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## Study of Some Production Indicators of Syrian Local Poultry in Coastal Conditions

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**Abstract:** The sexual maturity, egg quantity and productivity of 175 Syrian local hens of primary flock were studied for 150 days. Our results indicated that the age of sexual maturity was 206 days. The egg quantity average of the flock was 73.04 eggs, while it was 82.12 and 60.38 eggs for selected hens (egg quantity) and discarded respectively. The percentage of egg production was 49%. The average of egg weight was 50.85 gr. Egg mass amounted 24.58 gr/hen/day, while the egg productivity was 0.49 egg/hen/day. The Feed Conversion Ratio (FCR) was 4.6 kg. fodder/1 kg eggs. These results showed that the selected hens were better than discarded ones. Therefore, it is necessary to continue selection program to produce the first selected generation (F<sub>1</sub>).

**Key words:** Syrian local poultry, sexual maturity, egg quantity, egg weight

### INTRODUCTION

The local poultry has acquired a great attention in most of world countries. It was subjected to studying, growing and genetic improvement programs, to raise and improve the productivity levels and to derive local strains, that contribute with a higher ratio in covering the nutritional needs of the populations.

Adaptation characteristics with the environmental conditions and infection resistance and others, of the local poultry, has played a significant role in prompting the raisers to introduce it in rearing programs, after genetic improvement, to produce the commercial hybrids in the industrial poultry system.

Consequently, the research studies the Syrian local poultry, which has never been studied, to give some data about some indicators that show its abilities and its productive characteristics, as a step to establish a long term program for keeping and genetic improvement of these indicators.

This research studies the following indicators:

**Age of sexual maturity:** Sexual maturity age of a hen is determined by the period between the date of hatching and the date of its first laying of an egg. For a flock, the age is determined by the period between hatching till the egg production percentage is 50% for two consecutive days (Bogoluobsky, 1991).

The age of sexual maturity is between 150-165 days for the White Russian strain (egg breed) (Rahmanof, 2006), 119-126 days for the White Leghorn strain (egg breed), 168 days for Corniech (meat breed) (Bessarabov *et al.*, 2005) and between 148-154 days for four Lines derived from the hybrid Lohman brown (Bakhomova *et al.*, 2005).

**Egg quantity:** The biological cycle for poultry laying eggs extends to 12 months, it could start and end in different months of the year according to the date of hatching.

During this period, improved international egg breed strains lay between 280-300 eggs, while the dual purpose breeds lay between 180-200 eggs, while the meat production strains lay less rates of eggs. In Leghorn breed, the annual mean of hen's production amounts to about 250 eggs (Bessarabov *et al.*, 2005), 200-220 eggs for Rod Island breed (meat) (Zeper, 2005), up to 190 eggs for White Plymouth Rock (dual purpose breed) and increases to 296 eggs for the hybrid "White Hisex" (egg producers) (Bessarabov *et al.*, 2005).

**Egg weight:** The genetic factors play an important role in the observed variations in this characteristic, the heritability ( $h^2$ ) ranges between 0.5 and 0.7 which means that the role of environmental factors in these variations is between 0.3 and 0.5 (Bessarabov *et al.*, 2005). Egg weight isn't affected too much by inbreeding and the heterosis is unnoticed in most cases (Bogoluobsky, 1991).

It is known that a hen lays small-sized eggs at the beginning of laying-egg period and this increases with age. Egg weight becomes similar in the second and third years of age, but it surpasses the others in the first year of production in about 3-4 grams (Tsarinko, 1988). The mean weight of an egg varies between 60 and 62g for leghorn (egg breed) and 62 g for hybrid "White Hisex", 58-60 g for white Plymouth Rock (dual purpose) and 60 g for Rod Island (meat breed) (Bondareev, 2005).

**Egg mass:** Egg quantity and weight are used in calculating this indicator, to express the total mean weight (kg) for the eggs a hen produces in a year. The contemporary best hybrid hens produce between 18-19 kg of eggs annually. The egg mass is expressed as a mean: g/hen/day (Bessarabov *et al.*, 2005). In Iran, the egg mass of the commercial hybrid HY-Line W36 was 52.39 g/hen/day, with an age between 46 to 55 weeks

(Dizaji and Pirmohammadi, 2009). Egg mass of the hybrid SIRO-CB in Australia during the first four months of production was 52.4 g/hen/day (Perez-Maldonado *et al.*, 1999).

