BEEF CATTLE RESEARCH UPDATE

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Nutritional Recommendations of Feedlot Consulting Nutritionists

New Mexico State University and Texas Tech University recently summarized the professional practices of consulting feedlot nutritionists as an update[1] to surveys conducted in 2001[2] and 2007[3]. In this survey, 24 of 49 feedlot nutritionists invited to participate completed the survey. The 24 respondents reported that they serviced an average of 613,333 cattle per year, which, combined, accounts for over 14 million of the cattle on feed annually. The average number of cattle serviced by consulting nutritionists decreased over the past 15 years, from 735,278 in 2001 and 620,828 in 2007. In contrast, the minimum number of cattle serviced by consulting nutritionists increased from 20,000 in 2001 and 75,000 in 2007 to 100,000 in the newest survey. The nutritionists surveyed were representatives from individual consulting practices (54.2%), corporate cattle feeding companies (20.8%), corporate feed manufacturing companies (20.8%), or a combination of consulting practices (4.2%). These results are similar to those reported in 2007, as nutritionists working independently represented the largest number of survey participants (65.5% in 2007). The greatest number of participants (10; 41.7%) had been practicing for 16 to 25 years and 9 (37.5%) had been practicing for 26 years or more. The respondents serviced clients located primarily in the Midwest (41.3%; Nebraska, Colorado, Iowa, South Dakota, and Minnesota), but many of them also had clients in the High Plains (33.7%; Kansas, Texas, and Oklahoma), Northwest (9.8%; Idaho and Washington), and Southwest (7.6%; California and Arizona). The present survey introduced a number of new questions not included in the 2007 survey that focused on management strategies used in the receiving period.

Some of the major findings from this survey are listed below.

<u>General cattle management</u>

- The majority of respondents worked with feedlots that received calves weighing 600 to 800 lb (70.8%) and shipped finished cattle at weights ranging from 1300 to 1500 lb.
- Average days on feed for cattle were 201 days (mode of 180 days).
- 19% of the cattle in feedlots serviced by the nutritionists were Holstein or Holstein crossbreds.
- The minimum bunk space per animal at receiving was 11.9 inches as compared to 8.5 inches in finishing.
- Hay was used at receiving by 64% of the clients for an average of 4 days (mode of 3 days).
- Mass medication was used by 83.3% of the clients for cattle considered high risk, 39.4% for medium risk cattle, and 6.1% for low risk cattle.
- At initial processing, a majority of the nutritionists indicated that their clients used deworming treatments, either injectable (30.4%) or a combination of injectable and oral drenches (30.4%).
- 31.4% of the clients implanted cattle once, 70.5% implanted cattle twice, and 47.6% used a timed-release implant program..
- Sorting cattle into outcome groups was done by 43.7% of the clients, with 30.5% of the clients sorting at receiving and 29.4% at re-implant time.
- Of the clients that sorted cattle, 56.3% used body weight as a sorting tool, whereas only 17.3% and 12.2% use biometric measurements or ultrasound techniques to sort cattle.

<u>Cattle Adaptation to Finishing Diets</u>

- The most common method of transitioning cattle to the finishing diet was the use of multiple step-up diets, followed by the use of 2-ration blending 56.3 and 40.6% of nutritionists, respectively). In the 2007 survey, 75.9% of the nutritionists recommend multiple step-up diets to adapt cattle to the finishing diet while only 13.8% recommended 2-ration blending.

- When multiple step-up diets were used, the respondents suggested that the initial diet should contain approximately 40.7% roughage (dry matter basis, DM) and that, on average, 4 transition diets be used for 6 days per diet to transition cattle to the finishing diet within 24 days of initiating the step-up program (Table 2).
- Nutritionists who used 2-ration blending preferred 38.8% roughage (DM basis) in their starter diet with a longer transition period, resulting in adaptation to the finishing diet within 27 days.

Grain and Grain Processing Methods

- Corn was the primary grain used as an ingredient in both receiving (87.5%) and finishing (100%) diets by clients of the nutritionists surveyed which agrees with the results reported in the 2007 survey.
- The second most common grain source was wheat in both receiving and finishing diets.
- The primary grain processing method for receiving diets was steam flaking (65.2%), followed by dry rolling (30.4%).
- For finishing cattle diets, steam flaking (70.8%), high-moisture harvesting and storage (16.7%), and dry rolling (12.5%) were the primary grain processing methods. These results are similar to those reported in 2007.
- The average bulk density recommended for steam-flaked grains was 27, 26, and 32 lb/bushel, for corn, sorghum, and wheat, respectively. The recommended bulk densities reported in 2007 for corn and sorghum were the same (not reported for wheat).

