

## PHYSIOLOGICAL EFFECT OF DIETARY FEED ADDITIVES UNDER DIFFERENT FEEDING REGIMES ON SEMEN QUALITY OF MUSCOVY DRAKES

By

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**Abstract:** *In the present study red pepper or fresh garlic with yeast as feed additives were examined for improving semen quality in Muscovy drakes . Thirty six from males of Muscovy ducks were available. All the drakes were 33 weekly of age at With 4 drakes each the beginning of the experiment. All birds were divided equally into three groups of 12 drakes each. The first group control diet D-a), the second group control diet contain 1.0% red pepper (D-b). while, the third group. Is control diet contain 2.0% fresh garlic + 0.2% yeast (D-c). Each group was divided equally into three subgroups With 4 drakes each . The first subgroup.fed ad-libitum (G-1) and the second subgroup (4) was feed two times per day from 7 to 10 am and from 3 to 6 pm. (G-2). While, the third subgroup. Fed 3 time per day from 7 to 9 am, 12 to 2 p m. and from 6 to 8 pm) (G-3), with ad-libitum supply of water. Semen volume (mls), Semen volume (mls), Semen ph, Sperm motility (%), Spermatozoa per mm<sup>3</sup>, Spermatozoa per ejaculate (10<sup>6</sup>), Live spermatozoa in fresh semen (%), Live spermatozoa per ejaculate (10<sup>6</sup>), Normal spermatozoa per ejaculate (10<sup>6</sup>) and Abnormalities (%) were studied. The results showed that, The greatest (P<0.05) value of semen volume (mls) was recorded for draks fed control diet supplemented with 1.0% red pepper and fed two times per day. However, the greatest (P<0.05) record of Sperm motility (%) and Live spermatozoa in fresh semen (%) was noticed wherb draks fed control diet incoporated with 1.0% red pepper and feed two times per day.. Generally, Drakes fed fed control diet contain 1.0% red pepper and fed two times per day presented the highest (P<0.05) values of Drakes fed fed control diet contain 1.0% red pepper and fed two times per day presented the highest (P<0.05) values of Semen ph, Spermatozoa per mm<sup>3</sup>, Spermatozoa per ejaculate (10<sup>6</sup>) and Normal spermatozoa per ejaculate (10<sup>6</sup>). But, Abnormalities (%) was lower for drakes of fed control contain 1.0% red pepper and feed two times per day.*

**Key words:** *Muscovy ducks; feed additives; Physical semen characters.*

### INTRODUCTION

Low fertility in ducks is one of the major problems that retard the progress of duck raising, and the role of the male in this problem has not been studied sufficiently. Only a few investigators have studied semen production and artificial

insemination in ducks. As early as 1934, Serebrovsky & Sokolovskaja collected semen by electrical stimulation, but they did not study the characteristics of the collected semen. Japanese workers used different manual massage methods (Onishi,

Kato & Futamura, 1955; Watanabe & Sugimori, 1957) and electro-ejaculation (Watanabe, 1957) to collect semen from drakes. By the massage method, common Japanese drakes yielded from 0-1 to 1-0 cc semen (average 0-32 cc) (Onishi, Kato & Futamura, 1955). Other workers, using the massage method on the same breed of drakes, found that the average semen volume was 0-23 cc (Watanabe & Sugimori, 1957). Onishi & Kato (1955) reported a large yield of 0-82 cc semen from Muscovy drakes. With the electro-ejaculation method, the Japanese drakes gave an average of 0-33 cc semen containing 4-62 million spermatozoa per mm<sup>3</sup> with 20-13% abnormalities (Watanabe, 1957). Ola (2000) used 10 females to 2 drakes with Nigerian native Muscovy ducks. Nickolova (2004) used 1:6 drakes to ducks where 99.27% egg fertility was obtained. But housing method influences the quality of semen produced by drakes, hence fertility of flock considering earlier report (Setioko and Hetzel, 1984). This experiment was thus set up to investigate the effect of some feed additives under different feeding regimes on semen quality of Muscovy drakes.

