

The effect of feeding agro-industrial by-products on weight gain and body condition of draft oxen in Swaziland

B.H. Ogwang¹ and B. Xaba²

¹University of Swaziland, P.O. Luyengo, Swaziland

²Ministry of Agriculture, P.O. Box 4, Malkerns, Swaziland

Abstract

Despite the importance of draft animal power in Swaziland, very limited research work has been conducted to assess the effect of dry season supplementary feeding on the performance of draught oxen. In this study this effect was investigated using 60 oxen belonging to 15 small-scale farmers in the Middleveld of Swaziland. Twenty-eight oxen had access to crop residues and agro-industrial by-products as supplements, while 32 relying exclusively on veld grazing served as a control. Estimated body weights and body condition were recorded monthly from June to November, 1992. Supplemented oxen had consistently higher weight gains and a better body condition compared to the control animals. However, the feed formulation appeared to be too expensive and therefore unsuitable for draft oxen under the existing economic conditions. It is recommended that opportunities for cost reduction of supplementation should be investigated.

Introduction

In those parts of Africa where rainfall is both seasonal and subject to large variations between seasons, grazing cattle are frequently subjected to periods of under-nutrition and are unable to maintain their condition and live weight. Van Niekerk (1974) reported that, in southern Africa, unsupplemented animals may lose up to 30% of their maximum summer body weights during the dry winter period. Ogwang (1987) found that similar losses occurred between May and September in the Middleveld of Swaziland. Concern has been expressed that this weight loss could interrupt land tillage activities because of an assumed diminution of traction power. It is a widely held view that supplementary feeding of work oxen during the dry season is indispensable if delays in land preparation during the wet season are to be avoided (Bartholomew et al 1993).

Draft animal power (DAP) is very important in Swaziland and some 55% of rural households are known to use DAP. Cattle, donkeys and mules provide smallholder farmers with vital power for ploughing, ridging, weeding and transport. This study was designed to assess the growth response of draft oxen to dry season supplementary feeding with readily available crop

residues and agro-industrial by-products. The hypothesis was that if draft oxen are well-fed prior to the cropping season, they will be strong enough to start ploughing early resulting in higher crop yields on smallholder farms.

Materials and methods

The study was carried out in the Middleveld of Swaziland where DAP is an important source of traction for farm operations. Fifteen participating farmers were chosen from Ntondozi, Zombodze and Maliyaduma districts. Each farmer owned four oxen. Twenty-eight oxen were fed supplements while 32 were monitored as controls relying only on grazing. Initially, the farmers were trained how to feed their oxen. The farmers were supplied with feed each fortnight and they were to feed each ox a daily ration of 3.5 kg. The composition of the feed offered is presented in Table 1. Animal measurements were carried out from June to November 1992.

Body weight was estimated using a commercial tape to measure heart girth. Such tapes rely on the high correlations between the circumference of the chest and body weight. The heart girth was taken as an imaginary line beginning from a point slightly behind the shoulder blade, dropping down over the fore ribs and under the body behind the elbow of the front legs, and back up the other side of the animal to its starting point.

Body condition scores were determined based on a visual assessment of the prominence of the hip bones and the ribs. For hip bones, the following scale was used: 1 = prominent; 2 = slightly protruding, and 3 = round and smooth. For the ribs, a scale of 1 to 3 was also used as follows: 1 = very conspicuous, 2 = slightly visible, and 3 = not visible. By combining the two parameters, an ox in the poorest condition scored 2 while the top scoring animal would receive 6 points.

Results

Reports from several regions in southern Africa (Van Niekerk 1974) suggest that protein and energy are the major nutrients limiting the productivity of grazing livestock. Levels of these nutrients in natural pastures are influenced by soil characteristics, rainfall patterns as

well as by plant species composition. Figure 1 shows that the protein content of sampled veld forage in the study areas ranged from 3.2% during the driest months of July and August, to 3.9% at the peak of the rains in November. These protein levels are usually considered too low to maintain weight in mature cattle.

Table 1. Composition of feed offered to the oxen.