**Egg productivity:** The average of produced eggs number during a period is transformed into a decimal fraction to express the daily productivity of eggs per hen (egg/hen/day). The productivity of a Leghorn hen in Iran was 0.84 egg/hen/day, during the first three months of egg production (Rezaei, 2001). In Turkey, it was 0.83 egg/hen/day for the hybrid Hisex Brown (egg breed) at the age of 30-40 weeks and declined to 0.6 egg/hen/day at the age of 62-74 weeks (Inal *et al.*, 2001).

**Feed Conversion Ratio (FCR):** This index is explained as the amount of the consumed fodder (kg) necessary to produce (kg) of eggs (fodder kg/egg kg) (Pym, 1985). The heritability ( $h^2$ ) for feed conversion ratio is 0.4 (Siegee and Wisman, 1966) which means that hereditary factors have an important role in the variations of this characteristic. For the hybrid Hisex White (egg breed) the conversion ratio was 2.2, while it was between 2.3-2.4 for the hybrid White Lohman (egg breed) (Bessarabov *et al.*, 2005). In Morocco, it was 1.89 for the hybrid ISA Brown (egg breed), at the age of 26 to 42 weeks (Benahmidi and Benabdeljelil, 2001) and it was 2.23 for the leghorn that was studied in Iran (Rezaei, 2001).

## MATERIALS AND METHODS

- This research was conducted in Center of Animal Production in Fedio, a unit of Faculty of Agriculture, Tishreen University, in cooperation with Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD) according to a mutual agreement between the two parties.
- The research was conducted on 175 hens that continued in egg production till the end of the five-months study period and they were of the Syrian Local Poultry that was reared in the center starting from the hatching date.
- Poultry were fed a balanced productive forage adopted by the Al-Quraby Institution of Poultry.
- The average amount of daily fodder was 100-120 grams, according to the production months and amounted, in average, 115 g/hen/day during the 150-day research period, i.e. the ratio of a hen of fodder during this period was 17.25 kg.
- Rearing yards: Open, natural aeration through windows, 12 hrs of lighting and increased to 14 hrs in the fifth month of production.

### Age of sexual maturity

**For a hen within a flock:** It was identified by number of days separating between the date of hatching and the date of laying the first egg.

**For a flock:** It was identified by number of days separating between the date of hatching and the egg production reaches 50% during two consecutive days (Bogoluobsky, 1991).

**Egg amount:** The amount of the produced eggs during the first five month of production was studied and it was calculated monthly, for the whole period, for every individual bird and for the whole flock from the production records of individual growing inside numbered cages (batteries). To choose good production mothers to get the first generation F1 from them. The early election was applied on the flock members at the end of the study period. This formed the selected hens group whose production rates were more than 50% and the discarded hens group whose production rates were less than the above mentioned percentage.

The percentage of egg production is calculated as:

$$\% \text{ of egg production} = \frac{\text{Average of hen production during a period}}{\text{Days of the period}} \times 100$$

**Egg weight:** A digital balance with accuracy to nearest 5 g was used for the mass weighting of egg trays. This operation was conducted three times a month to calculate the monthly average of an egg weight and the average of an egg weight for the whole 150-day period and the average of total weight of produced eggs/kg/hen for all of the flock and the selected and discarded hens.

**Egg mass (gr/hen/day):** It was calculated by:

$$= \frac{\text{Average of egg weight during a period} \times \text{Average of produced eggs number}}{\text{Days of the period}}$$

(Bogoluobsky, 1991).

**Egg Productivity (egg/hen/day):** It was calculated by:

$$= \frac{\text{Average of production eggs during a period}}{\text{Days of the period}}$$

**Feed conversion ratio (kg. fodder/kg. eggs):** It was calculated by:

$$= \frac{\text{Average of consumed fodder during a period}}{\text{Weight of produced eggs}}$$

(Bogoluobsky, 1991).

**Statistical analysis:** Statistical analysis was carried out using t-Student test.

Values represented in the tables are the means  $\pm$  standard error.

