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EFFECT OF DUMYATI DUCK BREEDERS AGE ON PRODUCTIVE PERFORMANCE, EGG TRAITS AND THEIR OFFSPRING DUCKLING PERFORMANCE

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ABSTRACT

This study was conducted to investigate how ducks age (Dumyati strain) could affect on some productive traits, egg quality and performance of their offspring. Egg number, egg weight egg mass, Egg production % ,feed consumption and feed conversion to egg was investigated during three periods at (24-32)wk ,(32-40) wk and (40-48) wk. While 30 eggs were collected for determination egg quality at 4 different ages (24 ,32 ,40,48) wk old including (egg weight, egg shape index % (ESI) , shell % and thickness , albumin % ,Haugh unit (HU) ,yolk % , yolk index and yolk color and shell % and thickness, while a total of 2016 eggs were set in the incubator (504 egg /age) at the same intervals to determine egg hatchability traits. After complete hatching, (30) duckling-one day old- from each age weighed (initial body weight) and raised for 10 wk old through this period body weight (BW) ,body weight gain (BWG) ,feed consumption (F.C) and feed conversion ratio (FCR) were recorded bi-weekly. The Results of this investigation revealed that, egg production % and egg number significantly decreased with age, while egg weight significantly increased .but egg mass and FCR during 3 different periods didn't show any significant difference. Some egg traits (egg weight, ESI%, yolk % and shell thickness) were significantly increased with advancing ducks age. However, albumin proportion significantly decreased as the productive season progress, but shell % didn't show any significant difference between different ages. HU and yolk index show deterioration with age. Fertility % of eggs significantly increased with age advancing, While early mortality % was significantly higher at the begging of laying season (24 wk old), also total embryonic mortality% showed significant increase in eggs from young ducks breeder, however hatchability of total egg % didn't show any significant difference. Ducklings weight at hatch showed a significant increase with age, but this did not reflect on final body weight or BWG, which significantly decreased with age. Older breeder (48) wk old showed the lowest F.C and 40 wk old breeders had the lowest FCR. No-doubt that age of ducks in this study had a clear effect on some productive traits, egg traits and somewhat performance of offspring. Although of that we can't ignore environmental temperature changes with aging of ducks flock.

Key words: Dumyati ducks, Breeder age, productive performance, egg quality, hatchability and growth performance of offspring.

INTRODUCTION

Duck production plays vital roles in the economy of rural community in Egypt **(Awad, 2013).**They provide cash income and create employment opportunity for rural people **(Khan et al., 1999**). They can be raised cheaper than broiler especially when its market is well organized **(Singh, 2001).** There are several factors affecting ducks egg quality and hatchability traits, subsequently developing embryo and may be the performance of their young duckling, among these factors breeder age and its body weight that have considerable influence on both productive and reproductive traits **(Gallo et al., 2005).** With advancing breeder age, egg production rate decreased **(Tumova and Gouus, 2012)**, and egg number

also decreased **(Rayan et al., (2013)** .While egg weight, egg volume and surface area were increased with increasing of the hen's age **(El-Sheikh et al., 2014) .**

Tona et al., (2004) reported that the weight of 18 d old embryo increased with parental age .Eggs from older hen breeder characterized by higher yolk weight and lower white weight on average when compared with hen at the onset of egg laying, in addition to quality of egg yolk deteriorates as the reproductive season of broiler breeder progress **(Pirsaraei et al., (2011)**. Moreover, albumin characteristics including (albumin index and Haugh unit) and egg shell traits including (weight and thickness) deteriorated as hen aged **(Akyrek and Okur, 2009).** Fertility and hatchability percentages of egg produced from the younger flock age were higher than those from the older ones, while embryonic mortality percent not affected by flock age **(Awad and Abd El-Halim, 2014).**

Changes in egg quality with advancing age, May reflected on their offspring development and performance**.** As one-day-old broiler, chick weights were higher for chicks from old breeder 45 wk old than young breeder 35 wk old until 14-day-old, However percentage of high quality chicks from 45wk old were lower than 35wk old **(Tona et al., 2004**). In contrast, **Ulmer- Franco, et al., (2012)** reported lower final body weight of newly hatched chick from young breeder 29 wks old.