Inclusion of Grain in Feedlot Diets

- The majority of the nutritionists reported that the typical grain inclusion used in receiving diets was 60% of DM or less.
- For finishing diets, the majority of nutritionists specified the typical range of grain inclusion as 50% to 90% of DM. Only 78.3% of the nutritionists used grain concentrations of 60% or greater in finishing diets, whereas, in 2007, 93.1% of the nutritionists used 60% grain or greater.

Energy and Starch Recommendations

- The majority of the nutritionists recommended that their clients use NEg concentrations between 0.68 and 0.70 Mcal/lb for finishing diets which agrees with the results in the 2007 survey (average NEg concentration recommended was 0.68 Mcal/lb and most frequently reported was 0.70 Mcal/lb).

Grain By-product Use

- The percentage of the nutritionists' clients using grain by-products in finishing diets has increased by approximately 17% since the 2007 survey (100 vs. 83%).
- Wet distillers grains were the primary grain by-product used by the nutritionists in their clients' receiving diet formulations (58.3%), followed by wet corn gluten feed (25.0%), dried distillers grains (12.5%), and dry corn gluten feed (4.2%).
- Wet distillers grains were also the primary grain by-product in their clients finishing diets (70.8%), followed by dried distillers grains (16.7%), wet corn gluten feed (8.3%), and dry corn gluten feed (4.2%). This survey indicates greater use of wet distillers grains compared with dried distillers grains compared to that reported in 2007 (34.5% of clients for both wet and dry distillers gains).

Roughage Use

- Alfalfa hay (58.3%) was the most common primary roughage source used by the surveyed nutritionists' clients for receiving cattle diets.
- For finishing cattle diets, the majority of the nutritionists' clients (37.5%) used corn silage as the primary roughage source followed by the use of corn stalks (29.2%). In the 2007 survey, the primary roughage source used in finishing was corn silage. However, in the earlier survey, none of the clients used corn stalks.
- For receiving diets, 30% or greater (DM basis) roughage was used most frequently in the diet.
- In finishing diets, 8 to 10% (DM basis) roughage was the typical range of inclusion used in both the summer (50.0%) and winter (41.7%) months. A greater number of respondents indicated that 10 to 12% of DM was used in the winter rather than summer. In the 2007 survey, the average inclusion level for roughage was 8.3% during the summer and 9.0% during the winter.

Protein Use

- The average crude protein concentrations recommended by the surveyed nutritionists for receiving and finishing diets were 14.5% and 13.4% of DM, respectively.
- When urea was used in feedlot diets, the respondents recommended concentrations (DM basis) of 0.60% and 1.16%, with a maximum of 1.58% and 2.82% NPN, for receiving and finishing diets, respectively. In the 2007 survey, the average crude protein concentration recommended for finishing diets was 13.3% and the average urea inclusion rate was about 1%.

Liquid Feeds

- Approximately 26% of the clients serviced by the surveyed nutritionists used added nonfat liquids in feedlot receiving (26.7%) and finishing (26.5%) diets. In contrast, in the 2007 survey, 32.6% of clients used added nonfat liquids for finishing diets. The authors suggested that the numerically lower percentage of clients using added nonfat liquids in the current study could reflect increased use of high-moisture grain by-products.
- The suggested concentration of added fat in finishing diets (DM basis) was 2.76%, which is slightly less (numerically) than the 3.1% reported in 2007. The most common sources of added fat in the survey were tallow followed by yellow grease. The same results were reported in 2007.

Supplements

- Approximately 51.1%, 35.5%, and 21.6% of the surveyed nutritionists' clients used liquid, pelleted dry, and loose dry supplements as an ingredient in receiving diets at concentrations of 5.37%, 4.49%, and 2.64%, respectively.
- For finishing diets, 46.0% of the nutritionists' clients preferred liquid supplement, whereas 32.9% and 25.6% of the clients used pelleted dry and loose dry supplements at average inclusion rates of 4.71%, 3.84%, and 2.93% of the diet DM, respectively. The use of liquid and pelleted dry supplements in finishing diets was similar to that reported in 2007 (45.4% liquid at 5.2% inclusion and 38.6% pelleted at 5% inclusion), but the use of loose dry supplements was 2.5 times greater than in 2007 (10.4% at 5% inclusion).

