Themeda triandra
A Keystone Grass Species

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Themeda triandra is a grass species that dominates grasslands and savannas throughout southern and eastern Africa, Australia, south-east Asia, India and the Middle-East. Within these regions it is found across a broad range of climates, geological substrates and ecosystems. John Acocks, one of the best known botanists and ecologists in South Africa, stated "*Themeda* is by far the most generally important of our grasses".

Inappropriate grazing management, however, can result in a decline of *Themeda*, as it is not well adapted to an uninterrupted, selective grazing regime. A decline in abundance of *Themeda* in grasslands is usually coupled to a decline in grazing value, species richness, cover and ecosystem function. In spite of its significant ecological and economic importance, there has been no attempt to review and synthesise the considerable body of research undertaken on this grass. The aim with this review is to summarise and synthesize work previously undertaken and identify areas where further research is required.

It is likely that the *Themeda* covered in this review is not a single species but rather a species complex, which has over time become exceptionally well adapted to local biotic and abiotic variables under stable conditions. This likely makes it vulnerable to change, and may explain its rapid disappearance under changing conditions, such as selective grazing pressure or lack of fire. Its disproportionate ecological and economic importance, combined with its role as an indicator species provides justification for consideration as a keystone grass species.

We have attempted to both review and fit the published research into the bigger ecological picture which *Themeda triandra* occupies (Figures 1 and 2). Our hope is that, by listing a number of potential areas for research, this study will enable current and future researchers to apply their efforts in obtaining a more comprehensive and complete picture of this important grass species.

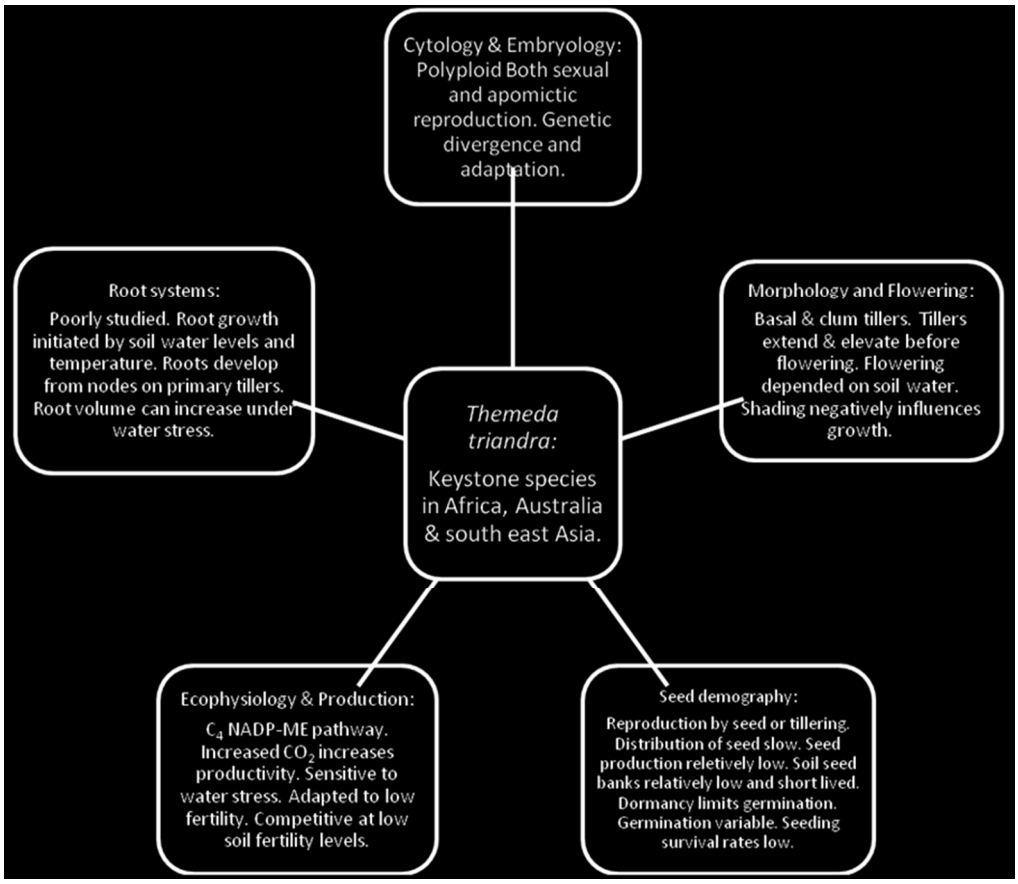

Figure 1 Biotic and abiotic factors affecting the distribution and abundance of *Themeda triandra*