## MATERIALS AND METHODS

This study was carried out at the poultry farm in the Department of animal production, Faculty of Agriculture South Valley University. during the period from November (2008) to January (2009). Thirty six from drakes of Muscovy ducks were available. All the drakes were 33 weekly of age at the beginning of this experiment and they were approximately similar in live body weight at this age. The normal diet was formulated according to NRC (1994) as in Table (1). The drakes fed on control diet contain 16.10 % crud protein, 8.87 % Crude fiber, 4.42 % Crude fat and 2735.55 kcal metabolized energy /kg diet metabolized energy during the experiment.

The total number of Muscovy ducks (36 drakes) was divided equally into three groups. The first group (12 drakes) FED on control diet (D-a), the second group (12 drakes) fed control diet contain 1.0% red pepper (D-b). While, the third group (12 drakes) fed contro diet contain 2.0% fresh garlic + 0.2% yeast (D-c) both of them are according to El-Ghamry et al. (2004). Each group was divided equally into three subgroups. The first subgroup (4 drakes) was fed ad-libitum (G-1) and the second subgroup (4 drakes) was feed two times per day from 7 to 10 am and from 3 to 6 pm (G-2). While, the third subgroup (4 drakes) fed 3 time per day from 7 to 9 am, 12 to 2 pm. and 6 to 8 pm (G-3), with *ad-libitum* supply of water were evaluated. figure (1) diagrammatic scheme shows the Experimental plan . At the first month from experiment, drakes were trained daily on semen collection using manual massage method while actual collection for analysis started on the second month, Semen was collected from individual males two times per week (sixteen times for each male). Semen was collected by the massage method previously used for chickens (Kamar, 1958). Semen volume (mls), Semen volume (mls), Sperm motility (%), Spermatozoa per mm<sup>3</sup>, Spermatozoa per ejaculate (10<sup>6</sup>), Live spermatozoa in fresh semen (%), Live spermatozoa per ejaculate (10<sup>6</sup>), Normal spermatozoa per ejaculate (10<sup>6</sup>) and Abnormalities (%) were estimated by the methods previously used for chickens. Statistical analysis were carried out using General linear Models (GLM) procedure of SPSS software (SPSS, 2008), analyses of variance for semen characteristics of muscovy drakes were conducted as follows:

$$Y_{ijk} = \mu + D_i + F_j + DF_{ij} + e_{ijk}$$

Where:

$Y_{ijk}$  = Observed value in the  $i^{\text{th}}$  diet, in the  $j^{\text{th}}$  feeding regimes.

$\mu$  = overall mean.

$D_i$  = Diet type effect ( $i = 1$  and  $3$ ).

F<sub>j</sub> = feeding regimes effect (j = 1 and 3).  
DF<sub>ij</sub> = Interaction of diet type by feeding regime.  
E<sub>ijk</sub> = Random error term.

## RESULTS AND DISCUSSION

Effect of different type of diet and feeding regimes on semen characteristics of drakes of Muscovy are presented in table. The effect of different type of diet and feeding regimes on Semen volume (mls), Semen ph, Sperm motility (%), Spermatozoa per mm<sup>3</sup>, Spermatozoa per ejaculate (10<sup>6</sup>), Live spermatozoa in fresh semen (%), Live spermatozoa per ejaculate (10<sup>6</sup>), Normal spermatozoa per ejaculate (10<sup>6</sup>) and Abnormalities (%) was significant (p < 0.05). As shown in **Table (2)** The semen volume (mls) of (D-b) 0.29 was higher (P < 0.05) significant than of (D-c) 0.26 and (D-a) 0.25. while, the semen volume (mls) of (G-2) 0.29 was higher significant