Ingredient	% in the ration	% DM	% CP	ME (MJ/kg DM)
Maize bran	41.2	90	10.0	13.8
Brewer's residue	29.2	91	21.0	11.7
Molasses	27.4	84	4.4	43.0
Common salt	1.0	-	-	-

Analyses of body-weight changes were based on two age groups of oxen: relatively young (3–5 years) and old oxen (6–12 years). In general, the young oxen that received supplementation had higher weight gains compared to those that did not (Figure 2). Their positive response was rapid, following commencement of feeding in June. The control oxen also gained in weight after the onset of summer rains in September but at a slower rate. Weight changes in older oxen were less pronounced (Figure 3). These oxen were still losing weight in July, one month after the start of feeding, but in general supplemented animals gained faster than unsupplemented controls. Body conditions of both groups of oxen improved during the wet season

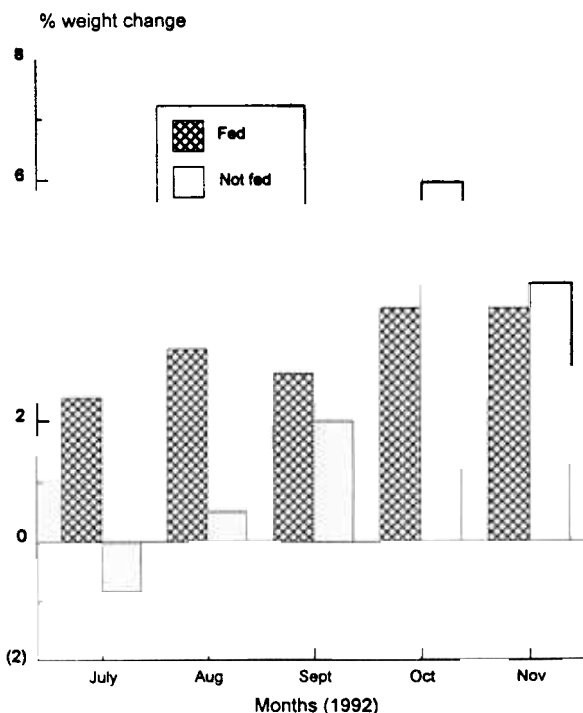


Figure 2. Monthly changes in body weight of young oxen (age range 3–5 years, mean June weight 310 ± 90 kg).

(Figure 4). Supplemented animals were in slightly better shape than those that depended exclusively on grazing. The cost of feeding the supplements to four oxen per

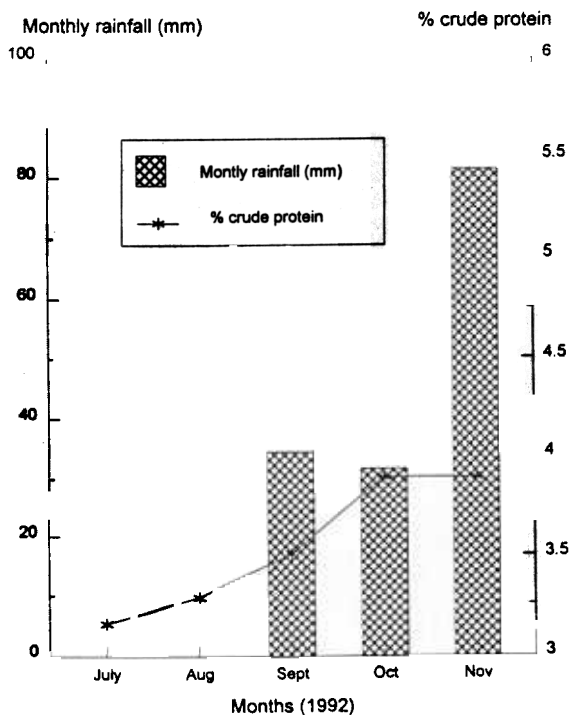


Figure 1. Variations in rainfall and crude protein content of natural pastures in the Middleveld of Swaziland.

