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التغيرات الموسمية في شكل وهستولوجيا الأعضاء التناسلية لذكر الجمل وحيد السنام

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تم في هذا البحث دراسة التغيرات الموسمية المختلفة في كل من الشكل الظاهري والتركيب الهستولوجي للأعضاء التناسلية لذكر الجمل وحيد السنام ، وقد شملت الدراسة عدد ٢٤ زوجا من الخصي والبرابخ وكذلك جسم غدة البروستاتا التابع لهم والتي تم جمعها من ذكور الجمال الناضجة السليمة وقد فحصت جميعها من ناحية الشكل والتركيب الهستولوجي خلال المواسم الأربعة ٠

وقد أسفر البحث عن وجود زيادة معنوية جدا في كل من وزن الخصية وحجمها خلال موسم الربيع والشتاء بالنسبة لموسم الصيف ، كما سجل وزن البربخ خلال موسم الربيع زيادة معنوية جدا وزيادة معنوية عنه خلال موسمي الصيف والشتاء بالترتيب ٠

كذلك لوحظ وجود زيادة غير معنويه احصائيا في وزن جسم غدة البروستاتا خلال موسم الربيع بالنسبة لموسمي الصيف والشتاء ٠

ومن الناحية الهستولوجية فقد تبين وجود أطوار كاملة لتكوين الحيامن وكذلك زيادة واضحة في النسيج بين الخلوي في الخصية خلال موسمي الربيغ والشتاء ٠

وقد كان متوسط قطر الأنيبيات المنوية ٢١٦ ميكرون خلال موسم الربيع و١٩٨ ميكرون أثناء الشتاء و١٨٦ ميكرون في موسم الخريف و١٦٨ ميكرون خلال الصيف ٠

وبالنسبة للبربخ فقد لوحظ أنه مبطن من الداخل بخلايا عمادية مع وجود عدد كبير من الحيامن بداخله أثناء الربيع بينما تبين خلال الصيف أن تجويف البربخ كان محتويا على مادة حمراء متجانسة من بلازما البربخ ٠

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SEASONAL CHANGES IN THE MORPHOLOGY AND HISTOLOGY OF THE GENITAL ORGANS OF THE MALE ONE-HUMPED CAMEL

(With One Table & 5 Figs.)

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SUMMARY

The different seasonal changes in the morphology and histology fo the genital organs of the male one-humped camel were studied. A total of 24 pairs of testes together with the corresponding epididymides and the relating body of the prostate gland, collected from adult healthy male camels, were examined morphologically and histologically. A high significant ($P \leq 0.01$) increase in both testicular weight and size was detected during Spring and Winter against Summer. The epididymal weight during Spring was high significantly ($P \leq 0.01$) and significantly ($P \leq 0.05$) increased than those of Summer and Winter respectively. Statistically non significant increase in the weight of the body of prostate was detected during Spring against Summer and Winter. Histologically, complete normal spermatogenic cycle and increased interstitial tissue were observed in the testes during Spring and Winter. The average diameter of the seminiferous tubules during Spring was 216 um and it was 198 um in Winter, 186 um during Autumn and 168 um in Summer. The epididymides showed columnar epithelial cell lining with large number of spermatozoa in the lumen during Spring against homogenous acidophilic epididymal plasma in the lumen during Summer. The histological examination of the prostate revealed marked activity during Spring and Winter.

INTRODUCTION

The frequency and the efficiency of reproduction in camels and the different factors influencing them, were investigated by many research-workers over the last few years (LEESE, 1927; ASHOUB, 1936; VOLCANI, 1954; CHARNOT, 1936 and 1964; OSMAN and EL-AZAB, 1974 and ABDEL-RAOUF, et al. 1975).

In Egypt, ASHOUB (1936) stated that Spring is the rutting season of camels and during which mature spermatozoa are produced by the testes and probably not at other times. ABDEL-RAOUF (1965) studied a case of bilateral partial testicular hypoplasia in a male camel and he measured the tubular diameter of the normal seminiferous tubules.

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OWAIDA (1973) studied the changes in the morphology of the camel testes in relation to age and season and he observed that the testicular weight was heavier during Spring and decreased in Summer. Moreover, the greatest diameter of seminiferous tubules was found in the material collected during Spring.

In Morocco, CHARNOT (1963) studied the seasonal histological changes in the camel testes and revealed that the testicular weight increased from November to May with increased amount of interstitial tissue. he added that spermatogenesis slowed down from May to october and few spermatozoa were found in the lumen of seminiferous tubules. NOVOA (1970) reviewed the histological changes in the camel testes and mentioned that during the season of sexual activity, the diameter of the seminiferous tubules averaged 183 um with 5 to 6 layers of germ cells in various stages of differentiation.

The present work was planned to reveal the effect of the season on both the morphology and histology of the genital organs of the male camel (Camelus dromedarius).

