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THE COMPOSITION OF THE CROP MILK IN EGYPTIAN BALADI PIGEONS AND ITS ROLE IN GROWTH OF SQUABS

By

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Abstract: *This study was conducted to determine the chemical composition of the crop milk of Egyptian baladi pigeons at different times of nestling period extended from the 1st day of hatch of squabs until the 21st days of age, and investigate the role of this milk in growth of squabs. Samples of crop milk were collected from thirty pairs of pigeons (females and males 24 months old) for one reproductive cycle at different times of nestling periods (1st, 7th, 14th, 21st days). All collected samples were individually weighed, mixed together and taken for chemical analysis. All the experimental birds were maintained under similar condition, where they reared in close pen type and feed ad libitum on a mash diet containing14% CP and 3100 Kcal ME/Kg of diet. Drinking water was available all times of the experiment.*

Results obtained can be summarized as follows:

1- Crop milk was produced from both females and males and its chemical composition was changed through the nestling period. The crude protein and gross energy were recorded significantly (P≤0.05) higher values at the 7th and 14th days of nestling period than those recorded at other nestling periods. Conversely ash had recorded significantly higher values at the 1st and 21st days of nestling period than those recorded at the 7th and 14th days.

2-The percentage of total lipids was significantly (P≤ 0.05) higher in crop milk at the 7th days of nestling period, compared with its percentages at the 1st, 14th and 21st days.

3-No nitrogen free extract were detected at 1st, 7th and 14th days of nestling period, while it was observed at the 21st days of nestling period.

4- The analysis of amino acids content in crop milk at different times of nestling period showed that aspartic, glutamic and leucin amino acids were recorded higher values compared with other amino acids. However, the amounts of amino acids in crop milk at the 7th and 14th days of nestling

period were recorded higher values than the other values present in tow nestling periods.

5- From the 1st to the 7th days of nestling period the parents fed their squab's crop milk only. While from the 8th to the 21st days parents fed their squabs on a mixture consists of crop milk and grains. However, at the end of nestling period (22nd to 28th days) the production of crop milk was completely ceases and the parents start to feed their squabs on grains only.

6-The growth rate of squabs was very rapid during the first 28th days of age and the growth reached the peak at this age. During the period from the 8th to 12th days of age body weight gain of squabs recorded significantly (P≤0.05) higher values compared with the other studied periods.

In general conclusion it could be concluded that the crop milk produced from both females and males of pigeons. Furthermore, Crop milk containing higher percentages and values of protein, lipids amino acids and gross energy, which were very important in feeding and growth of squabs.

INTRODUCTION

It's less well known that some birds feed their young on milk like secretion. In the pigeon for example this secretion is formed in the crop of both meals and females: it is known as crop milk and is regurgitated to feed the nestling. Curiously, the formation of crop milk is stimulated by the same hormone, prolactin that in mammals stimulates the mammary gland to produce milk (***Knut and James, 1994***).Pigeons unlike other avian species, such as chickens or quails, where their squabs hatch with unopened eyes and cannot digest adult bird's diets (***Kirk Baer, 1999***). The pigeon milk is produced from specialized cells lining the crop sac of both sexes under the control of prolactin hormone, which is produced by interior lobe of the pituitary gland. Crop milk is produced at the 14th days of brooding, and may continue till the 25th day after hatching (***Vandeputte-Poma and Desmeth, 1978***). However, ***Desmeth and Vandeputte-Poma (1980)*** mentioned that squabs are fed crop milk that is derived from sloughed off epithelial lining of the crop for about 3 days of their life by both parents. The author added that when the squabs grow older, crop milk is mixed with grains soaked in the crop of the parents and gradually replaced by the grains. Data of the composition of crop milk are not consistent due to sampling difficulties and feed ingested by both the pigeons (***Yang and Vohra, 1987***). No recent work has been conducted upon the chemical composition of crop milk of pigeons in recent years. However several old reports are available on the composition of crop milk and growth rate of squabs (***Reed et al., 1932, Dabrowska, 1932, Davies, 1939 and Leash et a.l., 1971***). In earlier studies

