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Dairy Extension
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Feeding Strategies for Post-Weaned Dairy Heifers, 2 to 6 months of age

Introduction

The cost of raising dairy heifer replacements represent 20 to 25% of the total costs of milk production. Keeping heifers healthy, developing consistent growth to attain target goals for frame size and body weight by 25 weeks of age without excessive body condition, and reducing feed costs are all important factors for managing the heifer enterprise.

Research conducted at the University of Minnesota Southern Research and Outreach Center in Waseca from 2003-2005 have evaluated options on feeding dairy heifers based on limit or full-fed concentrate mixtures with or without access to long hay during part of the feeding period from 2 to 6 months of age. The goal is to provide consistent performances across all seasons of the year. All heifers were from 3 commercial dairies and housed in grower barns in 4 or 5 replicated group pens (6 heifers/pen) per dietary treatment.

Feeding Strategy Options

1. ***Concentrate diets containing alternative protein sources.*** An 84 day study with 90 Holstein dairy heifers (av. 222.2 lb BW; hip height, 37.9 in) 13 to 24 weeks of age using three different grower diets. Diets contained a 18% crude protein (CP) concentrate mix (DM basis) fed up to a maximum of 5 lb/head/day with access to long hay (16.7% CP). The mix contained: 1) cracked-corn (CC) -- 66.25% of the diet, **soybean meal-based pellet** (P) -- 32.5%, and fat -- 1.25%; or 2) cracked-corn -- 31.25% and **dried distillers grain** mix (DDG) -- 67.5% at 3.2 lb/heifer daily) and fat -- 1.25%; vs. 3) cracked-corn -- 66.25%, pellet with 0.03 lb/heifer daily of **urea partially replacing soybean meal** (U) -- 32.5%, and fat -- 1.25% fat.

Average Heifer Performance – 84 days on study

	CCP	CCDDG	CCUP
Final BW, lb	398.3	406.2	396.4
Total Gain, lb	175.3	182.9	176.6
Final Hip Ht, in	43.9	43.8	43.7
Feed/gain, lb	4.4	4.1	4.3
ADG, lb	2.1	2.2	2.1
DMI/day, lb	9.3	9.1	9.3
CPI/day, lb	1.7	1.7	1.6

Results -- Overall heifer performance was not affected by concentrate mix fed. Limit feeding a concentrate mix to 5 lb/day with free choice hay for post weaned dairy heifers supported good growth rates and is a very acceptable program. The addition of dried distillers grain (3.2 lb/day) or urea (0.03 lb/day) as alternative protein sources in concentrate mixes to help feed utilization are acceptable options.

2. ***Full vs limit fed whole-shelled corn and protein pellet diets with differing fiber levels.*** A 112 day study with 96 Holstein dairy heifers (av. 204.7 lb BW; 37.1 in hip height) 9 to 25 weeks of age using 4 grower diets. Diets formulated were: 1) LFWCP -- 16 % CP (DM basis) whole corn and pellet mix (6.5% ADF) limit fed to 6 lb/calf (as fed) for 84 days and to 5 lb/calf daily from 85 to 112 days with free choice alfalfa hay (20.8% CP); 2) FFWCP -- 18% CP whole corn and pellet mix (5.5% ADF) full fed to 84 days with no hay and up to 5 lb/calf daily with free choice hay from 85 to 112 days; 3) FFHF -- 18% CP higher fiber whole corn with pellet (11.3% ADF) fed same as treatment 2 and, 4) FFLF -- 18% CP lower fiber whole corn with pellet (6.5% ADF) fed same as treatments 2 and 3.

Average Heifer performance over 112 days

	Treatment			
	LFWCP	**FFWCP**	**FFHF**	**FFLF**
Initial BW, lb	205.1	204.1	203.8	205.6
Final BW, lb	457.6	482.9	485.9	483.4
Daily Gain, lb	2.3	2.5	2.5	2.5
Hip Ht change, in	7.8	8.0	7.8	7.7
Feed/gain, lb	4.8	3.9	4.1	4.1
DMI/day, lb	10.8	9.8	10.3	10.2
CPI/day, lb	2.2	2.2	2.1	2.1

Results – Heifers fed free choice diets with no hay to 84 days averaged 9.82 lbs feed DM/day and gained 0.5 lbs/head more daily vs. those fed limit fed concentrates (4.57 lbs/day) with hay (5.33 lb/day). Between days 85 and 112, heifers switched from free choice to limit-fed concentrates with hay did not gain as well as those limit-fed throughout. Over 112 days, limit-feeding

concentrate grower diets with access to free choice hay (av 6.25 lbs/day) in group pens from 9 to 25 weeks of age resulted in a more consistent heifer performance without excess body condition when compared to full fed concentrates without hay followed by a period of limit feeding concentrates with full fed hay.

