Management Practices in Relation to Growth Rate in Beef Cattle in S.E. Queensland

by

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SUMMARY

Observations on the growth rate performance of beef cattle under various systems of management at "Brian Pastures", Cayndah, are discussed.

Cattle grazing unimproved pastures exhibited an unstable growth rate, losing weight during the late Autumn-Winter period and making net liveweight gains for approximately only 6 months in any year.

Introduced grasses grown in conjunction with legumes allowed cattle grazing these pasture mixtures to make uninterrupted growth throughout the year. Likewise, during one season access to a small area of lucerne in conjunction with unimproved pasture during the winter months prevented winter weight loss by cattle.

Implantation at levels of 60 mgm. and 30 mgm. with synthetic oestrogen significantly increased the growth rate of steers grazing: unimproved pasture during the summer months. Steers on a crop in the spring also responded significantly to an implant of 30 mgm. hexoestrol.

INTRODUCTION

Beef cattle in Queensland are grazed almost entirely on unimproved pasture and their growth is determined by the productive capacity of these grasses. Pasture growth fluctuates markedly with temperature and rainfall and the nutritional level is such that cattle make net liveweight gains for only 4 to 6 months in any year.

Alexander and Chester (1956), Mawson (1956), Shelton (1956), Arbuckle (1958) and Sutherland (1959) have reported observations on growth rates of cattle grazing unimproved pastures in areas east of the Dividing Range from Northern to Southern Queensland.

In each case, cattle exhibited a biphasic type of growth curve which is a reflection of the seasonal variation in the nutritional level.

Burns and Alexander (1956) have published data on the growth rate of calves at "Brian Pastures" for the years 1954 and 1955. Sutherland (1959) published similar information for the same centre for the years 1954-1955 to 1957-1958.

It was shown that in each year, calves made rapid gains from birth (November) till May. For the next three months prior to weaning in August calves gained little weight.

Arbuckle (1959) showed that the milk supply of beef cows grazing unimproved pastures in the Rockhampton district declined sharply after April, irrespective of the time lactation commenced. This decline was reflected in the growth rate of calves.

Systems of management designed to alter the growth pattern of cattle grazing unimproved pastures implemented at "Brian Pastures" have been reported in other articles. This paper represents an attempt to integrate these separate studies into an overall appraisal.

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DESCRIPTION OF PROPERTY AND NORMAL GROWTH PATTERN OF CATTLE

"Brian Pastures" is owned by the Australian Meat Board and is conducted by the Department of Agriculture and Stock as a Beef Cattle Pasture Research Station.

It comprises 5,300 acres of open eucalypt forest country and consists in approximately equal parts of soils of basaltic and granitic origin. Black Spear **(Heteropogon contortus)** and Forest Blue **(Bothriochloa intermedia)** are the co-dominant grass species. Annual rainfall approximates 30 inches having a distinct summer incidence. Frosts occur during the winter months. The property is tick infested but control is adequate. It is situated about 10 miles east of Gayndah along Barambah Creek. Both Hereford and Poll Hereford cattle are run and breeding and fattening are undertaken. (Alexander and Chester, 1956.)

The unstable growth pattern of cattle from birth to maturity in Table I highlights the high rate of gain from birth to 6 months, the small increase from May to weaning in August, the poor growth rate of weaners and the seasonal fluctuations in growth co-inciding with the rise and fall in the nutritional level of unimproved pastures.

MANAGEMENT PROCEDURES

The following systems of management have brought about an alteration in the growth pattern of cattle grazing on unimproved pastures :-

(i) Grazing Introduced Pasture Mixture.

(ii) Grazing unimproved pastures with access to a small area of lucerne during the winter months.

(iii) Hormone implantation of cattle grazing unimproved pasture or crop.

(i) Introduced Pasture Mixtures :

Three introduced grasses, Green Panic **(Panicum maximum var. trichoglume),** Gayndah Buff el **(Cenchrus ciliaris);** and Commercial Rhodes **(Chloris gayana)** were each planted with the legumes Phasey bean **(Phaseolus lathyroides)** and Lucerne **(Medicago sativa)** in five blocks of 4 acres each, giving 20 acres of each pasture mixture. The blocks were grazed rotationally for periods of two weeks at the rate of one two year old steer to 4 acres from January, 1955, to September, 1956, and one weaner steer to 2½ acres from September, 1956 (Young, Fox and Burns, 1959).

Over a 54 week period, the introduced pasture steers gained 146 lb. more liveweight than the control cattle grazing unimproved pastures (Table II). The main difference occurred during the late autumn to early spring period when the improved pasture group continued to gain weight whilst the unimproved pasture group lost weight.

The improved performance during the winter period of steers grazing introduced pastures is well demonstrated by the comparative liveweight changes of two year old steers from May to September, 1956 (Table II).

During that period of 18 weeks, the introduced pasture group gained 127 lb. in liveweight compared with a decline in weight of 57 lb. by their unimproved pasture counterparts.

The comparative growth performance of steers in the three introduced pasture mixtures was proportional to the amount of lucerne in each of the three mixtures (Young, Fox and Burns, 1959). This indicates the importance of a legume as a pasture component.

TABLE I.

Growth Rate of Steers Grazing Unimproved Pastures from Birth to Maturity

LIVEWEIGHT (LB.)											
Birth Dec., 1954	6 Months May, 1955	Weaning Aug., 1955	Oct., 1955	Dec., 1955	May, 1956	Aug., 1956	Dec., 1956	April, 1957	Aug., 1957	Slg. April, 1958	Dressed Wt.
74	342	354	347	405	504	465	615	754	643	1000	520

The performance of a group of weaner steers (Table II) grazing these introduced pasture mixtures clearly illustrates the importance of a high level of nutrition in overcoming poor growth rates in weaner cattle. Over a four months' period subsequent to weaning, steers grazing introduced pastures gained 177 lb. liveweight compared with 78 lb. by steers on native pasture.