Several studies demonstrated influence of broiler and turkey breeder age on egg quality and offspring performance, but few studies have support such possibilities in duck*s* **(Braun et al., 2002).** Hence, this study was carried out on local Egyptian duck strain (Dumyati duck) to study this impact.

MATERIALS AND METHODS

I. Ducks:

A total number of one hundred and sixty eight Dumyati ducks of (144 females and 24 drakes) were monitored from the El-Serw Waterfowls Research Station, Damietta, Animal Production Research Institute, Agricultural Research Center, Egypt during the period from October, 2016 to August, 2017. Ducks were leg banded, individually weighed and randomly divided into six equal groups, each pen contained 28 ducks (24 females and 4 drakes) were exposed to 16 hrs of light daily. They were reared under the same managerial and hygienic conditions. Fresh water and ration were offered *ad-libitum*. The ration was formulated to meet ducks requirements according to **Feed composition tables for animal and poultry feedstuffs used in Egypt, (2001)** are shown in **(Table1).**

II. Productive traits measurements:

II.1.Egg number and egg weight (EW) were recorded daily

II.2. Egg mass was calculated per duck from the following formula:

$$EM = \frac{\text{Total egg mass per pen (egg number X egg weight)}}{\text{Number of ducks at pen}}$$

II.3. Egg production (%) was calculated as

$$\text{Egg production rate} = \frac{\text{Number of egg produced}}{\text{Number of live ducks}} \text{ X100}$$

II.4.Feed consumption (FC) of each pen was calculated through division of total FC by number of live ducks.

II.5. Feed conversion ratio (FCR) for egg production was calculated as follows:

$$FCR = \frac{\text{Feed kg}}{\text{Egg kg}}$$

All these parameters were determined during 3 periods (24-32) wks, (32-40) wk and (40-48) wk according to **(Rayan et al., 2013)**.

III. Egg quality measurements:

30 eggs were collected from each age at (24, 32, 40 and 48) weeks for determination external and internal quality of fresh eggs

III.1. In the same day, eggs were numbered and weighed individually using sensitive weighing scale electronic balance (0.01accuracy).

III.2. Length and width of eggs was measured using digital vernir caliper to calculate egg shape index using the formula of **Carter, (1968):**

$$\text{Egg shape index (\%)} = \frac{\text{Egg width}}{\text{Egg length}} \times 100$$

Then, eggs were broken on Petri dish **(**15c.m**)** and the following parameters were determined

III.3.Albumin percentage was determined as albumin was weighed and calculated as percentages of egg weight and albumin height measured by digital vernier caliper for calculation of Haugh unit according to **(Haugh, 1937)** from the following formula:

$$HU = 100 \log (AH + 7.57 - 1.7 \times EW^{0.37})$$

Where: AH= albumin height (mm), EW=egg weight (g).

III.4. Yolk percentage was determined as yolk was weighed and calculated as percentages of egg weight while yolk height and diameter was measured by digital vernier caliper to determine yolk index (%) according to **Abu-tabeakh, (2011)** from the following formula:

$$\text{Yolk index (\%)} = \frac{\text{Yolk height}}{\text{Yolk diameter}} \times 100$$

III.5. Egg yolk color was determined by using La-Roche scale.

III.6.The weights of shell was recorded and calculated as percentages of egg weight.

III.7.Shell thickness was measured in three different parts (sharp, blunt and equatorial) by micrometer **(Tyler, 1961).**

IV.Egg fertility and hatchability percentages:

504 eggs from each age (24, 32, 40 and 48 weeks) were collected, numbered, washed, fumigated, and individually weighed. Eggs were set in an electric forced draft local industrial multistage incubator system to determine both fertility and hatchability percentages. Fertility percentage and early embryonic mortality percentage were determined in the 10^{th} day of incubation according to **(Othman et al., 2014)**. On day 24 of incubation late embryonic mortality percentage were determined then; eggs were transferred to a hatcher. On day 28 of incubation the embryo piped but unhatched, total mortality and hatched duckling's percentage were recorded according to **(Malik et al., 2015)**.Ducklings weight at hatch was recorded for each age.

