*Proceeding Paper*

# EFFECT OF CAMEL GUT PASSAGE ON SEED DISPERSION AND GERMINATION OF TWO *ASTRAGALUS* SPECIES (FABACEAE)

TRABELSI H.[1], KOUADRI A.[1], CHEHMA A[1]

[1]*Laboratoire des Bioressources sahariennes, Préservation et Valorisation.*
*Université Kasdi Merbah-Ouargla (Algeria)*

**Abstract**: Camels, adapted to harsh desert conditions, are known to consume various wild Fabaceae plants. This study explores the potential role of camels in dispersing and germinating seeds of *Astragalus ghysensis* and *Astargalus gombo*, two wild native Saharan Fabaceae species. Two experiments were conducted. Experiment 1 investigated the survival and germination of *A. ghysensis* seeds recovered from camel feces collected from natural rangelands. Fecal samples from each range were analyzed for seed content. Experiment 2 assessed the impact of camel digestion on seed recovery and germination. Three camels were fed *A. gombo* seeds for eight days. Feces were collected daily, and seeds were extracted and counted. The first experiment identified 3103 seeds, most of which were intact. A high proportion of Fabaceae seeds, especially *A. ghysensis* (41.57%), survived passage through the camel's digestive tract. Germination percentages were significantly higher for seeds that had passed through the camel's gut compared to control seeds. The second experiment showed that camel digestion slightly increased seed size without altering shape or color. A high percentage of seeds (45%) were recovered from feces between 48 and 72 hours. Importantly, seed germination was significantly enhanced after digestive passage. Germination percentages increased from 12.8% to 43.5% for *A. ghysensis* and 0.75% for *A. gombo* for both control and camel-passed seeds. These results indicate that camels contribute significantly to their ecosystem by dispersing viable seeds via their feces. Endozoochory facilitates the germination and establishment of various wild pastoral plant species.

**Keywords**: *Camel, Fabaceae, Seeds, Dispersion, Germination.*

## Introduction

Camels, adapted to arid environments, play a crucial role in desert ecosystems. This study investigates the potential of camels to disperse and enhance the germination of wild Saharan Fabaceae plants, particularly *Astragalus ghysensis* and *Astragalus gombo*.

## Materials and Methods

**Experiment 1 (Seed recovery from Camel faeces in natural rangeland):** In the first experiment, fecal samples were collected from natural Saharan rangeland. Each 100g sample was carefully examined to extract seeds. Intact seeds of *A. ghysensis* were then subjected to a germination test under controlled conditions.

**Experiment 2 (Animal feeding):** For the second experiment, three camels were fed 1500 *A. gombo* seeds for eight days. Faeces were collected daily, and seeds were extracted and counted. A comparison of germination rates was made between seeds ingested and excreted by camels, and controlled seeds taken directly from plants. Additionally, we measured the dimensions of seeds before and after their passage through the camel's digestive system to assess any morphological changes.

### Seed morphology and seed germination

A comparison of seed morphology and germination percentages between seeds ingested and excreted by camels, and control seeds. Germination tests were conducted with four replicates of 25 seeds each, distributed in Petri dishes, in a phytotron at 25°C in the dark for 20 days,



Corresponding author: tr.hafida@yahoo.fr

during which the number of germinated seeds was counted every two days.

**Result and discussion**

**Diversity of recovered seeds**: This study highlights the camel's significant role in seed dispersal of various plant species in arid environments. A diverse range of seeds, with *Astragalus ghyzensis* (Fabaceae) and *Helianthemum lippii* (Cistaceae) being particularly abundant. This suggests a preference for these plants, possibly due to their growth stage or high seed production. Thus, the camel contributes notably to the plant diversity of arid ecosystems.

**Figure 1.** *Astragalus ghyzensis*

**Figure 2.** *Helianthemum lippii*

**Impact on seed morphology**: while camel digestion did not induce significant morphological changes in *A. gombo* seeds, the slight increase in seed size might facilitate germination by weakening the seed coat.

**Seed recovery and germination time**: the rapid excretion of *A. gombo* seeds within 48-72 hours, coupled with the enhanced germination percentages, suggests that camels act as effective seed dispersers over short distances, contributing to the maintenance of plant populations.

**Seed survival and germination**: The germination results from both experiments indicate a significant difference between the seeds of *Astragalus ghyzensis* that passed through the dromedary's digestive tract and the control seeds. The germination rate reached 34.5% for the treated seeds compared to 12.75% for the control. However, no significant difference was observed for *Astragalus gombo* (0.75%). From these findings, we can infer that the passage of seeds through the dromedary's digestive tract has a positive impact on the viability and germination capacity of both Astragalus species.

**Tableau 1.** Effect of camel gut passage on seed germination percentage of *A. ghyzensis* and *A.gombo* (mean values ± SE)

| | Control | Camel digestif system |
|---|---|---|
| ***Astragalus ghyzensis*** | 12.8±3.20% [a] | 43.5±1.91% [b] |
| ***Astragalus gombo*** | 0.75±0.95% [a] | 0.75 ±0.95% [a] |

**Conclusion**

Camels contribute to the maintenance of plant diversity and the regeneration of Saharan rangelands. These findings underscore the importance of considering the interactions between animals and plants in conservation and restoration efforts.

**Bibliographic References**

1- Trabelsi, H., Ghedaiar, Z., Habita, I., &

Chehma, A. (2022). Effect of camel's digestive tract treatment on breaking seed germination of *Helianthemum lippii* (L) Pers. from the Northern Sahara in Algeria. *African Journal of Ecology*, *60*(3), 830–833.

2- Trabelsi, H., Chehma, A., Senoussi, A., Faye, B., & Kherraze, M. E. (2023). Camel potentiality in survival and germination of wild pastoral species: The case of Fabaceae in Sahara rangelands of Algeria. *Journal of Arid Environments*, 216, 105015