

BITE RATE CHANGES DURING SHORT-TERM TESTS OF EATING RATE

X.R. WANG^A, S.K. BAKER^{A B}, D.B. PURSER^B and R.A. DYNES^B

^AFaculty of Agriculture, The University of Western Australia, Nedlands, W.A. 6009

^BCSIRO Division of Animal Production. Private Bag PO, Wembley, W.A. 601

In short-term tests of eating rate by grazing sheep observations of ingestive behaviour have been made during different intervals of time, from 10-15 seconds (eg. Kenney and Black 1986; Hughes *et al.* 1991) to 3 minutes (Allden and Whittaker 1970). If the rate of intake is constant with time during eating rate tests, estimates made over different lengths of time will not be different. This study was conducted to determine bite rate during 2 consecutive 1-minute intervals.

The data for this study were taken from a study of short-term grazing by mature wethers of cultivars of subterranean clover (*Trifolium subterraneum*) at 3 stages of maturity; in the vegetative stage 6 weeks after germination, soon after flowering and when the swards were senesced and dry. The design and test procedure used in this study are described in more detail by Dynes *et al.* (1993). Briefly, the clovers were grown in individual boxes, the tests were conducted indoors and the swards were grazed until ca. 30% of the material on offer remained. A maintenance ration (900 g dry matter/day) was offered in equal meals at 0900 hours and 1600 hours, and the tests were conducted between 1300 hours and 1600 hours each day for 3 days. Bite rate (bites/minute) was determined from video recordings of the tests by counting the number of head jerks associated with prehensile bites during grazing. The data from sheep grazing for less than 2 minutes was excluded.

There was a wide range in the number of bites/minute made by the sheep; between 23 and 59 bites, 17 and 46 bites, and 10 and 36 bites when the clovers were in the vegetative stage, soon after flowering or senesced and dry, respectively.

The relations between the number of bites made by the sheep during the first (X) and second (Y) minutes of the tests at each stage of maturity of the clovers were analysed using a general linear model, $Y = \text{maturity} + X(\text{maturity})$, and are described by the regression slopes. The slopes changed with the stage of maturity of the clovers ($P < 0.001$) and were 0.97, 0.88 and 0.77, respectively when the clovers were in the vegetative stage, soon after flowering or senesced and dry. When the clovers were in the vegetative stage of growth the number of bites made in the first and second minutes were similar ($P = 0.27$) (the slope was not different from 1) but as the clovers matured the number of bites made in the second minute were progressively fewer than the number made in the first minute ($P < 0.001$).

Eating rate is a measure of the combined effects of rates of prehension, mastication and swallowing, so when a bout of grazing commences the rate of prehension is likely to be high relative to the rates of mastication and swallowing and to decrease until the relative rates of prehension, mastication and swallowing are steady. When the clovers were in the vegetative stage of growth none of these processes appeared to limit eating rate since bite rate was steady during the 2 minutes of the test, but as the plants matured 1 or more of these processes limited eating rate and the rate of prehension decreased progressively. Alternatively these data may reflect feedback after ingestion which is associated with the taste or odour of the clovers on offer.

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