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EFFECT OF THE INJECTION OF DOMIATY DUCK LAYERS WITH AD_3E VITAMIN DURING LAYING SEASON ON EGG PRODUCTION TRAITS, FERTILITY, HATCHABILITY, EMBRYONIC MORTALITY AND DUCKLINGS PERFORMANCE

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SUMMARY

A total number of 240 Domiaty duck layers (192 females and 48 males) at 8 months of age were divided randomly into four groups to investigate the effects of the Domiaty duck layers injection with AD_3E vitamin during egg laying period by a dose 0.1 ml solution / duck which containing (8000 IU vit. A, 4000 IU vit.D_3 and 2 mg vit E),the treatments were as follows : non injected group(control) ,injected groups once , twice and three times weekly on egg production traits, fertility, hatchability, embryonic mortality and growth performance of hatched ducklings up to 8 weeks of age .

The results indicated that ,egg number and mass per duck ,laying rate ,egg weight and feed consumption (g feed / g egg) were significantly improved by increasing the injection times of AD_3E vitamin per week than the control group. Egg quality traits were not significantly affected by the injection with AD_3E vitamin except yolk weight percentage . Also, all eggs which produced from the injected duck layers had significantly ($p<0.01$) better fertility , hatchability and lower total embryonic mortality percentages than the control group , while , live body weight, body weight gain ,feed consumption g / duck and feed conversion for hatched ducklings were not significantly affected at the growing period (0 - 8 weeks) of age . Blood traits in layers at the end of the injection period such as total protein was not affected significantly ,while ,glucose , ,GOT and GPT were significantly ($p<0.01$) lower values due to the injection of AD_3E vitamin . The economic efficiency of ducklings produced from injected layers with AD_3E vitamin 1 ,2 and 3 times weekly was improved by about 83.1 ,181.4 and 413.4 % than the control ,respectively.

Keywords: vitamin A, vitamin D_3, vitamin E, duck laying performance egg production, fertility, hatchability, embryonic mortality, growth performance, blood parameters

INTRODUCTION

In avian species the yolk of the ocyte contains nutritional (lipids and proteins) and regulatory (vitamins A,E and D) components necessary for the normal development of the embryo (Romanoff, 1960). Vitamins are one of the major parts of

coenzymes production, indispensable for normal functioning of the corresponding enzymes, or act as regulators of biochemical processes.

Vitamin A has an important role in the nutrition of poultry being involved in vision , reproduction and epithelial keratinisation (Scott *et al*. , 1982) . Recently new functions of vitamin A has been discovered such as in the immune response , cell differentiation , proliferation and morphogensis by means of modulating gene expression (Goss and McBurney , 1992) . For heat-stressed broilers , vitamin (A,D,E and B complex) supplementation in drinking water have been reported to be beneficial for the performance and immune response (Ferket and Qureshi , 1992). Beimudez *et al*(1993) ; Squires and Naber (1993) ; Kerti and Bardas (1997) and Lin *et al* , (2002) noted that egg production , egg mass , the weight of egg yolk and albumen , fertility and hatchability of eggs were significantly increased by using vitamin A supplementation to layer diets .Vitamin E supplementation is very effective for animals because it reduces the negative effects of corticosterone induced by stress factors Tengerdy(1989). Scheideler and Froning (1996), Bollengier-lee, *et al*. (1998) and Puthpongsiriporn *et al* (2001) reported that the egg production and egg mass were significantly higher due to vitamin E supplementation .Earlier research with turkeys has shown that vitamin E(45 mg/kg) significantly increased hatchability from 52 to 88 % (Atkinson *et al*,1955). Vitamin E supplementation markedly improved fertility and hatchability of eggs (Muduvil *et al*., 1982) . Wilson (1997) reported that vitamin E has been shown to be essential for normal hatchability . On the other hand Bensoussan *et al* (1998) reported that vitamin E plays important roles in maintaining the viability of the spermatic population and in allowing epithelial epidicdymal cells to acquire their fully differentiated structural appearance . Hatchability was significantly improved due to vitamin D supplementation to the layer diets Landauer (1967) . Henry and Norman (1984) suggested that 24,25-$(oH)_2D_3$ and 1,25-$(oH)_2D_3$ were both needed for normal reproduction in chickens.