by ***Davies (1939)*** showed that crop milk contains 28% dry matter, 33.8% fat, 58.6% total protein, 4.6% ash and 3.9 % starch on dry matter basis. However ***Leash et al. (1971)*** studied the crop contents of White Carneaux pigeon over a period of the 27th days. On day one (the hatching day) they found 70 % water, 27% fat, 46% protein and 21% carbohydrate. On the 7th days the crop milk composition abruptly changed to 5 % fat and 27 % protein and continued to change until the 27th days, where they recorded 27 % water, 3 % fat, 17% protein and 74 % carbohydrates. In other study was conducted by ***Ferrando et al. (1971)*** showed that crop milk contains 75-77 % water; 11-13 % protein, 5-7 % fat and 1.2-1.8% mineral matter. ***Hedge (1973)*** found that crop milk contains 74-75% water, 14.19% protein, 7.75 % fat, 1.03 % ash. Also the author found that the amino acids values as a percentage of protein were glutamic acid 14.19, aspartic acid 11.34, leucin 8.96, lysine 5.87, valine 5.61, phenylalanine 5.50, therionine 5.49, arginine 5.48, tyrosine 5.36, alanine 5.30, serine 5.20, glycine 4.99, isoleucine 4.50, proline 3.19, methionine 2.48, tryptophan 2.80, histidine 1.52, and cystein 0.34. ***Sim et al. (1986)*** found that crop milk contained 64-82% water, 11-18.8% protein, 4.5-12.7% ether extract, 0.8-1.8% ash and carbohydrate 0.0-6.14%. The higher values of carbohydrate may be due to containing of crop milk with foods. ***Kirk Baer and Thomas (1996)*** reported that dry matter, fat, protein and individual fatty acid in crop milk do not change between day one and three post hatching. But the concentration of methionine, lysine and threonine increase significantly over days one, two and three. In general there is no recent available data was found on the composition of crop milk of Egyptian baladi pigeons, therefore this study aimed to investigate the chemical composition of crop milk at different times of nestling period and the role of this vital secretion in the feeding and growth of squabs.

MATERIALS AND METHODS

Site of the experiment and the aim:

This study was conducted at Experimental Poultry Research Station belonging to Al-Azhar University, Naser city Cairo, Egypt. The main objective of this study was to determine the chemical composition of the crop milk produced from Egyptian baladi pigeons at different times of nestling period at (1st, 7th, 14th and 21st days of age), and its effects on squab's growth rate.

Bird's management and experimental design:

A total number of 30 pairs of pigeons at 24 months of age were used for collecting the crop milk samples. Each 10 pairs were reared in close type pen. The pens were prepared with batteries, which were hanging on the

inner wall of the pens. Each battery was divided into holes as nests measuring (30x25x30 cm). Each nest was numbered to follow up the growth rate of squabs of each parent's pair. Hatched squabs were leg banded with aluminum number ring to follow-up their growth rate and to determine the crop milk and grains given to them every day from hatch to the 28th days of age. Pigeons were fed *ad libitum* on a mash diet containing 14 %CP and 3100 Kcal ME/Kg of diet ***Abdel-Azeem (1998)***.The feed were putting in special feeders to avoid any loss during the experiment. Drinking water was available all times of the experiment. During the experimental period all birds were managed and maintained under good hygienic condition.

Collecting the samples:

During the nestling period started from hatch to 21st days of age, the samples of crop milk were collected from both females and males for one reproductive cycle by the special device designed for this purpose. All samples were examined and small pieces of broken grains were removed by hand-picking and the wet samples were weighed and filtered for each pair alone.

Chemical analysis:

After filtration all samples they were mixed together and dried in Mufle ference in Aluminum dishes with intermittent stirring, first at 40 °C and finally at 60 °C. The weights of dried matter were determined. The dried materials were exhaustively extracted in a soxhlet extraction apparatus for 18 hours with petroleum ether (60°C). The dried residue free fat was used for the different chemical analysis according to ***A.O.A.C. methods (1994)***. The gross energy was determined in samples by LECO'S automatic bomb calorimeter AC-350. The amino acids profiles were performed by Eppendrof apparatus ***(LC 3000) Amino acid analyzer)*** according to the method of ***Widner and Eggum (1966)***.

Growth measurements and determination of crop milk and grains given for squabs:

Individually live body weight was recorded at 1st, 3rd, 7th, 12th, 17th, 22nd and 28th days of age. Body weight gain was calculated at the intervals of 1-3, 4-7, 8-12, 13-17, 18-21 and 22-28 days of age. During the nestling period (28 days), daily amount of crop milk and grains given to squabs were determine. To determine the change of crop milk and grains amounts given to squabs their weight were recorded daily before and after feeding. The difference in weight indicates the amounts of crop milk and grain received by the squabs.

