

Climate change and adaptive land management in southern Africa

Biodiversity & Ecology 6

Assessments
Changes
Challenges
and Solutions

Product of the first research portfolio of

SASSCAL 2012–2018

Southern African
Science Service Centre for
Climate Change and
Adaptive Land Management

SPONSORED BY THE



Federal Ministry
of Education
and Research

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Klaus Hess Publishers
Göttingen & Windhoek
www.k-hess-verlag.de

ISBN: 978-3-933117-95-3 (Germany), 978-99916-57-43-1 (Namibia)

Language editing: Will Simonson (Cambridge), and Proofreading Pal
Translation of abstracts to Portuguese: Ana Filipa Guerra Silva Gomes da Piedade
Page desing & layout: Marit Arnold, Klaus A. Hess, Ria Henning-Lohmann
Cover photographs:

front: Thunderstorm approaching a village on the Angolan Central Plateau (Rasmus Revermann)

back: Fire in the miombo woodlands, Zambia (David Parduhn)

Cover Design: Ria Henning-Lohmann

ISSN 1613-9801

Printed in Germany

Suggestion for citations:

Volume:

Revermann, R., Krewenka, K.M., Schmiedel, U., Olwoch, J.M., Helmschrot, J. & Jürgens, N. (eds.) (2018) Climate change and adaptive land management in southern Africa – assessments, changes, challenges, and solutions. *Biodiversity & Ecology*, **6**, Klaus Hess Publishers, Göttingen & Windhoek.

Articles (example):

Archer, E., Engelbrecht, F., Hänsler, A., Landman, W., Tadross, M. & Helmschrot, J. (2018) Seasonal prediction and regional climate projections for southern Africa. In: *Climate change and adaptive land management in southern Africa – assessments, changes, challenges, and solutions* (ed. by Revermann, R., Krewenka, K.M., Schmiedel, U., Olwoch, J.M., Helmschrot, J. & Jürgens, N.), pp. 14–21, *Biodiversity & Ecology*, **6**, Klaus Hess Publishers, Göttingen & Windhoek.

Corrections brought to our attention will be published at the following location:

http://www.biodiversity-plants.de/biodivers_ecol/biodivers_ecol.php

Biodiversity & Ecology

Journal of the Division Biodiversity, Evolution and Ecology of Plants,
Institute for Plant Science and Microbiology, University of Hamburg

Volume 6:

Climate change and adaptive land management in southern Africa

Assessments, changes, challenges, and solutions

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Hamburg 2018

Please cite the article as follows:

Stolter, C. (2018) Open-access database – HERBFEEDS on nutritional quality of food plants for herbivores. In: *Climate change and adaptive land management in southern Africa – assessments, changes, challenges, and solutions* (ed. by Revermann, R., Krewenka, K.M., Schmiedel, U., Olwoch, J.M., Helmschrot, J. & Jürgens, N.), pp. 200-201, *Biodiversity & Ecology*, **6**, Klaus Hess Publishers, Göttingen & Windhoek. doi:10.7809/b-e.00324

Open-access database – HERBFEEDS on nutritional quality of food plants for herbivores

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Figure 1: Wild hindgut fermenter (zebra) meeting domestic foregut fermenters (cattle). Nutritional quality is one important aspect for understanding the habitat selection of wild herbivores (Image: S. Baumann).

Large herbivores contribute the lion's share of the gross national product in southern Africa. Main parts of the grassland ecosystems are used for livestock and game farming. Additionally, wild-ranging large herbivores are main attractants for tourism, providing an increasing contribution to the economy, and they are of high value for nature conservation. Next to animal husbandry, "bush meat" (including sport hunting) is an important food resource in southern Africa. It is expected that under the pressure of future human population growth, the pressure on wild and domestic herbivores will intensify. In this context, knowledge about the nutritional values of different food plants seems to be indispensable and of high importance for different stakeholders, ranging from the management of land use (e.g., livestock and game farming) to the management of wildlife conservation. Therefore, SASSCAL aims to create an open-access database on the nutritional quality of food plants.

As a result of the high availability and utilization of grasses, we have good information about grass quality. In contrast, less information is available about shrubs, trees, and herbs. These plants are often utilized by browsers but are also an alternative or supplementary food resource for livestock, especially in times of restricted food availability. It can be assumed that as a result of changes in climate, the importance of these food resources will be even more pronounced. We therefore aim to include different life forms of plants in the database (for an example, see Table 1).

The database will contain information on different nutrients, energy concentrations, and plant secondary metabolites. Furthermore, differences in analyses, either in the methodology or in the solvent used, will be included, as the applied methodology and the solvent used may lead to differences in the measured concentrations. The different fibre fractions

Table 1: Example of the structure of the database

Species	Other names	Plant life form	Ref. or Analyzer	Location	Biome	Time of sampling	Plant part	Nitrogen [%]	NDF [%]	ADF [%]	ADL [%]	Ash [%]	Condensed Tannins [%]	
													Extraction & Method	
<i>Grewia flava</i>	Brandy-bush, velvet raisin	Bush	SASSCAL Stolter & Tomaszewski	Waterberg, Namibia	Savanna	End of rainy season	Top shoots including leaves	2.8	45.6	66.5	6.5	6.6	1.23	Methanol Butanol-HCl
<i>Leucosphaera bainesii</i>	Wolbos, perdebossie, silverbossie	Shrub	SASSCAL Stolter & Tomaszewski	Erichsfelde, Namibia	Savanna	Rainy season	Top shoots including leaves	1.3	49.7	29.2	6.3	8.6	0	Methanol Butanol-HCl
<i>Eragrostis contortus</i>	Lehmann lovegrass	Grass	Kesch et al. (accepted)	Khutse and Central Kalahari Game Reserve, Botswana	Savanna	Combined samples	Whole plants	3.1	78.2	43.5	-	-	-	-

(neutral detergent fibre (NDF), acid detergent fibre (ADF) and acid detergent lignin (ADL)) will be given to index the concentration of soluble cell compounds, hemicellulose, and cellulose (for details, see info box on nutritional quality in this book (Stolter, 2018)). Because of seasonal and intra-individual differences in chemical composition, we will also include information on the season when sampling occurred and about the part of the plant analysed and the herbivore feeding on the plant, if applicable.

As mentioned in the section on forage availability and quality (Stolter et al., 2018), the quality of a given food item depends on physiological requirements, which vary by animal species; morphological adaptation to the food (e.g., hindgut or foregut fermenter); body size; age; sex; life stage (e.g., reproductive state); etc. Therefore, the database gives only nutritional values and insights into the “general quality” but offers no conclusions about the quality of feeds for specific herbivores.

Inputs into the database are gained either from fieldwork and lab analyses or from other data resources. Contributions that add valuable information to the database are welcome and should be sent to herbivorefeeds@sasscal.org. Planned linkages with other databases such as the Photo Guide to the Plants of Southern Africa (Hillmann et al., 2018) will expand the given information.

References

- Hillmann, T., Muche, G., Josenhans, K., & Jürgens, N. (2018). SASSCAL photo guide to plants of southern Africa. This volume.
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