This study aimed to investigate the effects of injecting the layer ducks with preparation vitamins, AD_3E during egg laying period on egg yield produced , egg quality, fertility , hatchability percentages and growth performance of their hatched ducklings throughout the first 8 weeks of age .

MATERIALS AND METHODS

This study was carried out at El-Serw Research Station , for water fowl , Animal Production Research Institute, Agricultural Research Center, Ministry of Agriculture. It was started in September 2002 and terminated in March 2003.

Experimental birds and management :

Parent basic flock of the Domiaty ducklings were obtained from the hatchery of El-Serw Station from the hatches of April , 2002 . They were reared under similar hygienic and managerial conditions . The ducklings were brooded in well ventilated brooding pens (3.4 × 8.6 m) from day-old up to 4 weeks of age . At the end of brooding period the ducklings were permitted to go out for yards .Throughout the brooding , rearing and egg production periods , feed and fresh water were available all the time . Ducklings were fed layer starter diet from 0 to 8 weeks , layer grower

diet from 8 to 16 weeks of age and the birds were transferred to well ventilated laying pens (3.5 × 8.6m)when they reached 16 weeks of age and fed a layer diet The composition and analysis of the rations are shown in (Table 1).

Table 1. Composition and calculated analysis of the rations fed to the basic flock of ducks throughout the experimental periods

Ingredients %	Diets		
	Starter (0–8 wks)	**Grower (8–16 wks)**	**Layer (16 up to the end)**
Yellow corn	65.00	63.00	66.00
Soya bean meal (44 %)	30.45	15.50	21.50
wheat bran	0.65	17.78	2.74
Dicalcium phosphate	1.80	1.25	1.50
limestone	1.40	1.80	7.60
Vit & Min. premix *	0.30	0.30	0.30
Salt (Nacl)	0.30	0.30	0.30
DL. Methiounin	0.10	0.10	0.10
Total	100.0	100.0	100.0
Calculated analysis **			
Crude protein	19.12	15.04	15.50
ME (Kcal / kg)	2865	2687	2724
Total calcium (%)	1.029	1.041	3.410
Total phosphorus (%)	0.72	0.71	0.64
Vit A IU / kg	4000	3900	4000
Vit E mg / kg	20.8	21.65	23.78
Vit D IU / kg	500	500	500

* Contents per 3 kg premix vit A 2 miu , vit D3 0.5 miu, vit E 5 g , vit K3 1 g , vit B1 1 g , vit B2 4 g , vit B6 1.5 g , N .acid 20 g , P. acid 10 g , F acid 1 g , Biotin 50 g , cholin 50 g , Zinc 45 g , copper 3 g , iodine 0.3 g , Iron 30 g , selenium 0.1 g , Manganese 40 g and carrier $CaCo_3$ to 3000 g . ** According to NRC (1994)

Birds were chosen randomly and weighed, then divided into 4 groups of 48 females and 12 males each and subdivided into 3 equal replicates .Each group for one of four treatments. The ducks were housed at 4.5 birds / m^2 for all groups.

Experimental design and treatments:

At the age of 32 week a total number of 240 bird (192 females and 48 males)were taken at random,weighed then divided into four experimental groups each of 48 females and 12 males. Each group was further subdvided into 3 equal replicates.Each experimental group was randomly assigned to one of the following treatments;

Treatment 1 :kept as control and received no injection ,
Treatment 2:received one injection weekly ,
Treatment 3: received two injection weekly , and
Treatment 4: received three injection weekly .

Injection was applied intramuscullary in the leg with an oil preparation of vitamin AD_3E. The dose of injection 0.1 ml / bird containing : 8000 IU vit. A , 4000 IU vit. D_3 and 2 mg vit. E. The injection started in November 2002 after 5 weeks of laying the first egg , when the rat of lay reached 10% of the control group after 10 weeks, the injection was stopped followed by a recovery period of another 6weeks.