Table 1: Averages of produced eggs numbers during the first five months of production

Group	Number	Relation of election or discard %	Monthly averages of egg production					Sum	Average
			1	2	3	4	5		
Flock	175	-	15.61	18.53	15.51	12.62	10.77	73.04	14.61±1.34 <sup>a</sup>
Selected hens	102	58	17.13	20.05	17.53	14.64	12.77	82.12	16.42±1.25 <sup>a</sup>
Discarded hens	73	42	13.50	16.41	12.69	9.80	7.98	60.38	12.08±1.47 <sup>b</sup>

<sup>a-b</sup>Means followed by different letters are significantly different (p≤0.05)

**RESULTS AND DISCUSSION**

**Age of sexual maturity:** The results showed that the sexual maturity age was so different between the flock individuals. its values ranged between the lowest limit (168 days) and the highest limit (250 days) and a whole flock, it was 206.

In consideration of the value of this indicator for some local strains in other countries, we notice that the research hens were late about 5 days compared to the local Egyptian strain "Alfayoumi", in which the sexual maturity age was 201 days (Bekele *et al.*, 2010) and 26 days compared with the local Tswana strain in Botswana (180 days) (Aganga *et al.*, 2003). And late 38 days compared to their local counterparts in Morocco (168 days) (Benabdeljelil *et al.*, 2001).

Compared with the developed international strains and hybrids, the value of this indicator of the research hens was too late. It was higher of 40 days compared with the white hybrid Hisex and Russian hybrid Zaria-17 (166 days) and higher of about 48-54 days compared with the Lohman hybrid (152-158 days) (Bessarabov *et al.*, 2005) and compared to the White Russian strain (150-165 days) (Rahmanof, 2006) and Leghorn strain (119-126 days) (Bessarabov *et al.*, 2005), we notice that the sexual maturity age for the research poultry was late of about (41-56) days and (80-87) days, respectively.

**Egg amount:** The produced eggs amount was studied during the five-month study period and Table 1 shows the results.

The Table 1 shows that the average of produced eggs during 150 days was 73.04 eggs for the flock, 82.12 eggs for the selected hens and 60.38 eggs for the discarded hens, i.e. the selected hens production surpassed the flock by 9.08 eggs and the discarded hens (p≤0.05) by 21.74 eggs. It is noticed that the monthly average of egg production of the flock, selected hens and discarded hens reached 14.61, 16.42 and 12.08 eggs, respectively. The monthly average of egg production of the selected hens increased 1.81 eggs compared to the flock and (p≤0.05) 4.34 eggs compared to the discarded hens. And compared with the Egyptian local poultry, it was noticed that the egg amount of the Syrian local poultry was less than the average of two Egyptian local strains which were "Al-mamura" and "the Silver Muntazah" whose average production was 89.9 eggs during 5 months and monthly average of 17.99 eggs (Zatter and Nofal, 2009), with a total increase 16.86

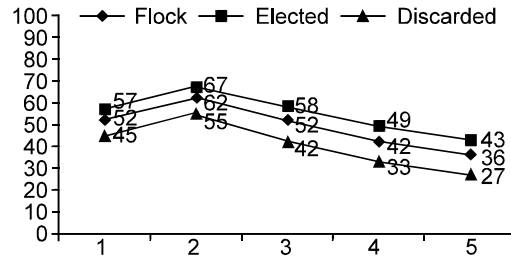


Fig. 1: The percentages of egg production for the Syrian Local Research hens

eggs more than the research hens and a monthly increase of 3.38 eggs.

In comparison with the White Leghorn strain (A study in Iraq), the average number of eggs for the research hens was less of 50.96 eggs, because this average for leghorn was 124 eggs (Al-Samarai *et al.*, 2008).

**The percentage of egg production:** This indicator shows the averages of the produced eggs, as percentages, which are shown in Fig. 1.

The diagram shows the graphs that express the percentages of eggs production for the flock and selected and discarded hens. The averages of egg production percentages were 49%, 55% and 40%, respectively.

The research results show that the mean percentage of eggs production for the Syrian local research hens (49%) was less compared to the percentage average of the Egyptian local strain "Al-Salam" (53.85%) (Radwan *et al.*, 2008) and less than the percentage average of the Saudi local poultry (61.64%) (Basiouni *et al.*, 2006).

But, compared to the hybrid Hisex Brown in Turkey, the difference was great for the latter; its average was 83% (Inal *et al.*, 2001).