V. Young ducklings performance:

The young ducklings were transported to grow out facility and give access to water and feed *ad libitum*. The ration offered to young duckling was formulated according to **Feed composition tables for animal and poultry feedstuffs used in Egypt (2001), (Table 2).** 30 ducklings were marked by leg marks individually and divided into three replicate raised on concrete floors with five centimeters

thick wood shaving as bedding. Initial body weight was recorded, then body weight (BWT), body weight gain (BWG), feed consumption (FC) and feed conversion ratio (FCR) were recorded bi- weekly.

VI .Statistical analysis:

Data obtained were statistically analyzed for variance using the General linear Model of **SAS, (2002).T**he used model was: $Y_{ij} = \mu + T_i + e_{ij}$, Where: Y_{ij}= an observation, μ = Overall mean, T_i= Effect of duck breeder age (i=1, 2, 3 and 4), and e_{ij} = Random error. Means were tested for significant difference by using Duncan's multiple range test **(Duncan, 1955).**

Table 1: Composition and calculated analysis of ration offered to the local Domiaty ducks throughout the experimental periods (24 wk to 48 wk)

Ingredients %	Layer (24-48) weeks of age
Yellow corn	62.25
Soybean meal (44%)	19.75
Corn gluten meal (60%)	4.27
Wheat bran	3.00
Limestone	8.61
Di-calcium phosphate	1.39
Vit.& Min. Premix[1]	0.30
Salt (NaCl)	0.37
Dl–methionine (97%)	0.06
Total	100.00
Calculated analysis[2]:	
Crude protein (%)	16.53
ME (kcal/ kg)	2756
Calcium (%)	3.51
Av. Phosphorus (%)	0.38
Methionine (%)	0.43

[1]-Each 3 kg of the Vit. and Min. premix contains: Vitamin A, 10000000 IU, Vit. D 2000000 IU, Vit E 10 g, Vit. K 2 g, Thiamin 1 g, Riboflavin 5 g, Pyridoxine 1.5 g, Niacin 30 g, Vit. B12 10 mg, Pantothenic acid 10 g, Folic acid 1.5 g, Biotin 50 mg, Choline chloride 250 g, Manganese 60 g, Zinc 50 g, Iron 30 g, Copper 10 g, Iodine 1g, Selenium 0. 10 g, Cobalt 0.10g.andcarrierCaCo3to3000g. [2]- According to Feed composition tables for animal and poultry feedstuffs used in Egypt (2001).

Table (2): Composition and calculated analysis of the ration offered to the local Domiaty ducklings throughout the raising period (10wk).

Ingredients %	Starter(0-4) wks	Grower (4-8) wks	Finisher (8-10) wks
Yellow corn	65.20	70.90	72.70
Soybean meal (44%)	21.50	18.60	17.30
Corn gluten meal (60%)	9.25	5.30	4.15
Wheat bran	0.00	1.15	2.00
Limestone	1.30	1.40	1.30
Di-calcium phosphate	1. 90	1.80	1.70
Vit.& Min. Premix[1]	0.40	0.40	0.40
Salt (NaCl)	0.35	0.35	0.35
Dl–methionine (97%)	0.10	0.10	0.10
Total	100.00	100.00	100.00
Calculated analysis[2]:			
Crude protein (%)	20.03	17.00	16.00
ME (kcal/ kg)	3005	3001	3000
Calcium (%)	1.02	1.03	0.96
Av. Phosphorus (%)	0.48	0.46	0.44
Meth. (%)	0.52	0.45	0.43

[1]-Each 3 kg of the Vit. and Min. premix contains: Vitamin A, 10000000 IU, Vit. D 2 000000 IU, Vit E 10 g, Vit. K 2 g, Thiamin 1 g, Riboflavin 5 g, Pyridoxine 1.5 g, Niacin 30 g, Vit. B12 10 mg, Pantothenic acid 10 g, Folic acid 1.5 g, Biotin 50 mg, Choline chloride 250 g, Manganese 60 g, Zinc 50 g, Iron 30 g, Copper 10 g, Iodine 1g, Selenium 0. 10 g, C obalt 0.10g.andcarrierCaCo3to3000g.

[2]- Accor ding to Feed composition tables for animal and poultry feedstuffs used in Egypt (2001).

