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The behaviour of beef cattle at pasture

Robert J. Kilgour[a,*], Katsuji Uetake[b], Toshie Ishiwata[b], Gavin J. Melville[a]

[a] New South Wales Department of Primary Industries, Agricultural Research Centre, Trangie, NSW 2823, Australia
[b] School of Veterinary Medicine, Azabu University, Sagamihara-shi 229-5801, Japan

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ABSTRACT

One of the Five Freedoms established by the British Farm Animal Welfare Council is the freedom for animals to express normal behaviour. However, for beef cattle, the major problem with this is to establish what constitutes "normal". In the absence of surviving wild ancestors, the best that can be done is to study the behaviour of cattle at pasture with minimal human intervention. While several studies have been conducted in an attempt to do this, most have major limitations. These limitations include the total lack of a complete time budget, very low numbers of animals studied, allowing animals to graze very restricted areas of pasture and the observation of single animals in a herd rather than the whole herd itself. In this study, we observed, during the hours of daylight, the behaviour of six herds of beef steers run under commercial conditions in Australia. Because of the distances involved, it was impossible to determine whether the animals were ruminating. Therefore resting and ruminating are combined. A time budget was constructed consisting of 18 behaviours. There were significant differences between the herds in the proportion of time that the animals allocated to grazing, lying resting/ruminating, standing resting/ruminating and walking. The main conclusion is that beef cattle at pasture spend approximately 95% of their time engaged in the major behaviours of grazing, resting/ruminating while either lying or standing and walking. An analysis of the diurnal rhythm of grazing indicated periods of increased grazing early in the morning and late in the afternoon in five of the herds, and in one of these, there was also a period of increased grazing in the middle of the day. In the sixth herd, there was no apparent diurnal rhythm in grazing behaviour.

1. Introduction

The Five Freedoms were developed by the British Farm Animal Welfare Council as a conceptual framework for the consideration of animal welfare. However, Mellor and Reid (1994) have suggested that they be thought of as the five domains of animal welfare compromise, the idea of the freedoms being too proscriptive. However, in either form, the concept continues to be useful and continues to be used by animal welfare scientists. One of the freedoms relates to the capacity of animals to perform normal behaviour. While the intent behind this is undeniably positive, the definition of what constitutes normal behaviour is not straightforward at all. One approach has been to study the behaviour of populations of wild animals, the idea being that this behaviour evolved in the absence of human beings and can, therefore, be considered normal. While the wild ancestors of such species as pigs and poultry still exist, the same does not hold for cattle. The last individual of the wild ancestor of domestic cattle, the aurochs, is said to have been killed in Poland in AD 1627 (Clutton-Brock, 1999). The closest animals to the wild ancestor in its natural environment are domesticated cattle at pasture with limited human intervention.

A recent review of the literature on studies of cattle at pasture (Kilgour, in press) indicated that there are only 22 such studies that provide information on the repertoire of behaviour other than just grazing and that

* Corresponding author. Tel.: +61 2 6880 8052; fax: +61 2 68887201.
E-mail address: bob.kilgour@industry.nsw.gov.au (R.J. Kilgour).

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most of these studies have limitations in understanding the normal behaviour of beef cattle at pasture. Firstly, eleven of them (Hejcmanová et al., 2009; Hessle et al., 2008; Hughes and Reid, 1951; Hull et al., 1960; Johnstone-Wallace and Kennedy, 1944; Kropp et al., 1973; Lampkin et al., 1958; Lofgreen et al., 1957; Peterson and Woolfolk, 1955; Ruckebusch and Bueno, 1978; Taylor et al., 1955) used small numbers of animals (10 or fewer and sometimes as low as three) and many of these were conducted in areas of less than 5 ha, conditions vastly different from those under which the behaviour of cattle evolved.

In six others, only one animal was observed at any one time (Cory, 1927; Dwyer, 1960; Herbel and Nelson, 1966; Low et al., 1981b; Wagnon, 1963; Zemo and Klemmedson, 1970) and in three of these (Cory, 1927; Herbel and Nelson, 1966; Low et al., 1981a) animals were observed at monthly intervals for periods of more than one year.

