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Dentition in beef cattle in northern Australia

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Abstract

Estimation of age of cattle is important to north Australian cattle producers who sell cattle on the basis of carcass classification, by description or to premium markets. Age at eruption of permanent incisor teeth of 52 Shorthorn and 42 Brahman×British steers grazing spear grass pastures in north Queensland was determined. Shorthorn steers cut each pair of incisor teeth when younger than Brahman×British steers ($P<0.01$). The 95% ranges for age at eruption in days for the four pairs were: 631 to 823, 772 to 1066, 951 to 1321 and 1181 to 1611 for Shorthorn and 679 to 871, 848 to 1142, 1055 to 1425 and 1306 to 1736 for Brahman×British, respectively. This large variation and overlap between successive pairs shows the limitations of dentition as an indicator of age of cattle for use in marketing.

INTRODUCTION

The need to assess age of cattle accurately, especially in north Australia, has not been of economic significance because the beef produced is sold to markets which do not currently link age of carcass with price paid. However, age will become important if north Australian cattlemen wish to use marketing options such as classification or sale by description. There are suggestions that premium markets for beef might impose age restrictions. Dentition, as an indication of age, is one criterion on which cattle and carcasses are categorised when birth dates are not known. In view of the wide variation in age at tooth eruption as a result of factors such as individuality, plane of nutrition and breed, the practice is considered to have limitations as a guide to the age of cattle (Burns 1959; Steenkamp 1970; Andrews 1973).

There is a paucity of published data on how accurately the number of erupted permanent incisor teeth indicates age of cattle under Australian conditions. No data are available for animals run in tropical regions or for the commonly used *Bos indicus* infused cattle.

This paper reports age ranges for the eruption of permanent incisor teeth in Shorthorn and Brahman×British steers grazing native pastures in north Queensland.

MATERIALS AND METHODS

Location

The study was conducted at Swan's Lagoon Beef Cattle Research Station which is 110 km south of Townsville. The pastures and climate have been described previously by Winks *et al.* (1974).

Animals

Age at eruption of permanent incisor teeth of 52 Shorthorn and 42 Brahman×British steers was determined. The British component (40 to 60%) of the crossbred steers was either Hereford or Shorthorn.

The steers were born between June and September 1972 and their birth dates and birth weights recorded. When observations commenced during April 1974 the mean ages of the Shorthorn and Brahman×British steers were 596±6.5 (SE) and 633±7.2 days, respectively.

Before weaning the steers were segregated by breed and grazed either native pasture or Townsville stylo pasture fertilised with superphosphate. The steers were weaned in May 1973 and then managed as a common group until all had eight permanent incisor teeth. Grazing was predominantly black spear grass (*Heteropogon contortus*), giant spear grass (*H. triticeus*) and golden beard grass (*Chrysopogon fallax*) with some access to tassal blue grass (*Dicanthium tenuiculum*) and forest blue grass (*Bothriochloa bladhii*). A molasses–urea (230 and 60 g/hd/d respectively) supplement was fed during winter and spring each year.

Measurements

The steers were mustered every three weeks, weighed, and then restrained in a crush or head bail to record the number of permanent incisor teeth. A tooth was considered to have erupted when it had broken through the gum and a pair to have erupted when the first tooth had broken through the gum.

Statistical analysis

Data were analysed by analysis of variance. Range in age at eruption of each pair of teeth was indicated for each genotype by 95% confidence intervals. The mean age for each steer with a given number of pairs of incisors was the age mid way between that for eruption of two successive pairs.

The effects of genotype, birth weight and liveweight gain on ages at tooth eruption were examined. Correlations between age at eruption of the first pair and age at eruption of subsequent pairs were determined.

RESULTS

Shorthorn steers cut each pair of incisor teeth when younger than Brahman×British steers ($P<0.01$) but within each genotype there was a wide range in the ages at which a given pair of incisor teeth erupted (Table 1).

Table 1. Mean age and range in age at eruption of each pair of incisor teeth and mean interval between eruption of teeth within each pair

Dentition	Breed	Mean age at eruption (days)	95% Range for age at eruption (days)	Interval between teeth erupted within pairs
1st pair	Shorthorn	727	631–823	n.r.
	Brah×Brit	775	679–871	n.r.
	LSD $P = 0.05$	19.8		
2nd pair	Shorthorn	919	772–1066	3
	Brah×Brit	995	848–1142	17
	LSD $P = 0.05$	30.4		9.2
3rd pair	Shorthorn	1136	951–1321	25
	Brah×Brit	1240	1055–1425	36
	LSD $P = 0.05$	38.1		12.5
4th pair	Shorthorn	1396	1181–1611	24
	Brah×Brit	1521	1306–1736	49
	LSD $P = 0.05$	44.3		20.8

n.r. = not recorded.

