A SURVEY OF THE LIVE WEIGHTS OF FRIESIAN COWS ON THE ATHERTON TABLELAND, QUEENSLAND

G.W. BROWN* R.T. COWAN** and T.M. DAVISON*

SUMMARY

The live weights of cows were measured in 19 herds on the Atherton Tableland, Queensland. The herds all contained predominantly Friesian cattle and were weighed twice, at the beginning and end of the annual dry season. Mean live weight of herds varied from 379 to 564 kg and was correlated with milk production by the herd ($P< 0.01$). Animals in the heavier herds calved at a younger age and both weighed heavier and produced more milk throughout their lives than animals in lighter herds. In all herds mature live weight and maximum levels of milk production were attained at 5 to 6 years of age.

INTRODUCTION

There is generally an association between the live weight of cattle and the level of milk production. In a preliminary study Cowan et al. (1974) observed an increase in milk production during the first lactation of about 7 l for each one kg increase in the live weight of Friesian heifers before calving. Heifers which were heavier at first calving also had higher levels of milk production in the second and third lactations than lighter heifers. These studies have led to the current recommendation that Friesian heifers should be 450 kg live weight immediately before first calving.

There is very little information on the live weights of Friesiancows in Queensland dairy herds. It is generally assumed that heifers do not attain 450 kg at calving, but that they continue to grow through at least the first three lactations. This study was undertaken to provide data on the live weights of cows in commercial dairy herds.

MATERIALS AND METHODS

The study was done on the Atherton Tableland during 1976. The area has an elevated tropical climate (latitude 17° to 19° S; altitude 700 to 1200 m and mean annual rainfall1250 to 2500 mm) and is generally regarded as a favourable dairying area. Rainfall follows a fairly consistent pattern of high recordings from December to April inclusive, followed by extended periods of full cloud cover and light rainfall through to July. August to November inclusive are the months of lowest rainfall, with a mean recording of approximately 10% of annual rainfall being recorded during these four months.

Various species of tropical grasses and legumes form the major source of feed for cows. Limited areas of irrigated temperate pasture species are used on some farms during the annual dry season. Pastures are often supplemented with grain and molasses.

A sample of 19 farms was chosen at random from those herds which had predominately Friesian cattle and in which the milk production of individual cows was recorded monthly by the Herd Recording service of the Department of Primary Industries. This sample was approximately 6% of all farms on the Atherton Tableland, and 20% of herds to which the study was restricted.

* Department of Primary Industries, Kairi Research Station, Kairi, Qld 4872.
** Department of Primary Industries, Mutdapilly Research Station, M.S. 825, Ipswich, Qld 4305.

Each herd was weighed twice, at the beginning and end of the annual dry season. The initial weighings were done between the 17th June and the 19th July and the second between the 1st and the 29th November, 1976. Cows were weighed immediately after the morning milking. Details on the major nutritional inputs on each farm, for example stocking rate, area of irrigation, amounts of fertilizer used and the amounts of grain and molasses given to cows, were recorded at the second weighing.

The ages of cows, their milk yields and lactation number were obtained from the Herd Recording files.

RESULTS

The meanliveweights of herds ranged from 379 to 564 kg. Associated levels of milk and fat production ranged from 1840 and 70 kg to 4200 and 164 kg respectively. The data collected on feeding showed greater inputs into land, fertilizer and supplements for those herds of high rather than low live weight. Mean values for all 19 herds were as follows; number of milking cows 66, proportion of cows aged 6 years or more 43%, liveweight 435 kg, milk yield 2980 kg, fat yield118 kg, area of dryland pasture 0.82 ha/cow, area of irrigated pasture 0.08 ha/cow, superphosphate used 227 kg/cow/year, nitrogen used 39 kg/cow/year, and grain and molasses given 672 kg DM/cow/year. Mean live weight of all herds was 450 $\pm$ 49 kg at the beginning of the dry season and 422 $\pm$ 38 kg at the end of the dry season.

The mean live weight of a herd (X,kg) and the mean level of milk production (Y, kg/cow/lactation) were correlated ($r = 0.77$; $P < 0.01$). The regression equation was,

$$Y = -1313 + 9.8\ (\pm\ 2.0)\ X \qquad (n = 18;\ RSD = \pm\ 367).$$

The data from two herds of high mean live weight (120 cows), from one large herd (154 cows) with a mean live weight equivalent to the overall mean and from the two herds of lowest mean live weight (91 cows) were analysed further to allow a comparison of trends in live weight in contrasting herds. The distribution of live weight in each of these herds was similar and there was a consistent difference of 200 kg between the heaviest and lightest cows in each category.

The effects of age on live weightand milk production of cows are shown in Figure 1. The differences between herds in live weight of cows tended to be greater in the older cows than in heifers or cows on their second or third lactation. In each group the maximumlive weightwas attained at 6 years of age. This was equivalent to the fifth lactation for cows in the heaviest category, but the fourth lactation for cows in the two lighter categories.

Milk yields were consistently higher for cows in the heavier herds (Figure 1). As with live weightthe differences between mature cows were as great or greater than the differences between heifers, and maximum yields were achieved at 5 to 6 years of age.