Finally, in no study has a complete time budget been drawn up. Most studies concentrate on the major behaviours of grazing, resting and ruminating, and many ignore behaviours such as comfort and social behaviours, which occupy very little time in the daily lives of cattle.

In the study reported here, we attempt to overcome the abovementioned limitations by studying six herds of cattle on different commercial properties and describing every behaviour observed. The numbers of animals per herd ranged from 56 to 500, the areas of pasture were, except for two small areas of improved pasture, greater than 200 ha and all of the animals in the herd were studied, not just individuals.

2. Materials and methods

Six herds of beef steers on five commercial properties were observed during the hours of daylight in August and September of two consecutive years. Due to the numbers of animals in the herds and to the size and complexity of the paddocks, observations during the hours of darkness were impossible. The properties were all within a 70-km radius of Trangie, NSW, Australia and details of the herds and the properties are presented in Table 1. In each year, three herds on three different properties were studied. In the second year, one of the properties was the same as the previous year, but with a different group of cattle.

The cattle in all of the herds had been inspected on the property where the observations were to be performed 10 days before the commencement of observations so that they were observed some considerable time after their habituation to the paddock. In each herd, observations were carried out over three morning and three afternoon sessions over a period of approximately 3 weeks. The morning sessions began as soon as the animals could be clearly seen through binoculars (approximately 06:00 h) until 12:00 h. The afternoon sessions began at 12:00 h and ended when the cattle could no longer be clearly seen through the binoculars (approximately 18:00 h). Observers took care to not be seen by the cattle by using natural cover or distance from the animals to achieve this. If rain occurred during any of the observations periods, the whole period was disregarded and the observations carried out at a later date. Weather data were recorded at the Agricultural Research Centre, Trangie at 09:00 h and 15:00 h.

Because of the fact that the herds often split into two sub-groups, three observers were used, one working alone and the others together. The observer working alone observed one sub-group and used a portable tape recorder so that observations could be made without having to interrupt observing the animals in order to record behaviour. The observers working together observed the second subgroup, with one observing the cattle and calling the behaviour to the other who recorded it. This also meant that the observations could be made without having to interrupt observations. Data were collected by the technique of instantaneous scanning at intervals of 15 min. In order to do this, all of the animals that could be seen were observed in one continuous scan, with the observers starting at one end of the group and scanning horizontally until all animals had been observed without removing their eyes from the herd. As each animal was seen, its behaviour at that instant was recorded. Behaviour was described using three categories, which had been predetermined based on previous experience with cattle at pasture. These were the location in the paddock where the behaviour occurred, primary behaviour and secondary behaviour.

As a result of preliminary inspections of the paddocks in which the animals were to be observed, the following locations were decided upon; pasture, barren ground, within one body length of a fence, at a watering point, on crop (Herd 2) and in the shade.

There were three mutually exclusive primary behaviours, standing, lying sternally and lying laterally. An animal was described as lying sternally if the main point of contact with the ground was the sternum. In this posture, the front legs were usually folded under the animal on either side of the sternum and the hind legs stretched out to one side. The head was usually upright although, sometimes, it might be stretched out in front of the animal with the chin resting on the ground. An animal was described as lying laterally if the main point of contact with the ground was the side of the animal.

There were several secondary behaviours, which could be performed at the same time as one of the primary behaviours. These were walking (when this behaviour was noted, the observer had to watch the animal for a slightly longer period than an instant in order to ensure that the walking was not simply part of a grazing bout), resting, grazing, excreting (urination and defaecation), agonistic behaviour, allogrooming, self-grooming, drinking, investigating an object, mounting and any other behaviour not covered by the above.

Because of the distances involved along with the fact that the animals' mouths could often not be seen due to their lying posture or the close proximity of herdmates, it was not possible to collect accurate data on rumination. Therefore, the category "resting" also includes ruminating.

2.1. Statistical analyses

In order to compare properties, only the main behavioural categories of grazing, resting and walking were used. In each time period the total number of animals