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STUDIES ON NATIVE PIGEONS UNDER EGYPTIAN VILLAGE NILE DELTA CONDITIONS.

By

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Abstract: *Experiment was conducted to study some productive and reproductive traits of Local Egyptian Baladi pigeons reared in traditional dovecotes at five different farms around El-Mahmodia City, Beheira Governorate, Egypt, throughout 12 consecutive months represented four seasons during years 2006/2007. Birds were fed naturally on seeds, grains, corns, beans, wheat….. etc, which were found in the fields around the dovecotes through the periods of crops harvesting and provided with corns, beans and wheat through the periods without crop harvesting, while water was provided continually.*

Results Summarized As Follows:

1-a- Seasons had a significant (P<0.05) effect on the fertility and hatchability percentages where spring and winter seasons had the highest values followed by fall and summer seasons, whereas the pattern became vice versa for embryonic mortality and pipped eggs percentages.

1-b- Farms had a significant (P<0.05) effect on the fertility, pipped eggs and hatchability percentages.

2-a- Seasons had a significant (P<0.05) effect on the all studied productive traits (egg number/female/season, egg weight, squab number/ female/season and squab pair weight at 28 days of age) where spring and winter seasons had the highest values followed by fall season then summer season.

2-b- Farms had a significant (P<0.05) effect on the all studied productive traits.

3-a- Seasons had a significant (P<0.05) effect on carcass traits for squab at 28 days of age (blood, feather, liver and gizzard weight percentages)

where spring and winter seasons values were higher than fall and summer.

3-b- Farms had no significant effect on all carcass traits for squab at 28 days of age

4-a- Seasons had a significant (P<0.05) effect on egg quality traits (shell weight, shell thickness and egg shape index), where spring had the highest values.

4-b- Farms had a significant (P<0.05) effect on all egg quality traits except for shell thickness and shell weight percentage.

CONCLUSION:

Results obtained refer that pigeons raised in dovecote should be supplemented with good rations during the summer and fall seasons in order to improve productive and reproductive efficiency

INTRODUCTION

Pigeons are mainly a monogamous birds (Essam, 1997), Levi (1974) reported that pigeons mated for life, they mate in pair and remained together for life unless they were forced to be separated by removal or death . Each hen of pigeon usually lays two eggs per clutch which lasts between 40 hours (Haynes, 1987) and 44 hours (Winter and Funk, 1951). The last author added that "if more than two eggs are laid, it is advisable to remove the extra ones as a pair of pigeons can raise only two good squabs at one time". Thear and Fraser (1988) noted that when the second egg was laid, natural incubation started and lasted about sixteen days and the first egg was hatched about 36 hours earlier than the second one. Male and female parent pigeons incubate the eggs and the first hatched squab usually is male, while the second was female (Abdel-Azeem, 2005).The young pigeons from one day old to about thirty days of age (marketing age) known as squabs have been recognized as a delicious and nourishing food (Levi, 1974).

Ballay and Meleg (1992) kept pigeons selected for commercial squab production in individual breeding cages inside an environmentally controlled house for 12 months. They found that the autumn and spring seasons had the highest means of fertility (96.59 and 95.64%, respectively) and the summer and winter seasons had the lowest ones (94.99 and 94.56%, respectively). Autumn and summer seasons had the highest means of hatchability (63.39 and 63.50%, respectively) while winter and spring seasons had the lowest ones (60.33 and 59.68%, respectively). Spring and winter means had the highest means of embryonic mortality during 6-14

days of incubation (4.00 and 4.26%, respectively) while summer and autumn seasons had the lowest means (2.41 and 1.65%, respectively). Sargisson et al., (2007) reported that the weights of 5 pigeons with free access to food, monitored over 3 calendar years in the laboratory, were found to fluctuate with season. All pigeons were at their heaviest in the winter and were lightest in summer.

This study was conducted to investigate the effect of season and farm on productive and reproductive traits of Local Egyptian Baladi pigeons raised in native traditional dovecotes under the Egyptian Nile Delta village conditions.