(P < 0.05) than of (G-3) 0.27 and (G-1) 0.24. The results are in agreement with those obtained by (Etuk *et al.*, 2006). Semen volume in The present study was lower than earlier report (Gerzilov *et al.*, 2004). Setioko and Hetzel (1984) had earlier averred that artificial vagina method produced more semen than the manual massage. The semen pH of (D-b) 7.50 was higher than of (D-a) 7.46 and (D-c) 7.46. while, in (G-2) and (G-3) was 7.48 higher than of (G-1) 7.46. The measurements of semen pH is of great importance because any semen extender used should be approximated to the same pH as semen or should act as a buffer against excessive acidity or alkalinity and also, it acts as an indication to the normal status of the accessory secretion and the livability of spermatozoa (Abd-El-Ghaffar, 1992 and Jean-Michel *et al.*, 2002). Generally, the semen pH of ducks should be slightly alkaline. However, Sperm motility (%) observed in this study were (D-b) 79.35% higher than of (D-c) 74.85% and (D-a)

73.92%. But, Sperm motility (%) in (G-2) 78.35% was higher (P < 0.05) than of (G-3) 75.98% and (G-1) 73.79%. They similar to that reported by Gamal,

Spermatozoa per mm<sup>3</sup> of type of diet was non significant (P > 0.05) while, of (G-2) 4.67 was higher than of (G-3) 4.38 and (G-1) 4.17. Spermatozoa per ejaculate (10<sup>6</sup>) were affected significantly (p < 0.05) by (D-b) 1805.08, (D-c) 1797.75 and (D-a) 1763.00. and also, by (G-2) 1804.67, (G-3) 1792.08 and (G-1) 1769.08. This is in agreement with that observed by Gamal, (1962). Live spermatozoa in fresh semen (%) of (D-b) 83.25% was higher than of (D-a) 79.58% and (D-c) 79.58%. while, of (G-2) 82.33% was higher than of (G-3) 80.42% and (G-1) 79.67%. Live spermatozoa per ejaculate (10<sup>6</sup>) of (D-b) 1504.83 and (D-c) 1495.25 was higher than of (D-a) 1455.25. But, of (G-2) 1504.42 and (G-3) 1486.25 was higher than of (G-1) 1464.67. Normal spermatozoa per ejaculate (10<sup>6</sup>) For drakes in groups

(D-b) 1619.33 and (D-c) 1607.17 was higher than of (D-a) 1559.83. But, The others in groups

(G-2) 1613.58 and (G-3) 1598.00 was higher than of (G-1) 1574.75. Abnormalities (%) of (D-b) 13.08 % was lower than of (D-c) 14.92 % and (D-a) 17.42 %. while, Abnormalities (%) of (G-2) 13.25% was lower than of (G-3) 15.25% and (G-1) 16.92%.

The effect of different feeding regimes on Coiled tail, Broken tail, Tailless, Coiled head, Hooked head, Ruptured head and Other forms.

**Table (3)** illustrated The effect of different type of diet and feeding regimes on sperm abnormalities (%) of Muscovy drakes , Coiled tail of (D-a) 4.84 % was higher (P < 0.05) than of (D-c) 4.11% and (D-b) 3.66 %. while, Coiled tail of (G-2) 3.86 % was lower than of (G-3) 4.29 % and (G-1) 4.46 %. Broken tail of effect type of diet was non-significant (P < 0.05) . But, Broken tail of (G-

1) 3.47 % was higher than of (G-3) 3.13 % and (G-2) 3.04 %. Tailless of (D-b) 2.13 % was lower than of (D-a) 3.28 % and (D-c) 2.56 %. While, Tailless of (G-2) 2.31 % was lower than of (G-3) 2.43 % and (G-1) 2.70 %. Coiled head of effect type of diet was non-significant ( $P < 0.05$ ). But, Coiled head of (G-2) 0.55 % was lower than of (G-3) 0.69 % and (G-1) 0.73 %. Hooked head of (D-b) 0.57 % was lower than of (D-c) 0.68 % and (D-a) 0.69 %. But, Hooked head of (G-2) 0.53 % was lower than of (G-3) 0.69 % and (G-1) 0.72 %. Ruptured head as affected by type of diet and feeding regimes was non-significant ( $P > 0.05$ ) their forms of (D-c) 2.19 % was lower than of (D-b) 2.25 % and (D-a) 2.68 %. While, Other forms of effect feeding regimes was non-significant ( $P > 0.05$ )

