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Beef Cattle Management Update

RECOMMENDATIONS ON NUTRITION AND MANAGEMENT OF INCOMING FEEDLOT CATTLE

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Introduction

Beef cattle feedlot managers are faced with one of the major challenges to their potential feedlot profitability when attempting to minimize the negative effects of stressed newly received cattle, and attain optimal response to new nutritional and environmental regimens. Getting new cattle on feed as quickly as possible is important for optimal response to health conditioning programs. A single percentage in mortality rate, not considering feed, medicine, veterinary service, labor, or yardage invested prior to occurrence of death, increases feeder prices by $0.77/cwt or it is equivalent to increasing breakeven price by $0.35/cwt in a market where feeders are priced at $0.75/cwt. Additionally, poor cattle performance during the initial receiving period often means sub-optimal performance throughout the growing-finishing period. This paper will highlight factors that contribute to stressed animals and outline nutritional and management regimens to be considered for optimal performance.

Cattle Evaluation

Source of cattle will effect potential stress prior to arrival and management needs upon arrival. Pollreisz et al. (1986) related sources of cattle to potential problems. On the one hand, severely stressed calves from sale barn require mass medication upon arrival to minimize clinical outbreaks that would imminently occur. On the other hand, cattle from closed-herds, which have had little exposure to outside cattle until co-mingled with others in the feedlot, have low titers to bovine respiratory diseases and would typically do well for the initial feeding period, but they later break with respiratory diseases causing high death loss and morbidity. Vaccination prior to shipment with modified live vaccines (intranasal) and immediate processing after arrival with similar products have been beneficial for these calves from closed-herds.

Objective evaluation of incoming cattle should include questions discussed by Pollreisz et al. (1986). Are the cattle coughing excessively as they are unloaded? Are there nasal or ocular discharges? If there is a discharge, is it clear and serous or mucopurulent? Are the cattle calm or excited? Are any cattle segregating from the bunch with backs arched and heads down? Are some cattle running a temperature? How long have they been on the truck? Are they from one source or several? Keeping detailed records of answers to such questions will aid in deciding on the appropriate health conditioning program. Preconditioning cattle prior to shipment that includes dehorning, castration and vaccinations has been shown to reduce mortality and morbidity in the feedlot. However, cost benefit relationships must be assessed.

Pre-arrival Weight Loss and Calf Morbidity

Weight loss during transit has been demonstrated to average 0.61% of BW for every 100 miles of transit with 53% accounted for by body, and 47% from digestive tract water losses (Brownson, 1986). Although feed and water deprivation accounts for 66% of weight loss during transit (Cole et al., 1988), pre-shipment dietary and management differences plus handling stresses will contribute a variable proportion to these weight losses. Calves stressed by weaning and immediately transported to a new environment will exhibit greater weight loss than those weaned followed by some dietary adjustment prior to shipment (such as to a hay diet, for example). Overnight weight loss will be higher for calves fed grass or silage diets vs those fed a concentrate diet. Excessive weight loss during shipment contributes to greater calf morbidity after arrival in the feedlot. Cattle with greater than 7% transit shrink are in a high stress condition and in a high disease risk category (Pollreisz et al., 1986). Time of day that calves are unloaded at the feedlot may affect morbidity, regardless of transit time. In a study by Cole et al. (1988), calves hauled for 12 hr, without feed and water, and unloaded at 8:00 p.m., had greater morbidity and mortality than those fasted calves hauled for 24 hr and unloaded at 8:30 am. Calves unloaded in the morning rested and recovered from transit during the day. Calves unloaded in the late evening remained restless and were further stressed. Calf morbidity will aggravate the depression in rumen function caused by water and feed deprivation during transit. Rumen function can remain depressed for 5 to 7 d after re-feeding which contributes to the difficulty in getting incoming cattle started on feed.