MATERIALS AND METHODS

The experiment was conducted using Local Egyptian Baladi pigeons "belongs to Rock dove, Columba livia" reared in traditional dovecotes at five different farms around El-Mahmodia City, Beheira Governorate, Egypt, throughout 12 consecutive months represented four seasons during years 2006/2007. Birds were fed naturally on seeds, grains, corns, wheats, beans….etc, which were found in the fields through the periods of crops harvesting. Pigeons were provided with corns, beans and wheats through the periods without crop harvesting. The feed crops during harvesting seasons in these areas were beans through March and April months, wheat through May and June months, maize and sunflower through August and September months, also, rice through September and October months. Water was provided continually. Pigeons were raised under natural day light.

The capacity of each dovecote ranged from 1000 to 1500 "Qadouses" which is the native name of pigeonholes or nests. The qadouse is usually occupied by one pair of mated pigeons. The qadouse is 35 cm long made of clay in a cylinder shape open from the two ends, it is wide in the middle and narrow at the two ends to prevent eggs or young's from roll and fall down.

At the beginning of the experiment fifty nests were selected randomly inside each dovecote and marked with special cards. Eggs of each female were numbered with China ink on shells to measure egg number per female per season, egg weight, fertility, embryonic mortality, pipped eggs, hatchability of fertile eggs and squab number per female per season. At the end of incubation period, all eggs that failed to hatch were broken out and then examined macroscopically to record the fertility and embryonic mortality.

All squabs were weighed (to nearest gram) at 28 days of age before they are ready to leave the nests in the early morning to reduce possible variation due to feed intake. At the same age six squabs were chosen randomly from each dovecote and slaughtered to measure carcass, blood, feather, liver and gizzard as a percentages of live weight.

Forty eight eggs per each farm (12 eggs/ season) were randomly taken and broken out, shells air dried weighed to nearest 0.1g., and percentage shell was calculated (shell weight/egg weight x100). The shell thickness were measured to 0.01mm accuracy with a micrometer. Index of egg shape estimated as the maximum width of egg/length of the egg x100. Yolk and albumen weights for each egg were recorded as a relative of total egg weight

Data were statistically analyzed by using the general linear model procedure "GLM" of (SAS, 1998). Differences among the means were tested according to Duncan's Multiple Range-test (Duncan, 1955). The percentage values were transferred to their angle using arcsine equation before subjected to statistical analysis.

Collected data were statistically analyzed using the following model:

$Y_{ijk} = \mu + S_i + F_j + (S*F)_{ij} + e_{ijk}$

Where: $Y_{ijk;}$= an observation.

μ = overall mean.

S_i = effect of season.

F_j = effect of farm (location).

$(S*F)_{ij}$ = effect of the interaction between season and farm.

e_{ijk} = random error.

RESULTS AND DISCUSSIONS

1- Hatching Traits:

1-1- Fertility percentage:

As shown in Table 1, fertility percentage was affected significantly ($P<0.05$) by season. Means were 93.90, 94.99, 87.48 and 91.69% for the winter, spring, summer and fall seasons, respectively. The spring season had the highest significant ($P<0.05$) mean of fertility (94.99%) than the other seasons, but the differences with the mean of winter and fall seasons were not significant. The summer season had the lowest significant mean of fertility (87.48%).

These results are inconsistent with those reported by Ballay and Meleg (1992) who kept pigeons selected for commercial squab production in individual breeding cages inside an environmentally controlled house for 12 months. They found that the fertility were 94.59, 95.64, 94.99 and 95.64% for winter, spring, summer and fall seasons, respectively. This inconsistent may appeared due the differences of rearing conditions. There were no significant differences in fertility among farms except between the first and fourth farms.

1-2- Embryonic Mortality Percentage:

Data presented in Table 1, showed that the embryonic mortality percentage was not affected significantly ($P<0.05$) by seasons. Means were 5.19, 3.86, 6.12 and 5.96% for winter, spring, summer and fall seasons, respectively. The spring season had the lowest mean of embryonic mortality (3.86%) and the summer season had the highest ones (6.12%). Differences among farms were not significant, means ranged between 4.64 and 6.19 %.

1-3- pipped eggs percentage:

Results in Table 1, indicated that the differences of pipping eggs among seasons were not significant. Means ranged between 4.44 and 6.28%. Differences among farm means were significant ($P<0.05$), means ranged between 3.76 and 7.35 %. The second farm had the highest significant mean (7.35%) but the differences with the means of third (6.34%) and fourth (5.63%) farms were not significant.