Illustrated in table (4), Interaction among type of diet and feeding regimes on some semen characteristics of Muscovy ducks the highest of semen volume (mls) was shown for fed control diet contain 2.0% fresh garlic + 0.2% yeast (D-c) which fed 3 time per day (G-3) 0.27. However, the lowest ( $P < 0.05$ )

semen volume (mls) noticed for drakes fed (D-a) and fed for *ad-libitum* (G-1) 0.24. While, interaction of live spermatozoa in fresh semen (%) of feed on normal diet contain 1.0% red pepper (D-b) with feed two

times per day (G-2) 86.50 % were high significantly. But, had significantly lower of feed on normal diet contain 2.0% fresh garlic + 0.2% yeast (D-c) with feed *ad-libitum* (G-1) 78.50%. The highest of Coiled tail (%) was shown for feed on normal diet (D-a) with feed *ad-libitum* (G-1) 5.15%. However, Coiled tail (%) Recorded the lowest value for birds fed control diet inclusion 1.0% red pepper (D-b) with two times feeding per day (G-2) 3.05%. Tailless (%) for drakes fed control diet

(D-a) with 3 time feeding per day (G-3) 2.88% were high ( $P < 0.05$ ) than others fed control diet contain 2.0% fresh garlic + 0.2% yeast (D-c) with eat 3 time feeding per day (G-3) 2.43%.

**Conclusion:** Semen from drakes with access to feed on normal diet contain 1.0% red pepper (D-b) with two times feeding per day (G-2) were more in semen volume, higher in Semen pH, Sperm motility (%), Spermatozoa per  $\text{mm}^3$ , Spermatozoa per ejaculate ( $10^6$ ), Live spermatozoa in fresh semen (%), Live spermatozoa per ejaculate ( $10^6$ ), Normal spermatozoa per ejaculate ( $10^6$ ). Therefore, necessary for breeding drakes considering the fact that these parameters are essential for maintaining good level of fertility in breeding stock.

**Figure (1):** Diagrammatic scheme of the experiment

Muscovy drakes (36 males)								
First group (12 males) Control diet (G-a)			Second group (12 males) Control diet contain 1.0% red pepper (G-b)			Third group (12 males) Control diet contain 2.0% fresh garlic + 0.2% yeast (G-c)		
First Subgroup (4 males) Ad-libitum (G-1)	Second Subgroup (4 males) Two times (G-2)	Third Subgroup (4 males) Three times (G-3)	First Subgroup (4 males) Ad-libitum (G-1)	Second Subgroup (4 males) Two times (G-2)	Third Subgroup (4 males) Three times (G-3)	First Subgroup (4 males) Ad-libitum (G-1)	Second Subgroup (4 males) Two times (G-2)	Third Subgroup (4 males) Three times (G-3)

**Table (1):** The formula and the chemical composition of experimental diets

Ingredients	Normal diet
Yellow corn (Kg)	50.00
Soybean meal 44% (Kg)	20.00
Protein concentrate (52%)	2.00
Wheat bran	25.00
Bone meal	2.00
Corn oil	--
Limestone (Kg)	0.25
Premix* (Kg)	0.20
Sodium chloride	0.50
DL-methionine	0.05
Total (Kg)	100.0
Calculated analyses	
Crud protein %	16.10
Crude fibre %	10.44
Crude fat %	7.84
Available phosphorus	0.43
Calcium	2.74
Metabolizable energy	2639.98

\* Permixon supplied / kg of diet :

Vit. A 12000 IU, Vit. D3 2200 IU, Vit. E, 10 mg, Vit. K3, 2 mg, Vit. B1, 1 mg, Vit. B2, 4 mg, Vit. B6 1.5 mg,

Vit. B12, 10 mcg, , 1.0 mg Pantothenic acid, 20 mg Nicotinic acid, 1.0 mg Folic acid, Biotin 50 mcg;

Chlorine 500 mg; Copper 10 mg; Iodine 1.0mg; , Iron 30 mg; Manganese 55 gm, Zinc 50 gm ;

Selenium 0.1 mg and Cobalt 0.1 mg.

