

CHARACTERIZATION OF IRAQI LOCAL DRAKE EJACULATE AND THE EFFECT OF FREQUENCY OF COLLECTION IN SPERM QUALITY

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ABSTRACT

A total of 24 adult male aged 32 weeks from Iraqi local drakes were used in this study to determine some semen characterization, drakes divided randomly into three equal groups and subjected to three semen collection frequencies (once daily, twice daily and once every 2 days) for 18 consecutive days.

The study revealed the following results:

- 1- Semen characteristics of Iraqi local drakes were, semen volume 0.65ml, spermatozoa concentration 3.52×10^9 , sperm motility and Abnormality 81.64, 13.14% respectively, pH value 7.1 and individual motility 84.2%. The concentration of glucose, protein and cholesterol in semen plasma were 95.8mg/100ml, 1.22mg/100 ml and 102.4 Mmol/ml respectively.
- 2- The total mean semen volume over 18 days period and total number of spermatozoa produced by the drakes increased significantly as the collection frequency increased from once over 2 days to twice daily from 3.42 to 8.90ml and 5.85×10^9 to 10.72×10^9 respectively.
- 3- The average semen volume per collection and the average number of spermatozoa per ejaculate decreased significantly as the collection frequency increased from once over 2 days to twice daily from 0.91 to 0.67ml and 1.96×10^9 to 0.92×10^9 respectively.
- 4- No significant difference showed on concentration of spermatozoa with the frequency of collection over 3 periods.
- 5- Analysis of semen from birds were ejaculated twice daily was showed that the second collection inferior to the first in total number of spermatozoa, total volume of semen and concentration of spermatozoa.

INTRODUCTION

Reproduction is the result of male and female interaction. Although both sexes have to cooperate to pass on their genes to next generations, and to increase their share a species gene pool, they differ in strategies to optimize their reproduction output.

Traditionally conflict between the sexes has been viewed to arise because male produce many small gametes (sperm) whereas female produce few gametes (egg) (1).

Sperm quality affect male fertilization success and thus male fitness in various species (2). In birds in particular experiments have shown that sperm motility measured as sperm swimming speed and the percentage of motile sperm or sperm mobility (Net movement of sperm) determines fertilization success, both following an

insemination by a single male (3) as well as in situations where sperm from different males (4, 5). At the interspecific level numerous studies showed that conspecific probability of fertilizing an egg than hetero specific sperm (6, 7). Similarly sperm from a male from same race population, or strain often have a higher fertilization capacity (8). The frequency of ejaculation can have a nontrivial impact on sperm number and quality and hence on the competitive ability of males ejaculate. Some studies on mammals have found negative associations between copulation rate and sperm number per ejaculate (9, 10) or sperm quality (Motility and swimming speed) (11).

Although in general frequent copulations seems to reduce sperm concentration and sperm quality in a single ejaculate, the total amount copulations may still be higher weekly sperm production (12, 13).

There is no any information available on semen characteristics and frequency of collection of semen of Iraqi local drakes. This study investigate some of the basis knowledge of semen characters and study the effect of the frequency of collection on some semen characteristics.

MATERIALS AND METHODS

Data were reported on a total of 24 adult Iraqi local drakes aged 32 week were divided randomly into three equal groups, and subjected to three semen collection frequencies for 18 days (three periods of 6 day each). The collection frequencies were once daily, twice daily and once every 2 day. The collection frequencies in the males subjected to two collection/day the interval between was 3h, this gave the drakes time to recover.

All groups were given a commercial diet (16% protein and 2800 kcal/kg) ad libitum. Semen collection with abdominal massage method (14). Semen collected into tubes maintained at 4°C.

Care was taken before semen collection to minimize contamination by feces and urates.

Determination of semen characteristics:

Semen volume was measured with tuberculin syringe attached to 16-20cm inseminating straw.

Spermatozoa concentration, was determined with Spectrophotometer a wave length by 640nm (15).

The percentage of Abnormal sperm was microscopically determined according to (16). The sperm morphology was calculated as percentage used Erythrosin β -phosphate buffer (17). The percentage sperm motility and in dividual motility according to (18).

The pH value of semen was measured with 5 Min after ejaculation using pH meter.