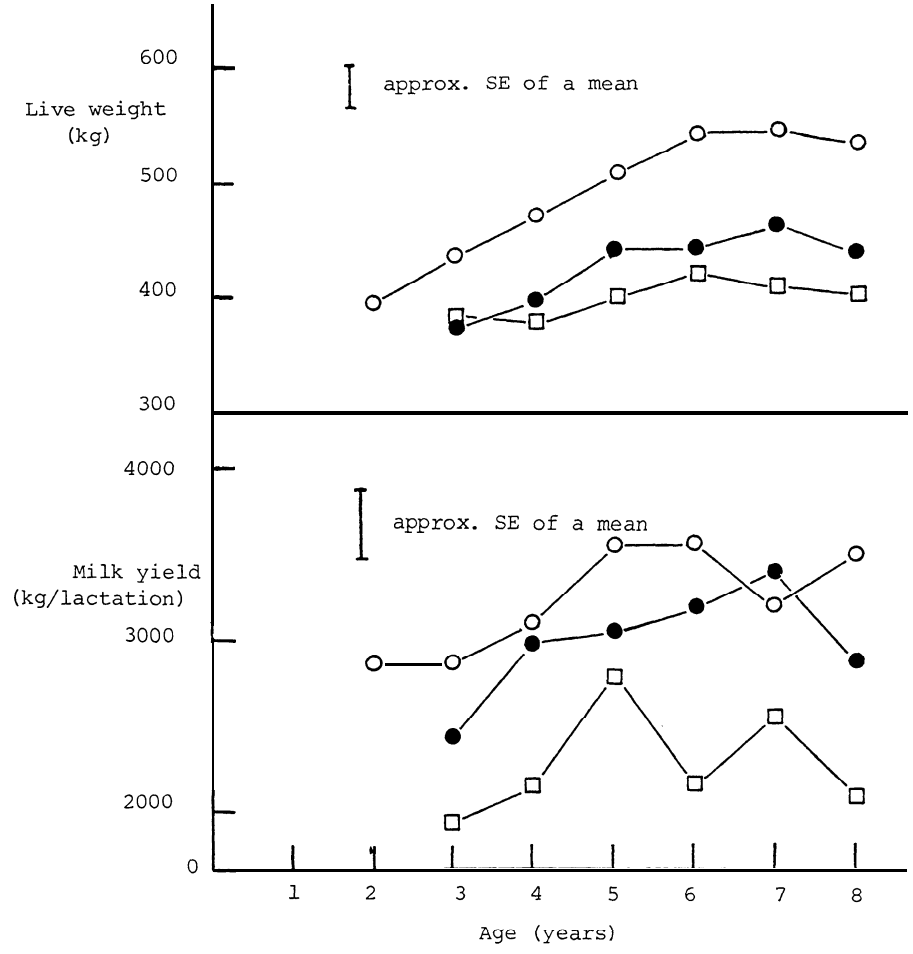

Fig. 1. Effect of age on the live weights and milk yields of cows in herds of low (□), medium (●) and high (○) live weight

DISCUSSION

The mean live weightsof all herds in this survey are low relative to the weights recorded in areas of higher production. For example Friesian cattle calving for the first time at two years of age and producing 5400 kg milk in the first lactation had a mean live weight of 580 kg. Cows in their third lactation produced 7000 kg milk and weighed 690 kg (Miller et al. 1973). These differences appear to result largely from the amounts of food cows are able to consume, particularly over the first 4 to 6 years of life.

The cattle in herds with relatively low levels of nutritional inputs did not make up any difference in weight by growing for longer periods. Instead a similar time was taken to reach mature weight and maximum levels of milk production in the various herds, This supports the observation of an association between milk yield and live weight, and suggests that inputs of food

are partitioned betweenlive weight and milk yield in a similar way in herds given different feeding levels. Also any increase in feeding level for a herd of light cows would not produce the full response in milk yield until live weighthad again stabilized at a higher level. This would normally take some time, perhaps a full year (Cowan et al. 1977), and could not be measured in short term comparisons of feed inputs.

Although this experiment does not measure a causitive relationship between live weight and milk yield, the correlation is similar to that previously found for Friesian heifers in the same environment. The data suggest that an increase of one kg in live weight of cows is associated with an increase of 9.8 ℓ in milk output, compared with a value of 7 ℓ obtained for Friesian heifers (Cowan et al. 1974). In practice increases in food input are likely to cause concurrent increases in live weight and milk production in a ratio comparable with these values.

Since animals in both light and heavy herds continue growing through to at least the fourth lactation, and milk production increases in a similar way to live weight, delaying the calving of heifers in light herds by one year is not likely to boost their subsequent yields relative to cows in heavy herds. The nett result of delaying calving is the loss of one lactation and a continuing lower level of production throughout the animal's life. To enable cattle in the lighter herds to calve at two years of age the level of food intake would need to be increased during the rearing period. Most efficient use of this extra input would then be made if the higher level of feeding was maintained through the animal's life.

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