**Table (2):** Effect of different type of diet and feeding regimes on semen characteristics of Muscovy drakes (  $\bar{X} \pm SE$  )

Type of diet and feeding regimes	SV(mls)	PH S	SM(%)	Sp/mm <sup>3</sup>	Sp/E	LSpf(%)	LSp/E	NSp/E	AB(%)
D-a	0.25 ±0.01c	7.46 ±0.01b	73.92 ±0.80b	4.33 ±0.13a	1763.00 ±8.77b	79.58 ±0.40b	1455.25 ±9.41b	1559.83 ±7.32b	17.42 ±0.71a
D-b	0.29 ±0.01a	7.50 ±0.01a	79.35 ±0.66a	4.54 ±0.14a	1805.08 ±6.91a	83.25 ±0.84a	1504.83 ±8.43a	1619.33 ±7.17a	13.08 ±0.67c
D-c	0.26 ±0.01b	7.46 ±0.01b	74.85 ±0.58b	4.33 ±0.09a	1797.75 ±6.14a	79.58 ±0.47b	1495.25 ±5.61a	1607.17 ±6.66a	14.92 ±0.64b
Mean	0.27 ±0.01	7.47 ±0.01	76.04 ±0.55	4.40 ±0.07	1788.61 ±5.16	80.81 ±0.45	1485.11 ±5.76	1595.44 ±5.87	15.14 ±0.48
G-1	0.24 ±0.01c	7.46 ±0.01b	73.79 ±0.89c	4.17 ±0.09b	1769.08 ±9.36b	79.67 ±0.48b	1464.67 ±8.64b	1574.75 ±9.02b	16.92 ±0.75a
G-2	0.29 ±0.01a	7.48 ±0.01a	78.35 ±0.85a	4.67 ±0.13a	1804.67 ±6.91a	82.33 ±0.99a	1504.42 ±8.31a	1613.58 ±9.73a	13.25 ±0.78c
G-3	0.27 ±0.01b	7.48 ±0.01ab	75.98 ±0.70b	4.38 ±0.11ab	1792.08 ±7.73a	80.42 ±0.58b	1486.25 ±10.05a	1598.00 ±9.13a	15.25 ±0.66b
Mean	0.27 ±0.01	7.47 ±0.01	76.04 ±0.55	4.40 ±0.07	1788.61 ±5.16	80.81 ±0.45	1485.11 ±5.76	1595.44 ±5.87	15.14 ±0.48

- Within each column means super scribed with different letters are significantly different (P<0.05).  
SV(mls) = Semen volume (mls)      PH S = ph of semen      SM(%) = Sperm motility (%)  
Sp/mm<sup>3</sup> = Spermatozoa per mm<sup>3</sup>      Sp/E = Spermatozoa per ejaculate (10<sup>6</sup>)  
LSpf(%) = Live spermatozoa in fresh semen (%)      LSp/E = Live spermatozoa per ejaculate (10<sup>6</sup>)  
NSp/E = Normal spermatozoa per ejaculate (10<sup>6</sup>)      AB(%) = Abnormalities (%)      D-a = Normal diet  
D-b = Diet contain 1.0% hot pepper      D-c = Diet contain Garlic 2% + Yeast 0.2%  
G-1 = Feed *ad-libitum*      G-2 = feed 2 times/day      G-3 = feed 3 times /day

**Table (3):** Effect of different type of diet and feeding regimes on sperm abnormalities (%) of Muscovy drakes (  $\bar{X} \pm SE$  )

