

Effect of supplementation on performance and faecal particle size distribution for yearling horses and weaned calves grazing coastal bermudagrass

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Introduction Supplements are often fed, especially to horses, without realistic expectations of the magnitude of performance response nor knowledge of biological or economic efficiencies of supplementation. The objectives of this experiment were to compare performance of weaned calves vs yearling horses grazing 'Coastal' bermudagrass [*Cynodon dactylon* (L.) Pers] (COS) pastures with and without a protein-energy supplement, and to assess faecal particle size distribution for both calves and horses to document digesta dynamics.

Materials and methods Weaned, 10-m-old calves (n=24) at 300 kg liveweight and 16-m-old horses (n=18) at 350 kg grazed in separate COS pastures from late May to Sept. (140 d). Two replicate pastures each were used for : calves grazing COS only (CPAS); CPAS plus self-limiting 34% CP supplement (CSUP); horses grazing COS only (HPAS); HPAS plus daily, hand-fed ration supplying 25% of energy requirements (H25SUP); and HPAS plus daily, hand-fed ration supplying 50% of energy requirement (H5SUP). At mid-trial, faecal samples were collected *per rectum* from all calves and from horses on HPAS and H5SUP (n=12). The samples were frozen until wet-sieved in duplicates using a Fritsch apparatus with mesh openings of 1.0, 0.40, 0.160, 0.100, 0.071, and 0.032 mm.

Results Herbage allowance averaged 150 kg DM/100 kg BW for all replicate COS pastures (low stocking rate). Forage CP was about 17% and NDF about 72%. Both CPAS and HPAS had identical ADG of 0.47 kg/d (Table 1). Calves on CSUP had increased (P<.05) ADG of 0.69 kg/d with a partial feed conversion ratio (SUP fed:extra gain) of 4:1 . Horses on H25SUP showed no extra gain over HPAS; whereas H5SUP had improved (P<.05) ADG of 0.58 kg/d with a partial feed conversion ratio of 21:1. Horses had a higher percent of large faecal particles compared to calves (19% vs. 10%) on grass only, and calves had more small-sized faecal particles retained on sieves than horses (8% vs. 3%) (Table 2). Supplementation did not affect faecal particle size for calves, nor for horses, except at the 0.160 seive size.

Table 1 Performance of weaned calves and yearling horses grazing Coastal bermudagrass (PAS) only or with supplement (SUP)

| Treatment | ADG ¹ | ADC ² | Extra gain | SUP:Extra Gain |
|---------------|---------------------|------------------|------------|----------------|
| | ----- kg ----- | | | |
| Calves-PAS | 0.47 a ³ | | | |
| Calves-SUP | 0.69 b | 0.87 | 0.22 | 4:1 |
| Horses-PAS | 0.47 a | | | |
| Horses-25 SUP | 0.40 a | 1.14 | --- | --- |
| Horses-5 SUP | 0.58 b | 2.3 | 0.11 | 21:1 |

^{1,2}Average daily gain (ADG) and average daily consumption (ADC).

³Means followed by a different letter, differ (P<.05).

Table 2 Distribution of faecal particles from calves and horses grazing bermudagrass pastures (PAS) only or with supplement (SUP)

| Sieve Size (mm) | Calves | | Horses | |
|-----------------|------------------------|-----------|--------|-------------|
| | PAS | PAS + SUP | PAS | PAS + 5 SUP |
| | ----- % retained ----- | | | |
| >1.00 | 10.4 b | 14.1 b | 18.7 a | 21.3 a |
| 0.400 | 17.1 b | 17.2 b | 21.8 a | 23.8 a |
| 0.160 | 30.2 b | 26.1 b | 34.7 a | 29.7 b |
| 0.100 | 20.0 b | 19.2 b | 15.6 a | 14.6 a |
| 0.071 | 14.7 b | 14.8 b | 6.4 a | 7.5 a |
| 0.032 | 7.5 b | 8.6 b | 3.2 a | 2.7 a |
| Groupings | | | | |
| 0.160 + .100 | 50.2 | 42.3 | 50.3 | 44.3 |
| .071 + .032 | 22.2 | 23.4 | 9.6 | 10.2 |

¹Numbers in the same row and followed by a different letter, differ (P<.01).

Conclusions Weaned calves and yearling horses can be expected to perform similarly during the summer on bermudagrass pastures. Supplementation of calves showed an additive effect; whereas, supplementation of horses showed a substitution effect. Supplementation was economically positive for calves, but not profitable for horses from a weight gain perspective. Smaller faecal particles with calves indicated differences due to rumination processes and possibly diet selection. We consider that documentation of faecal particle size between livestock classes has major implications for ration formulation and potential performance from forages.