Samples of semen kept in centrifuge 1600 30Mn at 5°C the plasma semen stored at -20°C to determined protein concentration in semen plasma used Biuret method according to (19). Glucose concentration determined according to (20). The plasma semen cholesterol concentration determined according to (21).

Data for the effect of frequency collection in semen characteristics were statistically analyzed by to test (22).

RESULTS AND DISCUSSION

Semen characteristics of Iraqi local drakes presented in (table 1). In general most semen characteristics of Iraqi local drakes were lower than that of pekin drake semen.

Table (1): Semen characteristics of Iraqi drake

| Characteristics | Values |
|---------------------------|------------------------|
| Semen volume | 0.65ml ± 0.04 |
| Spermatozoa concentration | 3.52 × 10 ⁹ |
| Sperm molility | 81.64% |
| Abnor molity | 13.42% |
| In dividual molility | 84.2 ± 1.9 |
| pH value | 7.1 |

The main semen volume count of Iraqi drake (0.65 ± 0.02)ml it was lower than that values found in pekin drake semen which (1.39ml) by (23) or (0.86ml) in Muscovy drake semen (24). The spermatozoon concentration of Iraqi drakes semen (3.52 × 10⁹) also lower than that values obtained form pekin drakes semen (5.7 × 10⁹) by (25) also lower than that values reported for muscovy drake semen (9.8 × 10⁹) (26).

The main percentage of sperm motility and the Abnormality values of Iraqi local drake semen were (81.64,13.42)% respectively both were lower than that values found in pekin semen (88.67, 15.21)% respectively (25 , 27).

The value of semen pH of Iraqi drakes was (7.1) it is within the range recorded by (28, 29). Semen from most avian species has a near natural pH (pekin drake 7.3, mallard duck 6.8 and domestic fowl 7.0 – 7.3) (30).

The differences in some semen characteristic between Iraqi local drakes and pekin, muscovy drakes were due to genotypic effect (31, 32).

Table (2) showed some chemical characteristic of Iraqi drake plasma semen, the values of glucose, protein and cholesterol concentration were (95.8 ± 4.3)ml/100ml, (1.22 ± 0.07)mg/100ml and (102.4 ± 8.3) Mmol/ml respectively these values were within the range recorded by (33, 34). In pekin drake semen which (97.2ml/100ml , 1.62mg/100ml and 105 Mmol/ml) respectively.

Table (2): Some chemical composition of plasma semen

| Characteristics | Concentrations |
|---------------------|----------------|
| Glucose ml/100ml | 95.8 ± 4.3 |
| Protein mg/100ml | 1.22 ± 0.07 |
| Cholesterol Mmol/ml | 102.4 ± 8.3 |

Table (3) showed the effect of collection frequency in some semen characteristic. Total semen volume and total number of spermatozoa increased

significantly ($P < 0.01$) as the frequency of collection increased. The total semen volume per drake and total number of spermatozoa increased from 3.42ml to 8.40ml and 5.85×10^9 to 10.72×10^9 respectively as the frequency of collection increased from once every 2 day to twice daily. The average of semen volume per collection and average number of spermatozoa per ejaculated decreased significantly ($P < 0.01$) as the frequency of collection increased. The average semen volume per collection and average number of spermatozoa per ejaculated decreased from 0.91ml to 0.62ml and from 1.94×10^9 to 0.92×10^9 respectively as the frequency of collection increased from once per 2 day to twice daily.

Table (3): Effect of frequency of collection in semen characteristics of Iraqi local drake

| Semen characteristics | Frequency of collection | | |
|---|---------------------------------|----------------------------------|---------------------------------|
| | Daily | Twice daily | Once over 2 day |
| Total semen volume. ML/drake | 5.61 ^b | 8.90 ^a | 3.42 ^c |
| Average semen volume per collection | 0.73 ^b | 0.67 ^c | 0.91 ^a |
| Total number of spermatozoa | 8.47×10^9 ^b | 10.72×10^9 ^a | 5.85×10^9 ^c |
| Average number of spermatozoa per ejaculate | 1.72×10^9 ^b | 0.92×10^9 ^c | 1.96×10^9 ^a |
| Concentration of spermatozoa | 1.71×10^9 | 1.63×10^9 | 1.83×10^9 |