Immediate Management Challenges for Incoming Cattle

Prior to arrival, feedbunks and water tanks should be located along pen fence lines so that cattle are forced to walk past them (Wagner et al., 1991). Cattle are typically unfamiliar with feedlot settings upon arrival, especially calves weaned and shipped directly off pasture. Cattle will circle pens looking for a way out initially, and would not readily find water tanks or feed bunks located in the center of pens (Ritter, 1989). Prior to cattle arrival, the feedlot building, feedbunks and water tanks should be cleaned. Clean bedding should be provided where appropriate. If possible, receiving pens should be placed around grassy areas rather than typical feedlot pens as this has permitted better adjustment by cattle as shown by reduction in stress and sickness

(Brazle, 1993). Incoming cattle should be allowed 1 ft of bunk space and 200 sq ft of pen space/hd. Once adjusted, cattle can be given 6 to 9 inches of bunk space and 150 sq ft of pen space/hd (Pollreisz et al., 1986).

Nutritional Management for Newly Received Cattle

Incoming cattle have a poor propensity for consuming feed during the first few days after arrival as they adjust to their new surroundings (Table 1). These cattle often consume feed equal to less than 1% of their BW—especially if they have high morbidity rates (Table 2). An initial goal would be to ensure that cattle consume enough feed to maintain their BW. Diet nutrient density should be adjusted accordingly to allow for varying consumption and expected gain as indicated by Hutcheson (1993) in Table 3. Restoration of cattle health and strength and improvement in rumen function are immediate goals. Normal feed intake will not occur until after a 21-d receiving period especially in long haul cattle (Lofgreen, 1988). Feeding a good quality grass hay with a 50 to 75% concentrate mix is the basis of a receiving diet. Both calves and yearlings can be fed a relatively high energy receiving diet (Goodrich and Meiske, 1979). Feeding grass hay free choice during the first week after arrival is necessary to stimulate feed consumption. Concentrate consumption can be 1 to 2 lb/hd on day 1, then increased 1 lb/hd daily for next 2 d so that grain intake is 3 to 4 lb/hd by the third day (Goodrich and Meiske, 1979). Whole corn fed with a protein supplement (3:1) and long hay has worked well as a basic receiving diet (Lofgreen, 1988). Top dressing a grain mixture over the hay already in the feedbunk is a method to enhance energy intake (Pollreisz et al., 1986). An alternate system for starting yearling cattle onto a finishing diet was described by Pritchard (1993). He suggested starting to feed the finishing diet the second day after arrival at 2.3x maintenance level, increasing this to 2.5, 2.7 and 2.9x maintenance, respectively, at weekly intervals. An ionophore is used in the system. The advantages cited included reduced roughage handling and simpler feed batching.

Table 1. The percentage of calves eating during the first 10 d after arrival[a]

Day	Eating, %	Range, %
1	21.7	0-50
2	36.7	10-60
3	56.7	30-90
4	61.7	30-90
5	66.7	40-90
6	68.3	40-90
7	70.0	60-90
8	71.7	60-90
9	73.3	60-90
10	85.0	60-100

[a] Adapted from Wagner et al., 1991.

Table 2. DM intake of newly arrived calves (% of BW)[a]

	Healthy	Morbid
1 - 7 d	1.55	.90
1 - 28 d	2.71	1.84
1 - 56 d	3.03	2.68

[a] Adapted from Hutcheson (1993).

Table 3. Needs of a 400-lb calf at different rates of gain[a]

Gain, lb/d	Protein, %	NE_m, Mcal/100 lb DM	NE_g, Mcal/100 lb DM	Calcium, %	Phosphorus, %
Calf consumes 1% BW (4 lb)					
0	15.0	95	0	.30	.30
0.5	21.2	128	61	.55	.50
Calf consumes 2% BW (8 lb)					
0	7.0	48	0	.16	.16
1	13.0	76	46	.31	.29
2	15.2	105	70	.59	.46
Calf consumes 3% BW (12 lb)					
1	9.2	32	0	.11	.11
2	10.5	65	20	.31	.28
2.5	11.1	80	49	.48	.35

[a] Adapted from Hutcheson (1993).

