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Grazing plant observations on the Swartrant: February 2006 to November 2008

INTRODUCTION

Seven plant factors were measured on the Swartrant from February 2006 to November 2008 in an attempt to move closer to more accurate grazing capacities and a more realistic estimation of the rangeland condition of Namibia's southern rangelands. The factors measured were: Available forage, Total Digestible Nutrients (TDN), Canopy cover, Potassium, Calcium, Magnesium and Fat of the most abundant grass and dwarf shrub species occurring in that area.

METHODOLOGY

Data collection took place on six farms (sites) on the Swartrant, four times a year (February, April, July and November) for a period of three years in an effort to capture seasonal variation in the measured factors. The approach closely followed the methodology of Du Toit (1996) in the Karoo where Grazing Index Values (GIV) were calculated and used in the determination of grazing capacities and a range condition assessment.

The GIV of a grazing plant is calculated as follows:

$$\frac{[\text{Available forage} + \text{TDN} + \text{cover} + (\text{K/Ca} + \text{Mg})] \div \text{Ether extract}}{100}$$

The derived value then says something about the Dry Material contribution of a particular plant to the total Dry Material production of the area, its nutritive value (TDN), its ability to protect the soil against high temperatures and erosion (cover), whether it provides the ideal Ca:K ratio needed for growth and development in the grazing animal and its palatability (ether extract is taken in Karoo bushes as a negative variable since higher ether extract values indicate a high resin and aromatic oils content, which renders dwarf shrubs unpalatable – therefore "divide" in the equation above. In the case of grasses, the higher the ether extract value, the higher the carotene content and thus the higher the feeding value – therefore, "multiply" with ether extract in the equation above).

Each time material was collected for analysis, a 3 600 point (600 points per site) botanical survey was carried out to determine whether the dominant plants, as determined by the first survey in February of 2006, were still dominant. The dominant species remained dominant throughout the project period. During each survey the crown diameter of 30 randomly selected plants of each of the dominant species were also measured and the canopy cover calculated. Harvested plant material was dried, the utilisable portion of the dwarf shrubs separated from the non-utilisable portion (see Spotlight on Agriculture No. 98), weighed, milled and analysed for moisture, Crude Protein, Ca, P, Crude Fibre, Fat, Ash, Mg and K, from which the TDN value could be calculated. Grazing Index Values were calculated for each of the dominant species and for every time that the surveys were carried out.

RESULTS

Dominant species and their Grazing Index Values.

Species	No. of sites in which species occurred	Highest GIV (month)	Lowest GIV (month)	Average GIV of species over all sites
Petalidium linifolium	6	45,66 (Nov.)	7,18 (Apr.)	15,65
Stipagrostis uniplumis	6	56,76 (Apr.)	6,11 (Nov.)	15,52
Eragrostis nindensis	5	7,16 (Feb.)	0,35 (Nov.)	2,79
Leucosphera bainsii	2	35,67 (Feb.)	5,49 (Nov.)	17,84
Enneapogon scaber	2	7,74 (Feb.)	1,79 (Jul.)	3,87
Barleria lanceolata	1	20,00 (Jul.)	2,19 (Apr.)	7,28
Panicum arbusculum	1	28,94 (Apr.)	5,26 (Nov.)	16,12
Stipagrostis ciliata	1	17,55 (Feb.)	4,80 (Apr.)	11,11

DISCUSSION

There is a natural tendency to compare GIVs of the different species. However, comparing GIVs of different species may be deceptive. An example is the index values of *Petalidium linifolium* (*Lusernbos*) and *Stipagrostis uniplumis* (*Blinkaar boesmangras*). Although they have almost the same grazing index value, further analysis of the data showed that *P. linifolium* had a 3,1 times higher canopy cover than *S. uniplumis*, and a 10,7 times higher dry material production and a little more than twice as much (1:2,04) crude protein. Based on the foregoing, it would appear that *P. linifolium* should have a much higher GIV value than *S. uniplumis*, but the primary reason for the two values to be almost equal is the "dividing/multiplying with ether extract methodology" in the GIV formula. It is expected that the same would be true for the Index Values of *Leucosphera bainsii* (*Wolbos*) and *Panicum arbusculum* (*Struik Panicum*). Comparing dwarf shrub to dwarf shrub, and grass to grass makes more sense, and from this can be gleaned which species in each category are the best.

Figure 1. Site with *Blinkaar Boesman* grass abundant.

Figure 2. Site with *Lusernbos* abundant.

The low GIVs of *Eragrostis nindensis* and *Enneapogon scaber* are as a result of their growth form. These species have small tufts (thus a very small canopy cover) and during winter months could, at some sites, not even be found and therefore also have an extremely low dry material production.

GIVs for annual grass species were not calculated. Annual grass species encountered during the surveys consisted primarily out of *Microchloa caffra*, *Entoplocamia aristulata*, *Enneapogon desvauxi*, *Eragrostis cylindriflora* and some *Aristida* spp., all with a high variation in occurrence and very low dry material production.

Adding the GIVs of all the abundant species recorded on the Swartrant, can be used as a benchmark for range condition (total of GIVs on Swartrant = 90,18 x 100). One way of deriving at a range condition mark at any site/farm is to do a simple survey, determine the most abundant species, allocate the GIV as determined, add and express it as a percentage of the benchmark figure. More on GIVs, range condition and grazing capacity when data are more fully analysed.

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REFERENCE

Du Toit, P.C.V., 1996. Development of a model to estimate grazing index values for Karoo plant species. Ph.D. Thesis, University of Pretoria.

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