

HETEROSIS AND BREED EFFECT FOR MILK PRODUCTION OF BEEF COWS UNTIL EARLY-WEANING AT 90 DAYS

J. Restle¹, D.B. Senna¹, F.N. Vaz¹ and R.Z. Vaz¹

¹ Departamento de Zootecnia, Universidade Federal de Santa Maria,
97119 900, Santa Maria, RS, Brazil

SUMMARY

This work was conducted at the "Departamento de Zootecnia, Universidade Federal de Santa Maria", Brazil, ninety-six, Charolais (C), Nellore (N), ½ CN and ½ NC cows were used. Milk production at 14 (M14), 42 (M42), 70 (M70) e 90 (M90) days post-partum were evaluated. Milk production of C and N cows was similar ($P>0.0500$) being 5.39, 4.60, 3.26 and 3.84 kg/day for C cows at M14, M42, M70 and M90, respectively, and 4.51, 3.73, 3.37 and 3.95 kg/day for N cows. Crossbred cows also showed similar ($P>0.0500$) milk production being 6.86, 6.87, 5.44 and 4.87 kg/day for ½ CN cows and 6.86, 5.99, 4.72 and 5.04 kg/day for ½ NC cows. Heterosis for M14, M42, M70 and M90 was, respectively, 38.59 ($P<0.0126$), 43.99 ($P<0.0073$), 42.17 ($P<0.0058$) and 29.23% ($P<0.0479$). Crossbred cows produced more milk and weaned heavier calves at 90 days than straightbred cows.

Keywords: beef cows, Charolais, heterosis, milk production, Nellore.

INTRODUCTION

Milk production of cows is an important characteristics in beef cattle production because its positive relationship with calf's weight gain (Reynolds *et al.* 1978; Ribeiro and Restle 1991; Alencar *et al.* 1996).

Diferences in milk yield between *Bos taurus* and *Bos indicus* beef breeds have been reported by Restle *et al.* (1989) and Alencar *et al.* (1995), while McCarter *et al.* (1987) reported higher milk production for Brahman crossbred cows than for Angus-Hereford crossbreds.

Higher correlations between cow's milk production and calf's weight gain for *Bos taurus* (Charolais) than for *Bos indicus* (Nellore) have been reported by Moletta *et al.* (1989).

The objective of the experiment was to study the breed and heterosis effect on milk production and its correlation with calf's preweaning weight gain.

MATERIALS AND METHODS

This work was conducted at the "Departamento de Zootecnia - Universidade Federal de Santa Maria", Brazil, from September, 15 of 1991 to February, 28 of 1992. Ninety-six Charolais (C), Nellore (N), ½ CN and ½ NC beef cows submitted to similar management, under grazing condition, were used.

Milk yields were measured by hand milking after oxytocin administration and 12 hours following a complete milkout. Milk production was taken at four intervals, 14, 42, 70 and 90 days post-partum. Calf weights were taken 24 hours after calving, 14, 42, 70 and 90 days post-partum.

A complete randomized experimental design was used. Twenty-four cows per genetic group were used. The data were submitted to analysis of variance using the GLM procedure (SAS, 1990). Age of dam was included in the model as covariable. Contrast analyses were performed between mating systems (straightbreds vs crossbreds) and between genetic groups within mating system.

Heterosis was calculated as: $H\% = ((\text{crossbreds average} / \text{straightbreds average}) - 1) \times 100$.

RESULTS AND DISCUSSION

The results for milk yield according to cow's genotype and milking intervals are presented in Table 1. No significant differences in milk yield measured at the four intervals were observed between the two straightbred groups. Average milk yields across the four intervals were similar to those reported by Restle *et al.* (1989) for Charolais and Nellore cows (4.4 vs 4.1 kg/day; $P > 0.05$). F1 cows also showed similar milk yield at the four intervals.