1-4-Hatchability Percentage:

In Table 1, hatchability of fertile eggs percentage was significantly ($P<0.05$) influenced by both season and farm. Generally the same trend of effect on fertility was recorded in hatchability. Means were 84.27, 86.11, 78.37 and 79.44% for winter, spring, summer and fall seasons, respectively. Hatchability percentages between farms ranged from 78.10 to 85.29%. The first farm had the highest significant mean of hatchability (85.29%) but the differences with the means of third (81.47%) and fifth (83.40%) farms were not significant. Our results were around the findings of Abd El-Azeem et al. (2007), where the over all mean in their experiment was 79.71 %. But disagree with those reported by Ballay and Meleg (1992) who found that the autumn and summer seasons had the highest means of hatchability (63.39 and 63.50%, respectively) while winter and spring seasons had the lowest ones (60.33 and 59.68%, respectively).

Therefore, it is concluded from the results of this table that spring and winter seasons recorded the highest means of fertility and hatchability

percentages with the decrease of embryonic mortality. These results confirm those of earlier work by Ballay and Meleg (1992) and Ahmed and Mahmoud (1992) who reported that season had an effect on reproductive traits of pigeons. Moreover, the decrease of fertility and hatchability percentages during summer season could be due to the free system of nutrition during this period without any interference for additional feed to the birds. In addition, these results and explanation are consistent with earlier reports by Drent and Woldendrop (1989) where embryonic mortality and pipped eggs increased and hatchability decreased in summer than other seasons.

2- Productive Traits:

2-1-Egg Number/Female/Season:

Each hen of pigeon usually lays two eggs per clutch (Abs, 1983; Goodwin 1983; Thear and Fraser 1988 and Bokhari 1994). Allover mean/season for this trait in this experiment was 3.20 eggs/female/season which is equivalent to 12.8 eggs/female/year, this number is lower than those estimated by Abd El-Azeem (2005) who reported that there are 7 cycles/year, that mean that female pigeon can produce up to 14 eggs/year. Both seasons and farms had a significant ($P<0.05$) effect on this trait (Table 2). Winter and spring seasons had the highest significant means of egg number per female (3.60 and 3.52 eggs, respectively) but the difference between them were not significant. While the summer and fall seasons had the lowest significant mean (2.74 and 2.96 eggs, respectively) and the differences between them were not significant. The fourth farm had the highest significant mean of egg number per female per season (3.42 egg) and the second farm had the lowest significant mean (3.08 egg) but the differences between each of them with the other three farms were not significant.

2-2- Egg Weight:

The means of egg weight are shown in Table 2. The results indicated that egg weight was significantly ($P<0.05$) affected by season and farm. Spring and winter seasons means (15.49 and 15.37 g, respectively) were significantly higher than those in fall and winter seasons (14.49 and 13.62 g., respectively). The difference between spring and winter seasons was not significant. The fifth farm had the highest significant ($P<0.05$) mean of egg weight (15.22 g) followed by the fourth farm (14.93 g) while the second farm had the lowest ones (14.33 g). The means of egg weight for the first and third farms were 14.67 and 14.58 g, respectively, but the difference between them was not significant.

These results are in agreement with those reported by Abd El-Azeem et al., (2007) who found that egg weight ranged from 13.78 to 17.38 g in local Baladi pigeon in an experimental station, while our findings were lower than those reported by Yanni (1969) who indicated that egg weight produced from pigeons was ranged from 17.99 to 20.50 g. These differences could be due to the genetical factor or nutritional effect.

2-3-Squab Number/Female/Season:

Table 2 shows that allover mean of squabs/female/season was 2.62 which is equal to 10.48 squabs/female/year. Those obtained result was lower than that reported in statement noted by Abdel-Azeem (2005)"the female can produce 14 squabs under good management conditions". Seasons had a significant effect on this trait whereas squab number per female per season was the same (3.03 squab) for both winter and spring seasons, which were significantly ($P<0.05$) higher than those of the summer (2.06 squab) and fall (2.34 squab) seasons. The first, fourth and fifth farms had the highest significant means of squab number per female per season (2.70, 2.69 and 2.68 squab) than the other two farms. The second and third farms had the lowest means (2.43 and 2.59 squab, respectively) but the differences between them was not significant.

