

The Performance of Beef Cattle in North Queensland

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SUMMARY

STUDIES of the liveweight gains of beef cattle have been undertaken at several places in North Queensland. These have included "Wairuna", 50 miles W. of Cardwell, in a 28-inch rainfall area fairly typical of a large area of cattle country in North Queensland; the Bureau of Tropical Agriculture, South Johnstone, where cattle are grazed on tropical grasses and legumes grown under the high rainfall conditions of the coast; and the Ayr Regional Station on the Burdekin delta where cattle are grazed on irrigated tropical grasses and legumes.

At "Wairuna" the comparative performance of cattle of the British breeds and Zebu crosses have been studied. Over a 915-day period, from November, 1952, to May, 1955, average daily bodyweight gains were 0.65 lb. and 0.77 lb. respectively. In both groups gains were satisfactory in summer and early autumn, followed by losses in late winter and spring.

At Ayr, the average daily bodyweight gains varied from 0.70 lb. to 1.39 lb. per head for experimental periods which ranged from 273-440 days. Slowest gains were recorded during February-March.

At South Johnstone average daily gains for 1952-53 and 1953-54 were 1.44 lb. and 1.19 lb. respectively.

The observations at "Wairuna" show that it is very difficult, under natural grazing conditions, to fatten cattle under four years of age in most of the North Queensland cattle country. Turn-off from this country is seasonal but by moving young store cattle to the better quality coastal pastures it should be possible to produce fat cattle at three years of age at all seasons of the year.

I. INTRODUCTION

Queensland has a beef cattle population of nearly 6,000,000 head and, of these, 2,000,000 are in North Queensland. Despite its importance, however, the beef cattle industry in North Queensland has many short-comings. The majority of the cattle slaughtered there are over four years old. Climatic conditions are mainly responsible for this, but improved husbandry methods should assist in the production of better quality younger beef.

An essential prerequisite to these changes is a sound understanding of the performance of beef cattle under the varied climatic and grazing conditions of that area. This paper summarises observations made at "Wairuna" on the Coastal Tableland of North Queensland, south Johnstone and Ayr and supplements earlier work by Seddon and Mulhearn (1939) at Charters Towers.

II. LOCATION AND DESCRIPTION

The following is a brief description of the three centres and their location.

(a) "Wairuna"

This property is situated between 18° and 19° S. latitude on the Coastal Tableland of North Queensland about 50 miles W. of Cardwell and 70 miles S.E. of Mt. Garnet. It is 1,800 feet above sea level and lies about midway between the Great Dividing Range to the West and the Cardwell Range to the East.

The average annual rainfall is 28 inches, most of which falls during the summer months. Storm rains are common in November and December, followed by three months of "wet season" when heavy falls are recorded.

The predominant grasses are Kangaroo grass (***Themeda spp.***), black spear grass (***Heteropogon contortus***) and ***Eragrostis spp.***

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Two groups of cattle were weighed at "Wairuna". One consisted of 25 British-breed cattle, including Shorthorn and Shorthorn-Hereford cross steers; the other consisted of 25 Zebu cross steers, the progeny of $\frac{3}{4}$ -bred Zebu bulls ($\frac{3}{4}$ Zebu and $\frac{1}{4}$ Shorthorn) and Shorthorn and Shorthorn-Hereford cross cows. Both groups grazed together throughout the experiment which lasted from November, 1952, to May, 1955.

(b) South Johnstone

South Johnstone is situated about 17°30'S. latitude in the high rainfall area of the tropical coast. Average annual rainfall for the past ten years is 119.5 inches.

Records of weight gains in Shorthorn and Hereford steers are available from 1952 to 1954, and were collected from cattle grazing tropical grasses and legumes at the Bureau of Tropical Agriculture Experiment Station. The steers grazed rotationally in ten paddocks, each of two acres.

