

GROWTH RATE OF AUSTRALIAN MILKING ZEBU HEIFERS
ON THE NORTH COAST OF N.S.W.

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Summary

Australian Milking Zebu heifers (including Australian Milking Zebu sired heifers) on the North Coast of N.S.W. in six herds were weighed on four occasions when they were between six and twelve months old. The milk production of these heifers during their first lactation was recorded. Mean growth rates ranged from .162 to .495 kg/day and the mean total milk production ranged from 678 to 1534 kg. There was a correlation of .736 ($P < 0.05$) between mean growth rate and mean total first lactation milk production.

I. INTRODUCTION

It is important for dairy heifer calves to be well grown for mating to calve at two years. Overseas results (Swanson 1967) indicate that with satisfactory nutritional levels, Holstein and Jersey heifers at 250 and 182 kg respectively and approximately 14 months of age should be exhibiting oestrus. However, generally, under Northern Australian conditions, heifer calves at grass are unable to gain at a rate of 0.5 kg per day, which is the minimum required to reach a mating weight of 230 kg at 15 months of age. Further, higher first lactation production figures are obtained from better grown heifers, and earlier calvings result in higher production (Reaves and Henderson 1954).

Growth rates of Friesian, Aberdeen Angus and Brahman crosses from Guernsey and Jersey dams, grazing tropical pastures on the North Coast of N.S.W. have been studied by Kaiser and O'Neill (1975). They reported poorer growth rates (.46 to .57 kg per day) for their calves than Kaiser (1973) calculated for calves grazing temperate pastures (.64 kg per day).

In the Australian Milking Zebu (A.M.Z.) breeding programme at Wollongbar in N.S.W., growth rates of heifer calves were recorded in six herds in 1969 and in four of these herds in 1970 and correlated with their milk production from their first lactation. The results are reported here.

II. METHODS

Heifer calves were the progeny of five A.M.Z. bulls in 1969 and six A.M.Z. bulls in 1970. Their dams were either A.M.Z. or European breed cows in the herds of six co-operating dairy farmers whose farms were in a radius of 27 kilometres of Wollongbar. Herds 1, 2 and 3 were on the flood plain of the Richmond River where the pastures were predominantly paspalum (Paspalum dilatatum) and carpet grass (Axonopus affinis). Herds 4, 5 and 6 were on soils derived from basalt with predominantly kikuyu pasture (Pennisetum clandestinum).

Calves were reared on whole milk for the first fortnight of age and then on skim milk until they were approximately six months of age. Only limited quantities of concentrates were fed as supplements to pasture during this period and calves were treated with anthelmintics when they showed clinical signs of parasitic infestation.

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At six months of age calves were weaned on to pasture and were largely unsupplemented. Live weights were recorded on four occasions when calves were between six and 12 months of age.

The heifers were mated at approximately 15 to 18 months of age and continued to graze the same pastures until they calved at 24 to 27 months of age. Heifers which did not reach puberty in 17 months had oestrus induced with six doses of 40 mg progesterone at 2 day intervals and 500 i.u. PMSG on day 14 (Hewetson 1968). After calving and joining the milking herd the heifers had access to better quality kikuyu and paspalum pastures, some of which had been topdressed with nitrogenous fertilizers and to grazing oats which had been fertilized with nitrogen.

Milk production was measured at 28-day intervals and total milk production and growth rate for each heifer calculated.

Within each herd in each year the correlation between milk production and growth rate was calculated. The correlation was also calculated between herds using the herd x year means. Sire effects on growth rate were examined using least square analysis.

TABLE 1
Mean growth rates from six to 12 months for Australian
Milking Zebu heifers and milk production at their
first lactation

Herd number	Number of heifers	Growth rate (kg/day)	S.D.	Total milk production (kg)	S.D.
1969					
1	36	.199	.081	902	499
2	11	.495	.081	1531	511
3	19	.162	.041	678	303
4	11	.367	.086	1257	294
5	12	.281	.074	1520	421
6	8	.287	.059	1269	439
1970					
1	34	.418	.104	1374	516
2	-	-	-	-	-
3	21	.275	.054	832	334
4	-	-	-	-	-
5	20	.378	.057	1534	247
6	11	.376	.075	1060	374

III. RESULTS

Mean growth rates in kg/day with standard deviation and total first lactation milk production in kg with standard deviation for the six herds are shown in Table 1. Between herds there was a correlation of .736 ($P < 0.05$) between mean growth rate in this six-month period and mean total first lactation milk production. Within herds there was no significant sire effect on growth rate and the correlation between growth rate and milk production was generally low and non-significant. The correlation between milk production and the percentage treated with progesterone/PMSG was $-.458$ ($P > .05$).

IV. DISCUSSION

These- are the first growth rates reported for A.M.Z.-sired heifers and are among the few reports of growth rates for dairy heifers in the Australian environment. The results illustrate overall poor growth rates and a large variation between herds.

Growth rates of heifers in these observations are generally below those of the crossbred calves grown on kikuyu grass by Kaiser and O'Neill (1975), but similar to those observed by Smeals (personal communication) in Australian Illawarra Shorthorns at Grafton, N.S.W. Lower growth rates resulted in lower joining weights, later puberty and necessitated hormonal treatment of some heifers to bring them into oestrus to conform to the seasonal calving pattern. These heifers were among the lower producers.

Within each year, the variation in growth rate between herds illustrated in Table 1, can be attributed to husbandry techniques because half-sibs are represented in all herds.

Poor husbandry which retarded growth was probably the reason for the small variation in growth rate between animals within herds and also between sires within herds.

The significant correlation between growth rate and milk production reflects the large differences in husbandry techniques which influences both parameters. No literature presenting similar results could be found. However several workers using heifers with growth rates in excess of ours, have examined differences in milk production. They used groups of heifers which had different nutrition before calving but similar nutrition during their first lactation. Using Holstein heifers Reid et al. (1964) showed no difference in milk production for groups with mean growth rate of .45 kg, .67 kg and .84 kg/day, but Arandi and Sedyalcin (1971) showed that heifers which grew at .38 kg, .45 kg and .55 kg/day produced 2967 kg, 3528 kg and 2648 kg of milk respectively.

These observations indicate that dairymen on the North Coast of N.S.W. should be encouraged to improve the animal husbandry of their dairy replacement heifers, since it can be concluded that better growth rates resulting from improvements in animal husbandry would also be associated with increases in milk production.

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