Results in this table represents that squab number/female/season was lower in summer and fall seasons by almost 30% compared to those in winter and spring seasons. These results add credence to the conclusion of Fred et al. (1953) who found that squabs number were highest during the spring season and lowest during the fall season.

2-4- Squab Pair Weight At 28 Days Of Age:

Table 2, shows that weights of squab pair at 28 days of age were fluctuated with season. Spring season had the highest significant ($P<0.05$) mean of squab pair weight (531.6 g) but the difference with the mean of winter season (521.2 g) was not significant. The summer season had the lowest significant ($P<0.05$) mean of squab pair weight (365.7 g) and it could be due to the raise in high temperature and insufficient food conditions during the summer season. Also, decreasing squab pair weight at 28 days of age in the summer and fall seasons compared to other seasons could be due to the fact fact that squabs depend on their parents on their feeding with crop milk and summer is not a good season for either natural crops or feed intake for the parents.

These results are in agreement with those found by Ahmed and Mahmoud (1992) on their study on wild pigeons. They found that squab

weights at 28 day of age were lower in summer and fall seasons. Also, Sargisson et al., (2007) found that the weights of 5 pigeons with free access of food monitored over 3 calendar years in the laboratory, were lightest in the summer season and heaviest in the winter season. Differences between farms mean on this trait were significant (P<0.05). The fourth farm had the highest significant mean of squab pair weight (495.7 g) but the differences with the means of fifth (470.1 g) and first (467.2 g) farms were not significant, while the second farm had the lowest significant mean (428.0 g) which differed significantly only with the mean of fourth farm.

3- Squab Carcass Traits:

3-1-Carcass Weight Percentage:

Data presented in Table 3, showed that season had a significant (P<0.05) effect on carcass organs percentages at 28 days of age. Spring season had the highest significant mean of carcass weight percentage (69.30%) but the difference with the winter season mean (68.43%) was not significant. While the summer season had the lowest one (64.55%) and the difference between the fall season mean (67.50%) and that of winter season was not significant. Differences among mean carcass weights percentages for farms were not significant, means ranged between 66.81 to 68.26%. Our results were around the findings of Abd El-Azeem et al. (2007), where the overall mean in their experiment was 67.79 %.

3-2-Blood Weight Percentage:

As shown in Table 3, generally season had a significant (P<0.05) effect on blood weight percentage. Spring season had the highest significant mean (6.44%) but the difference with the winter mean (6.03%) was not significant. While the summer season had the lowest significant mean (5.53%) but the difference with the fall mean (5.80%) was not significant. Slight numerical differences were detected for blood weight percentages among farms. Means ranged between 5.89 to 6.03%. Our results were around the findings of Abd El-Azeem et al. (2007), where the overall mean in their experiment was 6.03 %.

3-3-Feather Weight Percentage:

Table 3, shows that season had a significant (P<0.05) effect on feather weight percentage except between fall and winter seasons. Spring season had the highest mean (7.84%) followed by fall season (7.27%) and winter season (7.15%). Summer season recorded the lowest ones (6.85%). Differences among farms mean feather weight percentages were not significant, means ranged between 7.19 to 7.39%. Results were around the

findings of Abd El-Azeem et al. (2007), where the overall mean in their experiment was 7.70 %.

3-4-Liver Weight Percentage:

Spring season had the highest significant mean of liver weight (2.32%) compared to those for other seasons. While there were no significant differences among the values of other seasons. Differences among farms mean liver weight percentages were not significant. Means ranged between 2.10 to 2.19 %. Our results are in agreement with those finding by Abd El-Azeem et al. (2007), where the overall mean in their experiment was 2.32%.

3-5-Gizzard Weight Percentage:

As shown in Table 3, the only significant difference for gizzard weight percentage was observed between the spring and summer seasons. The highest value of gizzard weight percentage was recorded in spring season mean and the lowest one was in summer season. Moreover, farm had no significant effect on gizzard weight percentage. These results are in harmony with those reported by Abd El-Azeem et al. (2007), where the overall mean in their experiment was 1.95 %.

It can be concluded from these table that, squab carcass traits (carcass, blood, feather, liver and gizzard weight percentages) at 28 days of age recorded the highest means in spring and winter seasons and lowest mean in summer season. This result may be due to the decrease in feed intake for the parents through summer season and reflected to crop milk which squabs depend on it in their feed.

