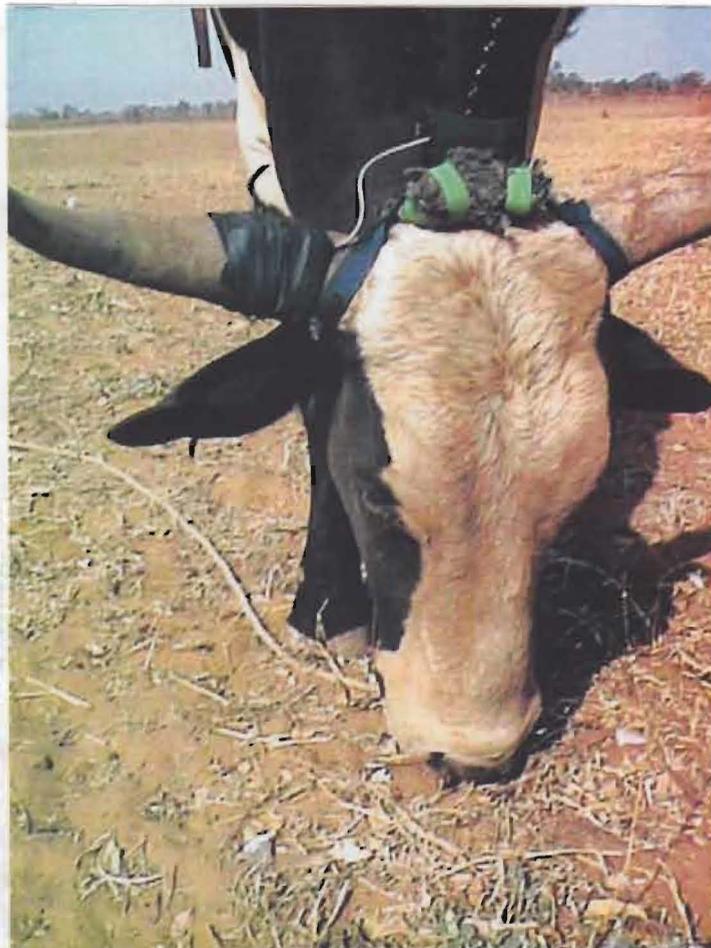


THE USE OF A VIBRATION METER AS INDICATOR FOR CHEWING ACTIVITY IN HORNED CATTLE



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1. Introduction.

Due to rapid population growth, the demand for staple food is increasing rapidly in West Africa. To this increased demand farmers respond by expanding the cultivated land onto marginal areas and by shortening or abandoning fallow periods. With arable land becoming scarce, the necessary long-term increase in crop production can only be achieved through an increase in the productivity per unit of land. Since mineral fertiliser is expensive and not easily accessible in many rural areas, animal manure plays a key role in the stabilisation and improvement of soil fertility (Jahnke, 1982, Powell & Williams, 1993). The quantities of manure available for arable farming are determined by the husbandry system (Williams *et al.*, 1995). In systems where animals are herded or graze freely within the village territories, an intensified utilisation of animal manure might be achieved through improved herding strategies. This was the focus of sub-project B3.2 of the Special Research programme 308, conducted in Niger by the University of Hohenheim/GERMANY, and the present research was carried out within this framework.

Livestock owners in the villages do not accept conventional methods for quantifying feed intake of grazing ruminants being applied to their animals (e.g. faecal collection bags, external faecal markers and conventional chewing meters), because they are afraid of negative impacts the manipulation might have on the animals performance. This is a problem for studies of livestock mediated nutrient transfers between grazing land and cropland.

A vibration meter was developed by Dr. Peter Lawrence at the Institute of Animal Production in the Tropics and Subtropics at the University of Hohenheim / GERMANY (Becker *et al.*, 1996. Lawrence *et al.*, 1997). This instrument registers vibrations at the horn of the animal that are caused by biting, chewing, mastication and rumination. The registered vibration pattern contains information on the type (mastication, rumination) and intensity of the chews. The sensor, which has the size and weight of a pencil, is tied to the horn of the animal. A small box for signal transmission is fastened in the animal's neck and a backpack is holding a data logger and a pack of batteries (ca. 1.5 kg in total). The apparatus does not hamper the animal and presents no danger for entanglement of the animal in the bushes, as might be the case with the faecal collection bags.

6. Overall discussion and conclusion

The meters do not give the linear $Y = x$ regression expected. Modification or the determination of a transformation 'rule' is necessary to the data.

Modification based on elimination of certain events on the basis of the duration classes does not improve the correlation. Therefore it can be concluded that even (part of) the events happening in the small duration classes are related to bites. Elimination is not a good option to improve the measured results.

The calculation of a regression line to transform the data is a better option. Here it seems that the individual meter has a very significant effect on the correlation between meter and observer. From the scatters it can be concluded that meter 1 is not a reliable meter for the purpose headed for.

In general it can be concluded that the meters are not yet ready for the specific research on counting chews. Too often errors occurred or bad correlations were found. The circumstances might have been too rough for the sensible meters, or the way to attach them to the animal might have given too many possibilities for errors to occur.

In this report the relation between the amount of chews and the registration of the vibration meter was investigated only. No analysis was done on the relation between intake and meter registration. In the future report 'The use of a vibration meter as an indicator of feed intake of horned cattle, *part 2; the vibration meter as an indicator of feed intake and the relation between intake and chewing behaviour*' more research will be done on these two relations.