3. ***Conventional vs Whole Shelled Corn and Pellet vs Complete Pellet Diets.*** A study with 72 Holstein dairy heifers (av. 189.8 lb BW; 36.8 in hip height) from 9 to 25 weeks of age. Diets formulated were: 1) GM -- 16% CP grain mix (50% cracked corn, 30% pellet, 15% oats and 5% molasses; 2) WCP -- 16% CP whole corn pellet mix (34% crude protein pellet; or, 3) CP -- 16% crude protein complete pellet. Grain mixes were limit fed to 6 lbs/heifer daily with free choice hay (16.9% Crude Protein). Diets were fed for 16 weeks.

Average Heifer performance over 112 days

	GM	WCP	CP
Final BW, lb	457.3	462.0	449.5
Total Gain, lb	264.5	274.3	260.5
Final Hip Ht, in	45.0	45.1	44.6
Feed/gain, lb	3.9	3.8	4.1
Hay DMI/day, lb	3.9	4.0	4.1
DMI/day, lb	9.3	9.3	9.5

Results – There were no overall differences across dietary groups in daily grain intake (averaging 5.4 lb) and hay dry matter intake (just under 4 lb/heifer). Heifers fed the whole shelled corn and pellet diet had a 3.6 and 5% higher total gain than those fed the grain mix and complete calf grower pellet, respectively. Heifers fed the whole shelled corn and pellet diet used their feed 2.6 and 7.3% more efficiently than those fed the grain mix and complete calf grower pellet diets, respectively. Limit-fed concentrate diets, with access to free-choice hay, fed to heifers performed at a higher growth rate than anticipated. Feed dry matter intake averaged 2.9% of body weight for the 112 day feeding period.

4. ***Diets Differing in Forage Quality and supplemented with a low moisture block.*** This 112-day study involved 96 Holstein heifers (av. 203.1 lb BW; 37 in hip height) from 3 to 6 months of age. Diets were formulated to include a 16% CP grain mix fed to a maximum of 6 lb/heifer daily for the first 14 days of the study, then decreased to 4 lb/heifer daily for days 15 to 112. The limit-fed grain mix was fed with free choice alfalfa hay at varying relative feed values (RFV). Treatments were: 1) 100 RFV; 2) LMB -- 100 RFV hay plus a low moisture molasses-protein block fed free-choice (30% CP with vitamins and minerals; 3) 131 RFV; and, 4) 154 RFV.

Average Heifer performance over 112 days

	100 RFV	100 RFV + LMB	131 RFV	154 RFV
Final BW, lb	416.5	425.9	438.5	441.4
Total Gain, lb	213.4	222.8	235.4	238.3
Daily gain, lb	1.9	2.0	2.1	2.1
Final Hip Ht, in	44.3	44.1	45.3	44.7
DMI/day, lb	9.0	9.2	9.6	9.2
LMB lb/day	------	0.3	-----	-----
Grain lb/day	3.7	3.7	3.8	3.7
Hay DMI/day, lb	5.3	5.2	5.9	5.5
Feed/gain, lb	4.7	4.6	4.6	4.3

Results – Using a low moisture block supplement with 100 RFV hay increased daily gain by 4% and feed efficiency by 2.3% compared to feeding 100 RFV hay without a block supplement. Using a 131 RFV hay compared to 100 RFV hay increased daily gain by 9% and feed efficiency by 3%. Using a 154 RFV hay compared to a 130 RFV hay increased daily gain by 1.4% and feed efficiency by 5.9%. Performance of all heifers were very acceptable and an economic comparison should be the criteria to select the hay of choice when limit feeding concentrates. The study demonstrated that feeding 6 lb/heifer daily of a 16% CP concentrate mix for the first 14 days followed by 4 lbs from day 15 to 112 when access to free choice hay, provides sufficient protein and energy for acceptable daily gain and frame growth

Conclusion

It is important to develop a nutritional management plan for group-fed dairy heifers between 2 to 6 months of age that will provide consistent performance whatever the season of the year with considerations for economic efficiencies. An initial summary of 897 dairy heifers raised at SROC over a two-year period from 2 days up to 6 months of-age indicated an average daily gain of just under 2 lb/heifer, a final hip height of 45.1 inches and a final body weight of 469 lb. These are very acceptable parameters for good quality six month-old heifers.

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