GRAZING BEHAVIOR OF CATTLE in relation to SHADE AND TEMPERATURE

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Grazing behavior of cattle is a major factor in animal production. The various activities of grazing cattle might be grouped into three categories as: (1) grazing—all the time spent in feeding; (2) lying down—all the time actually spent lying down; (3) loafing—all the time actually spent standing, drinking, scratching, fighting, and walking to water and to shade. The number of hours spent in chewing the cud, the number of drinks taken, the distance walked, and frequency of passing dung and urination are also important grazing data.

When data in time factor of all these activities were gathered under a wide variety of climate and pasture conditions they showed the following, as reported by R. M. Larkin in the *Queensland Agricultural Journal:* That animals (1) graze for periods of 5–10 hours per day, with an average of 7–7½ hours; (2) spend 9–11 hours lying down; (3) loaf for an average of 5–7 hours. Data on the daily time distribution of the animals' activities showed that in the temperate climate of New Zealand, about 60 percent of the total grazing time of dairy cattle takes place during the day, whereas in the tropical climate of Fiji, only about 33 percent of the cattle's grazing time takes place during the day. This difference in day and night distribution of grazing time may be associated with the climatic differences between the two countries.

According to the late A. W. Carter, the wild cattle in the central plateau of Waimea, Hawaii, came out from under the koa and mamani trees during the late afternoon and evening to feed (Fig. 1). This feeding pattern was followed to keep cool.

Studies on the grazing pattern of Shorthorn and Hereford steers on a 2-acre paddock in the tropical regions of Queensland, Australia, showed that climatic conditions have a great influence on the behavior of animals. During the summer months, grazing time may be as low as 5 hours per day, and in the cool months of winter nearly 10 hours per day. This information on grazing time distribution is important in the rotational grazing pattern established for the various climatic zones of Hawaii.

FIGURE 1. A stand of koa trees at 5,000-foot elevation, Mauna Kea, Waimea, Hawaii. (Photo by E. Y. Hosaka.)

SHADE

The stress of heat has been found to result in slow weight gain, which can be offset by shade. (Figs. 2 and 3.) A Mississippi study on steers indicated the value of shade in this respect. For two years 6 paddocks of 5 acres each, 3 with shade and 3 without shade, were used to study the value of shade to steers when grazing in the summer. The test was conducted for an average of 50½ days during July and August. The two-year average gain per steer in shade was 75.6 pounds for the period, or an average daily gain of 1.49 pounds. The average gain of steers without shade was 53.7 pounds, a daily gain of 1.04 pounds. The two-year, 50½-day period test showed a weight gain of 21.9 pounds per steer with shade over steers without shade, or a difference averaging 0.45 pound per day. The results of this test have been consistent, indicating that steers need shade during the hot months.

The late A. W. Carter never lost sight of the major importance of shade to animals when he was manager of Parker Ranch. When clearing lands clumps

FIGURE 2. Beef cattle under monkey pod trees. (Soil Conservation Service photo by F. Piper.)

of trees were always left standing, and shade trees were planted at strategic locations in the open ranges. This practice is being continued by A. Hartwell Carter (Fig. 4).

Results of an experiment conducted by McDaniel and Roark of the Louisiana Agricultural Experiment Station also indicate that the weight gains made by the cows with natural or artificial shade are significantly greater than those made by the cows without shade. During the experiment, cows in pastures without shade indicated a need for shade by reduced rumination, by panting, excessive walking and standing, crowding in fence corners, and frequent drinking and lying down in the late afternoon after the temperature had lowered. In contrast, cows in pastures with shade started grazing at approximately the same time cows without shade started lying down.

Some dairymen in Hawaii have installed self-feeding bunkers in the animal pens and have constructed large sheds close by to provide shade. The cows lie down in the shade of the shed, near the ration box. Dairymen with such a set-up have said that milk production is kept at a high level.

FIGURE 3. Dairy cows under kiawe trees and artificial shade. (Photo by E. Y. Hosaka.)

FIGURE 4. Koa trees saved for shade when clearing lar

(Photo by E. Y. Hosaka.)

