

## Winners and Losers of Severe Drought and Grazing on a Dryland Grassland in Limpopo Province

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**Abstract :** Severe drought may trigger a transition of vegetation composition in dryland grasslands, with productive perennial grasses often being replaced by annual grasses. Grazing pressure is thought to exacerbate drought effects, but little is known on the joint effects of grazing and drought on the functional and taxonomic composition of the herbaceous vegetation in African savannas. This study thus aimed to elucidate which herbaceous species and plant functional types (PFTs) are most resistant to prolonged drought and grazing and whether resting plays a role in this context. Thus, we performed a six-year field experiment in South Africa's Limpopo province, combining drought and grazing treatments. Aboveground herbaceous biomass was harvested annually and separated into species. We grouped species into five PFTs, i.e. very broad-leaved perennial grasses, broad-leaved perennial grasses, narrow-leaved perennial grasses, annual grasses, and forbs. For all species, we also recorded three-leaf traits (leaf area - LA, specific leaf area - SLA, and leaf dry matter content - LDM) to describe their resource acquisition strategies. We used generalized linear models to test for treatment effects and their interaction. Association indices were used to detect the relationship between species and treatments. We found that there were no absolute winner species or PFTs, as the six-year severe drought had a pronounced negative impact on the biomass production of all species and PFTs. However, we detected relative winners with increases in relative abundances, mainly forbs and less palatable narrow-leaved grasses with comparatively low LA and high LDMC, such as *Aristida stipidata* Hack. These species and PFTs also tended to be favored by grazing. Although few species profited from resting, for most species, the combination of drought and resting proved to be particularly unfavorable. Winners and losers can indicate ecological transition and may be used to guide management decisions.

**Keywords :** aboveground net primary production, drought, functional diversity, winner and loser species

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