Dynamic of Reproductive Qualities of Japanese Quails

Suleiman Saidu[1], Grigoriy Afanasyev[2], and Lubov Popova, Aleksie Komarchev, Umar Ibrahim[3]

***Abstract*—**An experiment was conducted to evaluate the differences of reproductive quality of Japanese quail different origin. Meat quail, obtained from golden giant, showed the highest egg-laying and yield the best incubation result. Analysis of the dynamics of quail egg-laying on 2nd -week period, showed the advent of peak production and its duration depended on the origin and direction of poultry production. Meat and egg quail of group 1 had a maximum, ranging from 65.0 - 71.4 %, production at the age of 20-30 weeks, meat quail had the highest egg-laying and was shifted to an earlier age. Thus, in group 2 quail egg-laying at level of 82.9-83.6% observed from 14 to 18 weeks of age. Subsequently, up to 24 weeks, egg production declined, but remained at a high level - 72,9-77,9%. The lowest peak egg production (57.9-62.9%) was in quail breed Pharaoh. Morphological analysis of eggs was carried out in the beginning, middle and end of the production period of quail at 9, 21 and 32 weeks of age.

The thickness of the egg shell of quail in group 1 was the highest - 192.2 microns, 10.9 and 4.2% (P> 0.95) compared with groups 2 and 3, respectively. For other morphological parameters of eggs quality significant differences between the groups at the beginning of the laying quail were not observed. In comparison with the morphological analysis of lay eggs, mid-production period in group 1, and the mass ratio of the protein and yolks weight was naturally dropped from 1.95 to 1.62. In quails eggs of groups 2 and 3 protein contained 3.2-3.7% (P> 0.95) were higher than in group 1. In this regard, the relation between protein to yolk was decreased based on age in group 2 from 2 .06 to 1.83, group 3 - from 1.86 to 1.81. Incubation of the eggs was carried out at the beginning, middle and at the end of the production period of a bird. At the beginning of egg-laying significant differences in the results between incubation quails of different origin have been identified. As can be noted better trends (92.3%) hatchability in quail group 2, however, the day old hatches (78.9%), this group was in second place due to the relatively low fertility of eggs (85.5%). The lowest results in the day old hatchability (74.1%) and hatchability (83.3%) were obtained in group 3. According to the results of incubation of eggs at the middle of laying quails also revealed no significant differences between the groups. Fertile eggs was within 86.2-87.3%, the day old hatched - 72.7-75.9%.

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I. Introduction

PRESENTLY, there is high demand of quail Products around the globe, due to the high taste of eggs and meat, the bird precocity can quickly payback. Joy, (2013) reported that, there is a tendency to change the range and quality of poultry products. One of the sources of high-quality products can be quail meat and eggs, which contains more balance diet and excellent taste (Joy, 2013). Rapid attainment of sexual maturity quail, with a short period of incubation and can produced up to five generations per annum, making it the most suitable and effective breeds to work with. Currently, there are about 40 species and varieties of quails consist of different colors of plumage, feather structure and direction of productivity (Somes, R.G. 1984, Afanasyev et. al., 2013). Quail selection in terms of productivity or absence of breed selections leads to a change in their phenotypic traits (Balcioglu. M.S. et. al., 2005, Farrag, S.A. et. al. 2011, Hamid, B. et. al. 2013). So, productive qualities of quails, even just one breed, but reared in different farms can vary significantly. Widespread use of quail at poultry industries and farms, to some extent constrained by the lack of information about their productive materials or features.

In order to study the reproductive characteristics of quail of quail different origin, the experiment was carried out at research and training center under the department of poultry production, faculty of Animal Science, Russian state Agrarian Univ.-MTAA Moscow Russia, in April - December 2013. For this purpose, 3 groups of 5-weeks old quails were used. Group 1 - meat and egg quail populations RSAU-MTAA Moscow, group 2 - meat quail golden giant, imported from France in 2011, and group 3 - meat quail Pharaoh, imported from Poland at the beginning of this century, from Hungarian meat quail. 30 females and 12 males were selected from each group to carry out the experiments.