Means within columns with no common superscripts differ significantly ($P < 0.01$)

Table (3) showed there were no significant differences between the concentration of spermatozoa with the frequency of collection. The present observations however agreed with similar findings (12, 13) that the frequency of collection negatively influenced semen quality. Ejaculation frequency can limit the amount and quality of transferred sperm due to short-term effects like depletion of the male's sperm store (35). This was observed in zebra finches, following several ejaculations in rapid succession and a gradation of sperm quality within the seminal glomera, such that sperm motility increased towards the region nearest to the cloacae (36).

Lack of maturation time might also account for the long-term decline in sperm motility after an extended period of frequent copulation (11). In bird sperm are still immotile. When they were released from seminiferous epithelium (37).

Maturation of avian sperm is envisioned to occur at the passage of the efferent ducts, where also sperm concentration increased due to absorption of the seminiferous tubule fluid (38).

Table (4): Effect of twice daily collection on semen characteristic

| Characteristic | First collection | Second collection |
|--|-------------------|-------------------|
| Total volume ml | 4.86 ^a | 3.62 ^b |
| Total spermatozoa number $\times 10^9$ | 6.91 ^a | 3.32 ^b |
| Concentration $\times 10^9$ ml | 1.49 | 0.71 |

Means within columns with no common superscripts differ significantly ($P < 0.01$)

Table (4) showed the effect of twice daily collection frequency in some semen characteristics of Iraqi local drake. The result showed that the second collection significantly different ($P<0.01$) in semen characteristics the total volume of sperm, total number of spermatozoa and concentration of spermatozoa in the first collection was higher than that in second collection, the present study results agreed with similar finding (35, 36, 39) that the second of the twice daily samples was of much poorer quality than the first.

صفات السائل المنوي للذكور البط المحلي العراقي وتأثير تكرار عملية الجمع على نوعية السائل المنوي

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الخلاصة

استخدم في هذه الدراسة (24) ذكر بعمر 32 أسبوع من البط المحلي العراقي لتقدير بعض صفات السائل المنوي وزعت الذكور عشوائياً الى 3 مجاميع متساوية لدراسة تأثير ثلاث معاملات من تكرار جمع السائل المنوي (مرة كل يوم، مرتين يومياً ومرة كل 2 يوم) ولفترة 18 يوم. أشارت نتائج الدراسة الى:

- 1- كانت صفات السائل المنوي لذكور البط المحلي العراقي على النحو التالي، بلغ معدل حجم السائل المنوي 0.65 مل، تركيز الحيامن 3.52×10^9 ، النسبة المئوية للحركة الجماعية للحيامن 81.64% والنسبة المئوية للحيامن المشوهة 13.42% وبلغت درجة الأس الهيدروجيني للسائل المنوي 7.1 والنسبة المئوية للحركة الفردية للحيامن 84.2%.
- 2- وجود زيادة معنوية ($P<0.01$) في معدل حجم السائل المنوي خلال فترة 18 يوم والعدد الكلي للحيامن كلما ازداد تكرار عملية جمع السائل المنوي من مرة كل يومين الى مرتين باليوم من 3.42 الى 8.90 مل ومن 5.58×10^9 الى 10.72×10^9 على التوالي.
- 3- معدل حجم السائل المنوي في القذفة ومعدل عدد الحيامن لكل قذفة انخفضا معنوياً ($P<0.01$) بزيادة تكرار عملية جمع السائل المنوي من مرة كل يومين الى مرتين باليوم من 0.91 الى 0.67 مل ومن 1.96×10^9 الى 0.92×10^9 على التوالي.
- 4- عدم وجود اختلافات معنوية بتركيز الحيامن باختلاف تكرار عملية جمع السائل المنوي خلال 3 فترات.
- 5- تحليل السائل المنوي للطبوير التي تم جمع قذفتين منها باليوم اظهر بان صفات السائل المنوي للقذفة الثانية كانت اقل من القذفة الأولى في العدد الكلي للحيامن، الحجم الكلي للسائل المنوي وتركيز الحيامن في القذفة.

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