4- Egg Quality Traits:

4-1- Shell Weight And Shell Thickness:

Shell weight percentage was significantly affected ($P<0.05$) by season (Table 4). Means were 14.13, 13.72, 12.90 and 13.59 % for winter, spring, summer and fall seasons, respectively. The winter season had the highest mean but was not significant with spring and fall seasons. Also, seasons has a significant ($P<0.05$) effect on shell thickness. Shell thickness ranged between 0.21 to 0.26 mm where the winter season had the highest mean but the differences were not significant with spring and fall seasons. Differences among farms were not significant for both traits. This rang was lower than the mean (0.30 mm) reported by Nam and Lee (2006).

The physical characteristics of the egg play an important role in the processes of embryo development and successful hatching. Koneva (1968)

found that the contribution of shell thickness of turkey eggs to their hatchability was around 40%. In a study of goose eggs, Tsarenko et al. (1978) reported that the hatchability of eggs with thicker shell was 20% higher. However, Andrews (1972) observed that the hatchability of turkey eggs with thinner shells was higher. Shatokhina (1975) and Kurova (1986) presented data indicating that eggs with extremely thick or thin shells resulted in increased embryonic mortality when compared to embryonic mortality from eggs of average thickness.

4-2-Egg Shape Index:

Results in Table 4, showed that there were a significant ($P<0.05$) effects for both season and farm. The spring season recorded higher significant mean (74.16%) comparing with other three seasons. Also, the second (71.26%) and third (74.24%) farms were significant higher means comparing with first (66.95%) and fifth (65.71%) farms. These results were paralleled by those of Amaefule et al. (2006), who found that egg shape index for pigeon was 74%. Tsarenko (1988) and Burtov et al. (1990) have all reported that eggs of normal shape hatch more successfully than those shaped abnormally.

4-3- Albumen And Yolk Weight Percentages:

Season had no significant effect on both traits. Means ranged between 48.73to 49.42 % for albumen weight and 36.52 to 37.85 % for yolk weight. Differences among farms were significant ($P<0.05$) for both traits. The second (50.32%) and fourth (50.15%) farms had the highest significant means for albumin weight. The third (38.32%) and fifth (38.16%) farms had the highest significant means for yolk weight but the differences with first (37.30%) one was not significant.

Results for some egg quality traits studied as shell thickness and shell weight percentage took the same previous pattern which higher in spring and winter seasons and lowest in summer season.

Generally, farm had a significant effect on some studied parameters, we can guess that location of the farm and nature around it which provide pigeons with food is the main reason of this effect.

Also, one of the most factor which affect the productive and reproductive of pigeons is the age of parents but this factor was not studied due to the uncertainty of it.

CONCLUSION

There is a lack in information about raising the Local Egyptian Baladi pigeons in traditional dovecotes. Therefore there is a great need for further studies on this point.

It is concluded that, from the foregoing results and discussions, raising the pigeons in dovecotes is better in winter and spring seasons due to the higher productively and reproductively of pigeons compared to other seasons. This improvement in productive and reproductive parameters of pigeons could be due to the additional supplementation of feed in winter season and temperature stress in summer.

Table (1): Means and standard errors (X±S.E) of hatching traits for parent Local Baladi pigeons as affected by season and farm