Measurements and Observations:

1- Feed consumption and conversion ratio:

Feed consumed by all ducks of each replicate for all treatments was weekly recorded, it was then averaged and expressed in gram per duck at the injection period 0 –10 weeks. Feed conversion for egg production during the same period was calculated according to the following formula :

Feed conversion ratio=Feed consumption (g/duck)/ total egg mass produced (g/duck)

2- Egg production traits :

Egg Number of eggs was recorded daily for 16 weeks from the beginning of injection. It was measured for each replicate as :

Egg number per duck =Number of eggs produced / Number of ducks at housing

Egg weight was recorded to the nearest gram for each replicate and egg mass was calculated as follows,

Egg mass /duck = Total egg mass produced /Number of ducks at housing

3-Fertility and hatchability :

Eggs were collected for 10 days during the laying period at three hatches as follows: First hatch the eggs were collected after 3 weeks of injection (135 egg/treatment),the second hatch the eggs were collected after 6 weeks of injection (180 egg / treatment)and the third hatch the eggs were collected after 9 weeks of injection (210 egg / treatment). Eggs were stored at 15 ºc , 65 % relative humidity then the stored eggs were transferred to an automatic computerized hatchery(Econome) . Total number of eggs set in the 3 hatches were 2100 eggs . Fertile eggs were detected on the tenth day of incubation by light candling test . Fertility percentage was estimated as follows ,

Fertility % =Number of fertile eggs x100 / Number of set eggs

Hatchability percentage was calculated on the basis of fertile eggs as follows, :

Hatchability %of fertile=Number of healthy duckling / Number of fertile eggs x100

4- Embryonic mortality percentage :

Embryonic mortality was classified according to the time of incubation as follows

1 – Early dead embryos up to the end of the first 10^{th} days of incubation ,

2– late dead embryos after the first 10^{th} days of incubation till the end of hatching time. Embryonic mortality percentage was calculated according to the following formula:

Embryonic mortality %=Number of dead embryos/Number of fertile eggs x100

5- Ducklings brooding , rearing and management :

All hatched duckling from each treatment in the first hatch were weighed and divided into 3 replicates .All duckling were reared under similar managerial and hygienic conditions. Temperature was adjusted at 32 -33ºC during the first two days after hatch and decreased by 0.5ºC daily until reaching 23ºC by the 22nd day , then it remained constant up to the 8th week of age .Ducklings were housed as 4.5 birds /m^2. Gas – heaters were used to provide the proper brooder temperature . Lighting period was 24 hours / day during the first two weeks, then decreased to 14 hours / day up to the end of the experimental period (8 weeks) . Food and water were offered ad-libitum throughout the experimental period . Birds in different experimental groups were fed layer starter diet from hatching up to 8weeks of age. Ducklings were weighed at biweekly intervals up to8 weeks of age .Weight gain , feed consumption and feed conversion were calculated .

6 - Blood analysis :

Blood samples from 3 laying ducks per treatment were collected after 10 weeks of injection .The samples were collected in heparinized test tubes and , then centrifuged at 3500 rpm for 20 minutes to obtain blood plasma . After that plasma was stored at – 20 ºc until analysis . The following parameters were assayed by commercial kits using spectrophotometer (Jenway 6105): Total protein ,glucose , glutamic– oxalo acetic -transaminase (GOT) and glutamic–pyruvic–transaminase (GPT).

Statistical analysis :

Data were analyzed by the analysis of variance according to Snedecor and Cochran (1982). Significant differences among means were detected by the method of Duncan (1955) .

The following model was used :

$$\mathbf{Y_{ij} = \mu + T_i + e_{ij}}$$

where,

Y_{ij} = An observation

μ = overall mean

T_i = Effect of treatment (1, 2 , … , b) and

e_{ij} = Random error .

RESULTS AND DISCUSSION

It was observed that the response of vitamin AD_3E injection was started after 2 weeks of injection and was more pronounce in the groups injected 2 or 3 times weekly. Table (2) shows the egg number per duck and laying rate were improved significantly at the pooled periods, during the injection period (0-10 wks) the group which injected 3 times weekly had better values of these traits than the control group by about 27.6% followed by those of 2 and 1 injection weekly by 18.3 and 12.12 %, respectively .Also, after the injection was stopped (10-16 wks), the groups which was injected 3,2 and 1 times weekly produced eggs amounted to 416.2 , 253.0 and 165.0 % that of the control. The same trend was found when the data were pooled at

(0-16 weeks) where the superiority of the groups injected 3,2 and 1 times weekly than the control group was 66.6 , 36.4 and 10.6 % , respectively.

