there any particular point of origin in the United States that you note a greater degree of health problems in newly arrived cattle?

C. How are new cattle managed:

1. Do you hold new animals off water? If so, for how long?

2. What does the starting ration consist of? (ingredients and % of each, if possible)

3. What level of antibiotics is included in the starter ration? (brand names, if commercial sources are known)

4. How many days will cattle be on feed prior to feeding Rumensin (if Rumensin is used in your lot)?

5. Is the medicated ration used on all newly arrived cattle, or do you wait and use medicated feed for specific pens of cattle?

D. Season of the year when animal health is of most concern:

(Circle one) Spring, Summer, Fall, Winter

E. Treating animals pulled from pen:

1. How many successive days will you treat an animal?

2. If you treat an animal one day and he shows considerable improvement the next day, do you continue treatment?

F. What drugs are used for treatment? (trade names)

Symptoms	Drug used	Amounts	How administered

G. Do you generally use one treatment plan or alter the treatment to fit the symptoms of the animal?

H. 1. If the treatment plan is altered, what symptoms or conditions must appear before an alternate drug is used?

2. What drugs are used in this situation, and what amounts?

III. Rations (Xerox copy of ration sheet will be satisfactory for this section.)

A. List all ingredients normally used in rations at your feedyard.

B. Number of rations used and % of each ingredient in the various rations:

Complete the following table.

Ingredient						
Total	100	100	100	100	100	100

Please state the basis for ration percentages listed above (as fed, 90% DM, etc.).

C. Calculated analysis of various rations. (state the basis where % figures are required, such as 90% DM, as fed, etc.)

Protein %						
Urea, lb/hd						
Calcium %						
Phosphorus						
Salt %						
Vit A, IU/hd						
Trace minerals						
MGA, Mg/hd						
Antib, Mg/hd						
Rumensin, Mg/hd						
DES, Mg/hd						
NE_m Mcal/lb.						
NE_p Mcal/lb.						

D. If the details of your calculated analysis differs from the example at C, then state what your analysis includes and the amounts for each ration.

E. 1. During the year certain conditions may arise that alter the ingredients you use in your rations. List the alternate ingredients that you have used in your feeding program during the past year.

Alternate Ingredients

E. 2. On what basis do you substitute these alternate ingredients into your ration in place of normal ingredients?

F. How frequent do you have an analysis on your rations calculated?

G. What commercial protein supplement is used in each ration? A feed tag would be ideal.

H. 1. What factors determine the length of time cattle are on each ration, such as consumption, economics, type of cattle, market, etc.?

2. If you have ever fed cows, how many days do you feed them and what ration is used?

I. Do you use dry or liquid supplement?

J. How is roughage processed immediately prior to feeding? Example: corn stalks processed through tub grinder, etc.

K. How is grain processed prior to feeding?

flaked, popped, micronized, cracked, other _____.

L. 1. If high moisture grain is fed, is the grain processed going into storage or coming out of storage?

L. 2. What type of processing is used on the high moisture grain (cracked, ground, etc.) and what machine is used to do this?

3. Is a preservative used on high moisture grain? If so, what brand name?

M. Number of times cattle are fed/day.

N. Is fat used in rations and, if so, what %?

O. Do you employ a private or commercial consulting nutritionist?

P. Do you employ a veterinarian on a <u>regular</u> basis or as the need arises?

Q. What percentage of steers, heifers, bulls, cows do you normally feed?

steers -
heifers -
bulls -
cows -

R. 1. Do you feel that the number of rations you use is adequate to avoid setbacks as you go from, say the number 3 ration to the number 4 ration? (please elaborate if you feel this is a problem)

2. Do you think there would be any benefit to offering, say 8 rations as opposed to 5, so that you would have a more gradual intake in energy level, or is this drawing the line too fine and becoming impractical?

IV. Feedyard facilities

A. 1. Capacity of feedyard:

2. Number of cattle fed/year:

3. Do you plan to increase your capacity during the next two years?

B. 1. Bunk space/pen:

2. Number of animals/pen:

3. Sq. Ft./head:

C. What is your manure disposal system?

D. Roughage storage:

1. Type of storage:

2. Capacity (tons and dimensions):

3. Is silage preservative used? If so, brand name:

E. Grain storage:

1. Type of storage:

2. Capacity:

F. Labor per 1,000 head of cattle on feed:

G. What name brand mixer do you use on your feed trucks?

H. What is your source of fuel to heat boilers which may be used in your feed mill? (natural gas, diesel, etc.)

I. Do you use a micro-ingredient machine?

J. 1. Do you consider a fast turnover rate of employees as part of the business, or do you feel that it is important to minimize the turnover rate?

2. How do you minimize the turnover rate of your employees?

K. What is your attitude toward hiring college graduates?

L. Do you think we will see more college graduates working in feedyards in the future, or less?

V. Marketing

A. Procurement of feeder cattle.

1. What market channels do you use to obtain feeder cattle (state on a % basis).

   a. Local auction (to include terminal auctions)
   b. Direct purchase
      1. From cowherd owners
      2. Growers
   c. Order buyers and traders

2. Origin of feeder cattle (state on a % basis)

   a. Native to Kansas
   b. Other states or regions (list the states or regions along with % for each)

3. What quality grade of feeder cattle do you receive (on a % basis):

   Prime
   Choice
   Good
   Standard
   Utility

B. Marketing of fed cattle

1. What market channels do you use to sell fed cattle (state on a % basis):

   a. Direct marketing
      1. Live weight and grade
      2. Rail weight and grade
   b. Terminal markets
   c. Auctions

2. What would be the % break down in slaughter cattle as far as quality grade for your particular yard?

C. 1. Do you, as a feedyard manager, encourage or prefer cattle that have been produced by an individual and then sent directly to your feedlot (retained ownership)?

2. What % of the cattle in your feedyard would be under retained ownership?

D. What weight of cattle and what breed or cross would you prefer to place on feed?

E. What % of the cattle are hedged?

F. Do you use hedging in connection with purchasing of grain on the cash market? If so, what %?

G. How large an inventory of grain do you normally purchase ahead of time? (Indicate no. days supply)

VI. Additional comments or suggestions.

A. What significant changes, if any, do you think we will see in the cattle feeding industry over the next 5 years?

B. What research topics would you like to see pursued at Kansas State University?

C. Question not included on this survey that you would like to have answered?

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The first 21 days in the feedyard was pointed out to be the most critical period in terms of animal health. Cattle originating from the Southeastern states routinely had the greatest degree of health problems. A medicated starter ration was used by 74 percent of the feedyards surveyed and provided an average level of 660 mg. antibiotic per head per day.

Rations used by the feedyards consisted of 1 growing ration and 4 finishing rations. The concentrate percentages for the 4 finishing rations on a 90 percent dry matter basis were 50, 65, 75, and 87 percent respectively. Steam flaking was the most popular form of grain processing being used by 58 percent of the feedyards surveyed.

Average one time capacity of the feedyards surveyed was 18,000 head with a labor requirement of 1.1 persons per 1,000 head on feed.

Results of this survey indicated 44 percent of feeder cattle

placed on feed were native to Kansas. Marketing of slaughter cattle is accomplished by selling direct to packer representatives on a live weight and grade basis. Only 18 percent of cattle fed in the 24 Kansas feedyards were hedged on the live cattle futures market.