TABLE II.

Weight Changes for Groups of Cattle Used in the Trial

GROUP	PERIOD	IMPROVED PASTURE Initial Wt. (lb.)	IMPROVED PASTURE Gain (lb.)	UNIMPROVED PASTURE Initial Wt. (lb.)	UNIMPROVED PASTURE Gain (lb.)
1	7/1/55—20/1/56	605	468	604	322
2	11/5/56—14/9/56	888	127	903	—57
8	14/9/56—18/1/57	423	177	418	78

(ii) **Access to Lucerne during the Winter Period:**

A feature of unimproved pastures is that they are capable of producing comparatively high rates of liveweight gain during their period of growth, August-April, but during the late autumn-winter they fall below maintenance requirements for cattle. Maximum use should be made of this cheap feed during its most productive period, supplementing it with grazing lucerne to bridge the nutritional gap during the winter months.

This form of management has been tested with very favourable results. Five two year old steers were depastured in a 30 acre paddock consisting of 25 acres of unimproved pasture and 5 acres of lucerne which was sub-divided into 4 x 1¼ acre blocks. From early spring to late autumn the lucerne area was shut-off. Cattle were given access to one block of the lucerne each fortnight during the late-autumn-early spring period in addition to the 25 acres of unimproved pasture. This is similar to the procedure recommended by Robertson (1954).

A control group of steers was grazed in a 30 acre paddock of unimproved pasture.

During the first year of observation, the lucerne group gained 86 lb. liveweight (Table III) during the period of lucerne grazing compared with a loss of 21 lb. by the control group (Annual Report, Department of Agriculture and Stock, 1958-59).

TABLE III.

Comparative Liveweight Changes of Lucerne Supplemented and Unimproved Pasture Grazing Steers

GROUP	LIVEWEIGHT CHANGE (LB.) 30/1/58—29/11/58	Winter Period
Lucerne Supplemented	+444	+86
Open Grazing	+372	—21

(iii) **Hormone Implantation:**

Hormone implantation was used to increase rate of liveweight gain on unimproved pasture during its period of active growth and also on crop for the same purpose.

1. Unimproved Pasture: In November, 1957, groups of steers grazing unimproved pasture were treated at levels of 60 mgm., and 30 mgm. with the synthetic hormone "Hexoestrol". These and a group of untreated steers were observed over a period of 155 days.

TABLE IV.

Effect of Hormone Implants on Growth Rate of Steers

GROUP	PERIOD	TREATMENT 60 mg. Hexoestrol Init. Wt. (lb.)	60 mg. Hexoestrol Gain (lb.)	30 mg. Hexoestrol Init. Wt. (lb.)	30 mg. Hexoestrol Gain (lb.)	Control Init. Wt. (lb.)	Control Gain (lb.)
1.	22/11/57—26/4/58 (Unimproved Pasture)	752	269	744	278	751	247
2.	19/12/58—3/4/59 (Unimproved Pasture)			861	198	865	173
3.	30/9/58—22/11/58 (Ratoon Sacaline Crop)			896	134	892	98

A group of steers of the same age was treated at the 30 mgm. level in December, 1958, and observed for a period of 105 days (Burns and Sutherland, 1959).

In each case, treated cattle made significantly greater weight gains than untreated cattle (Table IV).

2. **Crop:** An area of 50 acres was planted to Saccaline in February, 1958, and the crop was conserved as silage in May. Ratoon growth was produced the following winter and was used to fatten 28 two-year-old steers. Half this number were treated with 30 mgm. Hexoestrol.

The treated group gained on an average of 0.7 lb. per day more than the untreated steers. (Table IV.)

DISCUSSION

The unstable growth rates of beef cattle brought about by the inadequate plane of nutrition provided by our native pastures at certain times of the year, constitutes a major obstacle to the production of young, good quality beef in this State.

A study of the growth rate of cattle in Queensland indicates that there is tremendous wastage in terms of productive growth, particularly in young cattle in the 6 to 18 months age group. Unthriftiness of this type of animal is undoubtedly responsible to a large extent for the poor quality of many of the carcases of cattle turned off in Queensland.

Observations made at "Brian Pastures" point strongly towards the provision of some form of protein such as grazing lucerne to prevent winter weight losses in cattle. In a trial in Central Queensland, Stubbs (personal communication) has observed a similar response to lucerne hay used as a supplement to unimproved pastures during the winter months. This may represent a more practical measure since a small area of irrigated lucerne could provide fodder supplements for parts of a property where lucerne could not be grown satisfactorily. The use of lucerne hay should help the lucerne crop stand up over a longer time as there would be no trampling effect after rain which is a problem with grazing lucerne. It also possesses the advantage of minimising the danger of bloat.

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DISCUSSION

Professor T. K. Ewer (Qld.)—Were the differences due to hexoestrol significant ?

Answer—Yes. 30 and 60 mgm. hexoestrol were significantly different from the control but not from each other.

Professor T. J. Robinson (N.S.W.)—The response to hexoestrol occurred when cattle dressed only 52%. Were the cattle in Table IV as lean as those in Table I at the time of slaughter?

Answer—Yes. Fifty-two per cent. is normal for Brian Pastures (and other commercially fattened Queensland) cattle.

Dr. I. W. McDonald (Syd.)—What is the evidence that the response to lucerne supplementation was due to the protein in the lucerne?

Answer-The evidence is mainly circumstantial. Similar responses have been obtained in a number of other experiments where various protein supplements have been used.

Dr. M. C. Franklin observed that similar responses had been obtained from lucerne supplements in sheep though these experiments were concerned with supplements for survival in drought-feeding experiments.