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Livestock Browsing Threatens the Survival of *Balanites aegyptiaca* Seedlings and Saplings in Dinder Biosphere Reserve, Sudan

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Abstract

While the impact of livestock grazing has been frequently assessed for grasses, little is known about how livestock affects tree seedlings and saplings. We explored the effects of goat, cattle and camel browsing on the survival of *Balanites aegyptiaca* seedlings and saplings, a broadleaved evergreen tree species indigenous to Sudan, in Dinder Biosphere Reserve-Sudan (DBR). We used a stratified sampling design with four sites: GOA (mainly browsed by goats), CAT and CAM being mainly browsed by cattle and camels, respectively, while CON was a control area without any livestock browsing. We tested the survival, mortality and recovery of seedlings and saplings across different sites. Our results revealed that mortalities of seedlings in GOA were almost four times higher than that of CAM and CON and twice that of CAT ($F_{3,196} = 100.39$, $P < .001$). Further, sapling mortality was three times higher in GOA than that observed in CAT and CON ($F_{3,196} = 73.4$, $P < .001$). We found that seedlings recover better than saplings, and, unexpectedly, goat browsing severely affected the natural regeneration of *B. aegyptiaca* in DBR compared to other livestock species. Our study findings contribute to sustainable forest management and show that particularly goat browsing needs to be suppressed for conservation of vulnerable tree species.

KEYWORDS: Herbivory; Natural regeneration; Protected area; Rangelands; Woodland