Table 3: Relation between duck age and egg production traits:

	24-32 wk	32-40 wk	40-48wk	Significance
Egg number	34.6 ± 1.0^{a}	31.7 ± 1.0^{ab}	$30.1^{b}\pm1.0b$	*
Egg weight(g)	59.7 ± 1.2^{c}	66.3 ± 1.20^{b}	$71.4^{a}\pm1.2a$	**
Egg mass (g)	2067.8±99.2	2101.1±99.2	2149.4±99.2	NS
Egg production%	61.8 ± 1.7^{a}	56.6 ± 1.7^{ab}	$53.7^{b}\pm1.7^{b}$	*
Feed consumption (g)	8926.0 ± 68.2^{b}	9246.0 ± 68.2^{a}	$9479.0^{a}\pm68.2^{a}$	**
Feed conversion ratio	4.30±0.20	4.40±.20	4.40±.20	NS

Means in the same row with different letters are significantly different ($p \leq 0.05$) where , NS .Non-significant - * ($p \leq 0.05$) - ** ($p \leq 0.01$) .

Table 4: Relation between duck age and egg traits at 4 different ages

	At 24 wk	At 32 wk	At 40 wk	AT 48 wk	Significance
Egg weight (g)	57.5±0.81^{c}	69.9±1.35^{b}	75.2±0.84^{a}	75.7±0.94^{a}	***
ESI %	71.9±0.66^{c}	74.6±0.5^{b}	75.80±0.36^{b}	78.3±0.70^{a}	***
Albumin %	58.56±0.47^{a}	57.80±0.75^{ab}	55.99±0.63^{c}	56.62±0.36^{bc}	*
HU%	87.43± 0.86^{a}	85.47±1.11^{a}	85.08±1.02^{a}	81.79±1.33^{b}	**
Yolk %	31.77±0.5^{b}	32.93±0.66^{ab}	34.41±0.63^{a}	34.09±0.37^{a}	***
Yolk index%	45.32±0.52^{a}	41.91±0.59^{b}	43.57±0.57^{b}	38.98±0.66^{c}	***
Yolk color	4.93±0.13^{c}	6.10±0.13^{a}	5.80±0.01^{ab}	5.62±014^{b}	***
Shell %	9.68±0.15	9.47±0.11	9.63±0.12	9.29±0.12	**NS**
Shell thickness(mm)	30.85±0.65^{c}	33.86±0.5^{b}	32.84±0.5^{b}	35.57±0.51^{a}	***

Means in the same row with different letters are significantly different (p ≤0.05) where,NS …..Non-significant - * = (p ≤0.05) - ** (p≤0.01) -*** (p≤0.0001).

Table 5: Effect of duck age on egg hatchability traits at 4 different ages:

	24wk old	32wk old	40wk old	48 wk old	significance
Fertility%	81.5±1.4^{b}	89.5±1.4^{a}	91.3±1.7^{a}	90.8±1.03	**
Early embryonic mortality%	19.5±0.5^{a}	11.8±0.5^{b}	10.7±0.5^{bc}	9.8±0.5^{c}	***
Late embryonic mortality %	6.7±0.53^{b}	10.4±0.53^{a}	7.5^{b}0.53b	6.0±0.53^{b}	***
Pip dead %	4.4±0.37^{b}	9.5±0.37^{a}	6.9^{b}0.37b	9.7±0.37^{a}	***
Total embryonic mortality%	30.6±0.38^{a}	31.7±0.38^{a}	25.1±0.38b	25.5±0.38^{b}	***
Hatchability of total egg %	69.0±0.92	71.3± 2.07	76.6±1.73	73.8±2.85	**NS**
Duckling weight at hatch (g)	41.7±1.09^{b}	46.3±1.44^{a}	47.9±0.55a	47.3±0.83^{a}	*

Means in the same row with different letters are significantly different (p ≤0.05) where, NS …..Non-significant - * = (p ≤0.05) - ** (p≤0.01) -*** (p≤0.0001).

