SERUM ESTRADIOL AND PROGESTERONE IN IMMATURE MALE AND FEMALE WATER BUFFALO \textit{(Bubalus bubalis)} IN MARSHES OF IRAQ

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ABSTRACT

The present study aimed to determine some of reproductive values of water buffaloes in marshes of Iraq which may be used as a primary values for assaying the reproduction and production of water buffaloes. The study performed on immature male and female water buffaloes. Estradiol and progesterone hormones were determined. The results showed effect of sex on the levels of estradiol and progesterone of male and female buffaloes. The age was effective in estradiol and progesterone levels of female buffaloes, while it was no effective on estradiol and progesterone levels of male water buffaloes.

INTRODUCTION

The buffalo is an important dairy animal in many developing countries. The buffaloes are suitable for this, because of their high disease resistance and the opportunities of milk production despite feeding with low quality roughage \cite{1}. The buffaloes are multipurpose animals and have been used for milk production, meat production and draft power for more than 5000 years \cite{2}. Reproduction management is a major concern for the dairy industry, because inefficient heat detection causes significant economic losses \cite{3}.

Male water buffaloes are sexually mature at the age of 18 months \cite{4} and can be used as sires from the age of 3 years \cite{5}. \cite{6} showed that female buffaloes are polyestral and their reproduction is seasonal. The highest percentage of females in heat was observed in November, the lowest in June. External symptoms are hardly noticeable, thus full acceptance of the male is the most reliable symptom. A common phenomenon is heat with no symptoms, known as silent oestrus \cite{7}. Females are sexually mature at the age of 15–18 months and ready to reproduce when they are 24–36 months old \cite{6}.

There are many idea regarding the back history of water buffalo in Iraq, the dominant one was that buffaloes had been domesticated since third millennium B.C in Mesopotamia during Sumerian Era \cite{8,9}. Buffaloes is considered one of the animals that has wide spread in the marshes area in the south of Iraq. There is no house in the marshes area don’t have it. Buffaloes lived with circumstances of the environment. It is considered as the main source for living the people of marshes. It was considered as a source of insurance for care taker and his family to face the requites in that area. The buffalo isn’t get the sufficient importance in the past either by centers of investigation or
from the agriculture offices or veterinary college\cite{10,11}. The number of buffaloes in Iraq was 250 thousand head in the middle of the last century, and was a source of livelihood for a large segment of the rural population and especially the inhabitants of the marshes. However, and due to political and economic circumstances experienced by Iraq during the last five decades, from wars, draining the marshes, economic blockade and removal of subsidies on feed, and thus migration of buffalo farmers from the South part to other regions in middle and north parts of Iraq, for more water and fodder is cheap, that number has dropped dramatically\cite{12}. The latest Iraqi buffalo population is estimated about (285,537 heads) and distributed on 15 provinces with highest percent on the Basra province in south marshes about (57704 heads), Thi--Qar province (49283 heads), Baghdad (47809 heads) mainly in fadiliaya village in the east boundary of the capital and Missan province(24345heads)\cite{13}.

Steroid hormones are secreted by the ovary, testes, placenta and adrenal cortex. The two classes of hormones produced by the ovaries are progestins and estrogens and have cholesterol as a common precursor. Progestins are a group of hormones with similar physiological activity, the most important being progesterone (P4). This latter has a dominant role in regulating the oestrus cycle. Estrogens are hormones produced by the ovary and are transported in the body by binding proteins. Estrogens act on the central nervous system in order to induce behavioral oestrus in females and the most important of these hormones is estradiol\cite{14}.

The aim of the present study is to complete the above study by determine the levels of estradiol and progesterone in male and female of water buffalo.

**MATERIALS AND METHODS**

**Animals**: Forty immature male and female water buffaloes at marshes of south of Iraq were used during the period between October 2007 – May 2008. The animals were divided into two groups of age, the first one was equal or less than 6 month and the other was more than 6 months (6-12 months). Blood samples were collected from jugular vein under possible minimal stress. These samples were put in a tube with out any anticoagulant to separate serum by using a centrifuge with 2500 for 15 minutes for assaying the levels of hormones.

**Measurements of hormones**: Levels of testosterone, estradiol and progesterone were determined by Enzyme Linked Immuno Sorbent Assay (ELISA) by using of Elisa reader type BioElisa ELX800, Germany, with kits, BioCheck, Inc, Germany.

**Statistical analysis**: Statistical analysis was performed using one way analysis of variance (ANOVA). If a significance was found, differences among individual group means were tested by the least significant difference (LSD) test. Values were considered statistically significant at $P \leq 0.05$.

**RESULTS**

1- **Effect of sex and age on estradiol level**

The results of the effect of correlation between sex and age of the level of estradiol in immature male and female water buffaloes were presented in table (1). These results showed a non significant effect of age on estradiol level in male water buffaloes,
whereas there was a significant increase in estradiol level of female water buffalo at age more than 6 months compare with these female at age equal or less than 6 months. The results indicated a significant increase in estradiol levels in two age groups of female water buffalo compare with male water buffalo at ≤ 6 months and these at > 6 months old.