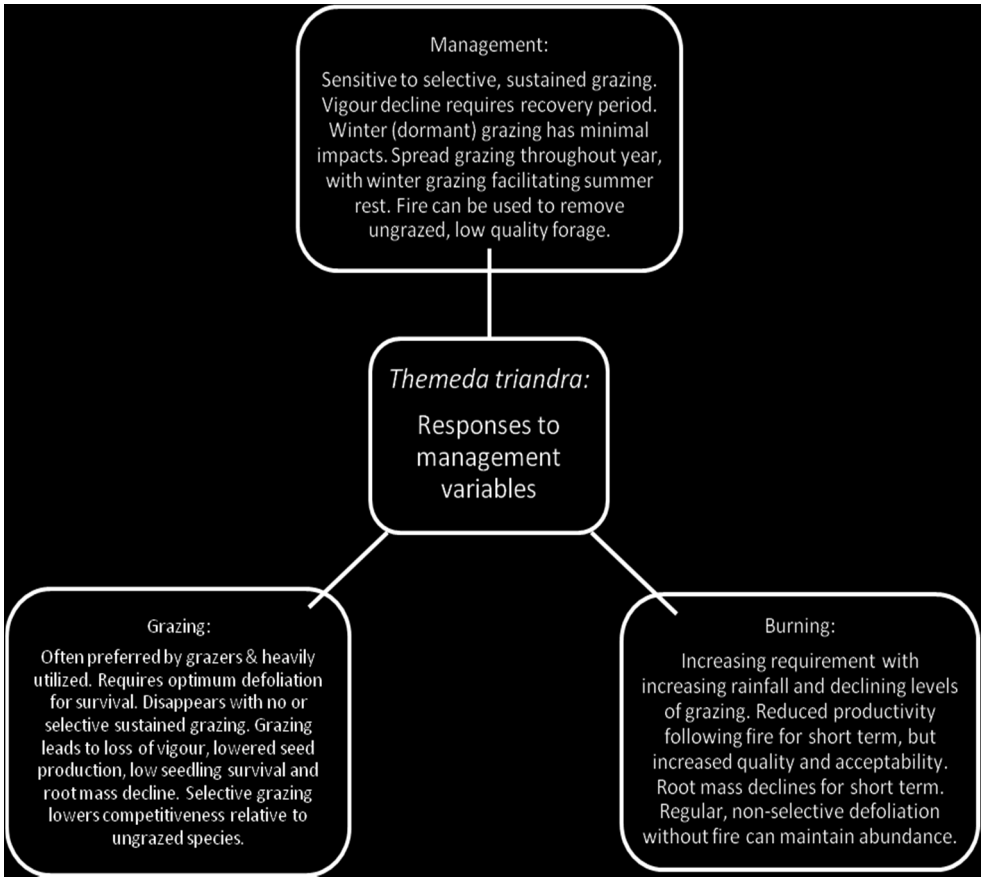

Figure 2 Management of *Themeda triandra* grasslands

In Vitro Organic Matter Disappearance of Kenyan Browse using Rumen Liquid from Goats Ingesting Grass Versus Browse

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African browse often contains condensed tannins (CT) which may be beneficial to browser health. Benefits include suppression of internal parasites or improved protein absorption; in concentrations over 5%, however, it may interfere with rumen breakdown of forage. Few East African trees and shrubs have been tested for CT so this study measured concentrations in four introduced and seven native tree/ shrub species in Kenya known to be consumed by ruminants. Leaf crude protein varied from 14 to 25% while CT ranged from almost none to nearly 12%.

This emphasizes the need to test our browse for CT in case wildlife or goats are being forced to consume too much or not enough. A second aspect of the study looked at the effect of diet on breakdown of CT and crude protein of individual browse species in the rumen. The presence or absence of CT in feed apparently has an effect on rumen function although how this affects production is still not clear. At the very least, the presence of CT in laboratory rumen digestibility trials should be documented when looking at browse with CT.

"Benefits include suppression of internal parasites or improved protein absorption"

Browse species	ECT	PBCT	FBCT	TCT
Acacia brevispica	4.1^{ab}	1.8^{bc}	1.5^{bcd}	7.4^{bc}
Acacia tortilis	5.8^{a}	3.0^{b}	3.1^{a}	11.9^{a}
Balanites aegyptiaca	0.0^{c}	0.0^{c}	0.1^{e}	0.2^{e}
Berchemia discolor	0.5^{c}	5.1^{a}	2.2^{ab}	7.8^{bc}
Grewia bicolor	6.6^{a}	2.9^{b}	1.2^{cde}	10.7^{ab}
Gliricidia sepium	0.0^{c}	3.0^{b}	1.9^{bc}	4.9^{cd}
Leucaena leucocephala	1.9^{bc}	2.5^{b}	2.0^{bc}	6.4^{cd}
Pithecelobium dulce	1.0^{c}	1.5^{bc}	0.7^{de}	3.2^{de}
Prosopis juliflora leaves	0.0^{c}	0.2^{c}	0.2^{e}	0.4^{e}
*P. juliflora*_pods	0.1^{c}	0.4^{c}	0.2^{e}	0.7^{e}
Terminalia brownii	1.2^{c}	1.3^{bc}	0.6^{de}	3.2^{de}
Ziziphus mucronata	1.0^{c}	1.6^{bc}	0.7^{de}	3.3^{de}
Effect of species	**0.001**	**0.004**	**0.0009**	**<0.0001**
SEM[1]	**0.89**	**0.64**	**0.35**	**1.1**

Table 1. Extractible (ECT), protein-bound (PBCT), fiber- bound (FBCT) and total (TCT) condensed tannins in leaves collected from browse species in Kenya.

Post-wildfire regeneration of rangeland productivity and functionality – observations across three semi-arid vegetation types in South Africa

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Uncontrolled fires can result in significant reductions of the agricultural potential of rangelands and substantial economic losses. Environmental assessments help to better understand fire effects on the natural resources and provide important information that can feed into decision-making at farm scale.

We investigated the short-term impact of a wildfire on the grass layer in different veld types of the North West province, in order to gain insight in the regeneration capacity of affected rangelands. In the growing season following the wildfire, the standing grass biomass was much lower in previously burned sites compared to adjacent unburned sites across veld types. The loss in rangeland production was also evident by a general decrease of grazing capacity and reduction in potential grazing days. In addition, much litter was burned increasing the proportion of bare soil, which is likely to influence soil stability, nutrient cycling and water infiltration. Nevertheless, the grass sward showed to recover quite well with no fire-related effects on species composition and grazing value, grass density and diversity.

However, it seems advisable that grazing of burned rangelands immediately after the fire event should be carried out in a sustainable way to avoid a further decrease in rangeland condition and stability.