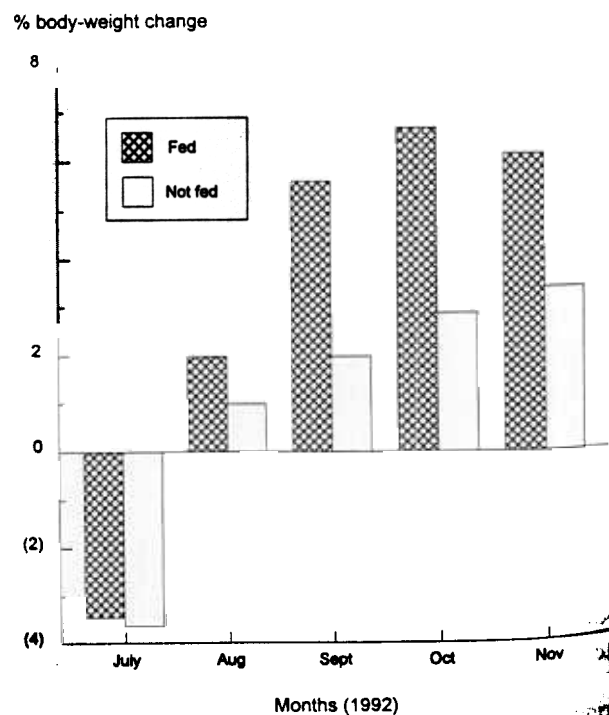


Figure 3. Monthly changes in body weight of old oxen (age range 6–12 years, mean June weight 440 ± 40 kg).

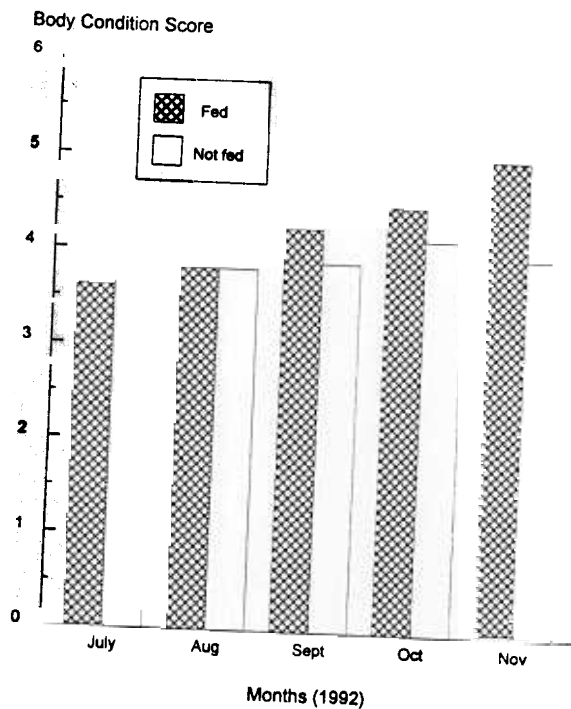


Figure 4. Monthly changes in body conditions score of fed and control draft oxen.

farmer from June to November amounted to 1,113 Emalangeni (370 US dollars) or 278 Emalangeni per ox.

Discussion

Although there were wide variations in animal weights and condition scores as well as in farmer circumstances, this study provided some insight into the likely benefits of supplementary feeding of draft oxen. It indicated that strategic supplementation with agro-industrial by-products has a positive effect on liveweight and body

condition. It may also increase growth rates of younger oxen.

It has often been reported that, to be appropriate to farmer circumstances, innovations require minimal additional investment (Fitzhugh et al 1992) partly because of the risks involved in crop production. Average maize yields on smallholder farms in Swaziland are probably about 1000 kg/ha/yr. A fifty per cent improvement in maize yield due to timeliness of ploughing with oxen could earn a gross return of about 800 Emalangeni. Compared with an investment of over 1,100 Emalangeni in feeds to supplement draft oxen, the feed package used in this study is unlikely to be acceptable to farmers. Therefore, there is a need to explore sources of cheaper supplements and establish the optimum level of supplementation required for the desired responses. Further cuts in cost could be accomplished through reduction of traction teams from the present four to two oxen by using better designed implements.

References

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Effet de la consommation de sous-produits agro-industriels sur le gain de poids et la condition corporelle de boeufs de trait au Swaziland

Résumé

Malgré l'importance de l'énergie de la traction animale au Swaziland, très peu de travaux ont été menés pour évaluer l'effet d'une complémentation de saison sèche sur les performances des boeufs de trait. C'est le thème de la présente étude effectuée sur 60 boeufs appartenant à 15 petits exploitants agricoles du Middleveld au Swaziland. 28 de ces animaux recevaient des compléments de résidus de culture et des sous-produits alimentaires, les 32 autres constituant le lot témoin, nourri exclusivement avec de l'herbe des

pâturages naturels. Le poids vif des boeufs a été estimé et leur condition corporelle observée mensuellement de juin à novembre 1992. Les animaux recevant une complémentation ont enregistré une meilleure condition corporelle et des gains de poids plus élevés que ceux des boeufs témoins. Toutefois, compte tenu de leur composition, ces aliments étaient trop chers pour des boeufs de trait dans les conditions économiques actuelles. Il est recommandé d'étudier différentes possibilités d'en réduire le coût.