

THE EFFECT OF DIFFERENT WINTER UTILISATION PERIODS OF A C₄ - SUBTROPIC FOGGAGE ON THE GROWTH OF WEANERS.

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ABSTRACT

A significant ($P < 0.05$) increase in lick consumption was found, as winter progressed, which was attributed to a significant decline in the quality ($P < 0.05$) of *Digitaria eriantha* foggage. Harvested treatments resulted in a significant ($P < 0.05$) decline in residual soil nitrogen levels compared to unharvested treatments. Losses, due to trampling, on average was 21.25%. It is advocated that *Digitaria eriantha* ought to be utilised in summer and is only suitable for maintenance if utilised in winter.

KEYWORDS

Management, wintering, fertilisation, animal production.

Abbreviations: LSU = large stock unit; ND = not determined; ADG = average daily gain

INTRODUCTION

Information on the influence of fertilisation on the quality of *Digitaria eriantha* foggage, as well as the treatment during the preceding growing season and also the influence thereof on the palatability and nutritional value of *Digitaria eriantha* in a semi-arid environment, is still insufficient. The aim of this investigation was to determine: (i) whether foggage derived from a full season's growth differs in quality to foggage with a closing date early in January; (ii) whether this quality remains constant throughout the winter, (iii) in addition, animal performance and wastage due to trampling has been evaluated.

MATERIAL AND METHODS

These trials were carried out on the experimental farm Machavie situated near Potchefstroom, in the North West Province, South Africa. The mean long-term annual rainfall is 628.7 mm (October - March). The investigation was carried out on 32 ha dry-land *Digitaria eriantha* winter grazing (foggage) divided into two summer treatments namely harvested and unharvested. Prior to harvesting the pasture was fertilised in October of 1992/93 and 1993/94 with a single application of 60 kg N and 6 kg P ha⁻¹ in the form of limestone ammonium nitrate (28 % N) and super phosphate (10,5 %P) respectively. Due to below average rainfall during the 1994/95 season, 30 kg N and 3 kg P ha⁻¹ was given in October. A further application of 30 kg N and 3 kg P ha⁻¹ was given to half of the trial area at the beginning of January 1995. No harvesting treatment was done in the 1994/95 season. Representative samples obtained from protected enclosures (1m x 1m) in each camp were sampled every 2 weeks during the trial and dried at 70 °C for 48 hours. Whereafter all samples were milled through a 1 mm sieve for subsequent chemical analysis. Chemical analysis included determination of (i): total nitrogen according to Clare & Stevenson (1964); (ii) Phosphorous content colorimetrically (Fiske & Subbarow, 1925) on an automatic flow system (Basson, 1974); (iii) cation content after incineration (Jackson, 1962) on a atomic absorption spectrophotometer (Varian AA775) and (iv) in vitro dry matter digestibility (IVDMD) (Tilley & Terry, 1963), as adapted by Engels & Van der Merwe (1967).

Estimation of wastage due to trampling. After completion of each annual trial, a sample area consisting of (5 m x 5 m) was sampled,

all broken off plant material was collected, weighed and dried to determine dry matter production.

Trial animals. After determination of annual dry matter production, 28 weaners (Simmentaler & Afrikaners) were allocated to treatments in the 1992/93 season. Fifty nine weaners were allocated for the 1993/94 season and 30 weaners for the 1994/95 season. All weaners were heifers, stratified according to mass and sub-divided into two groups prior to foggage utilisation. Weaners were weighed at the start of the adaptation period, and on average every 14 days thereafter. Mass determination occurred after the weaners had been fasted overnight. Lick consisting of 22 % urea, 22 % dicalciumphosphate, 22 % maize meal and 33 % salt was available ad lib. On average lick consumption was determined every 14 days, by weighing lick bins prior to and after consumption.

Statistical analysis. The General Linear Models Procedure of the Statistical Analysis System (SAS, 1985) was used in the analysis of the data. The factors used in the analyses were: Harvested and unharvested, early and late winter utilisation with four replications.