Table 2. Means and standard errors (x±SE) of egg number per duck and laying rate % at experimental intervals for Domiaty ducks as affected by injectionAD_3E vitamin

Treatment	Egg number			Egg laying rate %		
	0 –10 wk	**10- 16 wk**	**0- 16 wk**	**0- 10 wk**	**10- 16 wk**	**0-16 wk**
Non injected						
Control (C)	34.37±0.59^{c}	5.37±0.39d	39.75±0.46^{d}	49.10±0.85^{c}	12.79±0.45^{d}	35.49±0.41^{d}
%of C.	**100**	**100**	**100**	**100**	**100**	**100**
Injected(No./wk)						
One	35.10±0.33c	8.85±0.48c	43.95±0.64^{c}	50.14±0.44^{c}	21.08±1.16^{c}	39.24±0.58^{c}
% of C.	**102.11**	**164.81**	**110.56**	**102.11**	**164.81**	**110.56**
Two	40.65±0.57^{b}	13.58±0.31^{b}	54.23±1.28^{b}	58.06±0.81^{b}	32.34±1.76^{b}	48.41±1.14^{b}
% of C.	**118.24**	**252.85**	**136.40**	**118.24**	**252.85**	**136.40**
Three	43.85±0.90^{a}	22.35±0.31^{a}	66.21±1.16^{a}	62.64±1.29^{a}	53.22±0.75^{a}	59.11±1.04^{a}
% of C.	**127.57**	**416.10**	**166.55**	**127.57**	**416.10**	**166.55**
Significantly	0.01	0.01	0.01	0.01	0.01	0.01

Means within each column having similar letter (s) are not significantly different at $p \leq 0.05$

The egg mass per duck improved significantly at the pooled periods ,during the injection period (0-10 wks) the group which injected 3 times weekly had better value of egg mass per duck than the control group by about 27.8% followed by those of 2 and 1 injection weekly by 19.5 and 0.9%,respectively . After the injection was stopped , the groups which was injected 3,2 and 1 times weekly produced egg mass values being to 437.5 , 267.3 and 164.7 % than those of the control group, respectively . The same results were found when the data were pooled at 0-16 weeks where the superiority of the groups injected 3,2 and 1 times weekly than the control group was 69.1

During the whole injection period (10 weeks) the groups which injected 2 and 3 times weekly consumed more feed than the control by about 3.8 and 12.0% , while , the group injected once weekly consumed 1.8 % less feed than the control and all injected groups injected had better value of feed conversion ratio than the control group (Table 3). These results similarly with those obtained by Beimudez *et al*. (1993) ; Squires and Naber (1993); Kerti and Bardas (1997) and Lin *et al*. (2002) noted that egg production , egg mass and laying rate were increased significantly by using vitamin A supplementation to layer diets.Also, . Scheideler and Froning (1996), Bollengier-lee, *et al*. (1998) , Puthpongsiriporn *et al* (2001) reported that the egg production, egg mass and laying rate were significantly higher by supplementation vitamin E., Landauer (1967) and Henry and Norman (1984) who reported that vitamin D improved egg production and egg shell quality .