Heterosis for milk yield was significant at the four intervals and ranged from 43.99% at day 42 to 29.33% at day 90. Higher milk yields for Charolais-Nellore crosses than for straightbred Nellore cows were also observed by Alencar *et al.* (1995). McCarter *et al.* (1987) also reported higher milk yield for ½ Brahman ¼ Hereford ¼ Angus cows than for straightbred Brahman cows. Higher milking yields of the F1 dams also resulted in higher preweaning daily gain of their calves (Table 1).

Table 1. Heterosis and breed effect for milk production at 14, 42, 70 and 90 days post-partum of Charolais (C), Nellore (N), ½ CN and ½ NC beef cows and preweaning daily weight gain (PDWG) of their calves

Cow genotype	Milk production (kg/day)				Mean (kg/day)	Calf PDWG (kg)
	14	42	70	90		
Charolais (C)	5.39	4.60	3.26	3.84	4.27	0.638
Nellore (N)	4.51	3.73	3.37	3.95	3.89	0.555
Straightbred mean	4.95 ^b	4.16 ^b	3.32 ^b	3.90 ^b	4.08 ^b	0.596 ^b
•	•	•	•	•	•	•
½ CN	6.86	6.87	5.44	4.87	6.01	0.741
½ NC	6.86	5.99	4.72	5.04	5.65	0.737
Crossbred mean	6.86 ^a	6.43 ^a	5.08 ^a	4.96 ^a	5.83 ^a	0.739 ^a
•	•	•	•	•	•	•
Heterosis (%)	38.59	43.99	42.17	29.23	42.89	
<i>P</i>	0.0126	0.0073	0.0058	0.0479	0.0219	0.0006

a,b in the column, $P < 0.05$ for difference between straightbred and crossbred cows

Correlation coefficients presented in the Table 2 show a higher relationship between dam's milk yield and calf's preweaning weight gain for straightbred cows than for the crossbreds. Similar observations were made by Alencar *et al.* (1996). Correlation coefficients were significant between milk yield and calf weight gain at the four intervals for the straightbred cows, while for the crossbred cows they were only significant at days 14 and 42.

Table 2. Correlation coefficients between calf average daily weight gain from birth until early weaning (90 days) and dam's average milk yield according to mating system

Mating system	Milk production (kg/day)			
	14	42	70	90
Straightbreds cows	0.5096	0.5871	0.4836	0.3917
<i>P</i>	0.0001	0.0001	0.0001	0.0031
•	•	•	•	•
Crossbreds cows	0.5422	0.3497	0.1772	0.2859
<i>P</i>	0.0011	0.0497	0.3240	0.1190

CONCLUSIONS

- Charolais and Nellore cows have similar milk yield up to 90 days post-partum. The same happens between ½ Charolais ½ Nellore and ½ Nellore ½ Charolais cows.
- Heterosis for milk yield at 14, 42, 70 and 90 days post-partum is highly significant

REFERENCES

- Allencar, M.M., Cruz, G.M., Tullio, R.R. and Correa, L.A. (1995) *Rev. Soc. Bras. Zootec.* 24:530-541.
- Allencar, M.M., Tullio, R.R., Cruz, G.M. and Oliveira, M.C.S. (1996) *Rev. Soc. Bras. Zootec.* 25:92-101.
- McCarter, M.N., Frahm, R.R., Tinker, E.D., Castree, J.W. and Coleman, S.W. (1987) *Anim. Sci. Res. Rep.* MP119:1-5.
- Moletta, J.L., Restle, J. and Felten, H.G. (1989) *Anais R. Anual Soc. Bras. Zootec.*:357.
- Restle, J., Moletta, J.L., Felten, H.G., Dalla Porta, M.A. and Rosa, C.E. (1989) *Anais R. Anual Soc. Bras. Zootec.*:356.
- Reynolds, W.L., DeRouen, T.M. and Bellows, R.A. (1978) *J. Anim. Sci.* 47:584-594.
- Ribeiro, E.L.A. and Restle, J. (1991) *Pesq. Agropec. Bras.* 26:1145-1151.
- SAS (1990) "SAS User's Guide" 5th ed. SAS Institute, Cary.