



AgEcon SEARCH

RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

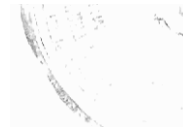
No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

TECHNICAL BULLETIN 55

ISSN 0070—2315

**GROWTH, FEED INTAKE, FEED EFFICIENCY
AND FEEDING COSTS OF EARLY WEANED CALVES**

S. Economides and E. Georghiades



**AGRICULTURAL RESEARCH INSTITUTE
MINISTRY OF AGRICULTURE AND NATURAL RESOURCES**



OCTOBER 1983

GROWTH, FEED INTAKE, FEED EFFICIENCY AND FEEDING COSTS OF EARLY WEANED CALVES

S. Economides and E. Georghiades

SUMMARY

The mean weight at birth, at weaning, at 91 and at 120 days, of male calves was 42, 73, 113 and 154 kg, respectively. The corresponding weights for female calves were 40, 69, 103 and 137 kg. Intake of solid feed by male and female calves increased from about 40g during the 2nd week to 1.17 kg at weaning. At 120 days of age intake was 4 kg for male calves and 3.5 kg for female calves. Dry matter intake per kg liveweight gain was 2, 2.5 and 3 kg, respectively, from birth to weaning, from weaning to 91 and from 91 to 120 days of age. Feed costs per calf from birth to 4 months of age were £38 when cow milk was fed and £28 when milk replacer was fed.

INTRODUCTION

Earlier studies (Economides and Georghiades, 1983) showed that both male and female calves can be successfully weaned at 8 weeks of age on either 200 kg of cow milk or 25 kg of milk replacer. Any reduction of milk intake either by earlier weaning or by reducing the quantities of milk fed reduces feed costs. Lower milk intake also enhances rumen development (McGilliard *et al.*, 1965; Stobo *et al.*, 1966) thereby increasing the intake of cheaper concentrates and hay (Economides and Georghiades, 1983; Hodgson, 1971). A shorter milk feeding period also reduces the incidence of diarrhoea and leads to better performance of calves (Roy, 1971).

The objective of this study was to examine feed intake, water intake and liveweight changes of calves from birth to weaning, and feed conversion efficiency and feed costs from birth to 4 months of age.

MATERIALS AND METHODS

Data on 170 calves from birth to 91 days, and on 134 calves from 91 to 120 days were used. The calves were weaned at 8 weeks of age on 200 kg of milk. Weight at birth, at weekly intervals thereafter, and at weaning, and solid feed, milk and water intake until weaning were recorded. Weekly liveweights and group feed intakes from weaning to 4 months of age were also recorded. The composition of the concentrate mixture used (5 mm cubes) from 10 days to 4 months of age was: Barley grain 46.3%, sorghum grain 30.9%, soyabean meal 16.0%, wheatbran 5.0%, limestone 1.0%, dicalcium phosphate 0.5%, sodium

chloride 0.3% and a vitamin-trace element mixture (Economides and Georghiades, 1983). The cost of the concentrate mixture at 1982 prices was C£71/ton. The price of milk replacer was C£380/ton and that of lucerne hay C£65/ton.

RESULTS

Weight changes

The mean birth weight, weaning weight, 91-day and 120-day weight of male and female calves is given in Fig. 1.

Feed intake

The mean daily intake of solid feed during the second week was about 40g (concentrates and hay), but only a third of all calves consumed any feed. Two male and two female calves did not consume any solid feed before four weeks and six weeks, respectively. Intake of concentrates during the last week prior to weaning increased to 1.17 kg and of lucerne hay to 0.19 kg. Mean daily intake of concentrates from weaning to 91 days of age was 2.45 and 2.30 kg and from 91 to 120 days of age was 3.95 and 3.55 kg, for male and female calves, respectively (Fig. 2). All calves were offered 0.5 kg of lucerne hay daily from weaning to 120 days of age.

