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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

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Energetic supplementation for beef heifers grazing temperate pasture

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Key words: *Avena strigosa*, heifer growth, *Lolium multiflorum*, meta-analysis

Introduction Supplementation of energy may alter energy requirements of grazing ruminants by altering grazing behavior or by influencing the efficiency of nutrient use (Caton and Duvetter, 1997). A number of studies have used energy supplementation for beef heifers grazing temperate pasture to improve stocking rate, growth rates and body condition. The published results, however, have not been consistent (Rocha et al., 2007). This study was conducted to investigate whether more comprehensive conclusions and a consolidate estimate of response to supplements could be quantified using meta-analysis.

Materials and methods Data used in analysis were from 14 published papers originated from seven fields experiments conducted in consecutive years to compare the responses of forage-fed beef females supplemented. The trials were conducted at Federal University of Santa Maria, RS, Brazil (29°43' S, 53°42' E). The pastures utilized were Italian ryegrass (*Lolium multiflorum*) plus black oats (*Avena strigosa*) plus arrowleaf clover (*Trifolium vesiculosum*) or red clover (*Trifolium pratense*). The grazing method was continuous with variable stocking rate. The experimental animals were beef heifers, Charolais-Nellore crossed, with initial age of nine months. Six energy supplements were evaluated: rice bran plus citric pulp (1:1), corn and sorghum grain, soybean hulls, wheat bran and a commercial ration. Offer of supplement quantity ranged from 0.3 to 1.5% of live weight. Variables included in analysis were herbage mass, daily accumulation of forage, percentage of crude protein on apparently consumed forage, average daily gain, stocking rate, score of body condition (1-5 scale), initial and final live weight. Data were analyzed comparing two groups: without supplementation (control) and with supplementation.

Results The pasture attributes and production characteristics for supplemented and non supplemented heifers are given in Table 1. Pasture related attributes (herbage mass, daily accumulation of forage, crude protein %) were similar for the two groups studied ($P > 0.05$). No differences in initial live weight and score of body condition were observed ($P > 0.05$). Regardless of energy source, supplemented heifers had a significant improvement in live weight gain (25.8%) and score of body condition compared with non-supplemented ones. Use of supplement increased stocking rate in 18.52% ($P < 0.05$). At end of pasture cycles, ranging from supplemented heifers had greater live weight (30 kg) and 0.22 more points of body condition (1-5 scale). Data were analyzed using SAS version 8.02 (2001).

Table 1 Variables from pastures and beef heifers grazing temperate pasture receiving supplement or not.

Variables	Without supplementation	With supplementation
Herbage mass, kg ha ⁻¹ DM	1392.1	1393.3 ns
Daily accumulation of forage, kg ha ⁻¹ DM	44.7	46.6 ns
Crude protein %	19.0	18.0 ns
Average daily gain, kg	0.734	0.924*
Stocking rate, kg ha ⁻¹ of live weight	965.7	1,144.5*
Initial live weight, kg	152.1	155.6 ns
Final live weight, kg	229.1	259.2*
Initial score of body condition (1-5)	2.91	2.92*
Final score of body condition (1-5)	3.26	3.48*

ns= non significant difference ($P > 0.05$); * = $P < 0.05$

Conclusion Production increases when measured as weight or body condition and stocking rate change when supplemental energy is provided for cattle consuming high quality forage.

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