	Farm					Overall mean	
	1	2	3	4	5		
Fertility (%)							S.E.
Winter	94.51	93.02	94.32	92.10	95.56	93.90 AB	1.12
Spring	96.63	90.70	96.51	94.51	96.59	94.99 A	1.13
Summer	89.76	86.25	90.85	84.48	86.05	87.48 C	1.16
Fall	95.12	92.11	92.41	88.55	90.24	91.69 B	1.19
Overall mean	94.00 a	90.52 ab	93.52 ab	89.91 b	92.11 ab	92.24	
S.E.	1.08	1.57	1.10	1.06	1.52		
Embryonic mortality (%)							
Winter	5.49	3.49	5.68	6.84	4.44	5.19	0.88
Spring	3.37	3.49	4.07	4.95	3.41	3.86	0.89
Summer	5.42	7.50	6.10	5.75	5.81	6.12	0.91
Fall	4.27	5.26	6.9	7.23	6.10	5.96	0.93
Overall mean	4.64	4.93	5.70	6.19	4.94	5.35	
S.E.	0.85	1.23	0.86	0.84	1.20		
Pipped eggs (%)							
Winter	4.40	4.65	4.55	5.26	3.33	4.44	0.87
Spring	2.81	9.30	4.07	5.49	3.41	5.02	0.87
Summer	4.22	6.25	8.54	6.32	4.65	6.00	0.90
Fall	4.88	9.21	8.23	5.42	3.65	6.28	0.92
Overall mean	4.07 b	7.35 a	6.34 ab	5.63 ab	3.76 b	5.35	
S.E.	0.83	1.21	0.85	0.82	1.18		
Hatchability (%)							
Winter	84.62	84.88	84.09	80.00	87.79	84.27A	1.64
Spring	90.45	77.91	88.37	84.07	89.77	86.11^{A}	1.65
Summer	80.12	72.50	76.22	72.41	75.58	78.37^{B}	1.69
Fall	85.98	77.63	77.22	75.90	80.49	79.44^{B}	1.33
Overall mean	85.29 a	78.23 b	81.47 ab	78.10 b	83.40 ab	*81.54*	
S.E.	1.57	2.28	1.60	1.55	2.22		

Means having the different small or capital letter in each column or row differ significantly ($P \leq 0.05$)

Table (2): Means and standard errors (X±S.E) of productive traits for parent Local Baladi pigeons as affected by season and farm

Season	Farm					Overall mean	
	1	2	3	4	5		
Egg number/female/season							S.E.
Winter	3.64	3.44	3.52	3.80	3.60	3.60 A	0.04
Spring	3.56	3.44	3.44	3.64	3.52	3.52 A	0.05
Summer	2.63	2.42	2.80	3.12	2.71	2.74 B	0.04
Fall	2.82	3.04	2.87	3.14	2.91	2.96 B	0.03
Overall mean	3.16 ab	3.08 b	3.16 ab	3.42 a	3.19 ab	3.20	
S.E.	0.03	0.05	0.04	0.03	0.05		
Egg weight (g)							
Winter	15.73	14.87	14.92	15.34	16.01	15.37 A	0.07
Spring	15.62	15.27	14.66	15.76	16.14	15.49 A	0.08
Summer	13.43	12.80	14.26	13.91	13.72	13.62 C	0.09
Fall	13.88	14.40	14.50	14.69	15.02	14.49 B	0.08
Overall mean	14.67 c	14.33 d	14.58 c	14.93 b	15.22 a	14.74	
S.E.	0.08	0.11	0.08	0.08	0.11		
Squab number/female/season							
Winter	3.08	2.92	2.96	3.04	3.16	3.03 A	0.02
Spring	3.22	2.68	3.04	3.06	3.16	3.03 A	0.03
Summer	2.11	1.75	2.15	2.26	2.05	2.06 B	0.04
Fall	2.42	2.36	2.22	2.38	2.34	2.34 B	0.02
Overall mean	2.70 a	2.43 b	2.59 ab	2.69 a	2.68 a	2.62	
S.E.	0.02	0.03	0.02	0.04	0.03		
Squab pair weight at 28 days of age (g)							
Winter	537.5	512.6	480.4	573.1	503.3	521.2 A	13.98
Spring	558.0	485.3	489.6	552.5	572.7	531.6 A	13.99
Summer	361.6	298.5	367.9	418.1	382.3	365.7 C	14.04
Fall	412.2	415.8	378.2	438.8	422.0	413.4 B	14.03
Overall mean	467.2 ab	428.0 b	429.1 b	495.7 a	470.1 ab	458.0	
S.E.	13.24	18.77	13.24	13.24	18.77		

Means having the different small or capital letter in each column or row differ significantly ($P \leq 0.05$).