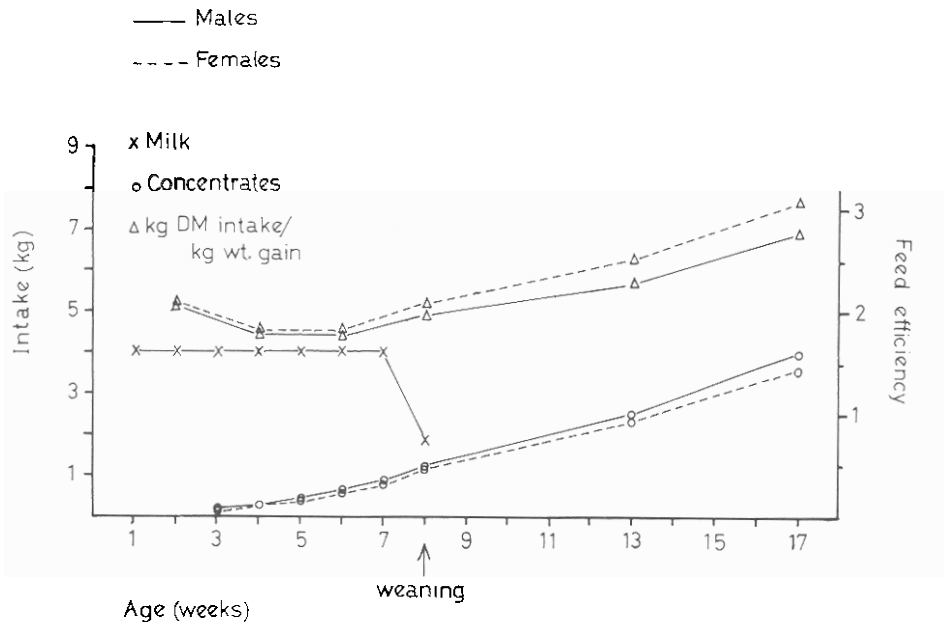


Fig.2. Feed intake, and feed conversion efficiency of male and female calves.

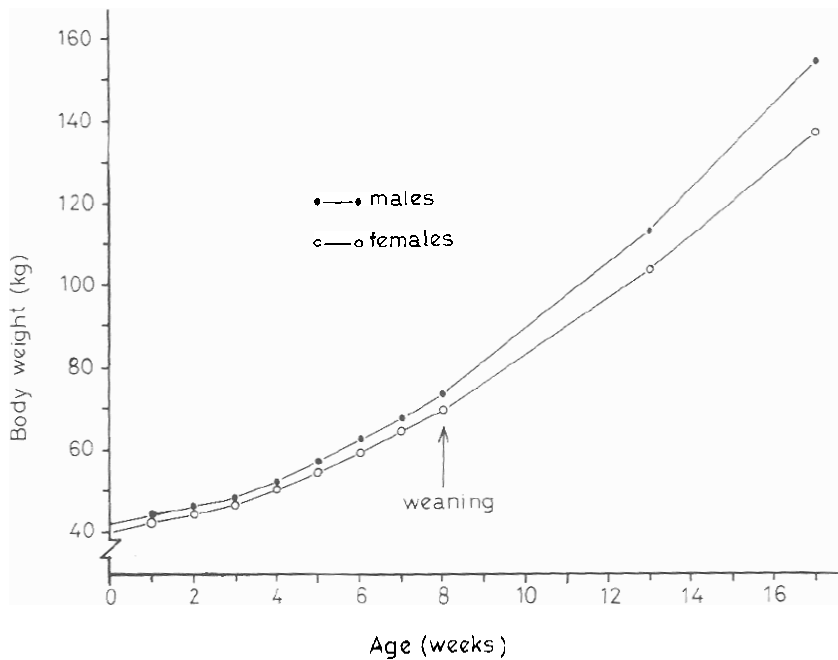


Fig.1. Liveweight of male and female calves from birth to 4 months of age.

Water consumption

Water consumption was not much affected by month of weaning, and was similar for male and female calves. Only 12% of the calves consumed any water by the second week, 52% by the third and 94% by the fourth week. After this age water consumption increased linearly from 6.5 liters in the fifth week to 11 liters/calf/day in the 8th week.

Feed conversion efficiency

Dry matter intake (milk solids+dry matter from concentrates and hay) was 2.0 kg per kg liveweight gain during the first 2 weeks (milk feeding only), decreased to 1.7 kg during the following two weeks, remained constant from the fourth to the sixth week and increased to 1.9 kg in the last 2 weeks prior to weaning. During the post-weaning period dry matter intake increased to 2.5 kg per kg liveweight gain from weaning to 91 days and to 2.93 kg from 91 to 120 days of age (Fig. 2). The conversion of feed to liveweight gain was always better in the males.

TABLE 1. Feed costs for male and female calves fed cow milk or milk replacer until weaning, and from weaning to 120 days of age.