Type of diet and feeding regimes	Coiled tail	Broken tail	Tailless	Coiled head	Hooked head	Ruptured head	Other forms
D-a	4.84 ±0.13 <sup>a</sup>	3.28 ±0.09 <sup>a</sup>	2.74 ±0.08 <sup>a</sup>	0.72 ±0.05 <sup>a</sup>	0.69 ±0.05 <sup>a</sup>	0.47 ±0.05 <sup>a</sup>	2.68 ±0.07 <sup>a</sup>
D-b	3.66 ±0.14 <sup>c</sup>	3.13 ±0.09 <sup>a</sup>	2.13 ±0.11 <sup>b</sup>	0.58 ±0.06 <sup>a</sup>	0.57 ±0.05 <sup>b</sup>	0.39 ±0.05 <sup>a</sup>	2.25 ±0.07 <sup>b</sup>
D-c	4.11 ±0.07 <sup>b</sup>	3.23 ±0.05 <sup>a</sup>	2.56 ±0.08 <sup>a</sup>	0.67 ±0.06 <sup>a</sup>	0.68 ±0.03 <sup>a</sup>	0.36 ±0.04 <sup>a</sup>	2.19 ±0.05 <sup>b</sup>
Mean	4.20 ±0.11	3.21 ±0.05	2.48 ±0.07	0.66 ±0.03	0.65 ±0.03	0.41 ±0.03	2.38 ±0.05
G-1	4.46 ±0.17 <sup>a</sup>	3.47 ±0.06 <sup>a</sup>	2.70 ±0.07 <sup>a</sup>	0.73 ±0.05 <sup>a</sup>	0.72 ±0.04 <sup>a</sup>	0.40 ±0.05 <sup>a</sup>	2.46 ±0.10 <sup>a</sup>
G-2	3.86 ±0.19 <sup>b</sup>	3.04 ±0.07 <sup>b</sup>	2.31 ±0.13 <sup>b</sup>	0.55 ±0.04 <sup>b</sup>	0.53 ±0.04 <sup>b</sup>	0.38 ±0.04 <sup>a</sup>	2.31 ±0.09 <sup>a</sup>
G-3	4.29 ±0.15 <sup>a</sup>	3.13 ±0.05 <sup>b</sup>	2.43 ±0.12 <sup>b</sup>	0.69 ±0.04 <sup>a</sup>	0.69 ±0.03 <sup>a</sup>	0.44 ±0.05 <sup>a</sup>	2.36 ±0.08 <sup>a</sup>
Mean	4.20 ±0.11	3.21 ±0.05	2.48 ±0.07	0.66 ±0.03	0.65 ±0.03	0.41 ±0.03	2.38 ±0.05

- Within each column means super scribed with different letters are significantly different (P<0.05).

**Table (4):** Interaction between type of diet and feeding regimes on some semen characteristics of Muscovy drakes ( $X \pm SE$ )

Type of diet and feeding regimes	SV(mls)	LSpf(%)	Coiled tail (%)	Tailless (%)
Da G1	0.24±0.01 <sup>d</sup>	79.75±0.48 <sup>cd</sup>	5.15±0.16 <sup>a</sup>	2.68±0.17 <sup>ab</sup>
Da G2	0.26±0.01 <sup>bc</sup>	79.50±1.04 <sup>cd</sup>	4.55±0.10 <sup>bc</sup>	2.68±0.17 <sup>ab</sup>
Da G3	0.25±0.01 <sup>cd</sup>	79.50±0.65 <sup>cd</sup>	4.83±0.29 <sup>ab</sup>	2.88±0.11 <sup>a</sup>
Db G1	0.26±0.01 <sup>bc</sup>	80.75±1.03 <sup>bcd</sup>	3.88±0.13 <sup>e</sup>	2.63±0.11 <sup>ab</sup>
Db G2	--	86.50±0.65 <sup>a</sup>	3.05±0.06 <sup>f</sup>	--
Db G3	--	82.50±0.65 <sup>b</sup>	4.05±0.06 <sup>de</sup>	--
Dc G1	0.24±0.01 <sup>d</sup>	78.50±0.65 <sup>d</sup>	4.35±0.10 <sup>cd</sup>	2.80±0.11 <sup>ab</sup>
Dc G2	--	81.00±0.41 <sup>bc</sup>	3.98±0.09 <sup>de</sup>	2.45±0.16 <sup>b</sup>
Dc G3	0.27±0.01 <sup>ab</sup>	79.25±0.85 <sup>cd</sup>	4.00±0.09 <sup>de</sup>	2.43±0.09 <sup>b</sup>

• Within each column means super scribed with different letters are significantly different ( $P < 0.05$ ).

