

Effect of animal species, diet and seed characteristics on seed recovery and germination of *Dichrostachys cinerea* and *Acacia nilotica* seeds

Julius Tjelele^{ab}, David Ward^b and Luthando Dziba^c

^aAgricultural Research Council, Animal Production Institute;
^bSchool of Biological and Conservation Sciences, University of KwaZulu Natal; ^cCSIR: Natural Resources and the Environment



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- Do grazing or browsing animals facilitate germination of woody plants?



Introduction

- Survival or digestion of seeds during the passage through the digestive tract of animals has vital implications for the population dynamics of the plant species.
- If seeds survive the digestive system they may subsequently be dispersed.



Introduction

- Herbivores may consume fruits or pods during the dry season and disperse seeds via their dung
- The survival of dispersed seeds usually falls with the length of time spent in the digestive tract of animals.



Objective

- Woody plant seeds characteristics, diet and animal species are vital for seed recovery, scarification and seed germination success.
- We studied the influence of diet (low vs. high quality), animal species and seed characteristics (size, hardness) on seed dispersal and germination of *D. cinerea* and *A. nilotica*.



Materials and methods

Goats vs. Sheep comparison

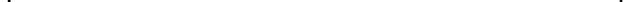
- Twenty female indigenous goats and 20 female dorper sheep were used in this study.

• Each group of 10 goats were further divided into two groups of five animals/group and each group was offered high-quality *Medicago sativa* (lucerne) hay

• The other group of 10 goats was also divided into two groups of five animals/group, where each group was offered low-quality *Digitaria eriantha* grass hay

Cattle vs. goats comparison

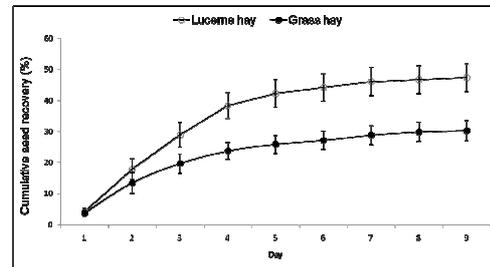
- Same procedure was followed.



Materials and methods

- Seeds recovered from each animal for the day were counted and stored in brown bags in a cool dry place pending the germination trial.
- Germination tests were subjected to a completely-crossed experimental design for both the goats vs. sheep and goats vs. cattle comparisons.
- All seeds that did not germinate at the end of 21 d were counted and subjected to a viability test.

Results

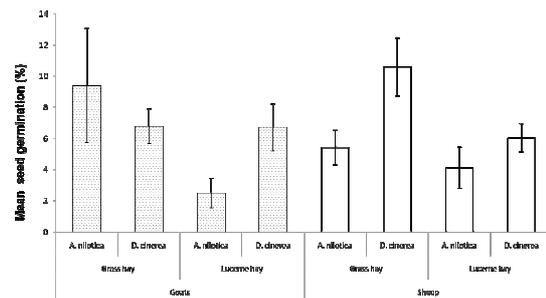


Significant effect of diet (high-quality hay and low-quality hay) on mean cumulative percentage seed recovery (goats vs. sheep comparison).

Results

• In cattle vs. goats comparison, the only significant factor was animal species on seed recovery (goats $31.98\% \pm 6.44$; cattle $50.29\% \pm 4.27$).

Results



Significant interaction effect of animal species, diet and seed species on mean cumulative germination percentage (goats vs. sheep comparison).

Results

- In goats vs. cattle comparison, animal species was the only factor with a significant effect ($P = 0.01$) on mean cumulative germination percentage (goats $14.07\% \pm 1.48$; cattle $9.33\% \pm 0.94$).
- There were more viable *A. nilotica* and *D. cinerea* seeds (83.94% and 92.17%) than dead seeds after 21 days of seed germination tests.

Discussion

- Diet of higher quality (lucerne) tends to pass quickly and unharmed through the digestive tract of herbivores and presumably carries more seeds than diet of low quality (grass).
- This may explain the significant effect of diet (high-quality hay $47.40\% \pm 4.65$; low-quality (grass) hay $30.21\% \pm 3.24$) observed on cumulative percentage seed recovery in this study.
- The more viable *A. nilotica* seeds and *D. cinerea* seeds than dead seeds from goats vs. sheep comparison.

Discussion

- Goats chew food thoroughly, which may result in seed damage and reduced seed recovery.
- The high mean cumulative percentage seed recovery for cattle (50.29%) compared to the 31.98%.
- Even though seed type did not significantly affect seed recovery, the relatively high seed recovery may be in part a function of the hard-seed coat of both *A. nilotica* seeds and *D. cinerea* seeds.

Discussion

- Seed recovery and survival of legume seeds depends on hardness and size and animal species - the retention time in the digestive tract of animals.
- In contrast, species with a hard-seed coat may pass unscarified through the digestive tract of herbivores and therefore, result in low germination.
- This proves to be the case in this study because the two seed species had relatively low germination percentages compared with high viability results.

Conclusion

- Diet fed to the animals and sometimes animal species and seed characteristics had important effects in the dispersal and germination of *D. cinerea* and *A. nilotica* seeds.

Acknowledgement



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