Protein Levels in Receiving Diets

Lofgreen (1988) proposed that a receiving diet should contain 15 to 16% protein (DM basis) to meet the needs of newly received cattle. Wagner (1993) and Hutcheson (1993) recommended a range of 12.5 to 14.5% protein. Steen et al. (1979) had earlier reported on information that suggested high protein (20 to 24%) helped cattle adapt to high grain diets without severe acidosis problems during the receiving period. Goodrich and Meiske (1979) suggested a preformed protein be fed during the first 2 to 3 wk.

More recent work by Fluharty and Loerch (1991) investigated the effect of CP level, ruminal by-pass protein sources and supplemental energy (fat) in receiving steer calf diets. Crude protein sources were soybean meal (SBM) vs blood meal (BM) at 12 vs 14% levels with 0 or 2% supplemental fat. There was a gain response to higher protein levels with blood meal-based diets during the first 28 d in the feedlot. Research by New Mexico workers, reported by Muirhead (1993), indicated that newly arrived calves fed 14% protein diets with SBM, BM or fish meal as protein sources showed no advantages to higher ruminal escape protein. In that study, feed intake by calves was only 1.5% of BW during the first 2 wk which negated any benefit of escape protein.

Zinn and Owens (1993) fed 435-lb calves a basal diet of 18% alfalfa hay, 10% sudangrass hay, 61% steam flaked corn, 2.5% yellow grease and 2.5% supplement which contained either urea with/without ruminal escape protein (REP) blend. In that study, the dietary treatments included the basal diet; basal plus 2% REP blend of 1/3 BM, 1/3 meat and bone meal (MBM), and 1/3 feathermeal; basal plus 4% REP blend, and basal plus 6% REP blend. Crude protein was 12.2, 13.4, 14.6 and 15.8% for the basal, 2% REP, 4% REP and 6% REP diets, respectively. The greatest response was to the 2% REP blend -- 13.4 and 8.4% increases in daily gain and feed efficiency over calves fed the basal diet, respectively. There were no performance benefits for feeding higher protein. An overview of a number of diet options is shown in Table 5.

These diets highlight the need to supply up to 14% crude protein from preformed protein sources, although the need to provide bypass protein is not well substantiated. Under cases of extreme feed intake depression, it may be necessary to increase the level of protein to accommodate the lower intake—as much as 24% crude protein.

Vitamins and Mineral Levels in Receiving Diets

Suggested vitamin and mineral levels are summarized in Table 4. Elevated levels of these nutrients above cattle requirements may be warranted because of low feed intake of newly received cattle. However, Wagner (1993) noted that once feed intake recovers, these levels are no longer necessary to meet the nutrient requirements of cattle, and they are considered an extra label use by the FDA if continually fed at excessive levels above nutrient requirements.

Stressed cattle lose essential minerals such as K during transit and, if diseased, there are added losses of trace minerals such as Cu, Zn, Fe, and Se associated with immunocompetence (Hutcheson, 1990). Restoration of adequate levels is a goal of nutrition programs for incoming cattle. Supplementing K to 1.2 to 1.4% appears justified if transit weight loss is greater than 7% (Hutcheson, 1990). Many chelated compounds are being evaluated to restore mineral balance to stressed cattle. More research is needed to identify precisely the effectiveness of chelated minerals, although enhanced absorption of specific elements is acknowledged. The combination of vitamin E with Se has shown a response in stress situations. Supplementation to receiving diets should be a minimum of 0.1 ppm Se with 100 IU vitamin E/hd daily (Hutcheson, 1990). Wagner et al. (1991) suggested that feeding 25 to 30 IU vitamin E/lb DM is adequate for most situations, but they considered that higher levels may enhance performance. These authors also reported on Kansas research that showed a positive response by receiving calves fed supplemental B-vitamins plus vitamin E vs calves fed no supplemental vitamin E or vitamin E alone. Hutcheson (1990) observed a response to daily niacin supplementation of 125 ppm for healthy calves and 250 ppm for morbid calves. Chang and Mowat (1992) found that feeding 4 mg Cr/d increased daily gain by 30% in stressed calves compared to those receiving no supplemental Cr. Chromium had no effect on calf morbidity.