The grasses in these paddocks included Para grass (**Brachiaria mutica**), Guinea grass (**Panicum maximum** var. **typica**), Purple Top Guinea grass (**Panicum maximum** var. **coloratum**) and Green Panic grass (**Panicum maximum** var. **trichoglume**). The legumes were Stylo (**Stylosanthes gracilis**), Puero (**Pueraria phaseoloides**), Centro (**Centrosema pubescens**) and Calopo (**Calopogonium mucunoides**).

(c) Ayr

Ayr is situated on the Burdekin delta at 19°30'S. latitude. Average annual rainfall is 53 inches. Observations on the bodyweight changes of Shorthorn steers grazing irrigated pastures of tropical grasses and legumes have been made since 1951 at the Ayr Regional Experiment Station.

Five different grass-legume mixtures were used, including Rhodes grass (**Chloris gayana**) and Stylo (**Stylosanthes gracilis**), Para grass (**Brachiaria mutica**), and Clitoria (**Clitoria ternalea**), Para grass (**Brachiaria mutica**) and Centro (**Centrosema pubescens**), Guinea grass (**Panicum maximum** var. **typica**) and Centro (**Centrosema pubescens**), and Guinea grass (**Panicum maximum** var. **typica**) and Stylo (**Stylosanthes gracilis**).

These pasture mixtures had been sown in twenty paddocks, each 1¼ acres in area, and each pasture mixture was replicated four times. Each group of cattle grazed rotationally on the four blocks of each mixture.

III. OBSERVATIONS

(a) "Wairuna"

Observations commenced November, 1952, with the groups of British-breed and Zebu-cross cattle when these animals were 7 to 11 months old. They were weighed at approximately monthly intervals until they were slaughtered in May, 1955, some thirty months later. The detailed changes in mean bodyweight of the two groups are shown in Fig. 1.

Both groups gained weight from November, 1952, to May, 1953. This was followed by a fall in weight and several months of more or less stationary weights, so that bodyweights in January, 1954, were still below those of the previous May. This period was followed by one of rapid growth until early April, 1954, when weights again showed little change until November, 1954, some eight months later. Thereafter, gains were satisfactory until the experiment terminated in May, 1955. A summary of mean bodyweights, cumulative total liveweight changes and liveweight increase per day to cover these periods are included in Table 1.

The performance of the Zebu-cross group was superior to that of the British-breed group during the first 18 months of the trial with mean bodyweight gains of 450 lb. and 345 lb. respectively. In the following 12 months gains in the two groups were 253 lb. and 252 lb. respectively.

TABLE 1
THE COMPARATIVE PERFORMANCE OF STEERS OF BRITISH BREEDS
AND ZEBU CROSS AT "WAIRUNA"

Date	Days on experiment	British breeds			Zebu cross		
		Mean L.W.	Cumulative L.W.I.	Mean cumulative L.W.I. per day	Mean L.W.	Cumulative L.W.I.	Mean cumulative L.W.I. per day
5.xi.52	0	lb. 322	lb. —	lb. —	lb. 365	lb. —	lb. —
22.v. 53	198	546	224	1.13	645	280	1.41
14. i.54	435	482	160	0.37	623	258	0.59
7.iv.54	518	684	362	0.70	821	456	0.88
25.xi.54	750	692	370	0.49	856	491	0.65
9. v.55	915	919	597	0.65	1068	703	0.77

In May, 1955, both groups of cattle were slaughtered at 3-3½ years of age in order to obtain comparative carcass data. This is one to three years younger than fat cattle are normally turned off from this district. Carcass weights and grades are shown in Table 2.

TABLE 2
CARCASS WEIGHTS AND GRADES OF "WAIRUNA" CATTLE*

	British breeds group	Zebu cross group
Mean chilled carcass weight	454 lb.	5 4 4 1 b .
Dressing percentage	49	51
Percentage 1 st grade	6.5	30.0
Percentage 2nd grade	76.0	63.5

*Eleven days elapsed between the last liveweight and slaughter. Of this time, five days were spent on the road from station to rail and one day on rail. The cattle were then spelled for two days before slaughter.

