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The Dry Material (DM) contribution of some selected dwarf shrubs on the Swartrand area of southern Namibia's Dwarf Shrub Savanna

INTRODUCTION

The clipping of quadrats (also known as the quantitative yield method) to determine grazing capacity has been well described by Bester (1988). This methodology has been tested in grass dominated veld and found to be reasonably accurate. However, when the question is asked on how dwarf and bigger shrubs are being accommodated in this methodology, the response has always been that any form of shrubbery should be considered a "bonus", which has made for a very "conservative" calculated grazing capacity since only the yield of grass material is taken into consideration when quadrats are being clipped.

What has been done since to include the shrub component in the calculation of grazing capacity? A study on the Swartrand which took place from February 2006 to November 2008, measured, amongst other vegetation characteristics, the utilisable dry material (DM) yield of the most dominant dwarf shrubs in this area. (None of the higher growing, frequently occuring shrubs such as *Boscia foetida*, *Catophractes alexandri*, *Phaeoptilum spinosum*, *Acacia mellifera* and *Rhigozum trichotomum* were included in the study.) The utilisable portion of any dwarf shrub is deemed to be all the leaves as well as all woody material less than and equal to 2 mm in diameter (Spotlight on Agriculture No. 98, December, 2005).

Figure 1. The Swartrand with its six selected sites

METHODOLOGY

Six farms or sites (Figure 1) were chosen on the Swartrand for the study: The first about 20 km south east of Maltahöhe and the last about 25 km east of Helmeringhausen.

Through point surveys at each of these farms, it was determined that *Petalidium linifolium* (Lusernbos, Figure 2) was dominant at all six sites, *Leucosphaera bainesii* (Wolbos, Figure 3) was dominant at two of the six sites and *Barleria lanceolata* (no known common name, Figure 4) was dominant at one of the sites.

Although a number of other dwarf shrubs (*Aptosimum spinescens, Calicorema capitata, Barleria rigida, Otoptera burchellii, Blepharis spinescens, Hermannia gariepina* and *Aizoon schellenbergii*) were recorded during the surveys, they occurred in insignificant numbers when compared to the dominant species and were therefore not included in the study. With the exception of the site at Ubiams, all sites were subject to normal grazing practices.

Figure 2. *Petalidium linifolium* on the Swartrand

Petalidium, *Leucosphaera* and *Barleria* were harvested four times a year (February, April, June and November) for

a period of three years and their dry material production (amongst other characteristics) determined. The results are as follows:

RESULTS

Table 1. Average available DM/specie (g) after 12 surveys over three years

	Number of sites on which species occurs	Number of times the plant was harvested	Number of plants harvested	Average DM per specie in gram
P. linifolium	6	72	690	83,66
L. bainesii	2	24	240	66,79
B. lanceolata	1	12	105	66,10
			Average	72,18

DISCUSSION

The clipping of quadrats (a quadrat = an area of 1 m x 1 m or 1 m²) to determine grazing capacity usually requires the cutting of all grass plants within the quadrat, with the exception of *Aristida*, which is deemed to be unpalatable and of low production value. Such collected material is usually dried, weighed and the yield extrapolated to kg DM/ha, from which the grazing capacity of a camp or area can then be calculated. To get a representative sample, it is suggested by Fourie (1989) that 40 quadrats be clipped. It is now suggested that wherever this methodology is applied on the Swartrand, all dwarf shrubs within a placed quadrat is counted while all grass plants within the quadrat is clipped. At the end of the 40 quadrats transect, all dwarf shrubs are totalled, multiplied with the value of 72 g (Table 1), extrapolated to yield per hectare and added to the yield of the grass material.

Example:

Yield of grass (plus palatable forbs and ephemerals) per 40 m²	= 560 g (after drying)
Therefore: 10 000 m² (1 ha) = 10 000/40 x 560 g	= 140 kg DM/ha
Number of dwarf shrubs in 40 m²	= 7
Therefore: 7 x 72 g	= 504 g (after drying)
Therefore: In 10 000 m² (1 ha) = 10 000/40 x 504 g	= 126 kg DM/ha
Total: 140 + 126	= 266 kg DM/ha from which grazing capacity can then be determined.

The contribution of the remaining component (tall woody shrubs) is still not dealt with. A possible methodology to determine the browseable yield of this component is the application of the BECVOL (Browse Estimates by Canopy VOLume) model, as developed by Prof. Nico Smith of the University of the Free State.

The average yield figure of 72 g DM per dwarf shrub is definitely subject to criticism, but it is nonetheless felt that this is a fairly reasonable average figure for all dwarf shrubs on the Swartrand. Although other dwarf shrubs will be encountered during the application of the quantitative yield methodology, it is perceived that they will by far be in the minority, and that their contribution would not influence the figure of 72 g per plant significantly. It is felt that this figure is a valuable figure in the calculation of more realistic dry material yields and therefore more accurate grazing capacity figures for that all important small stock area of southern Namibia.

Figure 3. *Leucosphaera bainesii*

Figure 4. *Barleria lanceolata* (© A.A. Dreyer; Kyffhauser)

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