# Carcass yield of giant African snails of the species *Archachatina marginata* bred in captivity *(Swainson 1821)*

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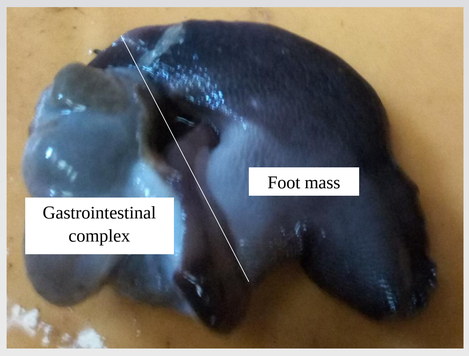
## Abstract

The carcass yield of giant African land snails of the species *Archachatina marginata* reared in captivity and subjected to a restrictive diet for 70 days, then re-fed for 70 days, was evaluated. The more severe the energy and protein restriction, the greater the rate of increase in the carcass and its various components during the re-feeding period. Despite a considerable effort due to a better feed efficiency of the re-fed subjects, the delay incurred during the feed restriction could not be fully compensated.

## Introduction

- The flesh of giant African snails is for many poor households in deprived rural areas one of the few sources of dietary protein of animal origin.
- This natural resource is constantly dwindling, because it is subject to excessive harvesting without any renewal strategy.
- To prevent this resource from disappearing, initiatives for its breeding in captivity are undertaken.
- This will require the development of livestock strategies that involve the rational use of already insufficient feed resources at the level of poor households in deprived rural areas.




- A feed ration sufficiently rich in energy and protein is essential to ensure optimal carcass yield in livestock.
- An innovative strategy would consist of reconciling the increasingly high cost of the raw materials usually used in animal feed and their efficient use for sustainable food security.
- **Research question**: Are *Archachatina marginata,* cold-blooded animal species able to fully replenish their decline in carcass yield after a certain period of feed restriction?

## Materials and methods

- 90 African giant snails of the species *Archachatina marginata* weighing an average of 52.48 ± 9.03 g were used.
- After an adaptation period of 10 days, the snails are distributed randomly into three batches of 30 animals in semi-buried enclosures made of cement blocks and fine mesh netting.
- Snails are fed collectively for 70 days with a floury type feed comprising 20.26%; 17.18% and 14.43% crude protein and 2976 kcal; 2540 kcal and 2089 kcal metabolizable energy per kg of dry matter.
- After the feed restriction phase, all batches of snails are fed for another 70 days, corresponding to the re-feeding phase, at the same level (100%) as the control batch.
- At the end of each feeding phase, eight snails are randomly sampled from each batch and slaughtered after the live weights have been recorded.

The experimental design of the study is presented in table 1 below.

Table 1: Experimental device

| Study criteria | Study phases | | | | | | |
|---|---|---|---|---|---|---|---|
| | Adaptation | Restriction | | | Re-feeding | | |
| | | Lot1 (100%) | Lot2 (85%) | Lot3 (70%) | Lot1 (100%) | Lot2 (100%) | Lot3 (100%) |
| **Trial duration (day)** | 10 | 70 | 70 | 70 | 70 | 70 | 70 |
| **Number of snails at the start of each phase** | 90 | 30 | 30 | 30 | 22 | 22 | 22 |
| **CP* (%)** | 20,26 | 20,26 | 17,18 | 14,43 | 20,26 | 20,26 | 20,26 |
| **ME* (kcal/ kg MS)** | 2976 | 2976 | 2540 | 2089 | 2976 | 2976 | 2976 |
| **Number of snails slaughtered at the end of each phase** | -- | 8 | 8 | 8 | 8 | 8 | 8 |
| **Number of snails at the end of each phase** | 90 | 22 | 22 | 22 | 14 | 14 | 14 |

*: CP: Crude protein; ME: Metabolizable Energy

## Results

- Feed consumption during the restriction phase tends to be inversely proportional to the energy and protein concentration of the ration.
- Feed consumption index is significantly more favorable ($p \leq 0.05$) in the batches of snails previously subjected to a feed restriction.

| Feeding phases | Mean feed intake (g DM/head/day) | | | Consumption index | | |
|---|---|---|---|---|---|---|
| | Lot1 (100%) | Lot2 : (85%) | Lot3 : (70%) | Lot1 (100%) | Lot2 : (85%) | Lot3 : (70%) |
| Restriction | 1,04$^{a*}$ ± 0,12 | 1,09$^{a}$ ± 0,13 | 1,13$^{a}$ ± 0,14 | 58,28$^{a}$ ± 15,41 | 103,30$^{b}$ ± 32,07 | 129,30$^{b}$ ± 30,86 |
| Re-feeding | 1,48$^{a*}$ ± 0,07 | 1,49$^{a}$ ± 0,07 | 1,49$^{a}$ ± 0,07 | 56,24$^{a}$ ± 7,89 | 36,32$^{b}$ ± 3,28 | 35,28$^{b}$ ± 3,21 |

- The carcass and its various components are significantly affected by the energy and protein restriction of the ration (Figure 1).