Statistical analysis:

Data were subjected to analysis of variance using the General Linear Models (GLM) procedure of ***SPSS*** software program package ***(SPSS, 2001, version 11.0).*** All percentages were first transformed to arcsine being analyzed to approximate normal distribution before ANOVA. Also, significant differences among means were determined by Duncan's multiple range test ***(Duncan, 1955)*** at 5% level of significant. Data were analyzed by one way method using the following Model:

$$Y_{ij} = u + N_i + e_{ij}$$

Where Y= the observed value, u= population means, N_i = the effect of nestling period, e_{ij} = the standard error.

RESULTS AND DISCUSSION

The overall means of chemical analysis of the crop milk produced by both parents of pigeons at different ages' of nestling period are presented in Table (1). The obtained data indicated that the yield of wet crop milk produced by all birds used in the study varied between 66.31 to 88.33 g. The highest production of crop milk was recorded at the 7th days of nestling period compared with other studied periods. However, a similar trend was observed for the dry material yield as well as dry matter percentages. While the lowest values were obtained at the 21st days of nestling period.

Concerning crude protein contents present in the crop milk the obtained results indicated that the crop milk contains more ($P \leq 0.05$) crude protein percentage at 7th and 14th days of nestling period, followed the values at 1st and 21st days. Values of total lipids appeared significantly ($P \leq 0.05$) elevation at the 7th days, meanwhile its values were approximately the same at the 1st and 14th days of nestling period. While the lowest value was recorded at 21st days. The elevation of both components especially at the 7th and 14th days of nestling period explain the higher growth rate noted of squabs during the period of 8-12 days of nestling period (Table 4). On the contrary ash percentage had recorded the highest values at the 1st and 21st days of nestling period compared with those detected at 14th and 7th days. However, no nitrogen free extract was detected in the crop milk at the 1st, 7th and 14th days of nestling period, while it was found at the 21st days of nestling period, this may be due to that parents start to feed squabs on a mixture consists of crop milk and grains. The values of gross energy were significantly ($P \leq 0.05$) higher in the crop milk at the 7th and 14th days, followed values at the 1st and 21st days of nestling period. These results are approximately agreement with those obtained by ***Davies (1939)*** who

showed that pigeon crop milk contains 28% dry matter, with 33.8% fat, 58.6% protein, 4.6% ash and 3.9 % starch on dry matter basis. However, ***Yang and Vohra (1987)*** decided that the data on composition of pigeons crop milk are not consistent due to sampling difficulties and feed ingested by pigeons, hence this explain the confliction between the results of this study and some earlier, reports regarding pigeons crop milk composition. In this respect ***Leash et al. (1971)*** studied the crop contents of white Carneaux pigeons over a period of the 27th days. On day one, at hatching day, the crop contains 70 % water, 27% fat, 46% protein and 21% carbohydrate. On the 7th days the crop milk constituents abruptly changed to 5% fat and 27% protein and continued to change until day 27, when they recorded 27 % water, 3.0% fat, 17% protein and 74 % carbohydrate. In other study reported by ***Ferrando et al. (1971)*** found that crop milk contains 75-77 % water; 11-13 % protein, 5-7 % fat and 1.2-1.8% minerals. ***Pace et al. (1952) and Hedge (1972)*** showed that crop milk is rich in protein and lipids moreover, it contains an uncharacterized growth –promoting factors (perhaps digestive microflora.). Also ***Hedge (1973)*** found that crop milk contains 74-75% water, 14.19% protein, 7.75 % fat, 1.03 % ash, 0.05% glycogen. ***Vandeputte-Poma(1980)*** reported that pigeon milk as a wet weight basis consisted of 9-13% protein, 9-11% fat, 0.9-1.5% carbohydrate ,0.8-1.1% ash, 0.10-0.12% NPN, energy content 5.6-6.8 Kcal/ g. Except for protein there was little or no decrease in pigeon milk constituents during the first weeks of secretion .

