Monthly changes in testes and epididymis measurements with some semen characteristics of tail epididymis for Iraqi buffalo

Mohammed Mehdi AL-Sahaf and Najlaa Sami Ibrahim
Department of Surgery and Obstetrics, College of Veterinary Medicine, University of Baghdad, Iraq
Accepted: 8/5/2012

Summary

The present study was carried out to investigate the reproductive activity of mature buffalo bull and months changes on the testes and epididymis. Two hundred and fifty (250) testes of mature buffalo bull were collected from the slaughter house east Kerbalaa city from December/2010 to September2011 ,visual examination of the male before slaughter was done to make sure it is healthy. Semen was collection from the left testes before slaughtering via aspiration from the tail of epididymis and make semen evaluation individual motility, viability, concentration and abnormalities. After slaughtering the right testes measuring the length and width then carefully dissected the epididymis and measuring the length and weight of epididymis and measuring the weight of testes, diameter and weight of epididymis tail. The present results demonstrated increased ($P<0.05$) significantly in weight, length and width in testes in March and April, and increased significantly in length, weight of epididymis, diameter and weight of epididymis tail in April and May. The individual motility higher significantly $P<0.05$ in December January and April, and the live sperm higher significantly in April, March and May, and the concentration higher significantly in April , May and March, while the abnormalities was higher significant in August ,July and September. From all these results conclusion reproductive activity of buffalo bull and semen physical characteristics increased in the moderate and cold months and decreased in hot months .The increased of ambient temperature in hot months lead to disturbance in reproductive activity but don't stopped it .

Keywords: testes, male buffalo, epididymis, buffalo semen characteristics.

التغيرات الشهرية في قياسات الخصى والبربخ وبعض فحوصات السائل المنوي لذيل البربخ للجاموس العراقي

محمد مهدي الصحاف ونجلاء سامي ابراهيم
فرع الجراحة والتوليد - كلية الطب البيطري - جامعة بغداد - العراق.

الخلاصة

تضمنت الدراسة الحالية التغيرات الشهرية في قياسات الخصى والبرابخ ونشاط الذكور في الجاموس العراقي. تضمنت الدراسة 250 خصية أخذت من مجزرة شرق مدينة كربلاء وللفترة من شهر كانون الأول ولغاية شهر ايلول ,أجري فحص عياني للذكر قبل الذبح للتأكد من سلامته الصحية. وأجري تقييم للسائل المنوي (الحركة الفردية ،الحيوية ،التركيز والتشوهات)للسائل المسحوب من ذيل البربخ .وزنت الخصية اليمنى بعد الذبح وأخذت أبعاد الخصية والبربخ بصورة منفصلة .بينت الدراسة الحالية وجود زيادة معنوية في وزن وأبعاد الخصية في شهر اذار ونيسان ,وزيادة معنوية في وزن وطول البربخ وقطر ووزن ذيل البربخ في شهر نيسان وايار .اما الحركة الفردية اظهرت زيادة معنوية في كانون الاول وكانون الثاني ونيسان ،وكذلك نسبة النطف الحية ارتفعت معنويا في شهر نيسان واذار وايار ،وزيادة معنوية في نسبة التشوهات في شهر اب وتموز وايلول .نستنتج من هذه الدراسة أن الفعالية التكاثرية لذكور الجاموس والصفات الفيزياوية للسائل المنوي أرتفعت في الأشهر المعتدلة والباردة وانخفضت في الشهر الحارة ،مما يدل على ان زيادة درجة حرارة المحيط في الأشهر الحارة قد أدت الى حدوث اضطرابات في الفعالية التكاثرية ولكن لا تؤدي الى توقفها .

الكلمات المفتاحية: خصى الجاموس , بربخ الجاموس , فحوصات السائل المنوي للجاموس.
الكلمات المفتاحية : الخصى , ذكور الجاموس , البربخ, صفات النطف.

Introduction

There are about 130 to 150 million domesticated buffalos which are widely distributed throughout the world and they exist as two main types, namely river and swamp buffalo (1) .About 150 thousands of buffaloes are reared in Iraq (Ministry of agriculture, 2006). However, the reproductive physiology is a limit to full buffalo productivity, as fertility is considerably lower in this species than in cattle (2). A morphological study of the testis is mandatory to evaluate the influence different factors, such as hormonal fluctuations of the photo-neuroendocrine circuit may have on reproductive efficiency which may be a result of seasonal variation (3). The morphophysiology of the male gonad is influenced by the pineal and pituitary incretions during the year which consequently may influence spermatic composition (4). The functions and morphology of the genital tract may also be modified in relation with the sperm maturation events taking place at this level (5).Therefore, the aim of this investigation was to evaluate useful parameters to determine the relationship between gonadic physiology and reproductive variation during the(December to September) .