SV(mls) = Semen volume (mls)

LSpf(%)= Live spermatozoa in fresh semen (%)

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## الملخص العربي

### التأثير الفسيولوجي للتغذية على علائق الاضافات الغذائية تحت فترات تغذية مختلفة على صفات السائل المنوي في ذكور البط المسكوفي

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أجريت هذه الدراسة لمعرفة صفات السائل المنوي لذكور البط المسكوفي المغذاه على بعض الاضافات الغذائية على فترات مختلفة. نفذت هذه التجربة خلال 3 شهور من شهر نوفمبر 2008 م الى آخر شهر يناير 2009 م. تم اختيار 36 ذكر من البط المسكوفي عمر 33 اسبوع ذات اوزان متقاربة ثم قسمت الى ثلاثة مجاميع المجموعة الاولى اغذيت عليقة عادية (كنترول) والمجموعة الثانية غذيت عليقة عادية + الفلفل الاحمر بنسبة 1 % والمجموعة الثالثة غذيت عليقة عادية + ثوم طازج بنسبة 2% + خميرة بنسبة 2 و. % . ثم تم تقسيم كل مجموعة من المجموعات السابقة الى ثلاثة مجموعات (انظمة غذائية) المجموعة الاولى غذيت حتى الشبع والمجموعة الثانية غذيت مرتين يوميا (من 7-10 صباحا ومن 3-6 مساء) والمجموعة الثالثة ثلاثة مرات يوميا (من 7-9 صباحا ومن 12-2 مساء ومن 6-8 مساء). ثم تم تدريب الذكور فى الشهر الاول من التجربة على جمع السائل المنوي عن طريق التدليك مع تغذيتهم على عليقة التجربة. وتم جمع السائل المنوي فى الشهرين الباقيين مرتين كل اسبوع بعدد 16 جمعة لكل ذكر خلال التجربة ثم تم دراسة صفات السائل المنوي الطبيعية والنسبة المئوية للحيوانات الشاذة ووضحت النتائج الاتى: بالنسبة لحجم السائل المنوي يوجد اختلافات معنوية عالية بين نوع الغذاء وايضا نظم التغذية وكان الغذاء المحتوى على الفلفل الاحمر اعلى مع نظام التغذية مرتين يوميا. بالنسبة لحموضة السائل المنوي يوجد اختلافات معنوية وكان الغذاء المحتوى على الفلفل الاحمر اعلى مع نظام التغذية مرتين يوميا. بالنسبة لحركة الحيوانات المنوية يوجد اختلافات معنوية عالية وكان الغذاء المحتوى على الفلفل الاحمر اعلى مع نظام التغذية مرتين يوميا. بالنسبة لعدد الحيوانات المنوية لكل مم<sup>3</sup> وجد عدم وجود اختلافات معنوية بين نوع الغذاء ولكن يوجد اختلافات معنوية فى نظم التغذية وكانت اعلى مع نظام التغذية مرتين يوميا. بالنسبة لعدد الحيوانات المنوية لكل قذفة يوجد اختلافات معنوية وكان الغذاء المحتوى على الفلفل الاحمر اعلى مع نظام التغذية مرتين يوميا. بالنسبة للعدد الحيوانات المنوية الحية فى السائل المنوي الطازج يوجد اختلافات معنوية وكان الغذاء المحتوى على الفلفل الاحمر اعلى مع نظام التغذية مرتين يوميا. بالنسبة للعدد الحيوانات المنوية الطبيعية يوجد اختلافات معنوية وكان الغذاء المحتوى على الفلفل الاحمر اعلى مع نظام التغذية مرتين يوميا. بالنسبة للنسبة المئوية للحيوانات المنوية الشاذة كانت اقل نسبة فى الذكور المغذاه على الفلفل الاحمر مع نظام التغذية مرتين يوميا. وايضا كانت منخفضة مع الاشكال المختلفة للحيوانات المنوية الشاذة.