Table (2) shows the amino acids concentrations of crop milk protein at 1st, 7th, 14th and 21st days of nestling period. The obtained results indicated that the main amino acids of crop milk protein from the side of concentration are aspartic, glutamic and leucin amino acids respectively, where they exhibited the highest concentrations through the nestling period. However, the absolutely higher value was recorded for glutamic acid, while the lowest value was recorded for cystin amino acid. The amino acids concentrations in the crop milk changed during the nestling period, where the concentrations of all amino acids content were highest at the 7th and 14th days of nestling period compared with those present at the 1st and 21st days of nesting period. The elevation of amino acids contents at 7th and 14th days of nestling explain also why growth rate of squabs was accelerates at these ages. In this respect ***Hedge (1973)*** found protein of crop milk contains the following amino acids as a percentages glutamic acid14.19, aspartic acid 11.34, leucine 8.96, lysine 5.87, valine 5.61, phenylalanine 5.50, therionine 5.49, arginine 5.48, tyrosine 5.36, alanine 5.30, serine 5.20, glycine 4.99, isoleucine 4.50, praline 3.19, methionine 2.48, tryptophan 2.80, histidine 1.52, and cystein 0.34. However ***Vandeputte-Poma(1980)*** reported that

about 1.4-2.5% of pigeons milk protein is in the form of free amino acids. On the other hand ***Kirk Bear and Thomas (1996)*** reported that the concentrations of methionine, lysine and threonine amino acids increase significantly over days one, two and three of nestling period.

Concerning the amounts of crop milk, a mixture of crop milk and grains and grains only given for squabs at different ages of nestling period Table (3) indicates that during the period of 1-3 and 4-7 days of nestling period both parents were fed their squab's on crop milk only. The amounts given per squab per day were 9.33 and 15.32g, respectively. While during the period from 8-12, 13-17 and 18-21 days of nestling period the parents start to fed their squabs on a mixture of crop milk and grains. The amounts of a mixture given for each squab per day were 25.38, 33.12 and 40.80 g respectively. During the last week of nestling period (22-28 days) crop milk production was stopped, where parents start to give their squabs 50.83 g of grains only for each squab per day. These results are closely agreement with those reported by ***Reed et al. (1932)*** who indicated that a squab weighing 10-13 g at hatch ingested 3-4 g of crop milk at the first day,5-10 g at the next day and 10-12 g at the following day. On the other hand ,the present results (regarding the pure crop milk feeding period) were not on line with those reported by several investigator ***(Murton and Isaacson,1963,Leash et al.,1971, Desmeth and Vandeputte-Poma,1980; Vandeputte, 1980 and Thomas and Reed,1994)*** who agreed that hatched squabs are fed the crop milk during the first three days of the life, after that their parents feeding them a mixture of crop milk and grains, which gradually replaced by grains only as the squabs advanced in age. Pigeons produce crop milk till day 12 after hatching of eggs, but only 64.5% till day 22 and 16% till day 25. By day 28 crop milk production has virtually ceased. ***Thomas and Reed (1994)*** found that at ages 0-2 days the diet was given for squabs was entirely crop milk.

Results illustrated in Table (4) show the averages of body weight and body weight gain of squabs at different periods of their life extended from the 1st to the 28th days of age. The average of body weight at hatch was 13.85 g, afterwards, squabs weight continued to increase with age till the end of nestling period. The differences between periods in squabs live weight were highly significant ($P \leq 0.05$). Also, it could be observed that squabs growth rate expressed by body weight gain significantly ($P \leq 0.05$) increased till the 17th days and the maximum increments in live body weight was recorded during the period from the 8th to the 12th days of age. This may be due to feeding squabs crop milk produced during that period, which contained higher levels of crude protein, total lipid, amino acids and gross energy, which may acting to enhancement the growth rate of squabs. These

results are in agreement with those reported by ***Dabrowska (1932)*** who suggested that the rapid growth rate of squabs was due to feeding crop milk containing high protein and fat content. ***Riddle and Benedict (1932)*** reported that stage of most rapid growth in the pigeon occurred during the 3 days after hatching, whereas the higher rate of metabolism occurs in pigeon's squabs at 11th days. ***Vandeputte-Poma(1980)*** reported that squabs fed pigeon milk increased their body weight by 22 fold in the first 3 weeks after hatching. ***Essam (1997)*** reported that the highest growth rate of squabs was obtained during feeding on the crop milk and the lowest was observed during seeds feeding. However, ***AbdelAzeem (2005)*** showed that growth rate of squabs were very higher during the 28th days of age and the increase in weight afterwards was very poor. Contrarily ***Levi (1974)*** who indicated that growth rate of squabs is very rapid, especially at the first 7th days of age and the growth peak was during the 26th to 28th days of age.