(b) South Johnstone

Western cattle were used for the South Johnstone observations and were 2-2½ years of age at the commencement. The 1952-53 group were Shorthorns and the 1953-54 group Herefords. Monthly changes in bodyweight are shown in Fig. 2.

In 1952-53, stocking was at the rate of 16 bullocks to 20 acres. Average liveweight gain over 363 days was 523 lb., or 1.44 lb. per head per day.

In 1953-54, stocking was at the rate of 19 bullocks to 20 acres. Average liveweight gain was 376 lb. in 3 15 days, or 1.19 lb. per head per day.

The only weight losses at South Johnstone were in June in 1953 and again in 1954. This may have been due to the influence of cooler weather on pasture growth.

Slow gains were recorded in February, 1953, and March, 1954. These were months of high temperatures, relative humidities and rainfall. These factors may have affected grazing adversely. In this connection, however, Larkin (1954) observed that the 1952-53 group of cattle grazed 7.68 hours per day in February, 1953. This was higher than that observed in October, 1952 (6.44 hrs.), December, 1952 (6.63 hrs.) and April, 1953 (7.13 hrs.), but lower than the figure for June, 1953 (8.48 hrs.).

(c) Ayr

Western cattle were used for the observations made at Ayr. In 1951, 1952 and 1953 they were purchased at 2-2½ years of age. In 1954 they were 12-18 months of age.

In the first three experiments the cattle were grazed on the five pasture mixtures already mentioned. In the 1954-55 experiment the Para grass and Clitoria plot was not included.

A constant number of animals was allotted to each pasture mixture and additional animals added or withdrawn according to pasture conditions. The group on each pasture grazed rotationally on the four replicated blocks, each of 1 ¼ acres. Each block was grazed for one week and then spelled for three. On several occasions the cattle had to be removed from the pasture before the week was completed. The mean stocking rates are summarised in Table 3, and the total gain per acre in Table 4.

The successive changes in weight of the groups grazing Para grass and Centro, Rhodes grass and Stylo, and Para grass and Clitoria are included in Fig. 3. The general performance of the groups on the other two mixtures was similar.

TABLE 3
MEAN STOCKING RATE PER 5 ACRES AT AYR

Pasture mixture	Mean stocking rate for period—			
	1951-52	1952-53	1953-54	1954-55
1. Rhodes grass and Stylo	4 (3.75-4)*	5.9 (3-7)	8.6 (8-10)	8 (3-15)
2. Para grass and Clitoria	3.7 (2.75-4)	5.8 (3-6)	6.6 (5.8)	—
3. Para grass and Centro	4.8 (4-6.5)	6.8 (3.5-8)	9.6 (6-12)	9.1 (3-14.75)
4. Guinea grass and Centro	4.4 (3.75-5.5)	5.8 (3-7)	9.9 (8-11)	8.5 (3-13.75)
5. Guinea grass and Stylo	5.3 (3-7.25)	6.0 (3.5-7)	9.4 (8-10)	7.2 (3-11.75)

*Figures in parentheses indicate the range on a monthly basis.

TABLE 4
LIVEWEIGHT GAINS PER ACRE

Pasture mixture	Liveweight gains per acre							
	1951-52 (333 days)		1952-53 (349 days)		1953-54 (273 days)		1954-55 (440 days)	
	Per day	Total	Per day	Total	Per day	Total	Per day	Total
1. Rhodes grass and Stylo	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
2. Para grass and Clitoria	1.02	339	1.26	440	1.47	402	1.47	646
3. Para grass and Centro	0.91	304	1.11	388	1.66	452	—	—
4. Guinea grass and Centro	1.19	396	1.02	356	1.85	506	2.17	954
5. Guinea grass and Stylo	1.10	367	1.08	377	1.57	428	2.04	897
	1.17	388	1.24	433	1.42	387	1.42	624

With only a few exceptions, continuous gains in bodyweight were recorded in all groups. There were, however, two periods of slow gains, one during the hot, wet summer months and the other in the winter. Although the winters are mild at Ayr, temperatures are not optimal for growth of these tropical pasture species.