Materials and Methods

Two hindered and fifty samples of testes for mature buffalo bulls aged 3- 6 year obtained from the slaughter house in east from Kerbalaa city during period from December 2010to September2011 in 3 times a week, visual examination of the male before slaughter was done to make sure it is healthy by the veterinarian. Samples from the testes before slaughtering by injection 1 ml normal saline in the tail of epididymis of the left testes and aspiration of semen to evaluated immediately (6). After slaughtering the right testes placed in a plastic box which contain ice until transport to the laboratory, remove the tissue which surrounding the testes and the epididymis by scissors and scalpel. Then carefully separating the epidydymis from the testes and weight of the testes by using digital electrical balance were taken and measuring the length and width by the vernea. Measuring the length of epidydymis, diameter of cauda epidydymal (vernea), the weight of epidydymis and weight the cauda of epidydymis by using digital balance. Data were analyzed statistically by complete randomized design in one -way ANOVA .Group differences were determined using Duncan Test at ($P \leq 0.05$) .To statistical analyzed we used (7).

Results and Discussion

The table (1) shows that testicular weight increased significantly ($p<0.05$) in January, April. Testicular length and width increased significantly ($p<0.05$) in April and February.

Table (2) epididymal weight increased significantly ($p<0.05$) in April, May and March. The epididymal length were increased in December ,April and May .The diameter tail of epididymis are increased significantly($p<0.05$)in April, May and March these are demonstrated in table (2) .The tail weight of epididymis showed increased significantly ($P<0.05$) in April, May and December .These increased in weight ,length and width in this months indicated increased the physiological activity of the testes in these months and increased in activity of seminiferous tubules and sperm production in the testes like the morphometric measures of testes in the different seasons (8),in bull (9 and 10)and resemble studies on camel (11) goat (12). The moderate temperature and moderate lighting period lead to decreased time of affecting the testes to high temperature then decreased the weight and volume the testes and decreased the semen production (13).This differences between moghomeric measures as result of differences in seasons that effect on the activity of the animals and the reproductive organs especially the testes (14).

Table (1) Effect of months on weight, length and width of buffalo testes (Mean ±SE)

Months	Weight gm	Length cm	Width cm
December	99.32±1.78^{ab}	8.70±0.40^{b}	4.26±0.12^{b}
January	106.48±3.86^{a}	8.88±0.20^{b}	4.17±0.07^{b}
February	100.80±1.56^{ab}	9.44±0.23^{a}	4.38±0.12^{ab}
March	98.46±1.43^{a}	9.17±0.20^{ab}	4.47±0.13^{ab}
April	105.36±1.23^{a}	9.69±0.17^{a}	4.62±0.11^{a}
May	96.08±3.78^{ab}	9.38±0.17^{a}	4.53±0.08^{a}
June	99.80±0.77^{ab}	9.07±0.14^{ab}	4.43±0.07^{ab}
July	100.16±0.86^{ab}	9.27±0.15^{ab}	4.31±0.07^{ab}
August	96.20±1.07^{b}	9.13±0.16^{ab}	4.50±0.06^{a}
September	95.20±1.28^{b}	9.28±0.17^{ab}	4.42±0.09^{ab}

Different small letters significant (P< 0.05) between months.

Table (2) Effect of months on length and weight of epididymis parts and diameter, weight of epididymis tail (Mean ±SE)

Months	Length epididymis (cm)	Weight Epididymis (gm)	Diameter tail epididymis (cm)	Weight tail epididymis gm
December	16.92±0.22^{a}	19.69±0.46^{c}	1.74±0.07^{c}	6.52±0.21^{b}
January	14.90±0.10^{d}	18.72±0.43^{c}	1.57±0.05^{b}	5.64±0.13^{c}
February	14.72±o.11^{d}	18.36±0.48^{c}	1.67±0.06^{d}	5.43±0.12^{c}
March	15.14±0.08^{d}	19.36±0.44^{bc}	1.84±0.04^{b}	6.08±0.11^{b}
April	16.46±0.12^{b}	21.68±0.43^{a}	1.98±0.05^{a}	7.55±0.16^{a}
May	15.88±o.12^{c}	20.40±0.32^{b}	1.88±0.04^{ab}	7.32±0.14^{a}
June	14.87±0.10^{de}	17.04±0.34^{d}	1.73±0.04^{c}	5.86±0.12^{c}
July	14.65±0.09^{ef}	16.40±0.31^{e}	1.60±0.04^{d}	4.58±0.09^{d}
August	14.46±0.11^{f}	15.52±0.28^{e}	1.54±0.06^{d}	4.53±0.10^{d}
September	15.03±0.07^{d}	17.44±0.43^{d}	1.65±0.05^{d}	5.86±0.19^{b}

Small different letters indicated significant difference between months (P< 0.05).