On the basis of the results of this study, it could be concluded that the crop milk produced from both females and males of pigeons. Also Crop milk containing higher percentages and values of protein, lipids, amino acids and gross energy, which were very important in feeding and growth of squabs.

Table (1): Chemical analysis of the crop milk at different ages of nestling period on basis *of dry matter (Means ±SE).*

Items	*Nestling periods(days)*			
	At 1 day of hatch	*At 7 days*	*At 14 days*	*At 21 days*
Yield of crop milk (g)[1]	77.0±0.84^{c}	88.33±0.66^{a}	86.28±0.75^{b}	66.31±0.65^{d}
Yield of dry material (g)	23.62±0.12^{c}	35.90±0.10^{a}	28.12±0.13^{b}	21.10±0.11^{d}
Dry matter per bird (g)	0.79±0.03^{c}	1.20±0.08^{a}	0.94±0.04^{b}	0.74±0.05^{d}
Dry matter (%) [2]	30.68±0.15^{c}	40.64±0.12^{a}	32.59±0.10^{b}	31.82±0.11^{c}
Nitrogen value	9.50	9.82	9.91	8.82
Total protein percentage in dry matter (Nx6.25)	59.38±0.54^{b}	61.38±0.75^{a}	61.94±0.47^{a}	55.13±0.61^{c}
Total lipids (%)	35.90±0.76^{b}	36.0±0.34^{a}	35.30±0.52^{b}	33.60±0.96^{c}
Ash (%)	4.84±0.47^{a}	2.75±0.94^{c}	2.86±0.36^{b}	4.86±0.47^{a}
NFE (%) [3]	-	-	-	6.42
Gross energy (Kcal/g)	4883.0±0.86^{b}	4912.0±0.47^{a}	4910.0±0.34^{a}	4315.0±0.34^{c}

$^{a-d}$ means with the same row with the different superscript are significantly different at ($P \leq 0.05$).

1-Samples were collected from 30pairs of pigeons.

2-Dry matter (%) =yield of dry matter, g/ yield of wet material, gx100

3-NFE=nitrogen free extract

Table (2): Amino acids concentrations of crop milk protein at different ages of nestling period.

Amino acids	Nestling periods(days)			
	At 1 day of hatch	At 7 days	At 14 days	At 21 days
Aspartic acid	9.69	11.56	12.32	10.02
Therionine	4.36	5.50	6.11	4.16
Serein	1.68	1.70	1.87	1.12
Glutamic acid	13.22	14.38	14.53	11.63
Prolin	2.98	3.32	3.43	3.02
Glycin	1.69	1.77	1.79	1.15
Alanin	1.11	1.18	1.33	1.12
Cystin	0.38	0.45	0.56	0.44
Valin	4.89	5.87	6.03	5.12
Methionine	2.80	2.96	3.11	2.90
Leucin	7.13	8.91	9.02	7.15
Tryptophan	2.01	3.05	3.16	2.15
Isolleucin	4.0	5.12	5.38	4.18
Phenylalanine	4.55	5.16	5.22	4.09
Tyrosin	1.09	1.22	1.46	1.02
Histidin	1.43	1.52	1.55	1.14
Lysin	5.0	5.89	5.99	5.18
Arginin	5.06	5.56	5.86	5.42

Table (3): The amounts of crop milk and grains given for squabs from 1 to 28 days of age.

Nestling period (day)	A mixture of crop milk and grains given for squabs		
	Crop milk only (g)	A mixture of crop milk and grains (g)	Grains only (g)
1-3	9.33*	-	-
4-7	15.32	-	-
8-12	-	25.38	-
13-17	-	33.12	-
18-21	-	40.80	-
22-28	-	-	50.83

*The value represents the amount given per squab per day.

Table (4): Body weight and gains of squabs from hatching to 28 days of age.

Age (days)	Means (g)
Body weight (g)	
At 1 day	13.85±0.13 g
3	43.15±0.83 f
7	87.19±0.48 e
12	168.60±0.54 d
17	240.0±0.52 c
22	290.16±0.82 b
28	350.22±0.61 a
Body weight gain(g)	
1-3	29.30±0.08 f
4-7	44.04±0.07 e
8-12	81.41±0.05 a
13-17	71.41±0.06 b
18-21	50.16±0.06 c
22-28	60.06±0.09 c

[a-g] means with the same row with the different superscript are significantly different at ($P \leq 0.05$).