The decreased gains during the hot, wet months from January to March, may be due to the general effect of the hot, humid weather on the cattle or to excessive succulence of the pasture. Larkin (1954) found that the daily grazing time on the Ayr pastures was 6.38 hrs. November, 1952; 6.2 hrs. January, 1953; 5.08 hrs. March, 1953; 9.52 hrs. May, 1953, and 9.37 hrs. July, 1953. The reduced grazing time in March coincided with the period of reduced liveweight gains in some groups and actual losses in others.

IV. DISCUSSION

Prior to Seddon and Mulhearn's (1939) observations at Charters Towers no data had been published on the performance of cattle on typical sub-coastal grazing country of North Queensland. The data collected at "Wairuna" supplement this earlier work and show a similar trend in bodyweight changes. The main pattern is one of rapid weight gains from January to May and a loss in weight or a long static period from May until the end of the year. The

time of the year when cattle commence to gain weight again varies considerably, depending on the onset of storm rains. Rarely would cattle commence to gain weight before October, and in some years this could be as late as the following January.

Under these conditions in semi-coastal areas, the annual liveweight increase is usually not greater than 200 lb. and the net increase may be much less. Consequently, the age at which cattle reach prime condition is rarely less than four years, and on many properties the age at slaughter is even higher. The average overall turn-off of fat cattle from such properties is low, often no more than 10-12 per cent., and the type of carcass is not usually the type required by the export trade.

The better performance of the Zebu cross cattle at "Wairuna", compared with those of the British breeds, effected an improvement in bodyweight gains and age at maturity, but even then the percentage of first grade carcasses at 3½ years of age was Only 30 per cent.

The excellent gains obtained on coastal irrigated or improved tropical pastures at the Ayr Regional Experiment Station and the Bureau of Tropical Agriculture at South Johnstone have demonstrated that the overall turn-off of beef could be increased by the fattening of cattle, bred in the sub-coastal environment, on improved pastures in the more-favoured coastal areas. Mawson (personal communication) has already obtained data on this following the transfer, in August, 1954, of twenty steers from "Wairuna" to the Bureau of Tropical Agriculture at South Johnstone. Ten were Zebu cross steers and ten were Shorthorn and Shorthorn x Hereford steers. These cattle were similar in type and age to those being weighed at "Wairuna". On August 31st, 1954, the "Wairuna" and South Johnstone groups averaged 760 lb. and 757 lb. liveweight respectively. Nine months later, May, 1955, average liveweights were 998 lb. and 1,108 lb. respectively. Ten of the South Johnstone group were slaughtered in September, 1955, when their average liveweight was 1,188 lb. Chilled carcass weight was 738 lb., or 61 per cent. of liveweight and all carcasses were first grade.

The "Wairuna" cattle were slaughtered in May, 1955, immediately prior to the weight loss which normally follows in this sub-coastal environment. Average carcass weight was 499 lb., or 50 per cent. of liveweight. Only 18 per cent. of the carcasses were first grade.

It is evident from the results of these investigations that if cattle reared in the sub-coastal environment were moved to coastal pastures at two years of age, they should produce good quality carcasses within twelve months. These carcasses would be much more suitable for the export market, and if this system of cattle fattening were adopted on a large scale it would have the desirable effect of tending to overcome the highly seasonal nature of beef production in the North. The only real limiting factor to this is the area of country available on the coast for establishment of improved pastures. It would not be unduly optimistic, however, to state that sufficient country would be available for the fattening of 50,000 cattle annually.