Table (3): Means and standard errors (X+S.E) for carcass traits of squab pigeon at 28 days of age as affected by season and farm

Season	Farm					Overall mean	
	1	2	3	4	5		
Carcass weight (%)							S.E.
Winter	68.57	68.28	68.13	69.01	68.14	68.43 AB	0.42
Spring	69.74	69.43	67.96	70.38	68.97	69.30 A	0.42
Summer	65.62	65.31	65.03	64.06	62.75	64.55 C	0.42
Fall	69.09	65.05	66.12	68.68	68.54	67.50 B	0.42
Overall mean	68.26	67.02	66.81	68.03	67.10	67.44	
S.E.	0.40	0.56	0.40	0.40	0.56		
Blood weight (%)							
Winter	6.28	5.71	5.93	5.96	6.28	6.03 AB	0.14
Spring	6.47	6.90	6.53	6.09	6.23	6.44 A	0.14
Summer	5.28	5.37	5.39	5.56	6.05	5.53 C	0.14
Fall	5.63	6.16	5.97	5.94	5.31	5.80 BC	0.14
Overall mean	5.92	6.03	5.95	5.89	5.97	5.95	
S.E.	0.13	0.19	0.13	0.13	0.19		
Feather weight (%)							
Winter	7.15	6.79	7.40	7.55	6.83	7.15 B	0.16
Spring	8.02	8.29	7.72	7.13	8.02	7.84 A	0.16
Summer	6.55	6.75	6.66	6.87	7.42	6.85 C	0.16
Fall	7.17	7.37	7.29	7.23	7.28	7.27 B	0.16
Overall mean	7.22	7.30	7.27	7.19	7.39	7.27	
S.E.	0.15	0.21	0.15	0.15	0.21		
Liver weight (%)							
Winter	2.22	2.10	2.05	2.08	2.24	2.14 B	0.05
Spring	2.28	2.31	2.33	2.42	2.28	2.32 A	0.05
Summer	2.07	2.02	2.02	2.07	1.96	2.03 B	0.05
Fall	2.06	1.97	2.05	2.18	2.30	2.11 B	0.05
Overall mean	2.16	2.10	2.11	2.19	2.14	2.15	
S.E.	0.05	0.07	0.05	0.05	0.07		
Gizzard weight (%)							
Winter	1.93	1.83	1.81	1.82	1.98	1.87 AB	0.04
Spring	1.97	1.96	1.90	2.02	2.00	1.97 A	0.04
Summer	1.68	1.76	1.79	1.73	1.75	1.74 C	0.04
Fall	1.70	1.77	1.83	1.90	2.03	1.84 BC	0.04
Overall mean	1.82	1.83	1.83	1.88	1.94	1.86	
S.E.	0.04	0.05	0.04	0.04	0.05		

Means having the different small or capital letter in each column or row differsignificantly ($P \leq 0.05$)

Table (4): Means and standard errors (X+S.E) for egg quality traits of parent Local Baladi pigeons as affected by season and farm

Season	Farm					Overall mean	
	1	2	3	4	5		
Shell weight (%)							S.E.
Winter	14.64	13.21	14.06	15.33	13.42	14.13A	0.13
Spring	15.10	13.25	12.51	13.76	14.00	13.72AB	0.19
Summer	12.31	14.10	12.33	12.65	13.11	12.90B	0.23
Fall	13.15	12.92	14.23	13.52	14.12	13.59AB	0.14
Overall mean	13.80	13.37	13.28	13.81	13.66	13.58	
S.E.	0.15	0.18	0.22	0.14	0.17		
Shell thickness (mm)							
Winter	0.23	0.28	0.26	0.27	0.25	0.26A	0.04
Spring	0.25	0.27	0.27	0.24	0.26	0.26A	0.06
Summer	0.22	0.23	0.21	0.21	0.20	0.21B	0.05
Fall	0.21	0.23	0.20	0.22	0.24	0.22B	0.05
Overall mean	0.23	0.25	0.24	0.24	23.8	0.24	
S.E.	0.04	0.06	0.04	0.04	0.56		
Egg shape index (%)							
Winter	62.16	70.95	74.29	63.89	65.79	67.22B	0.17
Spring	64.44	75.00	82.35	75.68	68.57	74.16A	0.21
Summer	68.75	70.59	67.74	69.70	67.74	68.94 B	0.13
Fall	67.64	68.57	71.88	64.71	61.11	66.67 B	0.19
Overall mean	66.95b	71.26a	74.24a	68.57ab	65.71b	69.28	
S.E.	0.21	0.13	0.26	0.08	0.15		
Albumen weight (%)							
Winter	51.32	48.65	49.12	50.14	47.55	49.35	0.35
Spring	50.16	52.00	47.19	48.11	49.65	49.42	0.28
Summer	48.11	49.55	49.02	51.21	48.37	49.25	0.41
Fall	46.02	51.08	48.29	51.13	47.14	48.73	0.33
Overall mean	48.90b	50.32a	48.40b	50.15a	48.18b	49.19	
S.E.	0.40	0.27	0.36	0.29	0.42		
Yolk weight (%)							
Winter	34.04	38.14	36.82	34.53	39.03	36.52	0.27
Spring	34.74	34.75	40.30	38.13	36.35	36.86	0.34
Summer	39.58	36.35	38.65	36.14	38.52	37.85	0.25
Fall	40.83	36.00	37.48	35.35	38.74	37.68	0.31
Overall mean	37.30ab	36.31b	38.32a	36.04b	38.16a	37.23	
S.E.	0.22	0.36	0.24	0.34	0.29		