MATERIAL and METHODS

The material of the present work was collected from Beni-Adi (Assiut) slaughter-house over the course of one year. These included 24 pairs of testes and epididymides, together with the body of the prostate gland of the examined camels. The material was collected directly after slaughter. Testes were removed and stripped of the surrounding tunics and adhering structures, then weighed and the volume estimated by water displacement. The epididymis was separated and weighed according to the techniques of OSMAN and EL-AZAB (1974).

Thin slices were taken from the parenchyma of the testis, the correspending epididymis and body of the prostate gland, kept in 10% formalin buffer solution. These formalin-fixed specimens were processed in the laboratory for paraffin sections as usual. Sections were cut and stained with H & E and PAS-reaction for detection of the histological changes in these organs according to the techniques of DRURY and WALLINGTON (1980). The diameter of 6 semi circular seminiferous tubules in each testis was measured in microns using micrometer calibrated lens.

Analysis of data was carried out according to the statistical procedures of SNEDICOR and COCHRAN (1967).

RESULTS

The results of the testicular weight and volume, weight of the epididymis and body of the prostate are illustrated in table (1). There was a highly significant ($P/ 0.01$) increase in both the testicular weight and size among the material collected during Winter and Spring than those collected during Summer. A significant ($P/ 0.05$) increase was observed during Autumn than during Summer relating the weight and size of the testis. As for the epididymis, the highest weight was observed among the epididymides collected during Spring with a high significant ($P/ 0.01$) increase than those of Summer and a significant ($P/ 0.05$) increase than those of Winter.

The histological examination of the testes collected during Spring and Winter revealed the presence of a complete spermatogenic cycle, where the seminiferous tubules contained

spermatogonia, spermatocytes, spermatides and spermatozoa (Fig. 1). In addition, the interstitial tissue increased markedly with evidence of oedema. On the other hand, the examination of the testes collected during Summer revealed the presence of incomplete spermatogenic cycle with absence of spermatozoa (Fig. 2).

The average diameter of the seminiferous tubules during Spring reached 216.0±1.05 Um and it was 198.0±1.9 Um during Winter, while it averaged 186.0±3.3 Um during Autumn and 168.0±1.41 Um during Summer. There is a high significant ($P < 0.01$) and a significant ($P < 0.05$) inerease in the diameter of the tubules during Spring than during Summer and Autumn respectively. A high significant increase ($P < 0.0$) during Winter than during Summer was also noticed.

The histological examination of the epididymids during Spring revealed that the epididymal wall was lined by high columner epithelium with large number of spermatozoa in the lumen (Fig. 3). The epithelial height was 57.0±3.0 Um. The corresponding figures during Winter and Autumn were 49.5±2.1 Um and 41.3±2.7 Um respectively. During Summer, the epithelial linning was low columnar (29.0±4.3 Um height) together with homogenous acidophilic epididymal plasma only in the lumen (Fig. 4). Statistically, there is a significant ($P < 0.05$) difference between Spring and Summer and a high significant ($P < 0.01$) difference between Winter and Summer.

The average weight of the body of the prostate gland showed slight non-significance during the different studied seasons. The histological picture of the prostate gland during Spring (Fig. 5) showed that the average diameter of the secretory end pieces was 65.1±2.9 Um and the average height of the epithelium was 24.3±1.2 Um. The bulk of the gland was formed by glandular high columnar epithelium, while the interstitial connective tissue was reduced to its minimal amount. The apical border of these columnar cells showed bleb-like cytoplasmic protrusions which indicate their apocrine mode of secretion. The nuclei appeared vesicular, round in shape and basally situated. The cytoplasm was pale and contained secretory granules.

During Winter, the average diameter of the secretory end pieces was 61.6±2.8 Um and the epithelial height was 22.4±1.7 Um. The rest of the picture was nearly similar to that of Spring.

The corresponding figures during Autumn were 55.0±2.3 Um and 15.5±0.8 Um respectively. The cytoplasm was more acidophilic and granular.

The picture during Summer showed that the diameter of the secretory end pieces was 46.4±1.6 Um and the epithelial height was 13.2±0.7 Um. The interatitial connective tissue was relatively abundant and the cytoplasm was highly acidophilic. A high significant increase ($P < 0.01$) in both dimensions was obtained during Spring and Winter in relation to Summer.

DISCUSSION

The results of the present work revealed that the seasonal changes in the weight of the testes of the examined camels were obvious. The testicular weight during Spring showed a high significant ($P < 0.01$) increase than during Summer. A high significant ($P < 0.01$) increase during Winter and a significant ($P < 0.05$) increase during Autumn in relation to Summer were also detected in the testicular weight. Similar seasonal changes in the weight of the camel testes were previously recorded by TAYEB (1951/52); VOLCANI (1954); YASIN and ABDUL-WAHID (1957); CHARNOT (1963 & 1964); OWAIDA (1973); EL-WISHY and Omar (1975); WILSON (1978 & 1984) and ARTHUR, et al. (1985).