Table 6: Effect of duck age on BWT, BWG, F.C and FCR of young duckling:

	Duck breeders age				Sig.
	24wks	**32wks**	**40wks**	**48wks**	
BWT					
2 wks	328.0±1.16^{a}	332.7±6.37^{a}	318.3±7.06^{a}	305.0±5.13^{b}	*
4 wks	925.3±2.91^{b}	1060 ±70.3^{a}	707.0±5.55^{c}	905.7±10.8^{b}	***
6 wks	1550.0±5.78^{b}	1678.0±47.7^{a}	1335.0±38.7^{c}	1520.0±23.1^{b}	***
8wks	2000.0±57.8^{a}	2077.0±67.5^{a}	1710.0±30.2^{b}	1747.0±12.0^{b}	**
10wks	2400.0±57.8^{a}	2517.0±88.3^{a}	1975.0±62.9^{b}	1960.0±5.8^{b}	***
BWG					
0-2 wks	286.0±1.48^{a}	286.0±6.8^{a}	270.7±7.7^{ab}	258.0±6.01^{b}	*
2-4 wks	597.3±2.67^{b}	727.3±67.4^{a}	388.3±0.87^{c}	601.0±5.8^{b}	***
4-6 wks	625.0±2.91	618.3±80.9	628.3±33.4	614.3±12.5	NS
6-8 wks	450.0±52.0^{a}	398.3±21.7^{a}	375.0±24.7^{a}	227.0±16.7^{b}	**
8-10 wks	400.0±11.0^{a}	440.0±55.7^{a}	265.0±48.3^{b}	213.3±6.7^{b}	**
0-10 wks	2358.3±58.7^{a}	2470.0±87.8^{a}	1927.3±63.4^{b}	1913.0±6.4^{b}	***
FC					
0-2 wks	372.3±9.3^{c}	453.0±13.3^{b}	325.0±8.4^{d}	502.0±8.7^{a}	***
2-4 wks	1322.0±11.7^{b}	1432.3±17.2^{a}	1134.3±18.4^{c}	1520.3±58.4^{a}	***
4-6 wks	1932.3±6.8^{c}	2059.0±9.9^{b}	2211.3±14.5^{a}	2039.0±32.7^{b}	***
6-8wks	2031.3±19.1^{a}	22032.0±24.8^{a}	2126.0±23.9^{a}	1113.3±75.8^{b}	***
8-10wks	2044.0±11.1^{a}	2044.0±30.6^{a}	1837.0±27.3^{b}	830.0±30.0^{c}	***
0-10wks	7702.0±87.8^{a}	8020.0±102.0^{a}	7633.0±90.5^{a}	6004.0±171.7^{b}	***
FCR					
0-2 wks	1.30±0.03^{c}	1.58±0.01^{b}	1.19±0.01^{d}	1.95±0.01^{a}	***
2-4 wks	2.21±0.01^{c}	1.99±0.16^{c}	2.92±0.06^{a}	2.53±0.08^{b}	***
4-6 wks	3.09±0.02	3.45±0.48	3.53±0.16	3.28±0.02	NS
6-8 wks	4.63±0.09^{b}	5.24±0.36^{b}	5.72±0.41^{b}	8.53±0.70^{a}	**
8-10 wks	5.11±0.08^{bc}	4.76±0.5^{c}	7.36±1.23^{ab}	8.12±0.45^{a}	*
0-10 wks	3.26±0.04^{b}	3.25±0.30^{b}	3.96±0.08^{a}	3.13±0.01^{b}	***

Means in the same row with different letters are significantly different ($p \leq 0.05$) where,NS …..Non-significant - * = ($p \leq 0.05$) - ** ($p \leq 0.01$). *** ($p \leq 0.0001$).

RESULTS AND DISCUSSION

Table 3 shows the result of egg number, egg weight (EW), egg mass, egg production rate, feed consumption and feed conversion ratio. Egg number and egg production % were significantly decreased ($p \leq 0.05$) with advancing duck breeders age. As layer get older they produce larger eggs, but fewer numbers than younger layers do, due to decline in ovulation rate over time. Similar results reported by (**Johnston and Gous, (2003) and Rayan et al., (2013)**. While EW during the three periods (24-32) wks, (32-40) wks and (40-48) wks showed a significant increase ($p \leq 0.01$) as the productive season progress this may be due to increase egg yolk %. Similar trend was noticed by **(Johnston and Gous (2007) and Rayan et al., 2013).** However, Egg mass didn't show any significant difference during different periods of production season. This may be attributed to increase of EW with age and decrease of egg numbers. Similar results were reported by **(Rayan et al., 2013).**