[a,b,c] Means in the same row and column with different superscript are significantly different ($p \leq 0.05$)

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الملخص العربي

دراسات على الحمام البلدي تحت ظروف القريه في دلتا نيل مصر

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أجريت تلك التجربة على الحمام البلدي المصري المربى في الأبراج وذلك في خمس مزارع مختلفة بمدينه المحموديه بمحافظه البحيرة في مصر خلال مده 12 شهر مشتملة على أربعه مواسم متتالية خلال عامي 2006/ 2007 بهدف دراسة بعض الصفات الانتاجيه والتناسلية للحمام المربى في تلك الأبراج. الطيور كانت تتغذى طبيعيا على البذور، الحبوب،الذره، الفول، القمح، ..... الخ الموجودة في الحقول المحيطة بتلك الأبراج خلال مواسم الحصاد وقد تم تقديم مخلوط من الذرة والفول والقمح في موسم الشتاء نظرا لعدم وجود حصاد في تلك الفترة. وقد تم تقديم الماء للحمام بصفة مستمرة.

ويمكن تلخيص النتائج المتحصل عليها كالآتي:

1-أ- أثرت المواسم معنويا على كلا من نسب الخصوبة والتفريخ حيث سجلت أعلى النتائج في موسمي الربيع والشتاء وتلى ذلك موسمي الخريف والصيف على التوالي. بينما انعكس الوضع تماما في النتائج وذلك لكل من نسب النفوق الجنيني والبيض الناقر.

1-ب- أثرت المزارع المختلفة معنويا على كل من نسب الخصوبة والتفريخ والبيض الناقر.

2-أ- أثرت المواسم معنويا على كل الصفات الانتاجيه المدروسة (عدد البيض/الأنثى/الموسم ، وزن البيض ، عدد الزغاليل/الأنثى/الموسم ، وزن زوج الزغاليل عند عمر 28 يوم) حيث حاز كلا من موسمي الربيع والشتاء على أعلى القيم مقارنه بالقيم المسجلة في موسمي الخريف والصيف على التوالي

2-ب- سجلت المزارع اختلافات معنوية في كل الصفات الانتاجيه المدروسة.

3-أ- اختلفت معنويا صفات جوده الذبيحة للزغاليل عند 28 يوم من العمر لكل من نسب أوزان (الدم ، الريش ، الكبد ، القونصه) بين المواسم المختلفة حيث سجل موسمي الربيع والشتاء أعلى القيم مقارنه بالخريف والصيف.

3-ب- لم تتأثر معنويا صفات جوده الذبيحة عند 28 يوم من العمر بين المزارع التي تمت فيها الدراسة.

4-أ- اختلفت معنويا كل صفات جوده البيضة (وزن القشرة ، سمك القشرة ، معامل شكل القشرة) بين المواسم المختلفة حيث حقق موسم الربيع أعلى القيم بينما لم تتأثر معنويا كل من نسب وزن البياض والصفار باختلاف المواسم.

4-ب- كانت هناك فروق معنوية لصفات جوده البيض ماعدا سمك ووزن القشرة بين المزارع.

* من تلك النتائج يمكن استنتاج أن تربيه الحمام في الأبراج خلال فصلى الشتاء والربيع سجل أعلى القيم للصفات الانتاجيه والتناسلية المدروسة مقارنه بالفصول الأخرى.