Table 4. Suggested nutrient recommendations for newly received calves[a]

Nutrient	Suggested range
DM, %	80 - 85
Concentrate, %	50 - 75
NEm, Mcal/lb[b]	.82 - .90
NEg, Mcal/lb[c]	.46 - .56
CP, %	12.5 - 14.5
Calcium, %	.60 - .80
Phosphorus, %	.40 - .50
Potassium, %[d]	.8 - 1.40
Magnesium, %	.2 - .3
Sodium, %	.2 - .3
Copper, ppm	10 - 15
Iron, ppm	100 - 200
Manganese, ppm	20 - 40
Zinc, ppm	75 - 100
Cobalt, ppm	.10 - .20
Selenium, ppm	.10 - .20
Trace mineralized salt	.50
Vitamin A, IU/lb	2500
Vitamin E, IU/lb	50 - 100

[a] Adapted from Wagner (1993) and Hutcheson (1993).
[b] Net energy for maintenance.
[c] Net energy for gain.
[d] Higher levels for stressed/morbid calves.

Table 5. Examples of starter diets for newly received calves[a]

	50% concentrate					60% concentrate					70% concentrate				
Ingredient	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	% as-fed														
Oats					21.9										
Barley				22.1					26.7					31.2	
Corn	43.2	15.4		22.9	22.7	51.9	25.7		27.4	27.3	60.7	37.5		32.3	32.0
Ear corn			50.5					61.6					72.0		
Grass hay[b]	24.6	11.0	19.8	24.8	24.8	19.7	9.4	13.4	19.8	19.8	14.8	7.6	7.4	14.9	14.9
Alfalfa hay[c]	25.4	11.4	20.5	25.6	25.6	20.4	9.8	13.8	20.5	20.5	15.2	7.9	7.7	15.4	15.4
Corn silage[d]		55.4					47.4					38.2			
Supplement[e]	6.8	6.8	9.2	4.6	5.0	8.0	7.7	11.2	5.4	5.9	9.3	8.8	12.9	6.2	6.8

[a] Adapted from Wagner et al., 1993.

[b] 88% DM, 11% CP.

[c] 85% DM, 17% CP.

[d] 35% DM, 8% CP, 50% concentrate.

[e] Supplements for oats and barley diets contain about 32% CP, 5.0% calcium, 2.5% phosphorus, 1.5% potassium, 1.2% magnesium, 9.0% salt and 48,000 IU/lb vitamin A. Supplements for the other diets contain 36% CP, 3.6% calcium, 2.0% phosphorus, 1.7% potassium, 0.8% magnesium, 6.3% salt and 32,000 IU/lb vitamin A.

Feed Additives

There are a number of feed additives that have been indicated as having potential of stress reduction in receiving cattle. Probiotics and yeast cultures have been used with variable results. Wagner et al. (1991) suggested that cattle trucked over 290 miles appeared to show a greater response to probiotic use than those hauled shorter distances. Cole et al. (1992) found that yeast culture caused a favorable response by morbid calves. Antibiotics have often been incorporated into receiving programs and may include chlortetracycline, oxytetracycline, bacitracin and tylosin (Wagner, 1993). He noted that only tylosin is approved for use in combination with monensin, and only oxytetracycline for use in combination with lasalocid. Antibiotics can be fed at 1 g/hd daily for 21 to 28 d (Wagner et al., 1991). Recent studies discussed by Wagner (1993) showed that feeding aureomycin-sulfamethazine for 14 to 28 d gave consistent results in a number of trials. Coccidiostats such as amprollium (Corrid), decoquinate (Deccox), lasalocid (Bovatec) and monensin (Rumensin) are approved for control of coccidiosis in cattle (Wagner, 1993). He noted that adequate intake of medication is critical to controlling coccidiosis, which may be a concern during the initial receiving period when feed intakes are low. However, Hutcheson (1990) reported an increase in appetite of newly received calves when decoquinate was incorporated into receiving diets (0.5