One of the elements for evaluation of egg production is the age of sexual maturity of birds. Jiang S. et al. (2014) investigated the differences in egg shell quality, bone quality and serum bone biochemistry markers associated with changes in age and dietary soybean oil levels in laying hens. Group 3 quail breed pharaoh started egg-laying earlier before other groups started. The first egg in this group appeared at the 7-week of age. Quail egg production of other groups began a week later. The increase in egg production occurred

in all groups differently (Fig. 1). Despite the early start of laying, bird breed Pharaoh lately reached the age of sexual maturity, which is determined by the age at 50% of egg production of all herds. But breed Pharaoh, egg -laying of 50% or higher, set to 75 days of age. Whereas the age of puberty quail local population RGAU-MSHA (group 1) was at 63 days. Whereas very early age at sexual maturity characterized quail obtained from golden giant breed (group 2): 50% of egg production, they have reached the age of 57 days.

II. Materials And Methods

The experiment was carried out at research and training center under the department of poultry production, faculty of Animal Science, Russian state Agrarian Univ.-MTAA Moscow Russia, in April - December 2013.In this case, 3 groups of 5-weeks old quails were used for the research. Group 1 - meat and egg quail populations RGAU-MSHA, group 2 - meat quail golden giant, imported from France in 2011, and group 3 - meat quail Pharaoh, imported from Poland at the beginning of this century, from the Hungarian meat quail. 30 females and 12 males were selected from each group to carry out the experiments. Group 3 quail breed pharaoh started egg-laying earlier before other groups started. The first egg in this group appeared at the 7-week of age. Quail egg production of other groups began a week later. The increase in egg production occurred in all groups differently (Fig. 1). Despite the early start of laying by Pharaoh and lately reached the age of sexual maturity, which is determined by the age at 50% of egg production among all the other herds. But breed Pharaoh, egg-laying of 50% or higher, set to 75 days of age. Whereas the age of puberty quail local population RGAU-MSHA (group 1) was at 63 days. Whereas very early age at sexual maturity characterized by quail obtained from golden giant breed (group 2): 50% of egg production, at the age of 57 days. Meat quail, obtained from golden giant, showed the highest egg-laying and yield the best incubation result. Analysis of the dynamics of quail egg-laying on 2nd -week period, showed the advent of peak production and its duration depended on the origin and direction of poultry production. Meat and egg quail of group 1 had a maximum, ranging from 65.0 - 71.4 %, productivity at the age of 20-30 weeks, meat quail had the highest egg-laying and was shifted to an earlier age. Thus, in group 2 quail egg-laying at level of 82.9-83.6% was observed from 14 to 18 weeks of age. Subsequently, up to 24 weeks, egg production declined, but remained at a high level - 72,9-77,9%. The lowest peak egg production (57.9-62.9%) was in quail breed Pharaoh. Morphological analysis of eggs needed to be evaluated as food and hatching qualities. Morphological analysis of eggs was carried out in the beginning, middle and end of the production period of quail at 9, 21 and 32 weeks of age. In our studies, the thickness of the egg shell of quail in group 1 was the highest - 192.2 microns, 10.9 and 4.2% (P> 0.95) compared with groups 2 and 3, respectively. For other morphological parameters of eggs quality significant differences between the groups at the beginning of the laying quail were not observed. In comparison with the morphological analysis of lay eggs, mid-production period in group 1, and the mass ratio of the protein and yolks weight was naturally dropped from 1.95 to 1.62. In quails eggs of groups 2 and 3 protein contained 3.2-3.7% (P> 0.95) were higher than in group 1. In this regard, the relation between protein to yolk was decreased based on age in group 2 from 2 .06 to 1.83, group 3 - from 1.86 to 1.81.

