

BIOLOGICAL STUDIES OF WILD RODENTS WITH PARTICULAR REFERENCE TO
THE SPRINGHARE (Pedetes capensis larvalis HOLLISTER) AND THE
THE AFRICAN GIANT RAT (Cricetomys gambianus WATERHOUSE).

BY

MARGARET AZUKA, ANIZOBA
B.Sc. (NIGERIA), M.Sc. (LONDON).

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A thesis submitted in fulfilment for the degree of doctor of
philosophy in the University of Nairobi.

1979.

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SUMMARY

The Springhare (*Pedetes capensis larvalis* Hollister)

1. The clumping of burrow complexes in the wild and the occurrence of more single sleeping chambers than larger chambers for 2-3 animals per burrow complex confirmed that the Springhares were semicolonial.
2. The burrow microclimate was similar to that of a jerboa and the land use in the Springhare's habitat was cattle ranching.
3. The minimum living space in the wild was approximately 24m^2 while the minimum sleeping space ranged from 0.28m^2 (single chambers) to 0.64m^2 (double chambers).
4. The peak activity of wild Springhares on dry moonless nights occurred between 8 p.m. and 11 p.m. Rainfall and low temperature reduced activity.
5. Subtle sexual dimorphism existed and the males had larger body weights, longer head and body, tail, leg and ear lengths. The males also had larger adrenals, kidneys and skulls.
6. The allometric body relationships tended towards linear functions and predictive equations were thus computed.
7. Food in the wild consisted of grass and grass seeds but never leaves of dicots. In captivity watery foods were not readily accepted and usually led to digestive upsets.

8. Dry matter intake and fecal out put of single experimental foods were significantly influenced by the food types.
9. Springhares were more efficient than the laboratory rabbit in the digestion of coarse grass, laboratory pellets and concentrated natural foods. A low dry matter digestibility value was recorded for rabbit pellets.
10. Based on a sample size of 35, the annual pregnancy rate was $52.4 \pm 40.6\%$ and the females bred all the year round. The gestation period was estimated to be 90.3 ± 5.6 days and the adult males' testes did not regress during the 12 months of study.
11. The mean dry eye lens weight of 3 new born Springhares was 49.7 ± 32.52 mg and the mean dry eye lens weights of male and female immature Springhares were 135.8 ± 14.7 mg and 253.0 ± 15.9 mg respectively. In mature males and females, the mean dry eye lens weights were 465.6 ± 101.5 mg and 400.7 ± 97.82 mg respectively.
12. Spermatozoa appeared in the cauda epididymis at testes weight of 3.64 gm and the penis in the immature animal became eversed at testes weight of 5.0gm.

13. Pregnant females showed estrous signs and mated while pregnant. Hence spermatozoa in vaginal smears did not always indicate the beginning of a gestation period and the mean estrous lengths in pregnant and non-pregnant animals were 11.0 ± 8.0 days and 6.04 ± 3.3 days respectively. The Springhare is a reflex ovulator.
14. The average thickness of the germinal epithelium of the ovaries was $11.9 \pm 4.0 \mu\text{m}$ ^{and} the thickness of the thick, fibrous tunica albuginea was $56.9 \pm 29.5 \mu\text{m}$. The mean diameters of the antral follicles and corpora lutea were $3.60 \pm 1.33 \text{ mm}$ and $7.2 \pm 0.6 \text{ mm}$ respectively. Two types of luteal cells were observed in the corpora lutea.
15. The pregnant side always had a single corpus luteum while crops of follicles grew and degenerated in the non-pre-pregnant side ovary without ovulating. Accessory corpora lutea did not form in ovaries of either the pregnant or non-pregnant sides.
16. During estrum, the vaginal epithelia did not cornify but the top cell layers separated and desquamated into the lumina.

The African Giant rat (*Cricetomys gambianus* Waterhouse)

1. The Giant rat burrows were widely separated (150-160 metres apart) thus indicating a solitary way of life.
2. Rainfall during the night reduced the Giant rats' activity and a maximum of one animal a week was captured during the wet months

while a maximum of 8 per week was obtained during the dry months.

3. Land use in the Giant rat's habitat was small scale farming and built-up areas.
4. The male Giant rats had significantly heavier total and eviscerated body weights, longer head and body, tail, leg and ear lengths than the females. The males also had higher absolute liver, kidney, spleen and eye lens weights than the females while the latter had higher absolute adrenal weights.
5. Allometric relationships were not common between the body components in both the male and female Giant rats. Predictive equations were computed with the total body weight, head and body length, liver weight and the anterior tibialis muscle weight regarded as the 'independent variables'.
6. In the wild, the Giant rat fed on wild and cultivated fruits, seeds, grains and tubers such as tomatoes (Lycopersicon esculentum), Kei apple (Dovyalis caffra), Sweet potatoes (Ipomoea batata) and maize (Zea mays). The Giant rat adapted easily to foods fed to laboratory animals such as mice pellets, guinea-pig pellets, Carrots and Cabbages. The rate of dry matter intake and digestibility of maize, Irish potato, Carrot, Cabbages, mice pellets, guinea-pig pellets and dried wheat were similar to those observed in the laboratory guinea-pigs.

7. The Giant rat bred all the year round but during the rainy seasons more males and females were in breeding condition than during the dry seasons.
8. The Giant rat is a spontaneous ovulator with a mean ovulation rate of 5.67 ± 0.58 per female. The mean estrous cycle length was 4.4 ± 1.9 days and the vulva was swollen, dry and pink at estrum. The vaginal smear technique was a reliable indicator of the ovarian activity.
9. Vaginal closure occurred in both captive and wild adult animals and in such females, vaginal epithelium was thin (45.7 ± 38.7 μm thick) with only two cell strata. The occurrence of vaginal closure was not seasonal.
10. The germinal epithelium of the ovary was 8.2 ± 2.17 μm thick and the thickness of the thick, cellular, indistinct tunica albuginea was 57.8 ± 23.12 μm . The mean diameters of the antral follicles and corpora lutea were 747.6 ± 331.8 μm and 1403.4 ± 324.3 μm respectively. Two types of luteal cells were observed in the corpora lutea.
11. The gestation period was estimated to be 32.3 ± 2.8 days based on the 'placental sign' technique.
12. Age determination was based on sexual maturity criteria such as body weight, fur texture and colour, dried eye lens weights, teat length for females only and penis eversibility in the males.

Immature males and females had mean dried eye lens weights of 16.71 ± 3.35 mg and 14.60 ± 5.0 mg respectively. In mature animals, the mean dry eye lens weights were 25.23 ± 1.28 mg and 22.76 ± 3.82 mg respectively.

13. Among the male Giant rats, spermatozoa appeared in the epididymal smears at testes weight of about 2.10 mg and the penis became everted at testes weight of about 5.30 mg.