Table 3. Means and standard errors ($\bar{x}$±SE) of egg mass (g) ,feed consumption (g)and feed conversion (g feed / g egg) at experimental intervals for Domiaty ducks as affected by injection AD_3E vitamin

Treatment	Egg mass (g)			Feed consumption	Feed conversion
	0 –10 wk	10- 16 wk	0- 16 wk	0- 10 wk	0- 10 wk
Non injected					
	c	**d**	**d**	**bc**	**a**
Control (C)	2123.33±38.9	326.97±12.6	2450.31±29.1	9108.3±30.7	4.29±0.09
%of C.	**100**	**100**	**100**	**100**	**100**
Injected(No./wk)					
	c	**c**	**c**	**c**	**a**
One	2142.60±19.6	538.56±27.5	2681.16±37.1	8947.9±135.4	4.18±0.04
% of C.	**100.90**	**164.71**	**109.42**	**98.23**	**97.43**
Two	**b**	**b**	**b**	**b**	**b**
% of C.	2538.43±40.0	874.04±50.1	3412.17±87.4	9456.2±166.4	3.73±0.01
	119.54	**267.31**	**139.25**	**103.81**	**86.94**
Three	**a**	**a**	**a**	**a**	**b**
% of C.	2713.85±48.9	1430.72±20.2	4144.58±65.6	10197.9±198.7	3.76±0.006
	127.81	**437.56**	**169.14**	**111.96**	**87.64**
Significantly	0.01	0.01	0.01	0.01	0.01

Means within each column having similar letter (s) are not significantly different at $p \leq 0.05$.

Table (4) shows that all injected groups of duck had better fertility percentage than that of the control group at different periods. The groups which injected 3 , 2 and 1 times weekly surpassed the control in respect of fertility percentage by 7.83 , 4.34 and 2.57% at 3 week, 10.28 , 6.85 and 3.99% at 6 week and 7.14 , 4.54 and 1.95% at 9 weeks, respectively. These results indicated that the group which injected 3 times weekly had highest fertility percentage followed by that injected twice ,once and non injected in a descending order .All eggs for injected groups with vitamins AD_3E had significantly ($P \leq 0.01$) better of hatchability percentage of fertile eggs than the control group after 3 , 6 and 9 weeks from injection .The superiority of hatchability percentage of fertile eggs for the groups injected 3 , 2 and 1 times weekly than the control group was 32.0 , 14.7 and 12.5% after 3 weeks , 14.4 , 8.4 and 4.8% after 6 weeks and 19.3 , 15.2 and 11.6% after 9 weeks of injection , respectively . These results similarly with those obtained by Beimudez *et al*(1993) ; Squires and Naber (1993) ;Kerti and Bardas (1997) and Lin *et al* , (2002) noted that fertility and hatchability of eggs were increased significantly by using vitamin A supplementation to layer diets . Supplementation of vitamin E significantly increased hatchability from 52 to 88 % (Atkinson *et al*,1955). Vitamin E supplementation markedly improved fertility and hatchability of eggs (Muduvil *et al* , 1982) . Wilson (1997) reported that the effect of vitamin E has been shown to be essential for normal hatchability . Hatchability improved by vitamin D supplementation

(Landauer ,1967) , Henry and Norman (1984) suggested that 24,25-$(oH)_2D_3$ and 1,25-$(oH)_2D_3$ were both needed for normal reproduction in chickens to obtain maximal egg fertility and hatchability .

Table 4. Means and standard errors (x±SE) of fertility % and hatchability of fertile eggs % at different periods for Domiaty ducks as affected by injection AD_3E vitamin

Treatment	Fertility % at			Hatchability of fertile egg % at		
	3 wks	6 wks	9 wks	3 wks	6 wks	9 wks
Non injected						
Control (C)	85.18±0.73^{c}	83.33±1.25^{c}	85.55±2.4	61.69±3.36^{b}	82.84±1.77^{c}	79.28±1.89^{c}
%of C.	**100**	**100**	**100**	**100**	**100**	**100**
Injected(No./wk)						
One	87.37±0.71bc	86.66±0.47^{b}	87.22±0.5	69.44±2.77b	86.81±1.89^{bc}	88.51±1.16b
% of C.	**102.57**	**103.99**	**101.95**	**112.56**	**104.79**	**111.64**
Two	88.88±1.28^{ab}	89.04±0.47^{ab}	89.44±1.1	70.77±3.86^{b}	89.85±1.88^{ab}	91.30±0.57^{ab}
% of C.	**104.34**	**106.85**	**104.54**	**114.71**	**108.46**	**115.16**
Three	91.85±0.73^{a}	91.90±0.04^{a}	91.66±0.9	81.47±2.02^{a}	94.82±1.34^{a}	94.57±1.78^{a}
% of C.	**107.83**	**110.28**	**107.14**	**132.06**	**114.46**	**119.28**
Significantly	0.05	0.01	NS	0.01	0.01	0.01

Means within each column having similar letter (s) are not significantly different at $p \leq 0.05$.