III. Results And Discussion

So, in this study, Meat quail obtained from golden giant, showed the highest egg-laying and yield the best incubation result. (Glinkina, I.M. et. al. 2011) Parameters of quail egg production different genotypes, the maximum egg-laying was noted in group 1, where it was: early lay - 237.5 pc., mid-lay - 250.0 pc., final-laying- 263.9 pc. Analysis of the dynamics of quail egg-laying on 2nd -week period, showed the advent of peak production and its duration depended on the origin and direction of poultry production. But according to (Glinkina, I.M. et. al. 2011) In the 2nd group egg laying on average laying was lower than in the 1st group of 5% , early-lay - by 2.5%, final -laying - by 7.7%. Meat and egg quail of group 1 had a maximum, ranging from 65.0 - 71.4 %, production at the age of 20-30 weeks, meat quail had the highest egg-laying and was shifted to an earlier age. Thus, in group 2 quail egg-laying at level of 82.9-83.6% was observed from 14 to 18 weeks of age. Subsequently, up to 24 weeks, egg production declined, but remained at a high level - 72,9-77,9%. The lowest peak of egg production (57.9-62.9%) was in quail breed Pharaoh. Morphological analysis of eggs needed to be evaluated as food and hatching qualities. Morphology Analysis of eggs was carried out in the beginning, middle and end of the production period of quail at 9, 21 and 32 weeks of age. In our studies, the thickness of the egg shell of quail in group 1 was the highest - 192.2 microns, 10.9 and 4.2% (P> 0.95) compared with groups 2 and 3, respectively. Not agreed with the result by (A. Genchev, 2012) Throughout the cycle, the quality traits of egg albumen, yolk and eggshell gradually decreased and attained lowest values by the end of egg laying (P<0.001). For other morphological parameters of eggs quality significant differences between the groups at the beginning of the laying quail were not observed. In comparison with the morphological analysis of lay eggs, mid-production period in group 1, and the mass ratio of the protein and yolks weight was naturally dropped from 1.95 to 1.62. In quails eggs of groups 2 and 3 protein contained 3.2-3.7% (P> 0.95) were higher than in group 1. In this case, the relation between protein and yolk was decreased based on age in group 2 from 2 .06 to 1.83, group 3 - from 1.86 to 1.81.There were no significant differences between groups in protein's quality and egg yolk, judging by their index in the middle of quails egg- laying were found. However, the trend of the benefits of group 1 according to the thickness of the shell on a background of law-age decline in the quality of the egg shell. At the end of the production period of quail found no significant differences in the density and thickness of the egg shell. Ratio of constituents of eggs in Groups 1 and 2

were substantially the same. Quail eggs of group 3 differed largest yolk (34.3%) and the smallest of protein weight (52.7%). The ratio of protein to the yolk in group 3 was at a level of 1.53 or 1.92 and 1.85, respectively, in groups 1 and 2 Large yolk weight usually involves in an increase of its diameter and decrease its height by some due to its own gravity. As a result, the yolk index, which depends on these parameters is reduced. Therefore in group 3 yolk index was lowest (39.8%). To confirm the inverse relation of the yolk index of its weight, we realized the presence of the highest index (42.3%) due to the very low of yolk weight (29.9%) of quail eggs in group 1.Thus, the morphological analysis of quail eggs of different origin showed that the age changes indicate the quality of eggs is generally identical to, and does not depend on the direction of the production and the origin of birds. Morphological characteristics of egg quality during the production period of quail, broadly in line with the requirements for hatching quail eggs (V.I. Fisinina, 2011). To estimate the breeding qualities of quail eggs which was collected from the quails for incubation. Incubation of the eggs was carried out at the beginning, middle and at the end of the production period of a bird. At the beginning of egg-laying significant differences in the results between incubation quails of different origin have been identified. As can be noted better trends (92.3%) hatchability in quail group 2, however, the day old hatches (78.9%), this group was in second place due to the relatively low fertility of eggs (85.5%). The lowest results in the day old hatchability (74.1%) and hatchability (83.3%) were obtained in group 3.

According to the results of incubation of eggs at the middle of laying quails also revealed no significant differences between the groups. Fertilized eggs was within 86.2-87.3%, the withdrawal of young -72.7-75.9%. At 32 weeks of age significantly decreased fertility of quail eggs in all groups, but the greatest decrease in this parameter was observed in group 3 (Table 3). Low fertility of eggs in group 3 had a negative effect on the output of chicks, it was 45.7%, which is lower than the other groups on 11.3-11.4% (P <0.95). However, the hatchability of eggs in group 3 remained at a high 88.9% level- and superior to that in group 1 to 17.5% (P> 0.95) in group 2, 8.6% (P <0, 95). It was characterized that in group 3 during the incubation period (prior to the transfer to the output) the embryos was not dead, which indicates their good viability. On the day of hatching so many dead ones from both groups. Especially a lot of incubation waste, the dead ones was from group 1, 8.7%, which is 2.9-3.9% higher than the other groups. However, the quails in Group 1 have better fertili eggs, but their hatchability was very low, which has led to an increase in the number of dead embryos. Against the background of high fertility and low hatchability in group 1 day old hatchability was 57.1%,but chicks from Group 2, had the lowest (9.1%, P <0.95) fertility of hatchability was 8. 9% (P <0.95) higher.