V. ACKNOWLEDGMENTS

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VI. REFERENCES:

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WAIRUNA

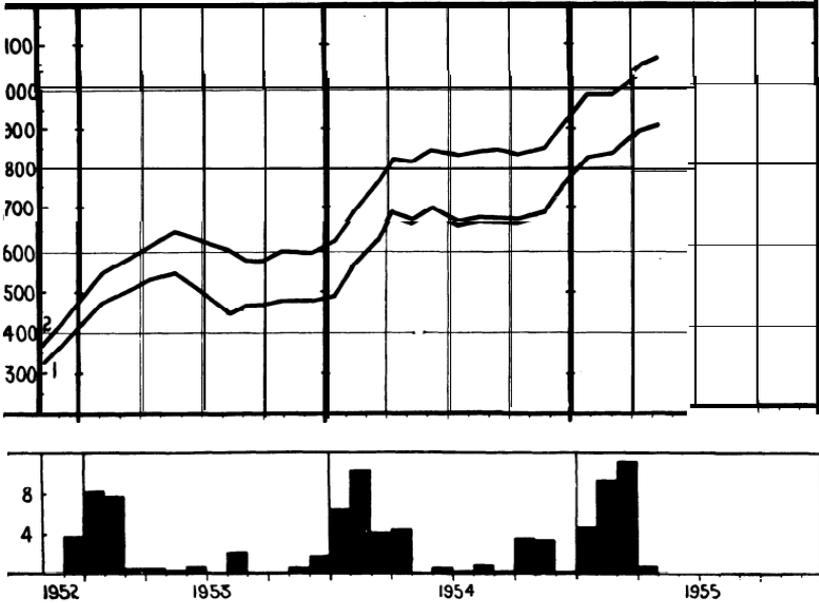


FIGURE 1: "Wairuna."

Upper — Changes in liveweight (lb.).

Lower — Monthly rainfall data (inches).

Group 1 — Shorthorn and Shorthorn x Hereford steers, 7-11 months old.

Group 2 — Zebu cross steers, 7-11 months old.