Feed consumption of the breeders was significantly increased ($p \leq 0.01$) with progress of productive season. This may be due to the need of ducks to obtain more nutrient elements for production of larger eggs. Similar studies were reported by **(Singh et al., (2009) and Rayan et al., (2013).** Feed conversion to egg of duck breeders during different periods didn't show any significant difference. Although of increase of FC, some studies reported increase of FCR with age (**Yasmeen et al., (2008) and Rayan et al., (2013).**

Results of **(Table 4)** shows that EW significantly increased ($p \leq 0.0001$) with advancing breeder ducks age this might be attributed to significant increase in yolk %.similar results were reported by (**El-Hanoun, et al., (2012) ; Alsobayel et al., (2013) and Stępińska et al., (2017).** While, **Chung and Lee, (2014**) didn't found any significant difference between different ages of laying hens. The egg shape index % also significantly increased ($p \leq 0.0001$**)** with advancing duck age this may be due to increase in egg width or the rate at which duck eggs becomes larger in width is faster than rate of being longer. This result was in contrast to studies of, **Tumova and Gous, (2012) and Rayan et al., (2013)** which recorded decrease in ESI %. Others studies of **Altan et al., (1995) and Padhi et al., (2013)** didn't found any significant difference with advancing bird ages and this may be attributed to difference of birds used in these studies. Albumin percentage significantly decreased ($p \leq 0.05$) at 40 and 48 weeks of age this may be due to increase of egg weight in a faster rate than albumin. Similar results reported by **(Ulmer-Franco et al., (2010) and Yilmaz- Dikmen et al., (2017).**

HU showed a significant decrease ($p \leq 0.01$) with advancing ducks age, this may attributed to decrease in albumin height because of ovomucin decreased – albumin protein- the most important component in determining the height of the inner thick albumen **(Toussant and Latshaw, 1999).** Similar results were reported by **(Silversides and Scott, (2001);Tona et al., (2004); Nowaczewski et al., (2010) and Tumova and Gous, (2012).**

Unlike albumin %, yolk percentage significantly increased ($p \leq 0.0001$) with advancing duck age this may be due to increase the ability of duck to synthesis yolk and yolk precursor's. Similar results were reported by **(Zita et al., (2009); Ulmer- Franco et al., (2010) and Yilmaz Dikmen et al., (2017).** However, yolk index in this study significantly decreased ($p \leq 0.0001$) with age this may be due to decrease in yolk height or increase in yolk diameter similar results were reported by (**Zita et al., (2009) and Yilmaz Dikmen et al.,**

(2017). However, **Padhi et al., (2013)** reported a significant difference between different ages without specific trend of decrease or increase. Yolk color in this study showed a significant variation ($p \leq 0.0001$) throughout the whole period of study. The highest mean value was observed in eggs from 32 wks old breeder. While the lowest mean value was observed at 24 wks old. This may be due it's mainly depend on feed ingredients or there is a probability of feed absorption was greater in 32 wks old breeder. Similar results were reported by **(Niranjan et al., (2008) ; Rajkumar et al., (2009) and Pahdi et al., (2013).** However**, Yilmaz Dikmen et al., (2017)** observed increase with age.

Egg shell thickness is important property of egg affect the success of embryonic development in poultry **(Balkan et al., 2006).** Shell percentage in this study didn't show any significant difference this might be due to shell weight increased with a similar rate of egg weight increase. This result disagrees with other studies of **Kokoszynski et al., (2007) and Rajkumar et al., (2009).** However, shell thickness was significantly increased ($p \leq 0.0001$) with advancing duck breeder age. Similar results were reported by **Koneva, (1968) and Pahdi et al., (2013)**. On the contrary some studies were reported decrease in egg shell thickness with ages **(Suk and Park, (2001), El-Hanoun et al., (2012) and Rayan et al., (2013).**

Our result obtained in **Table 5** indicated that the fertility % increased ($p \leq 0.01$). with age without significant difference between ages from 32wks, 40 wks and 48 wks old breeders. This may be due to increase ability of breeder to fertilization when compared to early period of laying seasons (24wks). Similar results were reported by **Ulmer-Franco et al., (2010) and Stępińska et al., (2017)** who observed that the lowest fertilization rate was in week 2 of laying season. However, several studies reported that decrease in fertility % as bird aged **(Almarshade, (2011), El-Safty, (2012); Awad and Abd El-Halim, (2014) and Iqbal et al., (2014).**This difference may attributed to the fertility of eggs is affected by factors originating from the hen such as her ability to mate successfully, to store sperm, to ovulate an egg cell or to produce a suitable environment for the formation and development of the embryo(**Brillard, 2003**).

