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Recovery and Germination of Dichrostachys cinerea Seeds Fed to Goats (Capra hircus)

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ABSTRACT

Goats can act as dispersal agents by consuming seed pods of woody plants and dispersing the seeds in feces. Concerns that goats might thereby promote encroachment by woody plant species such as Dichrostachys cinerea (sickle bush) have not been addressed. The objective of this study was to determine the recovery rate and germination of D. cinerea seeds that pass through the digestive tract of goats. We hypothesized that 1) D. cinerea seeds will remain intact and viable after passage through the digestive tract of goats and that 2) D. cinerea seeds will be scarified by such passage, resulting in improved germination percentages. The first trial measured the recovery rate of 1 500 D. cinerea seeds that were consumed by indigenous goats, either voluntarily after mixing them with feed pellets (mixed) or by force-feeding (gavaged). Seed recovery for the gavaged treatment (32.7%) was significantly higher than for the mixed treatment (9.9%; $P<0.001$). The second trial determined germination percentages of D. cinerea seeds recovered from the feces of animals in the two treatments of the first trial as well as scarified and control (untreated) seeds. The germination percentage of mechanically scarified seeds (53.0%) was significantly higher than that of seeds that passed through the digestive system in the mixed (35.5%) or gavaged (31.2%) treatments or were untreated (19.0%; $P<0.001$). Seeds that passed through the digestive tract (mixed and gavaged treatments) had a significantly higher germination percentage than untreated seeds ($P<0.001$). A nonnegligible proportion of D. cinerea seeds remained intact after ingestive chewing and passage through the digestive system, and their germination percentage was even elevated. This suggests that goats have a potential to facilitate woody plant encroachment through dispersal of viable and scarified seeds.