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الملخص العربى

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عبدالعظيم فهمى عبدالعظيم

كلية الزراعة- جامعة الازهر- مدينة نصر-القاهرة-مصر

تم اجراء هذا البحث لدراسة التركيب الكيماوى للبن الحوصلى فى الحمام البلدى المصرى وذلك عند فترات مختلفة من تغذية الزغاليل والممتدة من عمر يوم وحتى اليوم ٢١ من حضانة الزغاليل . وكذلك دراسة دورة فى نمو الزغاليل . تم جمع عينات اللبن الحوصلى من عدد ٣٠ زوج من الحمام البالغ (الاناث والذكور) عند عمر ٢٤ شهر وذلك لمدة دورة انتاجية واحدة عند فترات مختلفة من الحضانة (١،٧،١٤،٢١ يوم) . حيث تم وزن جميع العينات المأخوذة ثم بعد ذلك تم خلطها مع بضعها استعدادا لاجراء التحاليل المعملية عليها. تم وضع جميع الطيورتحت ظروف موحدة من حيث التربية فى اعشاش مغلقة وتغذيتها بصورة حرة على علائق تحتوى على ١٤% بروتين خام ، ٣١٠٠ كيلو كالورى طاقة ممثلة.

والنتائج المتحصل عليها يمكن تلخيصها فى التالى:

١- اللبن الحوصلى ينتج من كل من الاناث والذكور على السواء وبتغيرالتركيب الكيماوى لهذا الافراز خلال فترة تغذية الزغاليل. كانت قيم كل من البروتين الخام والطاقة الكلية المسجلة اعلى معنويا فى اليوم السابع والرابع عشر من فترة التغذية بالمقارنة بالفترات الاخرى. بينما سجلت قيم الرماد نتائج معاكسة حيث سجلت ارتفاع معنوى عند اليوم الاول والحادى والعشرين من فترة التغذية بالمقارنة بالقيم المسجلة عند اليوم السابع واليوم الرابع عشر .

٢- كانت قيمة الدهون الكلية مرتفعة معنويا فى اللبن الحوصلى عند اليوم السابع بالمقارنة بالقيم المسجلة عند اليوم الاول والرابع عشر والحادى والعشرين.

٣- اظهر التحليل الكيماوى للبن الحوصلى انة لا يحتوى على المستخلص الخالى من النيتروجين عند اليوم الاول ، والسابع ، والرابع عشر من فترة التغذية بينما لوحظ ظهور هذا المستخلص الخالى من النيتروجين عند اليوم الحادى والعشرين .

٤- اظهر تحليل الاحماض الامينية عند فترات مختلفة من التغذية ارتفاع مستوى كل من الاسبارتيك ، الجلوتاميك ، الليوسين مقارنة بباقى الاحماض الامينية الاخرى.ومن جهة اخرى وجد ان كمية الاحماض الامينية الموجودة فى اللبن الحوصلى عند اليوم السابع والرابع عشر من فترة تغذة الزغاليل كانت اعلى من بقية فترات التغذية الاخرى

٥- وجد انة من اليوم الاول وحتى اليوم السابع من حضانة الزغاليل يقوم الاباء بتغذية الزغاليل على اللبن الحوصلى فقط.وبداية من اليوم الثامن وحتى الحادى والعشرين يقوم الاباء بتغذية الزغاليل على مخلوط مكون من اللبن الحوصلى والحبوب.وعند اقتراب نهاية فترة الحضانة يتوقف انتاج اللبن الحوصلى ويبدأ الاباء فى تغذية الزغاليل على الحبوب فقط .

٦- وجد ان معدل النمو فى الزغاليل يكون سريع جدا خلال فترة ال ٢٨ يوم الاولى حيث سجل معدل النمو والزيادة المكتسبة فى الوزن اثناء الفترة من ٨-١٢ يوم الاولى من العمر زيادة معنوية مقارنة بباقى الفترات الاخرى المدروسة.

ومن هذة الدراسة امكن استنتاج ان اللبن الحوصلى ينتج من كلا من ذكور واناث الحمام وهو يحتوى على نسب وقيم مرتفعة من البروتينات ، الدهون ، الاحماض الامينية والطاقة الكلية الهامة فى تغذية ونمو الزغاليل .