

Plane of nutrition affects growth and reproduction in prepubertal dairy heifers

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A good understanding of the effects of nutritional plane on growth and reproductive performance is necessary to optimize heifer rearing and management. Very few studies evaluated the effects of feeding diets high in energy and protein, or the converse, on growth and reproductive performance of dairy heifers. One of the objectives of this ongoing project is to determine whether the plane of nutrition affects growth and reproductive performance of dairy heifers.

Thirty heifers were fed one of three diets (10 heifers per diet) formulated for an average daily weight gain (ADG) of 0.5kg (*Low*: 2.25 ME Mcal/kg DM and 14% CP), 0.8kg (*Normal*: 2.50 ME Mcal/kg DM and 16% CP) or 1.1 kg (*High*:2.75 ME Mcal/kg DM and 18% CP) from 100 kg to 330 kg body weight. Height at hip, body length from withers to hooks, heart girth and back fat thickness were measured every two weeks. Ovarian follicular changes were monitored by transrectal ultrasound imaging on alternate days for a 22-day period commencing when the heifers attained 8 months of age.

Table 1. Preliminary results obtained at 8 months for growth and back-fat, and follicle data.

Diets	ADG (kg/d)	Height (cm)	Length (cm)	Girth (cm)	Back-fat (mm)	Number of ovarian follicles		
						≤5mm	6-9 mm	≥10 mm
High	1.09 ± .04	105.2 ± 1.5	89.2 ± 1.4	142.2 ± 3.5	2.61 ± 0.3	22.8 ± 3.7	3.1 ± 0.5	0.89 ± 0.1
Normal	0.80 ± .03	100.2 ± 1.6	84.3 ± 1.3	135.3 ± 3.5	2.12 ± 0.2	17.6 ± 3.2	2.9 ± 0.5	0.85 ± 0.1
Low	0.45 ± .05	95.8 ± 1.4	78.7 ± 1.3	122 ± 3.9	1.55 ± 0.1	17.8 ± 3.4	4.4 ± 0.5	0.52 ± 0.1

The maximum size (diameter, mm) of follicles in the low diet group was smaller (11.3 mm; P<.001) than in high (13.6 mm) or normal (13.2 mm) diet groups. These preliminary findings suggest that heifers fed a diet high in energy and protein have a better body condition, bigger frame size, and are reproductively more active.