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Grass Yield in the Camel Thorn Savanna: Rainfall vs Stocking Rate

INTRODUCTION AND METHODOLOGY

In a research review, Chronology of Droughts in Southern Africa, Unganai (1994) reports on the 1981 to 1992 period: "wet years were rare during this period and drought was the norm for most of the continent (Africa). By 1983 drought or below average rainfall affected nearly the whole continent; 1984 saw little improvement; while 1985 had some improvement but 1986/87 saw further drought conditions though not as severe as 1982/83". Du Pisani (1997) regards the 1996/97 rainy season (summer) as reasonable, referring back to the 1995/96 rainy season which according to him came back-to-back with the 1994/95 rainy season. The latter being a typical El Niño summer with the only good rains falling over the Namib Desert and western parts of Namibia.

A trial was launched at Sandveld Research Station in the Camel Thorn Savanna of Namibia to determine the influence of stocking rate on the grass layer. Four different stocking rates were applied. The trial was initiated in 1985 (Kruger, 1998) and continued until 1992. From 1995 until 1997 grass yield data was collected by Reed (1997). A third experimental period extended from 1998 to 2002 (Bester et al, 1999). Available grass yield was determined annually and is expressed as available grass yield in kilograms per hectare. The results of three of the stocking rate treatments are presented in this paper. Due to the fact that the 1995/97 yield data was collected only in three of the six camps per treatment, the yield data for the experimental period 1998/2002 was analyzed accordingly.

Figure 1. Total annual rainfall for the Sandveld Research Station for the rainy seasons 1985/86 to 2001/02.

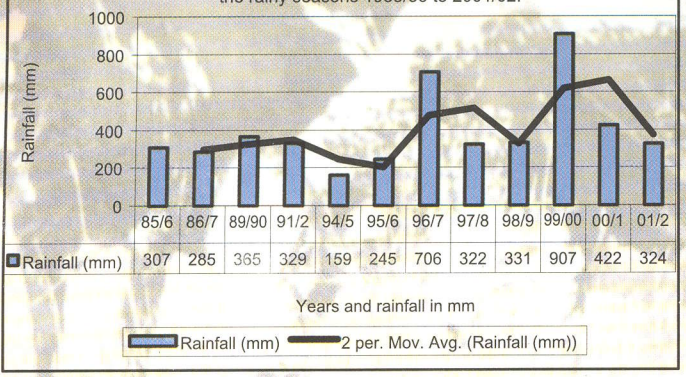
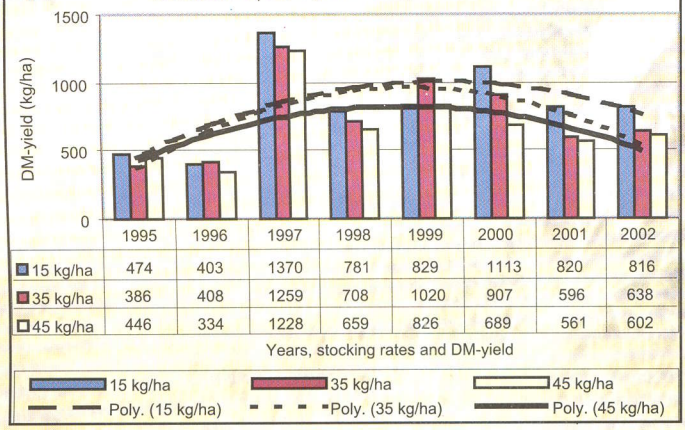


Figure 2. Dry-material grass yield of the three stocking rate treatments over the years 1995 to 2002



RESULTS AND DISCUSSION

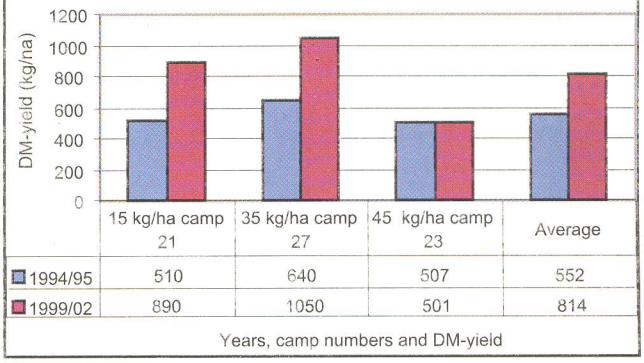
The annual rainfall for the rainy seasons 1985/86 to 2001/02 is presented in Figure 1. The annual dry-material grass yield (DM-yield) of the three camps per treatment, for the three stocking rate treatments, is presented in Figure 2. The results are the average of the two cattle fame type treatments.

The results presented in Figure 1 reflect a large fluctuation in rainfall from the rainy season 1985/86 to 2001/02. The experimental period started off (1994/95) with a well below average rainfall of 159 mm. Two peak rainy seasons during 1996/97 and 1999/2000 followed. A decline in precipitation was observed after the 2000 rainy season.

It is clear from the results presented in Figure 2 that the 15 kg/ha stocking rate treatment produced a grass yield higher than the other two stocking rate treatments. The grass yield of the 45 kg/ha stocking rate treatment was on average lower over the experimental period. However, it is notable that initially all the treatments produced low yields during one of the most severe below average rainfall seasons recorded at Sandveld Research Station. The grass yield at the end of the 1994/95 growing season was for the three stocking rate treatments 474, 386 and 449 kg/ha, and for the

1995/96 growing season 403, 408 and 334 kg/ha, respectively. The 35 kg/ha stocking rate treatment could benefit from the seasons of high rainfall, better than the 45 kg/ha stocking rate treatment. However, the yield of the 35 kg/ha stocking rate treatment decreased drastically with the decline in total annual rainfall from the years 2000 to 2002. Comparing the results presented in Figure 3, it appears that the individual camps per treatment initially produced higher yields than the average of the three camps presented above and that the yield of the 45 kg/ha stocking rate treatment did not differ much between the seasons 1994/95 and 1999/00. This can be ascribed to a difference in species composition of the camps.

Figure 3. Dry-material grass yield of the individual camps for the years 1995 and 2000.



	15 kg/ha camp 21	35 kg/ha camp 27	45 kg/ha camp 23	Average
1994/95	510	640	507	552
1999/02	890	1050	501	814

Years, camp numbers and DM-yield

CONCLUSIONS

- The experimental period was subjected to large fluctuations in rainfall, and the grass yield accordingly reflects the years of high and low precipitation.
- Heavy stocking rates exacerbates lower grass yields during below average rainfall seasons.
- Variation in yield of individual camps between treatments can be ascribed to a difference in species composition.

Large frame 15 kg/ha 1995 (Camp 21).

Large frame 15 kg/ha 2001 (Camp 21).

Large frame 45 kg/ha 1995 (Camp 23).

Large frame 45 kg/ha 2001 (Camp 23).

Pictures courtesy of E.R. Reed & F.V. Bester. MAWRD. Directorate Agriculture Research and Training, Private Bag 13184, Windhoek, Namibia.

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