Minerals

- The surveyed nutritionists recommended average calcium, phosphorus, and potassium concentrations (DM basis) of 0.88, 0.37, and 1.07%, respectively, in receiving diets.
- For finishing diets, the recommended average calcium, phosphorus, and potassium concentrations were 0.73, 0.30, and 0.68%, respectively. In the 2007 survey, the average calcium, phosphorus, potassium concentration were 0.7, 0.3, and 0.7 %, respectively.
- Salt was recommended in the diet at 0.37% and 0.30% of DM for receiving and finishing diets, respectively. In the 2007 survey, the average recommended salt level was also 0.3%,
- The majority of respondents (45.5%) considered only the partial value of the trace mineral concentrations in the basal diet, whereas 36.4% of respondents did not consider trace minerals in the basal diet when formulating diets for feedlot cattle. Thus, the recommended trace mineral concentrations in this survey are expressed as the concentration of added minerals rather than the concentration of total trace minerals provide in the diet as was done in the 2007 survey (Table 1).
- When supplementing trace minerals, 77.3% and 54.6% of surveyed respondents indicated a preference for a combination of organic and inorganic sources for receiving and finishing diets, respectively, whereas 22.7% and 45.4% of respondents indicated a preference for organic trace minerals as the sole source in receiving and finishing diets, respectively.
- With the exception of iron, the nutritionists recommended that equal or numerically greater concentrations of trace minerals be provided in receiving diets compared with finishing diets (Table 1). These recommendations were probably designed to offset lower DM intake typically associated with lightweight cattle during the receiving period or to provide intakes of trace minerals that might have positive effects on the immune system.

Table 1. Trace mineral recommendations in finishing diets (2007 and 2015) and in receiving diets (2015).

Trace Mineral, ppm	2007 Finishing[a]	2015 Finishing[b]	2015 Receiving[b]
Copper	17.6	17.0	22.0
Cobalt	0.38	0.82	1.03
Iodine	0.75	0.73	0.87
Iron	51.7	13.8	11.5
Manganese	47.9	47.9	54.4
Selenium	0.24	0.24	0.27
Zinc	93.0	87.3	109.0

[a] Recommendations expressed as concentration of total minerals.
[b] Recommendations expressed as concentration of added minerals.

Vitamins

- The average concentrations of vitamins A and E recommended by the nutritionists for receiving diets were approximately 2,175 and 13.5 IU/lb, respectively.
- The average concentrations of vitamins A and E recommended for finishing diets were 2,138 and 11.4 IU/lb, respectively. In the 2007 survey, the average vitamin A and E concentrations recommended were 2,365 and 11.7 IU/lb, respectively.
- The mode for vitamin E was 9.1 and 0 IU/lb for receiving and finishing diets, indicating that although nutritionists often add vitamin E to receiving diets, the majority chose not to provide additional vitamin E to finishing cattle.

Feed Additives

- On average, 92.3% of the respondents reported that their clients provided some type of ionophore in the receiving cattle diet, whereas 97.3% of their clients used ionophores in finishing cattle diets. The primary ionophore used by the nutritionists' clients in receiving diets was monensin (77.3%), followed by lasalocid (22.7%), whereas all the nutritionists' clients (100%) who provided an ionophore in the finishing diet used monensin.
- Direct-fed microbials, or probiotics, were used by an average of 62.5% of clients for receiving cattle diets and 59.6% of clients for finishing cattle diets. Medicated feed additives also were used by the nutritionists' clients to control liver abscesses (83.4%) or manage foot health (43.2%).
- Approximately 84.8% of the clients serviced by the nutritionists used some type of β-adrenergic agonist in their finishing cattle diet. Due to the recent withdrawal of products containing zilpaterol hydrochloride from the U.S. market, 95.5% of the nutritionists indicated that ractopamine hydrochloride was most commonly used as the β-adrenergic agonist.

These researchers concluded that with respect to nutritional recommendations, the practices used by the consulting nutritionists have not changed greatly over the past 15 years. However, they noted that continued decreases in the overall number of cattle on feed and differences in the availability or cost of certain feedstuffs might create the potential for alterations in cattle management.

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[1] Samuelson, K. L., M. E. Hubbert, M. L. Galyean, and C. A. Löest. 2016. Nutritional recommendations of feedlot consulting nutritionists: The 2015 New Mexico State and Texas Tech University survey. J. Anim. Sci. 94: 2648-2663.

[2] Galyean, M. L., and J. F. Gleghorn. 2001. Summary of the 2000 Texas Tech University Consulting Nutritionist Survey. Burnett Cent. Internet Prog. Rep. No. 12. Available: http://www.depts.ttu.edu/afs/burnett_center/progress_reports/bc12.pdf.

[3] Vasconcelos, J. T. and M. L. Galyean. 2007. Nutritional recommendations of feedlot consulting nutritionists: The 2007 Texas Tech University survey. J. Anim. Sci. 85: 2772-2781.