BEEF PRODUCTION IN THE DRY TROPICS A CHALLENGE TO GENETIC PROGRESS

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Summary

Advances in techniques of commercial beef cattle production may be grouped under one of three broad headings - genetic, nutrition and management. The, expression of genetic worth is affected by both the nutritional and managerial factors.

Under commercial conditions, it is uneconomic to increase the plane of nutrition to the stage of exploiting the maximum genetic potential. The important measure is to locate the genetic material which performs best under the particular environmental conditions.

A strong trend towards the use of Brahman cattle in many parts of Queensland and, in particular, the northern breeding areas, indicates that progress with the traditional British breeds is not satisfactory.

The reasons for the failure to achieve worthwhile gentic progress in the rather harsh environment of the dry, tropical North Queensland breeding areas are discussed and some preliminary weight data are presented.

I. INTRODUCTION

The North Queensland Statistical Division, embracing approximately all of Queensland north of 22" South latitude, covers an area exceeding 270,000 sq. miles, and the greater part of this is used for breeding beef cattle. It is convenient to refer to the inland section of this region as the "dry topics".

The particular sector of this region to which reference is made has an average annual average rainfall of about 710 mm (28 in.) of which 580 mm or over 80 per cent falls in the four months December to March inclusive. Typically, very little worthwhile rain occurs in the other eight months.

The average daily maximum temperature ranges from 78°F in July to 94.7°F in December and exceeds 80°F for all months except June and July. The average daily minimum temperature ranges from 48.8°F in July to 70°F in January. Average daily temperatures on a monthly basis range from 63°F in July to 82°F in December and exceed 77°F for the months October to March inclusive. Individual daily ranges are of much greater magnitude and may range from below freezing point to over 100°F.

* "Meadowbank" via Mt. Garnet, North Queensland.

Native pasture growth is rapid following rain in late spring and early summer and growth far exceeds utilisation over the summer months. However, this type of forage quickly becomes a poor quality roughage. A critical pastoral position is reached by October and frequently extends to the end of the year. Losses become virtually unavoidable and many properties write off 10 per cent of the breeding herd each year.

Survival of breeders is of first importance and, for this reason Bos ***indicus*** cattle are being introduced on an ever-increasing number of commercial holdings.

Traditional types of beef cattle in the dry tropics are the Shorthorn, Hereford, Devon and Aberdeen-Angus breeds. In northern areas, the Shorthorn and Devon — and their crosses — have predominated.

The policy of many graziers in this environment has been to purchase top stud bulls in southern or eastern Australia. Selection has been based on the appearance and conformation of animals, in many cases under hand feeding or supplementary feeding conditions. Representatives of some of what are regarded as the best blood lines in the different breeds have been brought to North Queensland.

It would appear that this method of selection has failed to produce animals better adapted to this environment. Suitable genetic material for livestock improvement may be present in studs in other areas but it is difficult to envisage how it will be revealed under current force-feed conditions. Where commercial pastoral conditions have more in common with stud breeding properties, selection problems are much less formidable.

II. ADVANTAGES OF BRAHMAN CROSSBREDS

The better performance of crossbred Brahman cattle under commercial conditions in this environment has been established by commercial experience, comparative weighing trials and from survey data. Mawson (1954, 1956) reported on advantages of 91 lb (41 kg) bodyweight gain for Brahman crossbred steers compared with British breed steers over a period of 30 months — from weaning to slaughter. Because of heavier weaning weights and a higher dressing percentage, the crossbred carcasses averaged 90 lb (40 kg) higher than the British breeds and also recorded a better carcass grading. Donaldson (1962), from survey data of properties in North Queensland including the coastal strip, quotes calf branding percentages of 55.1 per cent for Brahman-cross herds compared with 50 per cent for British breed herds.

It is not my intention to attempt to distinguish between the effects of hybrid vigour and the effect of a more suitable genetic make-up in crossbred animals. To continue to benefit from hybrid vigour, new pure breeds must be continually brought in and I consider this to be impracticable in this environment.