**Average of egg weight:** The characteristic of egg weight for the groups of the research poultry: the flock, the selected and discarded hens was studied. The words selected and discarded means that this is done according to the characteristic of egg amount only, because the election according to both of eggs amount and weight will reduce the number of the selected hens for the production of F1 generation later.

Table 2 shows the results of eggs weight. It is noticed that the average of egg weight, during the study period, for the flock, the selected and discarded hens was (p≥0.05) 50.85, 51.2, 50.41g, respectively and the

Table 2: Egg weight averages (gr) for the parents flock groups for the first five months of production

Production period/month	1	2	3	4	5	X 1-5
Flock	46.20	49.47	51.33	53.12	54.13	50.85±1.41 <sup>a</sup>
Selected	46.54	49.83	51.70	53.47	54.46	51.20±1.41 <sup>a</sup>
Discarded	45.75	49.02	50.93	52.71	53.64	50.41±1.41 <sup>a</sup>

<sup>a</sup>Means followed by same letters are not significantly different ( $p \geq 0.05$ )

Table 3: The average of eggs mass during the first five months of production for the research flock groups

Group	Number	Relation of election or discard %	Monthly averages of egg mass gr/hen/day					Average
			1	2	3	4	5	
Flock	175	-	24.04	30.56	26.54	22.35	19.43	24.58±1.89 <sup>a</sup>
Selected hens	102	58	26.57	33.30	30.21	26.09	23.18	27.87±1.76 <sup>a</sup>
Discarded hens	73	42	20.59	26.81	21.54	17.22	14.27	20.09±2.12 <sup>b</sup>

<sup>a</sup><sup>b</sup>Means followed by different letters are significantly different ( $p \leq 0.05$ )

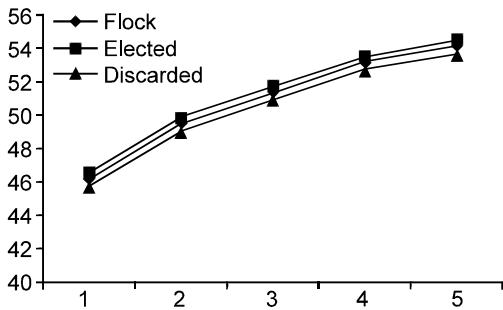


Fig. 2: Graphs of egg weight averages/gr/ for the flock groups during the first five months of production

average of the selected ones surpassed the flock average by 0.35 gr and the discarded ones by 0.79g.

The following diagram reflects graphically the monthly averages of an egg weight for the three groups of the research hens.

The graph shows that the selected hens - the best egg-producers - gave the highest averages ( $p \geq 0.05$ ) of an egg weight, while the discarded - the worst egg-producers - gave the lowest averages of an egg weight. The flock as a whole unit reduces an egg weight with the increase of eggs number. Any flock has a certain percentage of hens whose hereditary characteristics makes them fit for a better production of eggs without affecting the egg weight characteristics compared to other individuals. These hens are an excellent material for the programs of hereditary improvement (Bogoluobsky, 1991).

Compared to the local Egyptian strain "Alfayoumi", in which the egg average weight was 45.9 gr (Madkour *et al.*, 1982), it was noticed that the value of this indicator for the local Syrian hens was higher (50.85 gr) and it was higher compared to the average of two Egyptian local strains "Al-Mamoura" and "the Silver Muntazah" (48.37), for the same studied period (Zatter and Nofal, 2009).

The research hens surpassed concerning the average of egg weight the Tanzanian local strains: Kuchi (45 gr) and Medium (42 gr) (Lwelamira *et al.*, 2008).

Compared to some international and hybrid strains, the average weight of research hens eggs was low. It was 60-62 gr for white Leghorn and 62 g for hybrid Hisex white (Bondareev, 2005).

**Egg mass:** Egg mass (gr/hen/day) was calculated as an average for the flock, the selected and discarded hens. Table 3 shows that the average of eggs mass (gr/hen/day) of the flock, the selected hens and the discarded ones was 24.58, 27.87, 20.09, respectively, i.e. the selected hens surpassed those in the flock by 3.29 and the discarded ones ( $p \leq 0.05$ ) by 7.78 gr/hen/day.