Result of this study revealed that total embryonic mortality significantly decreased with advancing duck age this may be due to significant increase of early embryonic mortality and late embryonic mortality in eggs from 24 and 32 wk old ducks although they reported lower percent of pip dead. This may be due to lower yolk proportion when compared with embryo from ducks aged 40, 48 wk old .Although percent of pip dead increased in older ducks which may be due to increase in shell thickness. Similar results were reported by **(Suarez et al., (1997**) and **Rogue and Soares, (1994)** who reported increase in early mortality in younger flock .Also **El-Hanoun et al ., , (2012)** found that embryonic deaths were higher for the young flock duck during (0-24) day of incubation. On the contrary some studies reported increase in embryonic mortality with advancing bird age **(Reis et al., (1997); Elibol and Brake, (2006); El-Safty, (2012)** and **Mitrovic et al., (2012)**. However, some studies did not observe any significant difference between different ages (**Ulmer-Franco et al., (2010)** and **Awad and Abd El-Halim, (2014).**

Hatchability % of total egg in this study didn't show any significant difference, although they are numerically lower in eggs from 24wks old breeder when compared to older breeder, this difference may be attributed to low fertility and higher early embryonic mortality in eggs from 24 wks old. Similar results were reported by **Ulmer-Franco et al.,**

(2010) ;Gulhanone et al., (2012) and Othman et al., (2014). On the contrary, some studies reported increase of hatchability with age **(Rogue and Soares, (1994); Braun et al., (2002) and El-Hanoun et al., (2012).** While, others studies reported decrease of hatchability % with ages **(Abudabos, (2010); El-Safty, (2012); Awad and Abd El-Halim, (2014) and Iqbal et al., (2014).**The difference may attributed to different birds and ages used in these studies and hatching of duck eggs has been more difficult than that of chicken eggs because of the reported characteristics of large size, thick eggshells, and high numbers of pores (**Changkang et al., 1999).**

Duckling weight at hatch were significantly increased ($p \leq 0.05$) with age without significant difference between 32, 40 and 48 wks old breeders, this difference may be due to increase of egg weight in this study with duck age. Eggs from older flocks are larger in size and the embryos used yolk nutrients for growth more effectively than those from young parents. In addition, breeders become more efficient in depositing essential embryonic nutrients with increasing parental age. Similar results reported by **(Silversides et al., (2006)**; **Alsoybal et al., (2013) and Iqbal et al., (2014).** However, some studies didn't notice any significant difference of one day old chicks weight between different ages **(Trehan and Bajwa (2001), Braun et al., (2002) and Awad and Abd El-Halim (2014)**. This difference may be related to different birds and ages of these studies.

Table 6: shows live body weight of young duckling from 1 day old until 10 wks old shows often significant increase in duckling from young breeders (24 and 32) wks old than older breeders (40 and 48) wks. Although weight of young duckling at hatch was higher in older breeders, but the final BWT (10) wks old was higher in young duckling from young breeders (24 and 32) wks which indicate chick weight not affair predictor for final body weight. Old breeder flocks produce a greater number of heavier chicks as a result of increased egg weight **(Suarez et al., 1997).** However, the percentage of chicks was reported to be higher in older (45-wks) than in younger (35-wks) flocks **(Tona et al., 2004).** Similar trend observed by (**Shanawany, (1987) and Applegate et al., (1999)**. However for others, this has not been the case (**Proudfoot and Hulan, (1981) ; Sklan et al., (2003) and Ulmer-Franco et al., (2010)** they demonstrated that chick weight could be an accurate predictor of final BW .

BWG through (0-10) wks old significantly increased in young duckling from young breeders (24 and 32) wks when compared to young duckling from older breeders this increase corresponding to BWT increase and may be attributed to increase of feed consumption of young duckling from younger breeders. On contrast, results of **Shanawany, (1987); Braun et al., (2002) and El-Hanoun et al., (2012** showed a positive trend between duckling growth and parental age of ducks.