There was a positive relationship ($P<0.01$) within both genotypes between age at eruption of the first pair of incisor teeth and age at eruption of subsequent pairs with correlation coefficients ranging from 0.42 to 0.65. Steers which cut their first pair of incisor teeth when younger than other steers also cut subsequent pairs when younger than their contemporaries.

Mean intervals between eruptions of successive pairs of incisor teeth were less in Shorthorn than in Brahman×British steers for all pairs but the difference was significant ($P<0.05$) for intervals between the first and second and second and third pairs only.

The interval between the eruption of the two teeth of the first pair was not recorded. Mean intervals between the eruptions of individual teeth in subsequent pairs were shorter for Shorthorn than for Brahman×British but differences were significant ($P<0.05$) for the second and fourth pairs only.

The mean ages of steers with one pair, two pairs, or three pairs of permanent incisor teeth were 822, 1027 and 1267 days,respectively for Shorthorn steers; and 885, 1118 and 1381 days, respectively for Brahman×British steers. Corresponding pooled standard deviations were 54.3, 77.0 and 92.6 days, respectively.

Birth weight was negatively correlated with age at eruption of incisor teeth in Shorthorn steers, the coefficients varying from −0.23 to −0.43. These relationships were significant for the first and second pairs ($P<0.01$) and the fourth pair ($P<0.05$). The corresponding relationships in Brahman×British steers were low and not significant, varying from −0.03 to 0.17.

Liveweight gain from birth to the commencement of the study was not correlated with age at eruption of incisor teeth. Average daily gains were 0.305 kg/hd for Shorthorn and 0.465 kg/hd for Brahman×British steers.

DISCUSSION

This study highlights the limitations of using the number of permanent incisor teeth as an indication of age of cattle and is in agreement with other observations (Burns 1959; Tulloch 1962; Steenkamp 1970; Andrews 1973).

In this study Brahman×British steers with one pair of incisor teeth had mean ages in the range 777 to 993 days but could have been as young as 679 days or as old as 1141 days. With the mean daily growth rate of 0.465 kg/hd recorded for Brahman×British steers in this observation, an extreme liveweight difference of 215 kg is possible.

Burns (1959) found that first and second pairs of incisor teeth erupted approximately one and three months later, respectively, amongst females than amongst contemporary Polled Hereford males. The range in ages at which these pairs of incisors erupted tended to be greater amongst females than males. Therefore, data from steers may not be appropriate for contemporary females.

The age at which incisor teeth erupt in Shorthorn steers has also been recorded by other authors. Tulloch (1962) reported that teeth in Shorthorns erupted earlier than in Herefords but at the same age as in Angus steers. Mostert (1972) found that teeth in Shorthorns erupted earlier than in a range of genotypes including Angus, Hereford, Africander and Bonsmara. The Bonsmara is a Zebu (Africander) British cross breed and it may be comparable to Brahman×British crossbreds.

The strong positive correlation between age at eruption of the first pair of incisors and age at eruption of subsequent incisors recorded in this observation suggests that beef

cattle have a pre-determined pattern of tooth emergence. We are unaware of similar findings with cattle but Adler (1963) has documented such a pattern with humans and suggested that it has a genetic background.

The intervals between eruptions of teeth within a pair were shorter than those recorded by Andrews (1974). This difference may be a function of the recording techniques used, as Andrews estimated when incisor teeth were fully erupted. In our observation the intervals between eruption within pairs of incisors increased from the second to the fourth pair and were greater in Brahman×British steers. The greater variation in the crossbreds may be a function of genetic variation but whatever the reason it highlights the importance of a consistent recording technique.When comparing our data with those of other studies, a variation of 49 days is possible if assessing the age of Brahman×British steers on the basis of 7 or 8 incisor teeth erupted.

The negative correlation between birth weight and age of eruption of permanent incisor teeth in Shorthorn steers indicates that heavier calves tended to cut their teeth at younger ages than calves of lower birth weight.

Commercial implications

The Australian meat industry is currently striving to objectively classify bovine carcasses as a means of improving market transactions and identifying carcasses of superior eating quality. Dentition is currently used as an indication of age. This study supports other studies which have shown dentition to be an imprecise indicator of age of cattle and provides specific information on Shorthorn and Brahman×British cattle in the north Australian environment. The large variation in ages at eruption of incisor teeth recorded here results in considerable overlapping of the distributions for successive pairs. This indicates that low priority be given to pricing carcasses on the basis of dentition and that biologists be encouraged to search for a more accurate method of assessing age of cattle or alternatively meat tenderness.

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