mg/kg BW). Use of ionophores have been successful in controlling coccidiosis although there is concern about reduction of feed intake. Any feed intake depression appears to be diminished after 14 d and is not detrimental to overall calf performance (Wagner, 1993). Ionophores also enhance feed efficiency in growing-finishing cattle. There may be an interaction of ionophore and K levels in receiving diets. Hutcheson (1989) observed that high levels of K fed with lasalocid negated effects on feed efficiency. In that study, 0.5% K and 0.25% Na fed with lasalocid (30 g/ton) gave optimal response. This author noted that feeding ionophores enhances absorption of macrominerals such as Ca, P, Mg and K, which may alter the mineral requirements.

Fat Supplementation

Energy is the first limiting nutrient for newly arrived feedlot cattle. Dietary fat supplementation provides the opportunity for enhanced dietary energy density. Cole and Hutcheson (1987) found that 4% fat blend added to 13.4% CP diets tended to increase feed intake of stressed newly arrived cattle for the first 14 d but not for the entire 28-d receiving period.

Conditioning Strategies

Guidelines for types of vaccination products and schedules will vary depending on the prevalence of specific diseases and cost effectiveness. Young calves scheduled for a preconditioning program may be vaccinated for IBR, PI_3 4-way blackleg and Haemophilus somnus as shown by a program on a large Mississippi farm, summarized by Mills (1990). In this example, calves were also dewormed, castrated and implanted plus given an oral probiotic gel. The calves were not dehorned at this first processing. A schedule for receiving cattle was outlined by Smith (1984) as follows: Upon arrival or the following morning, take temperature (may not be beneficial indicator) on stale or obviously stressed cattle; administer IBR, PI_3, BVD, Lepto-pomona, 4-way clostridia; implant, deworm, treat for external parasites; tip horns, castrate, bob tails and brand or eartag. The author suggested a revaccination for light calves, stale or green cattle with IBR, PI_3 and BVD 5 to 7 d after arrival. Reimplantation was administered 60 d after arrival in this example but would vary with manufacturers' recommendations.

An evaluation should be implemented on the number of times newly arrived calves are re-treated to assess the economic benefits. Henderson (1990) suggested that most cattle regain their health after a 3- to 5-d treatment program. He emphasized that chronic problems should be identified early to ensure treatment expenses do not become excessive.

Summary

An overview of nutrition and management of incoming feedlot cattle has been discussed that included cattle evaluation, pre-arrival weight loss and calf morbidity, immediate management challenges for incoming cattle, nutritional management examples for newly received cattle, protein levels in receiving diets, vitamins, minerals, feed additives, fat supplementation and an example of processing guidelines. Careful daily attention to details is critical to the success of any program.

Some things to keep in mind are:

1. Have vaccines, dewormer, antibiotics, other pharmaceuticals, eartags, implants, personnel and equipment ready to handle receiving cattle at least 24 hours before their arrival.

2. Vaccinate, deworm, implant, eartag and weigh cattle within 72 hours from arrival following basic hygiene rules and in an organized and quiet pace.

3. Use and clean receiving and sick pens as needed.

4. Have access to water within 3 to 4 hours from arrival

5. Feed a high energy concentrate with 12 to 14% preformed degradable protein within 1 day from arrival.

6. Observe cattle at least twice a day (especially at feeding time). Pull and treat sick cattle.

7. Make gradual diet changes.

8. Remember that one percentage unit mortality rate increases paid price by $0.77/cwt or breakeven by $0.35/cwt.

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