Table (1) : Effect of sex and age on Estradiol level of water buffaloes in marshes of Iraq (Mean ± S.E.).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>N of samples</th>
<th>Estradiol level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male of water buffaloes</td>
<td>≤ 6 months</td>
<td>10</td>
<td>4.69 c ±0.28</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 months</td>
<td>10</td>
<td>4.43 c ±0.21</td>
</tr>
<tr>
<td>Female of water buffaloes</td>
<td>≤ 6 months</td>
<td>10</td>
<td>30.13 b ±0.98</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 months</td>
<td>10</td>
<td>50.66 a ±2.27</td>
</tr>
</tbody>
</table>

L.S.D = 7.62

2- Effect of sex and age on progesterone level

The results of the effect of sex and age of the level of progesterone in immature male and female water buffaloes were presented in table (2). The results was shown no significant differences between the male age groups. Also, the results indicated a significant differences between the female aged groups. The progesterone level of females equal or less than 6 months of age was higher than females aged more than 6 months. The results indicated a significant increase in progesterone levels in two age groups of female water buffalo compare with male water buffalo at ≤ 6 months and these at > 6 months old.

Table (2) : Effect of sex and age on progesterone level of water buffaloes in marshes of Iraq (Mean ± S.E.).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>N of samples</th>
<th>Progesterone level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male of water buffaloes</td>
<td>≤ 6 months</td>
<td>10</td>
<td>0.16 c ±0.00</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 months</td>
<td>10</td>
<td>0.14 c ±0.00</td>
</tr>
<tr>
<td>Female of water buffaloes</td>
<td>≤ 6 months</td>
<td>10</td>
<td>13.93 a ±0.70</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 months</td>
<td>10</td>
<td>7.73 b ±0.37</td>
</tr>
</tbody>
</table>

L.S.D = 6.02
DISCUSSION

The results of the present study showed the influence of sex on the level of testosterone, estradiol and progesterone in male and female water buffaloes, while there was a significant effect for age on estradiol and progesterone levels in female water buffalo.

Sexual behavior is activated by hormones from the time of puberty throughout the animal’s life. The increasing amounts of reproductive hormones during oestrus affect parts of the brain in female animals. This results in behavioral changes directed towards mating which varies considerably between species [15].

In buffalo the general pattern of secretion of the estradiol-17ß indicates a surge which takes place on the day preceding the LH peak [16,17] or frequently very close to the LH peak with blood levels ranging between 9 and 13 pg/ml [18] respectively in Murrah and Mediterranean buffaloes Estradiol 17-ß was significantly higher in postnatal calves up to two months of age, and E2 17-ß showed a negative correlation with age [19].

The function of progesterone is to create favorable conditions for the fetus and neonate. Increased levels of progesterone influence the epithelium in the uterus. The glands in the endometrium grow and secrete nutrients, the effects of that are to prepare the uterus to have the right conditions for the development of the embryo. Progesterone prevents uterus contractions that can lead to abortion or too early parturition. Progesterone also contributes to growth and differentiation of the mammary tissue and prepare for milk synthesis [15]. The progesterone levels can be used for diagnosis of pregnancy. An animal that is not pregnant will have very low levels of progesterone in the plasma and vice versa. Since the range of progesterone concentration in the luteal phase overlaps with the pregnancy concentration repeated measurements are required to determine if the animal is pregnant or not [15]. The progesterone levels were higher in newly born calves and mature bulls. Otherwise, the levels continued to be low throughout the period of growth and development [19].

[20] showed non significant differences between hematological and biochemical parameters of immature male and female buffalo. Also, the same results indicated there was a significant increased in these parameters of mature female buffalo when compared with immature females. [21] showed by the preliminary study on water buffalo in marshes of Iraq for defining some values of reproductive hormones (FSH, LH and Prolactin) the relationship between the sex and age of buffaloes with the levels of these hormones.
مستوى الاستراديول والبروجستيرون في مصل ذكور وإناث الجاموس في مناطق اهىار جنوب العراق

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الخلاصة
هدفت الدراسة الحالية تحديد قيم بعض الهرمونات الستيرويدية في جاموس مناطق اهىار العراق، حيث درست مستويات هرمون الاستراديول وبروجستيرون لذكور وإناث الجاموس عبر البالغة ضمن مجموعة عمريتين (أقل من إيلياوسي 6 أشهر، أكثر من 6 أشهر (6-12 شهراً)). أظهرت النتائج الدراسة الحالية تأثير معنوي للجنس في مستويات هرمون الاستراديول وبروجستيرون في ذكور وإناث الجاموس. كما كان للعمر تأثير معنوي في مستوى الهرمون المذكورين في إناث الجاموس المحليين، فيما لم يكن للعمر تأثير معنوي في مستوى الهرمون اعلا في ذكور الجاموس. وقد نوقشت النتائج من الناحية الفسيولوجية مقارنة مع دراسات علمية سابقة لاسيما وأن هذه القيم بالنسبة للجاموس العراقي تعتبر قيم أولية جديدة.

REFERENCES


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