Table (5) shows that the injection of ducks by vitamins AD_3E for 3 ,6 or 9 weeks had significantly lower ($P \leq 0.01$) of the total embryonic mortality percentage than the control group , the improvement of total embryonic mortality percentage was more pronounce with increasing the weekly injection number to be 3 times weekly where it represented about 48 ,27 and 26 % that of the control after 3 ,6 and 9 weeks of injection ,respectively. These results similarly with those obtained by (Ferket and Qureshi , 1992) who reported that vitamin (A,D,E and B complex) supplementation in drinking water have been reported to be beneficial for the performance and immune response. Tengerdy(1989) reported that vitamin E supplementation is very effective for animals because it reduce the negative effects of corticosterone induced by stress factors .

At the end of injection treatments, the plasma total protein level was not significantly changed among all experimental groups. The plasma total protein values in the groups injected 1 and 3 times weekly were less than that of the control group by about 8.92 and 4.91% but the group injected 2 times weekly was more 10.4% than the control. In respect the plasma glucose level at the end of injection period , it was significantly ($P \leq 0.01$) decreased in all injected groups than those of the control, the groups injected 1 , 2 and 3 times weekly had less values of the plasma glucose than the control group by about 5.5 , 2.21 and 12.68% respectively.

Table 5.Means and standard errors (x±SE) of total embryonic mortality % at different periods and some blood traits of duck layers at 10th of I of injection for Domiaty ducks as affected by injection AD_3E vitamin

Treatment	Total embryonic mortality % at			Some blood traits			
	3 wks	6 wks	9 wks	Total P. (g/dl)	Glucose (g/dl)	GOT (U/L)	GPT (U/L)
Non injected							
Control (C)	38.30±3.37[a]	17.15±1.77[a]	20.71±1.8[a]	6.73±0.43	213.0±2.07[a]	48.0±0.51a	32.30±1.52[a]
%of C.	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Injected(No./wk)							
One	29.91±1.70[a]	13.18±1.89[ab]	11.48±1.1[b]	6.13±0.14	201.3±2.89[b]	49.0±1.24[a]	27.66±5.12[a]
% of C.	**78.09**	**76.85**	**55.43**	**91.08**	**97.91**	**102.08**	**85.63**
Two	29.22±3.86[a]	10.15±1.88[bc]	8.69±0.57[bc]	7.43±0.37	208.3±3.83[ab]	29.66±0.70b	24.33±2.84[c]
% of C.	**76.29**	**59.18**	**41.96**	**110.40**	**97.91**	**61.79**	**75.32** **b**
Three	18.52±2.02[b]	4.66±0.88[c]	5.42±1.78[c]	6.40±0.46	186.0±2.64[c]	34.0±0.23[b]	28.0±5.02[b]
% of C.	**48.35**	**27.17**	**26.17**	**95.09**	**95.83**	**70.83**	**86.68**
Significantly	0.01	0.01	0.01	NS	0.01	0.01	0.01

Means within each column having similar letter (s) are not significantly different at p ≤ 0.05.

The plasma GOT and GPT activity at the end of injection period were significantly (P ≤ 0.01) affected by vitamins AD_3E injection , the groups injected 2 and 3 times weekly had lower values of plasma GOT than the control group by about 38.21 and 29.17%, but the group injected once weekly had more value by about 2.08% than the control.Similarly, all injected groups 1 , 2 and 3 times weekly had the lowest values of plasma GPT than those the control group by about 14.47 , 24.68 and 3.32%, respectively.