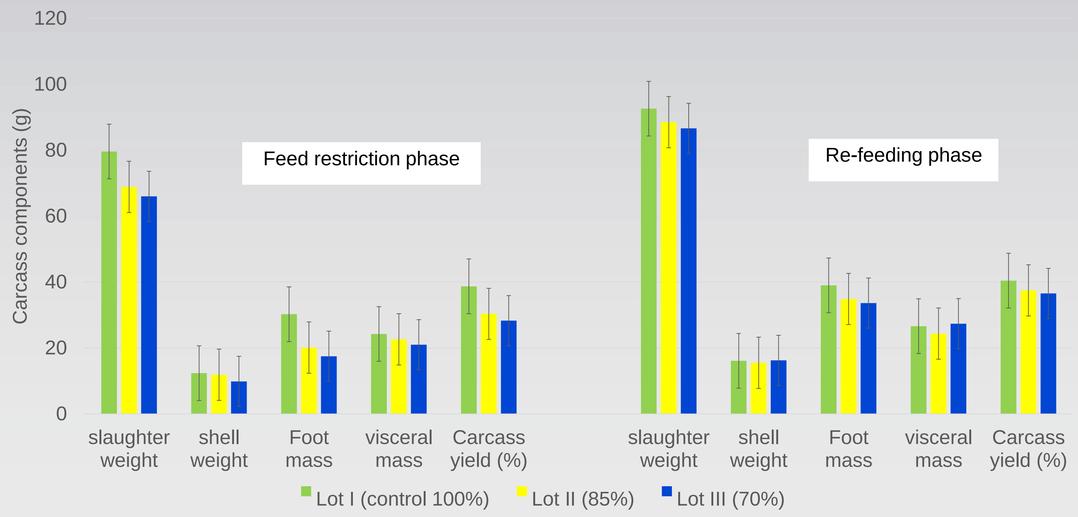



Figure 1: Characteristics of the carcass of the snail *Archachatina marginata*

- After the re-feeding period, the difference between the batch of regularly fed snails and the other batches was considerably reduced, following a better feed efficiency of the latter.
- The more severe the restriction, the greater the compensation effort.

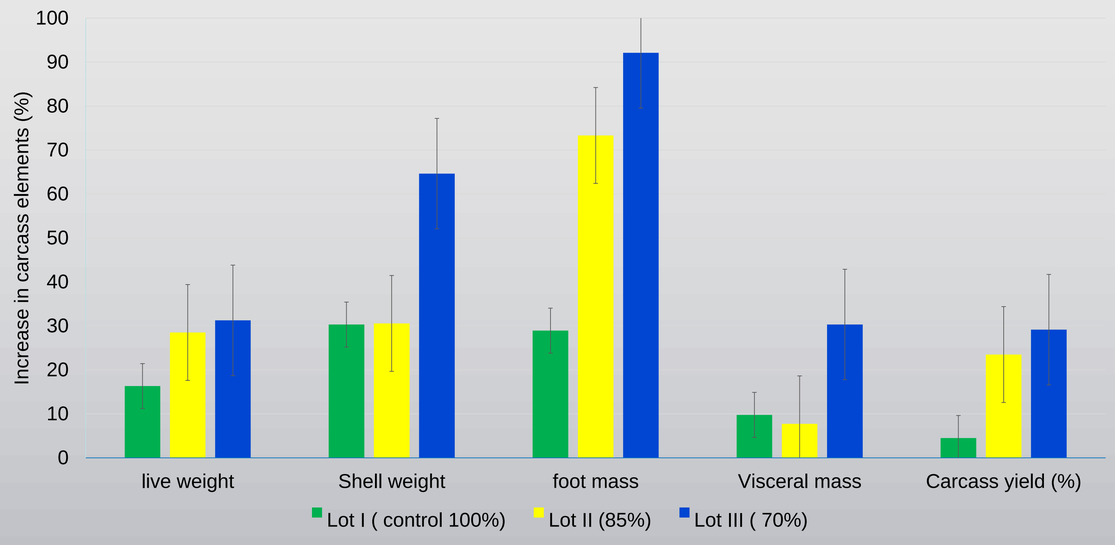



Figure 2: Increase in carcass components of *Archachatina marginata* snails between restriction and re-feeding periods

- The carcass and its various components experienced a growth rate that proved to be inversely proportional to the intensity of the restriction.
- Re-fed subjects have accelerated growth, which allows them to partially catch up on the delay recorded during the previous phase of feed restriction.

## Conclusion

- The strategy of a diet based on energy and protein restriction of the ration in giant African snails of the species *Archachatina marginata* bred in captivity has made it possible to significantly improve feed efficiency during subsequent re-feeding;
- Despite a superiority of the re-fed snails over the controls in the development of the carcass and its components, the delay incurred during the previous phase of feed restriction could not be fully compensated;
- It has been proven that an energy and protein restriction threshold of the order of 30% is strategically more effective compared to that of 15%, because the compensation effort is greater.

## Acknowledgments

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