	Cow milk				Milk replacer			
	Male		Female		Male		Female	
	Quantity Kg	Value C£	Quantity Kg	Value C£	Quantity Kg	Value C£	Quantity Kg	Value C£
Until weaning								
Cow milk	200	19.81	200	19.81	10	1.02	10	1.02
Milk Replacer	—	—	—	—	25	9.50	25	9.50
Concentrates	23	1.63	23	1.63	23	1.63	23	1.63
Lucerne hay	7	0.45	7	0.45	7	0.45	7	0.45
Total cost		21.89		21.89		12.60		12.60
From weaning to 91 days								
Concentrates	107	7.60	97	6.89				
Hay	17.5	1.14	17.5	1.14				
Total cost		8.74		8.03		8.74		8.03
From weaning to 120 days								
Concentrates	201	14.27	183	12.99				
Lucerne hay	32	2.08	32	2.08				
Total cost		16.35		15.07		16.35		15.07
TOTAL FEED COST (Birth to 120 days)								
		38.24		36.96		28.95		27.67

The amount of feed required to produce one kg of liveweight gain was 7 kg of milk, 0.8 kg of concentrates and 0.25 kg of lucerne hay until weaning, 2.24 kg of concentrates and 0.46 kg of lucerne hay from weaning to 91 days of age and 3.1 kg of concentrates and 0.4 kg of lucerne hay from 91 to 120 days of age.

Feed costs

Feed costs until weaning amounted to C£21.89 for cow milk and C£12.60 for milk replacer (Table 1). Total feed costs from birth to 120 days of age were C£38.24 with cow milk and £28.95 with milk replacer for male calves, and C£36.96 and C£27.67, respectively, for female calves (Table 1).

The cost per kg liveweight gain until weaning was C£0.41 with milk replacer and C£0.77 with cow milk, from weaning to 91 days of age it was C£0.19 and from 91 to 120 days of age C£0.25.

DISCUSSION

The rate of growth and feed conversion efficiency of calves during the first two weeks of life was low because during this period the incidence of diarrhoea was relatively high (Economides and Georghiades, unpublished). From the third week onwards all calves were healthy, grew normally, and feed conversion was improved. The low milk intake induced increased intake of solid feed (Economides and Georghiades, 1983; Hodgson, 1971), which at weaning reached 1.17 kg daily, a quantity much higher than that recommended for early weaned calves (0.5 kg) by Appleman and Owen (1975). Feed intake increased sharply after weaning and reached 4 kg daily for male calves. This high feed intake resulted in a high rate of growth and better feed utilization. Liveweight gain after weaning was produced at considerably less feed cost on solid feed (C£0.19—0.25 per kg) compared to the milk feeding period (C£0.41—0.77 per kg). This clearly indicates that reducing either the milk feeding period or the quantity of milk fed will substantially decrease feed costs. With the current prices of milk replacer (C£380/ton) and of cow milk (C£99/ton) there is a saving of about C£10 per calf until weaning when 25 kg of milk replacer (200 kg of milk substitute) instead of 200 kg of fresh cow milk is fed. However, this advantage disappears when the quantity of milk replacer fed is more than 50 kg.

It is concluded that consumption of solid feed is enhanced with reduced milk intake until weaning but rises sharply after weaning (8 weeks of age). The unit of liveweight gain is produced at a lower cost with solid feed compared to milk. Feed costs are reduced when 25 kg of milk replacer are given instead of 200 kg of cow milk. However, this advantage disappears when the quantity of milk replacer increases above 50 kg per calf.

ACKNOWLEDGEMENTS

We thank Mr. C. Heracleous and Mrs. M. Theodoridou, for technical assistance.

REFERENCES

- Appleman, R.D., and F.G. Owen. 1975. Recent advances in calf rearing. Breeding, housing and feeding management. *Journal of Dairy Science* 58: 447—464.
- Economides, S., and E. Georghiades. 1983. The effects of weaning age, quantity of milk, once daily feeding and form of concentrates on the performance of Friesian calves. *Technical Bulletin* 52. Agricultural Research Institute, Nicosia. 9 p.
- Hodgson, J. 1971. The development of solid food intake in calves. V. The relationship between liquid and solid food intake. *Animal Production* 13: 593—597.
- McGilliard, A.D., N.L. Jacobson, and J.D. Sutton. 1965. Physiological development of the ruminant stomach. In *Physiology of digestion in the ruminant*. Butterworth, Washington, D.C.
- Roy, J.H.B. 1971. Decision-making and calf health. *Journal of the Royal Agricultural Society, England* 132:81—105.
- Stobo, I.J., J.H.B. Roy, and H.J. Gaston. 1966. Rumen development in the calf. I. The effect of diets containing different proportions of concentrate to hay on rumen development. *British Journal of Nutrition* 20:171—179.