Table (6) shows that live body weight , body weight gain and feed consumption and feed conversion of hatched ducklings at growing period . Live body weight for ducklings due to the injection of layers by vitamins AD_3E were not significant at all studied ages up to 8 weeks , except at hatch ,body weight gain improved due to the injection with AD3E vitamin without any significant from 0 – 8 weeks . The feed consumption throughout the whole experimental period (0-8 weeks) for ducklings produced from layers injected 1 , 2 and 3 times weekly were significantly (p ≤0.05) less than that of the control group by 6.57 , 5.0 and 1.97% , respectively. On other hand , feed conversion ratio at the same period 0-8 weeks improved for injected groups by about 6.20 to 19.68 % than the control.

Table 6. Means and standard errors (x±SE) of live body weight (g) , body weight gain (g) and feed consumption (g/duck) and feed conversion at (0—8wks) of hatched ducklings at growing period for Domiaty ducks as affected by injection AD_3E vitamin

Treatment	Live body weight (g)		Body weight gain (g) at 0 –8 wks	Feed consumption (g)	Feed coversion (g feed/g B.W.gain)
	At hatch	8 wks			
Non injected					
Control (C)	33.9±0.34^{ab}	1122.9±40.1	1089.0±40.7	4039±31.6^{a}	3.71±0.10
%of C.	**100**	**100**	**100**	**100**	**100**
Injected(No./wk)					
One	34.9±0.40^{a}	1195.9±60.3	1161.0±60.6	3774.6±18.7^{b}	3.27±0.17
% of C.	**102.94**	**106.50**	**106.61**	**93.43**	**88.14**
Two	33.7±0.40^{b}	1322.4±25.6	1288.7±25.2	3838.0±56.7^{b}	2.98±0.07
% of C.	**99.41**	**117.76**	**118.33**	**95.00**	**80.32**
Three	32.1±0.09^{c}	1174.6±44.	1142.5±44.6	3960±89.7^{b}	3.48±0.20
% of C.	**94.69**	**104.60**	**104.91**	**98.03**	**93.80**
Significantly	0.01	NS	NS	0.05	NS

Means within each column having similar letter (s) are not significantly different at $p \leq 0.05$.

The injection of Domiaty duck layers with vitamins AD_3E during egg production significantly improved egg production , so that , the cost of each egg produced was decreased by increasing the number of injection per week with vitamins AD_3E , the cost of laying one egg was gradually decreased with increasing the number injection per week from 0.0 up to 3 times, the lowest value of cost per duckling produced was occurred for the three times weekly injected group followed by those injected 2 , 1 and 0.0 times weekly in a descending order. Generally, the injected groups 1 ,2 and 3 times weekly decreased the cost of each egg produced by about 9.9 ,21.9 and 32.3 % than the control group , respectively .Also ,the same trend occurred of the economic efficiency of duckling produced from injected layers by AD_3E vitamin. The injected groups by 1 ,2 and 3 times weekly with AD_3E surpassed the control group by about 83.1 ,181.4 and 413.4 % in respect of the E.E.% ,respectively (Table 7).

Table 7. Economic efficiency (E.E.%) of produced and incubation Domiaty eggs as affected by injecting layers with vitamin AD3E during laying egg

Treatments	Cost of one egg produced (L.E.)	No.of eggs incubated	Total cost of egg incubated (L.E.)	No.of hatched ducklings	Total return (L.E)	Net return (L.E.)	E.E. %
Non injected							
Control (C)	00.457	525	239.9	333	333.00	93.10	38.80
%of C.	**100**		**100**	**100**	**100**	**100**	**100**
Injected(No./wk)							
One	00.412	525	216.3	370	370.00	153.70	71.05
% of C.	**90.15**		**90.16**	**111.11**	**111.11**	**165.09**	**183.11**
Two	00.357	525	187.40	392	392.00	204.60	109.17
% of C.	**78.11**		**78..11**	**117.71**	**117.71**	**219.76**	**281..36**
Three	00.319	525	167.40	436	436.00	268.6	160.40
% of C.	**67.83**		**69.77**	**130.93**	**130.93**	**288.50**	**413.4**

CONCLUSION

The obtained results generally showed that the best results in most studied traits were recorded for the injection of laying ducks with AD_3E vitamin solution two or three times weekly during egg production. It could be advised that the application of the injection of laying ducks by AD_3E vitamin solution may be alternative methods to maximize the productivity and profitability of Domiaty ducks .