Feed consumption of young duckling through (0-10) wks old showed a significant decrease with advancing age, but this may be attributed to raising young duckling from older breeder at summer season in Egypt un- like young duckling from younger breeders. On the contrary, several studies reported that the increase of FC with advancing flock age (**Braun et al., (2002) and El-Hanoun et al., (2012).** However, **Applegate et al., (1999)** didn't observe any significant difference of FC. FCR of young duckling through (0-10) wks old significantly increased with advancing age, this may be attributed to decrease of feed consumption. However, **Applegate et al., (1999) and El-Hanoun et al., (2012)** did not find any significant difference FCR between chicks from different ages.

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الملخص العربي
تأثير عمر أمهات البط الدمياطي على انتاجية وخواص البيض وكفاءة أداء الكتاكيت حديثي الفقس

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تم اجراء هذه الدراسة لمعرفة تأثير عمر أمهات البط الدمياطي على بعض الصفات الانتاجية وخواص البيض وكفاءه أداء الكتاكيت .وقد تم دراسة كل من(عدد البيض ،وزن البيض ،كتلة البيض، نسبة انتاج البيض ،معدل استهلاك العلف وكذلك معدل التحويل الغذائي) خلال ثلاث فترات عمرية هي (٢٤-٣٢) أسبوع ،(٣٢-٤٠) اسبوع ،(٤٠-٤٨) اسبوع .ولتحديد خواص البيض تم فحص ٣٠ بيضة عند أربعة اعمار مختلفة (٢٤،٣٢،٤٠،٤٨) أسبوع وقياس كل من (وزن البيض ،مؤشر شكل البيضة، نسبة و سمك القشرة، نسبة الزلال ووحدات Haugh نسبة المح ،مؤشر جودة المح و درجة لون المح .ولتحديد خواص فقس البيض تم ادخال عدد ٢٠١٦ بيضة عند نفس الاعمار بمعدل ٥٠٤ بيضة لكل عمر بعد الفقس تم تربية ٣٠ كتكوت من كل مجموعة- عمر يوم واحد- لمدة ١٠ أسابيع وقد تم تسجيل كل من (الوزن– الوزن المكتسب ،معدل استهلاك العلف ومعدل التحويل الغذائي) كل أسبوعين.

وقد أظهرت النتائج الاتي: وجود نقص معنوي في نسبة انتاج وعدد البيض مع تقدم عمر أمهات البط بينما حدثت زيادة معنوية في وزن البيض خلال الثلاث فترات. ولم توجد أى فروق معنوية في كتلة البيض أو معدل التحويل الغذائي خلال الفترات العمرية المختلفة. بعض خواص البيض (وزن البيضة مؤشر شكل البيضة نسبة المح وسمك القشرة) أظهرت زيادة معنوية مع تقدم عمر أمهات البط بينما لوحظ نقص معنوي مع تقدم العمر في نسبة الزلال لم يكن هناك أي فروق معنوية في نسبة القشرة بين الأعمار المختلفة وأظهرت وحدات Haugh ومؤشر جودة المح انخفاضا معنويا مع تقدم العمر .أما نسبه خصوبة البيض فشهدت زيادة معنوية على العكس من معدل الوفيات الأولية والكلية التي انخفضت معنويا مع تقدم العمر .الا انه لم يكن هناك أى فروق معنويه في نسبه الفقس الكلى .وبالنسبة لأداء كتاكيت فقد لوحظ زيادة ف الوزن الأولى للكتكوت مع تقدم العمر ولكن ذلك لم ينعكس على الوزن النهائي او الوزن المكتسب اللذان انخفضا مع تقدم العمر .وقد لوحظ أعلى معدل لاستهلاك العلف في الامهات عمر ٤٨ أسبوع بينما سجل اقل معدل للتحويل الغذائي في الامهات عمر ٤٠ أسبوع. مما سبق في هذه الدراسة يتضح أن عمر أمهات البط كان له تأثير واضح على بعض صفات إنتاج البيض وخواص البيض والى حد ما أداء الكتاكيت وبالرغم من ذلك لا يمكن تجاهل عامل التغير في درجات الحرار ة.