By comparing our results with others of similar studies, we find out that the average of egg mass for the flock of the Syrian local poultry of the research flock (24.58) was less than its counterparts of the Egyptian local strain "Al-Salam" (26.77) (Radwan *et al.*, 2008) and less than the average of two local strains "Al-mamoura" and "the Silver Muntazah" (31.01) (Zatter and Nofal, 2009) and it was less than its value for the SIRO-CB hybrid in Australia in which the average was 52.4 gr/hen/day (Perez-Maldonado *et al.*, 1999).

**Egg productivity:** This indicator is calculated to express the daily egg production amount for a hen (egg/hen/day), for the three groups, during five months of production. Table 4 shows that the average of egg productivity: egg/hen/day, was 0.49 for the flock, 0.55 for the selected individuals and 0.4 for the discarded ones. The selected hens surpassed both of the flock and the discarded ones by ( $p \geq 0.05$ ) 0.06 and 0.15 egg/hen/day, respectively.

The results show that egg productivity of the research poultry was less compared to that of the Egyptian local strain "Al-Salam" (0.53) (Radwan *et al.*, 2008) and the same thing compared to the Saudi local poultry (0.61) (Basiouni *et al.*, 2006).

But they were higher compared to the local poultry in Kenya (0.43) (Kingori *et al.*, 2010). But compared to

Table 4: Averages of egg productivity/egg/hen/day during the first five months of production

----- Production period/month -----		1	2	3	4	5	Average
Egg production	Flock	0.52	0.62	0.52	0.42	0.36	0.49±0.04 <sup>a</sup>
	Elected	0.57	0.67	0.58	0.49	0.43	0.55±0.04 <sup>a</sup>
Egg/hen/day	Discarded	0.45	0.55	0.42	0.33	0.72	0.40±0.07 <sup>a</sup>

<sup>a-a</sup>Means followed by same letters are not significantly different (p≥0.05)

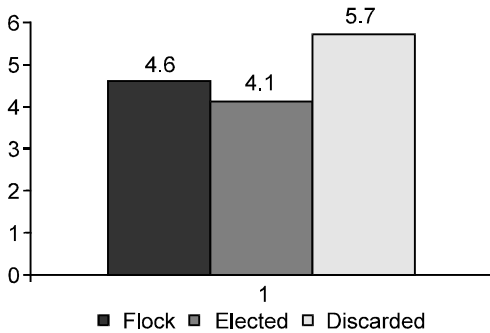


Fig. 3: Averages of feed conversion ratio for the parents flock groups

Leghorn strain (0.84) (a study in Iran) (Rezaei, 2001) the difference looks very big and it becomes greater compared to the hybrid ISA Brown (0.94) egg/hen/day in Australia (Boorman and Gunaratne, 2001).

**Feed conversion ratio (kg. fodder/kg. eggs):** The results showed that, on the average, a hen in the studied flock gave 3.714 kg of eggs during the 150-day production period. While a hen in the selected group gave 4.205 kg and in the discarded group, a hen gave 3.044 kg of eggs, consequently the feed conversion ratio for these groups was 4.6, 4.1 and 5.7 respectively and the following graph reflects these results:

It is clear from the Fig. 3 that the selected group was the best in the feed conversion ratio (0.5 kg) compared to the flock, while the discarded group was the worst (1.1 kg), compared to the flock, too.

It is clear that the Syrian local poultry flock consumes a higher amount of fodder to produce 1 kg of eggs compared with the high productivity international hybrids, in which the ratio is between (2.2- 2.3 kg) fodder for every kg of eggs (Bessarabov *et al.*, 2005). The feed conversion ratio for the Leghorn strain was 2.23 (Rezaei, 2001) and the brown hybrid Hisex 2.36 (Inal *et al.*, 2001). The Saudi local poultry has a better ratio value (4.01) (Basiouni *et al.*, 2006), compared to the study local poultry (4.6) and this was better than the two local poultry strains in Indonesia: Kampung (4.9) and Pelung (7.1) (Creswell and Gunawan, 1982).

**Conclusion:**

- The face values of the studied ratios of the studied Syrian local poultry were low compared to many strains of local poultry in some countries and very low compared to the international and hybrid strains.

- The production averages of the Syrian local poultry were low due to negligence of research institutions and centers and not including it in the rearing and growing programs.
- Inside the Syrian local poultry groups, there is a group of hens that has higher production rations than the flock average and they form a core for an selected flock that could be established for a better productivity.

So, we recommend a continuity of growing the selected group and subject it to the genetic development of the productive and body characteristics.

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