I have discarded the practice of criss-crossing as experience indicated that the problems associated with the necessary rigid controls, involving several separate breeding herds, were beyond practical achievement, at least within the environment we were able to provide.

The problem of segregation is difficult enough in any normal breeding programme incorporating controlled mating periods, pregnancy testing and other modern animal husbandry practices. Any attempt to add the complication-of separate breeds or any other out-crossing techniques would be doomed to failure.

The alternatives then are (a) to select from the old established breeds in the area, (b) develop herds of the constitutionally superior pure Brahman, or (c) introduce Brahmans in to the old-established breed and select from succeeding generations of the crossbred progeny.

With reference to (a), it may be possible to select within our British breeds for better adapted animals but, as this selection has been neglected for so long, there is no proof it can now be done as quickly as by the introduction of a new breed.

In-so-far as the pure Brahman is concerned, many high,-grade commercial animals leave something to be desired in regard to beef conformation. Top stud animals are, of course, an exception. Add to this the prohibitive cost and relative scarcity of pure Brahmans and it will be appreciated that the economic result would not be attractive. Brahmans can supply much needed characteristics to our beef industry when crossed with British cattle.

I mention Brahmans particularly because they have been virtually the only Bos ***indicus*** breed available to me. It is not intended to exclude Africanders or other ***Bos*** *indicus* breeds.

If my experience and assessments have been well founded, the problem is then to select superior animals from within the crossbred herd.

III. A SELECTION PROGRAMME

Given a reasonable degree of property development in the form of water facilities and fencing, it is comparatively simple on a large breeding area initially to infuse all present females with Brahman blood. By using not less then half-bred bulls, the only segregation necessary would be with the resultant cross-bred heifers, as would be the practice in any case in all progressive breeding herds.

There is created a larger gene bank of prospective qualities, many of which were absent in the original herd.

The manager can select within his own breeding females for those qualities he considers necessary for better production, such as reproductive performance, but the main influence for progress will come from the sires he selects.

In brief, it is suggested that the qualities the commercial cattleman requires of his stock in this environment are tick resistance, foraging ability, hardiness during periods of stress, such as the ability to hang on to life longer, superior tolerance to heat stresses, better mothering ability and ease of handling. The sum of these factors and qualities amounts to a considerable overall gain. It is shown by more pounds of beef per breeder.

Since progress is faster if we limit the number of factors for which selection is made, I suggest that emphasis be placed on muscle growth.

Rate of growth, or the ability of an animal to convert feed into beef economically, is therefore of first importance.

TABLE 1

Average weights and rate of gain for 56 bulls from weaning to 24 months

Date	Av. Age (Months)	Av. Weight (lb)	Av. Weight (kg)	Av. Rate of Gain (lb)	Av. Rate of Gain (kg)	Range of Weight (lb)	Range of Weight (kg)
1968							
May (weaning)	5-6	320	145	—	—	203-411	92-187
1969							
Jan.	12	496	225	0.84	0.38		
June	18	593	270	0.65	0.30		
Sept.	21	694	315	1.10	0.50		
Dec.	24	774	352	0.79	0.36	645-913	293-415

The programme I am following for herd sire selection involves a preliminary selection at branding when 80 animals are selected. These are weaned at 5 to 6 months of age when the initial weighing is made. These animals are then subject to identical conditions right through to final selection at 26 months. During the normally dry winter, spring and early summer, a small amount of supplementary fodder may be supplied to allow the bulls to keep growing at a moderate rate.

Weighings are made at intervals of from 3 to 6 months, depending on seasonal and managerial factors. When animals are 12 months of age, some culling is done.

The average weights of 56 animals which survived the culling at 12 months of age are shown in Table 1. A bad drought occurred in 1969 and this has affected overall growth rate. Between December 1969 and February 1970, when final selection is made, weight gains of 100 lb (45 kg) or more per month are common and average weights are expected to exceed 900 lb (409 kg) at final selection.

Of the original 80 head, only about 30 will remain after the final selection, these being on or above the average of the group. Even under the adverse conditions experienced, a considerable range in the individual performance of animals is evident. My aim is to make genuine selection for superior performance.

IV. REFERENCES

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