SOUTH JOHNSTONE

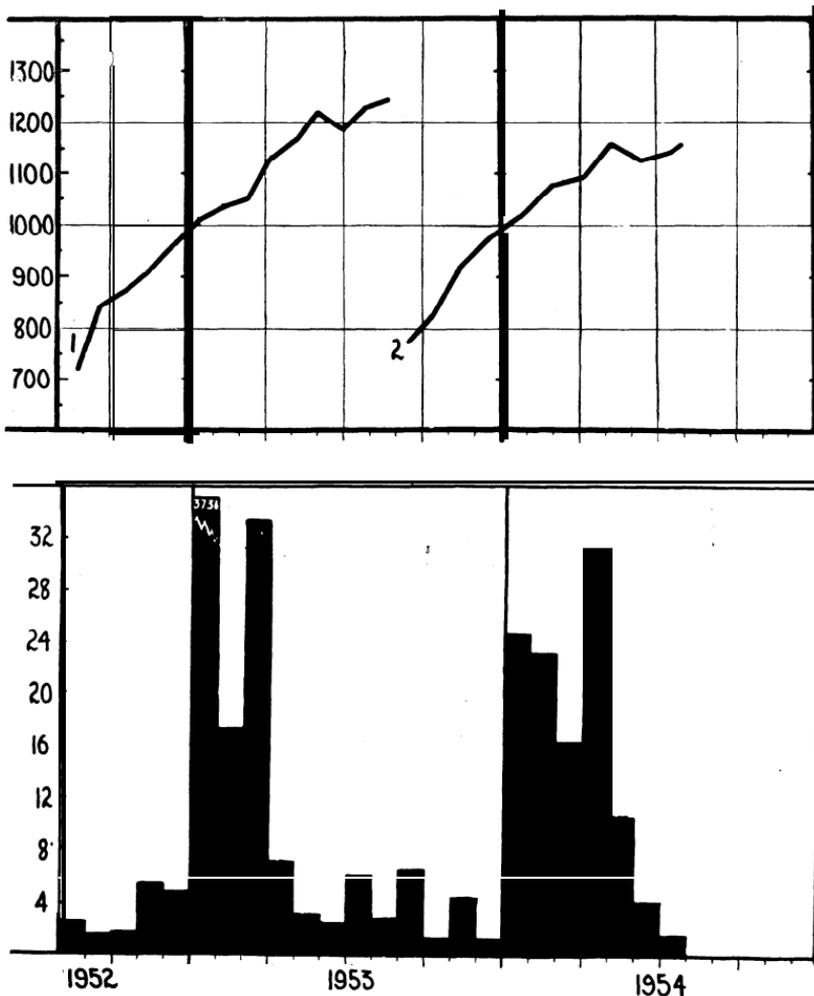


FIGURE 2: Bureau of Tropical Agriculture, South Johnstone.

Upper — Changes in liveweight (lb.).

Lower — Monthly rainfall data (inches).

Group 1 — Shorthorn steers, 2-2½ years old.

Group 2 — Hereford steers, 2-2½ years old.

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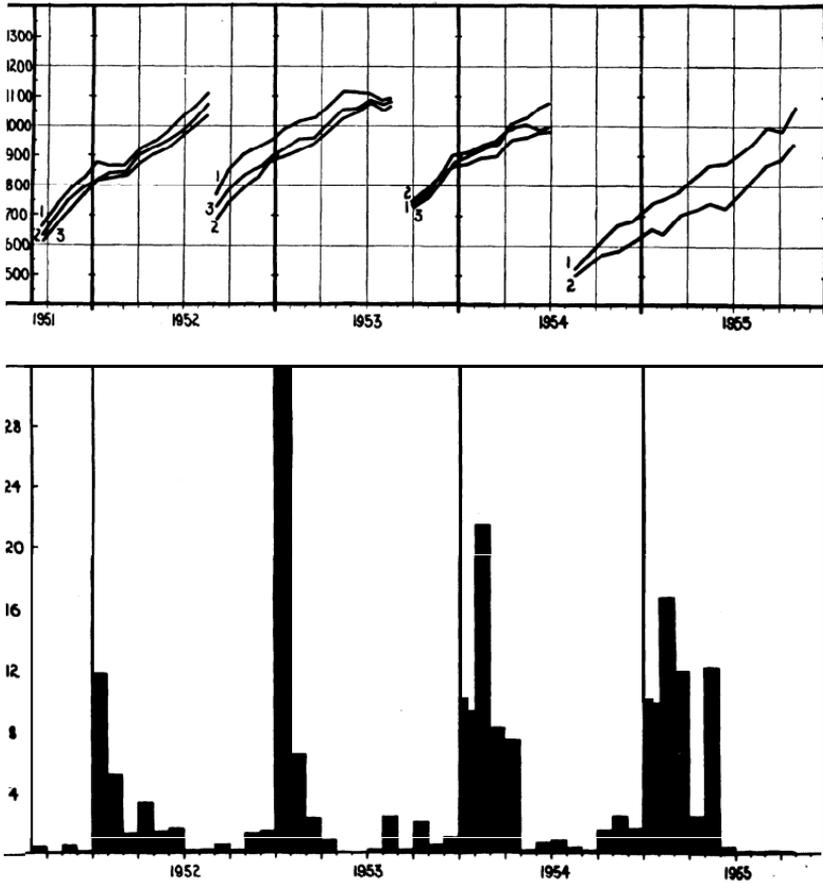


FIGURE 3: Regional Experiment Station, Ayr.

Upper — Changes in liveweight (lb.).

Lower — Monthly rainfall data (inches).*

Group 1. Steers grazing Para grass and Centro.

Group 2. Steers grazing Rhodes grass and Stylo.

Group 3. Steers grazing Para grass and Clitoria.

*During the summer months 3 inches of irrigation per fortnight were applied if no rain fell. If rain fell, irrigation was applied to give a total of 3.5 inches for irrigation plus rainfall. For the remainder of the year, 2.3 inches of water per fortnight were applied unless more than 2 inches of rain had fallen since the previous irrigation.