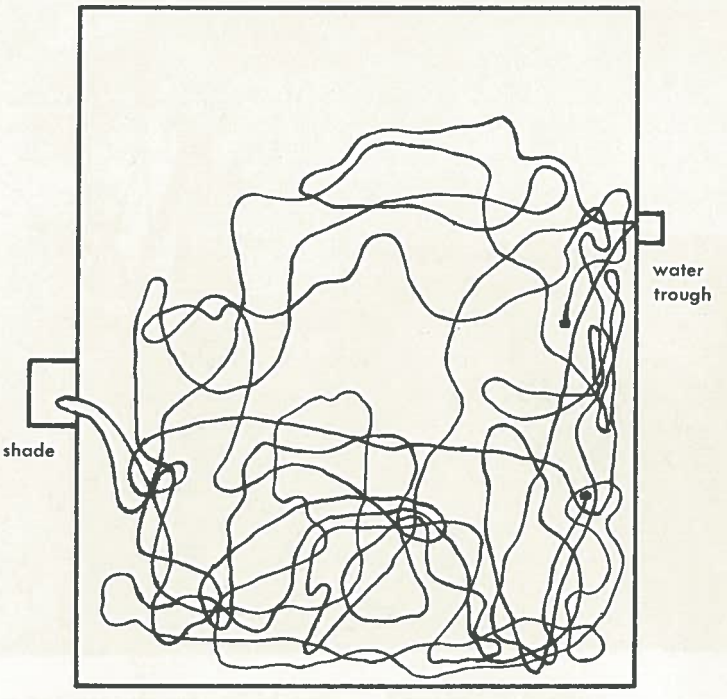

FIGURE 5. Diagram showing the path of one steer during 24 hours in 1½-acre paddock. The distance traveled was 1,845 yards. (After R. M. Larkin.)

GRAZING

In the *Queensland Agricultural Journal* report, Larkin concluded that in an improved pasture, the distance animals walk is inversely proportional to the amount of forage. When pastures are lush and plentiful, as little as ¾ mile per day might be covered while grazing and walking about. When pastures are poor, the distance walked per day is increased to 1½ miles. When a steer is looking for a bellyful of good quality forage, he covers much ground.

A study of the pattern a steer made during a 24-hour period in a small paddock in search of feed is illustrated (Fig. 5). It indicates that when feed was low, the animal covered a large area in seeking feed to sustain life. It has been found, also, that pasture quality and quantity is an important factor in the length of time an animal spends in grazing. However, despite changes in pasture conditions, climate has a great influence on the total grazing time. A steer grazing under conditions of climatic stress on pastures of inadequate forage must suffer from reduced feed intake, and hence have lowered production performance.

EFFECTS ON BRITISH BREEDS

The British breeds of cattle in tropical Queensland behave far differently from similar breeds of cattle run under the temperate climatic conditions in which they were originally selected and bred. The main difference in the behavior pattern is in the distribution of time spent grazing during the day. There is a change from daytime to nighttime grazing in the tropics, especially during periods of high temperature. Animals with Brahman blood seem to tolerate heat better and are seen grazing in the hot sun. This has been seen repeatedly in the Parker Ranch pasture at Puako, Hawaii.

PRACTICAL CONSIDERATIONS

It is evident that the British breeds of cattle are able to adapt themselves to unfavorable climatic conditions by changing their behavior pattern. The change may be of such a nature that factors limiting production are introduced. For example, reduced grazing time during hot weather may result in lowered feed intake and consequently lowered weight gain. Because of these limiting factors introduced by changing animal behavior, everything possible in the way of suitable management practices should be undertaken to enable livestock to produce at a high level of efficiency during periods of heat stress.

It is now generally agreed that when the air temperature goes above 80°F., the British breeds of cattle suffer a rise in body temperature and a decrease in milk production. At atmospheric temperatures of 95°F., the body temperature of the animals may be increased from 2° to 4°F. There seems to be a more urgent need for developing methods to protect cattle against temperature rising above 80°F. than against temperature declining below freezing.

The extensive study on environmental physiology by Brody and associates at the Missouri Experiment Station confirmed the previous reports on European-evolved Jersey and Holstein cows. This study indicated that environmental temperature above the critical level, 70°–80°F., increases rectal temperature and respiration rate.

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