RESULTS AND DISCUSSION

The annual rainfall, annual dry matter production, wastage due to trampling, average daily gain (ADG), grazing period, lick consumption and carrying capacity as recorded on 32 ha *Digitaria eriantha* foggage for the period 1992-95 are illustrated in Table 1.

Wastage due to trampling. During the 1992/93 season, wastage, mainly due to trampling, on average was 34 % in the 8 unharvested camps. During the 1993/94 season estimated wastage, due to trampling was 26.2 % for the regrowth of harvested plots and 21.7% for unharvested plots. The 1994/95 season had the lowest wastage, on average 12%, because growth mainly took place from December, resulting in higher nutritional value. No statistical significant change in mass was recorded between treatments over the three years of monitoring, however, the 1994/95 season was characterised by positive growth. This positive growth is contributed to the higher nutritional value of the foggage (Table 1).

Lick Consumption. Lick consumption of weaners, in the early winter was characterised by a statistically significant ($P < 0.05$) lower lick consumption in comparison to late winter periods (Table 2).

Crude protein. A significant decline in crude protein levels were found consistently as winter progressed (Results not shown).

In vitro dry matter digestibility. A significant decline in IVDMD occurred consistently over the three year winter monitoring period. (Results not shown)

DISCUSSION

Barnes (1966) illustrated that animals may lose weight if the crude protein of foggage drops below 3.5 %. The utilisation of *Digitaria eriantha* foggage early in winter therefore can be recommended. The difference in quality ($P < 0.05$) is revealed by the higher lick

consumption late in winter (Table 2). No significant difference in quality was found between the harvested and unharvested treatments.

CONCLUSION

It would seem that the quality of *Digitaria eriantha* can be improved by a split application of nitrogen applied in October and January and with a summer defoliation treatment, although not significant. Heifers with the potential (7 months old) to gain weight were benefited by utilising camps which received the above mentioned differential fertilised treatment, as indicated by higher ADGs. Early winter utilisation, however, did result in significantly ($P < 0.05$) lower lick consumption.

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Table 1. Summary of data recorded on *Digitaria eriantha* foggage for the period 1992-1995.

| Year | 1992/93 | | 1993/94 | | 1994/95 | |
|--|-----------|-----------|-----------|-----------|-----------------|----------------|
| Rainfall (mm) | 444.8 | | 682 | | 467.7 | |
| Fertilisation (kg N + kg P ha ⁻¹) | 60 + 6 | | 60+ 6 | | 60 +6 or 30 + 3 | |
| Treatment | Harvested | Unharvest | Harvested | Unharvest | Single 30N +3P | Double 60N +6P |
| Annual production (kg ha ⁻¹) | ND* | 2410 | 1764 | 4000 | 633 | 708 |
| % Wastage (kg ha ⁻¹) | ND* | 34% | 26.2% | 21.75% | 11.1% | 13.2% |
| Grazing period (days) | ND* | 86 | 92 | 104 | 83 | 76 |
| ADG (g. day ⁻¹ heifer ⁻¹) | ND* | 69 | -6.52 | -11.5 | 112 | 99 |
| Carrying capacity (ha. LSU ⁻¹) | ND* | 3.5 | 3.5 | 3.1 | 6.8 | 7.4 |

Table 2. Average lick consumption for the two utilisation periods, early and late winter, as recorded on *Digitaria eriantha* foggage at Potchefstroom (1993-1995).

| | 1993 | 1994 | | 1995 | |
|----------------------------------|-------------------|------------------|------------------|------------------|------------------|
| Treatment | Unharvested plots | Harvested 1994 | Unharvested | Single 30N +3P | Double 30N +6 P |
| Early winter g day ⁻¹ | 104 ^a | 181 ^a | 147 ^a | 115 ^a | 79 ^a |
| Late winter g day ⁻¹ | 176 ^b | 218 ^b | 218 ^b | 121 ^a | 122 ^b |

A common letter in the table indicates no significant differences.