VOLCANI (1954) mentioned that the camel testis during Winter averaged 96 gm and it was 66 gm during Summer. OWAIDA (1973) concluded that the weight of the testes was much heavier during Spring and decreased in Summer and reincreased during Autumn and Winter.

The highest weight of the epididymis was observed among the materials collected during Spring with a high significant ($P/ 0.01$) increase and a significant ($P/ 0.05$) increase than those of Summer and Winter respectively. A somewhat different results were recorded by OSMAN and EL-AZAB (1974) who found a lesser total epididymal weight of 14.7 ± 1.7 gm during Spring and 14.9 ± 1.4 gms during Autumn among Egyptian camels. The histological picture of the testes during Spring and Winter reflected the presence of complete spermatogenic cycle and increased interstitial tissue which indicates increased activity of the gonads during these seasons. Conversly, the testes during Summer showed a wide lumen seminiferous tubules free from spermatozoa. These findings are in accordance with those of BODENHEIMER (1954); VOLCANI (1954); CHARNOT (1964); OWAIDA (1973) and ABDEL-RAOUF, et al. (1975) who concluded that active spermatogenesis with spermatozoa in the lumen of the seminiferous tubules was mainly observed during Spring and that all germ cells except spermatozoa were found during different seasons. They added that the number of mature leydig cells increased markedly during late Winter and Spring.

The diameter of the seminiferous tubules of the examined material averaged 216.0 ± 1.05 Um during Spring, 198.0 ± 1.9 Um in Winter and 186.0 ± 3.3 Um and 168.0 ± 1.41 Um during Autumn and Summer respectively. These findings are nearly in accordance with those of ABDEL-RAOUF, et al. (1975) who recorded an average diameter of 218.35 Um during Spring and 195.85 Um during Summer of the seminiferous tubules of camels, OWAIDA (1973) found that the diameter of the seminiferous tubules fluctuated around 210 Um in adult camels. However, a smoewhat lower figures were obtained by VOLCANI (1954) who recorded 183 Um as an average diameter of seminiferous tubules in camels during the months of sexual activity and 130 Um in the inactive season. The presence of large number of spermatozoa in the lumen of the epididymides examined during Spring together with the increased epithelial height can be considered as an indication of increased epididymal activity during Spring. Moreover, the detected increase in the weight of the body, the diameter of the secretory end pieces and the height of the epithelium of the prostate gland together with the observed reduction in the amount of the interstitial connective tissue in the gland during Spring in relation to other seasons,reflacts the marked activity of the gland during Spring.

Finally, it can be concluded that the genital organs of the male one-humped camel are mostly in their optimum functional activity during Spring.

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LIST OF FIGURES

Fig. (1): Testis showing complete spermatogenic cycle during Spring (X 125).

Fig. (2): Testis showing incomplete spermatogenic cycle at mid-Summer (X 125).

Fig. (3): Epididymis lined with high columnar epith. and large number of sperms in the lumen during Spring. (X 125).

Fig. (4): Epididymis with its lumen free from sperms at mid-Summer (X 125).

Fig. (5): Body of prostate gland with papillary projection in the acini during Spring (X 125).

Table (1)
Average weights and measurements of the genital organs during different seasons

Season / Parame ters	Winter	Spring	Summer	Autumn
Number of animals	4	11	3	6
Age (Years)	11.25 (8-13)	7.27 (4-11)	5.66 (4-7)	8.5 (6-11)
Live body weight (Kg)	550 ±35.35	554.5±17.16	500 ±57.8	525 ±42.34
Weight of testis (gm)	83.75±6.73**	83.63±6.79**	53.0 ±6.57	82.66±9.98*
Volume of testis (ml)	82.75±6.72**	81.22±6.76**	53.0 ±6.57	80.08±9.72*
Diameter of seminiferous tubules	198.0±1.9*	216.0±1.05**	168.0±1.41	186.0±3.3
Weight of epididymis (gm)	14.62±1.08	17.0±0.59**	13.66±0.92	16.08±0.75*
Epithelial height (Um) of epidid.	49.5 ±2.1**	57.0 ±3.0**	29.0 ±4.3	41.3 ±2.7*
Weight of body of prostate (gm)	21.25±1.37	23.75±1.38	20.0 ±4.36	22.5 ±1.91
Diameter of secretory end pieces (Um) of prostate	61.6 ±2.8**	65.1 ±2.9**	49.4 ±1.6	55.0 ±2.3
Epithelial height (Um) of prostate	22.4 ±1.7**	24.3 ±1.2**	13.2 ±0.7	15.5 ±0.8

Mean ± Standard erroe
** = Highly significant (P/ 0.01)
* = Significant (P/ 0.05)