The results obtained(Table 3) indicated that the sperm aspirated from the tail of epididymis showed months-related differences ,even if accompanied by remarkable variations between individuals (3). In addition, the individual motility increased significantly (p<0.05) in December, January and April. The motility was affected by the year, season and age of the buffalo bull (15). The sperm motility did not differ between seasons (16). While the concentration of sperm cells was significantly (P<0.05) higher in April, May and March table (3). This increase could be altered to effect of ambient temperature, it is moderate that due to increase the grass , good feeding and good healthy lead to increase the physiological activity of the testes in this months and increased in activity of seminiphrus tubules and sperm production in the testes this process regulate by the increased testosterone hormone ,these results corresponding to the (17). Table (3) showing that sperm viability increased significantly (P<0.05) during April, March and May. The correlation between motility ,concentration and viability highest significant in the same months that lead to increase activity of the animals in this months, percent of life sperm reach to the highest maximum in spring and winter and decrease to the minimum in summer this may be due to activity of ambient changes during this seasons especially the temperature ,the higher temperature could be lead to heat stress to the testes and decreased sperm viability, a variety of factors

affect the viability of sperm such as variation in age ,breed and feeding regime (18), the ambient temperature and the seasons play important role in sexual behavior in cattle especially on physical characteristics (15) ,the decline in semen viability during humidity hot and cold months over other seasons(17) .These might be due to breed and nutritional differences ,semen production largely depend on the factors like age, sexual maturity, nutritional status ,general health condition ,endocrine balance and soundness of the sex organs and seasons (19). Testicular and paired epididymal sperm production as affected by breed and season (20). Sperm abnormal morphology depending on the results clarified in table (3) there was a significant depression ($P<0.05$) of sperm abnormal morphology in April, March and May and the results of abnormal sperms morphology showed a significant increase ($P<0.05$) in August, July and September. In the present study definite seasonal influence was observed on the total number of abnormal spermatozoa in the semen ,this number was found to be highest in summer and lowest in spring ,the high temperatures of summer adversely affected the process of spermatogenesis ,resulting in a high number of abnormal spermatozoa in the months to follow like September ,the correlation between semen characteristics that recorded in moderate and cold seasons corresponding with lowest in abnormities in these seasons and obtain good semen quality in these seasons comparative with hot seasons .The increase of environmental temperature especially in summer and beginning of autumn that affected to testes lead to increased temperature of the scrotum and increased sperm abnormalities in the testes and continuous for long time after the moderate the temperature (21).

Table (3): Monthly changes in semen characteristics of epididymis tail buffalo (Mean ±SE)

Months	Individual motility%	Live sperm %	Concentration $X10^6$/gm	Abnormalities %
December	74.16 ± 1.75^{a}	74.56 ± 1.18^{bc}	155.60 ± 2.76^{cd}	11.60 ± 0.50^{cd}
January	73.00 ± 1.34^{a}	75.56 ± 0.78^{b}	159.88 ± 2.23^{c}	10.85 ± 0.55^{cd}
February	69.80 ± 1.39^{ab}	73.32 ± 0.79^{bc}	161.96 ± 1.64^{c}	11.64 ± 0.40^{cd}
March	69.72 ± 2.75^{ab}	76.40 ± 0.93^{ab}	170.00 ± 1.41^{b}	10.12 ± 0.40^{d}
April	73.60 ± 1.02^{a}	79.00 ± 0.70^{a}	189.12 ± 2.18^{a}	9.32 ± 0.43^{d}
May	72.92 ± 1.18^{ab}	76.24 ± 0.97^{ab}	186.92 ± 2.68^{a}	10.16 ± 0.48^{d}
June	68.68 ± 0.94^{b}	72.92 ± 0.92^{cb}	166.56 ± 2.90^{b}	12.20 ± 0.58^{c}
July	68.00 ± 0.96^{b}	68.72 ± 1.36^{d}	153.16 ± 2.22^{de}	14.68 ± 0.64^{ab}
August	68.80 ± 1.01^{b}	69.60 ± 1.36^{d}	151.16 ± 2.68^{e}	15.56 ± 0.57^{a}
September	69.80 ± 1.13^{b}	71.36 ± 1.06^{d}	160.36 ± 2.59^{c}	13.40 ± 0.53^{bc}

Different small letters significant ($P<0.05$) between months.

In conclusion the morphological modifications occurring in the testis and epididymis in response to the different factors brought about by seasonal variations that, starting from the retina and involving the pineal/hypothalamus/pituitary/gonadal axis, modulate the hormonal fluctuations which, in turn, influence the spermatogenesis process.

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