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تأثير حقن أمهات البط الدمياطي بفيتامين أد٣هـ خلال موسم وضع البيض على صفات إنتاج البيض ونسبة الفقس والنفوق الجنيني وأداء الكتاكيت الفاقسة خلال فترة النمو

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أجرى هذا البحث بمحطة بحوث الطيور المائية بالسرو – معهد بحوث الإنتاج الحيواني – مركز البحوث الزراعية وزارة الزراعة . صممت الدراسة لمعرفة تأثير حقن أمهات البط الدمياطي بفيتامين أ د٣هـ خلال فترة إنتاج البيض بجرعة ٠.١ ملي طائر (تحتوى على ٨.٠٠٠ وحدة دولية فيتامين أ و٤.٠٠٠ وحدة دولية فيتامين د و ٢ ملجم فيتامين هـ) بعدد مختلف من مرات الحقن أسبوعيا(مرة واحدة، مرتين أو ثلاث مرات) على إنتاج البيض وصفات الخصوبة والفقس وكذلك أداء الكتاكيت الفاقسة خلال فترة النمو حتى ٨ أسابيع والمقارنة بالكنترول غير المحقون حيث أجريت هذه الدراسة خلال الفترة من سبتمبر ٢٠٠٢ حتى مارس ٢٠٠٣ واستخدم فيها ١٩٢ بطة و ٤٨ ذكر من سلالة البط الدمياطي منتخبة من فقس أبريل ٢٠٠١ وزنت وقسمت عشوائياً الى أربع معاملات تجريبية للحقن بفيتامين أ د٣هـ هي: مجموعة بدون حقن ، مجموعة تحقن مرة واحدة أسبوعيا ، مجموعة تحقن مرتين أسبوعيا ثم مجموعة تحقن ثلاث مرات أسبوعيا

وكانت أهم النتائج المتحصل عليها هي : تحسن إنتاج البيض معنوياً للمعاملات المحقونة بفيتامين أ د٣هـ خلال فترة الحقن (١٠ أسابيع) وبعد توقف الحقن (٦ أسابيع) عن الكنترول وكانت أفضل المعاملات هي التي حقنت ثلاث مرات ثم مرتين أسبوعياً وذلك لصفات عدد البيض لكل بطة وكتلة البيض ومعدل وضع البيض لكن لم تتأثر كفاءة التحويل الغذائى لانتاج البيض ، تحسنت نسبتي الخصوبة و الفقس معنوياً بالحقن وأفضل المجموعات التي حقنت ثلاث مرات ثم مرتين أسبوعياً ، النفوق الجنيني الكلى خلال فترة التفريخ كان منخفض في البيض الناتج من المعاملات المحقونة بالفيتامين في الأمهات عن الكنترول بفروق معنوية عند ١%لم يتأثر أداء النمو خلال فترة النمو الأولى (٨ أسابيع) لصفات الوزن الحي و معدل الزيادة الوزنية و كفاءة التحويل الغذائي معنوياً وان كانت المعاملات المحقونة أفضل بالمقارنة بالكنترول ، في الأمهات لم تتأثر بعض صفات الدم معنوياً نتيجة للحقن بفيتامين اد٣هـ مثل البروتين الكلى في البلازما وتأثرت بعض الصفات معنويا مثل والجلوكوز وإنزيمات الكبد بالمقارنة بالكنترول ، تحسنت الكفاءة الاقتصادية نتيجة حقن أمهات البط الدمياطي بفيتامينات أد٣هـ خلال إنتاج البيض وكذلك إنتاج كتاكيت من تفريخ ذلك البيض وكانت افضل المعاملات من الناحية الاقتصادية تلك التي حقنت ثلاث مرات أسبوعيا ثم مرتين تحسنت الكفاءة الاقتصادية نتيجة حقن ومن النتائج يتضح: أنه يمكن استخدام حقن الأمهات خلال فترة الإنتاج بفيتامين ا د ٣هـ بجرعة ٠.١ ملى/طائر مرتين أو ثلاث مرات أسبوعياً لتحسين الخصوبة و الفقس وصفات إنتاج البيض للبط الدمياطي .