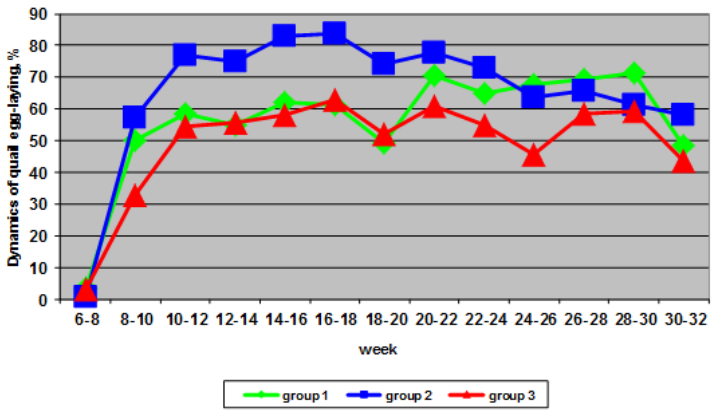

Fig. 1 Dynamics of quail egg-laying, %

TABLE I
QUAIL EGG-LAYING

Parameter	Group		
	1	2	3
Egg-laying per bird, (pieces)			
Initial	90.0	101.1	55.6[a]
Average	106.1	118.4	65.0[b]
The intensity of egg production,(%)	82.1	89.3	49.1[c]

* Note: here and after the difference between the values indicated by different letters are significant at P> 0.95

TABLE II
MORPHOLOGICAL PARAMETERS OF EGG QUALITY OF 21-WEEK OLD QUAIL

Parameter	Group		
	1	2	3
Egg weight, (g)	12.8±0.43[ab]	13.2±0.22[a]	11.9±0.27[b]
form index, (%)	8.5±0.99[a]	76.4±0.94[a]	77.8±0.89[a]
eggs density, (g/cm³)	1.079±0.002[a]	1.071±0.002[a]	1.071±0.002[a]
Shell weight:			
g	1.8±0.05[a]	14.1±0.47[a]	1.6±0.03[b]
%	12.1±0.20[b]	1.5±0.03[c]	12.6±0.26[bc]
Yolk weight:			
g	4.2±0.17[a]	32.8±1.10[a]	4.1±0.18[ab]
%	31.1±1.09[a]	3.7±0.12[b]	31.1±0.88[a]
Protein weight:			
g	6.8±0.36[ab]	53.1±0.84[a]	7.5±0.18[a]
%	56.8±0.97[b]	6.7±0.17[b]	56.3±0.90[b]
Protein height, (mm)	4.5±0.21[a]	4.1±0.32[ab]	3.9±0.19[b]
Protein index, (%)	11.8±0.76[a]	10.7±1.02[a]	10.7±0.70[a]
Yolk index, (%)	50.5±0.34[a]	51.1±0.64[a]	50.9±0.82[a]
Shell thickness, (microns)	182.3±3.78[a]	177.2±2.74[a]	173.1±3.26[a]

TABLE III
THE RESULTS OF THE INCUBATION OF EGGS OF 31-32 WEEKS OLD QUAIL

Parameter		Group		
		1	2	3
N0. of eggs	(pcs)	70	86	70
Egg fertility,	(%)	80.0	70.9	51.4
Egg hatchability,	(%)	71.4	80.3	88.9
Day old hatched,	(%)	57.1	57.0	45.7
Herds		40	49	32
Incubation waste, (%):				
Unfertile eggs		20.0	29.1	48.6
Blood ring		2.9	2.3	-
Stilled embryos		5.7	4.7	-
Died ones		8.6	4.7	5.7
weak Quails		5.7	2.3	-

Pcs = pieces

IV. CONCLUSION

On the basis of indicators of productivity and results of incubation can be concluded that the meat and egg quail local population RSAU-MTAA and quail meat golden giant, have relatively high reproductive performance compared with quail breed Pharaoh. Reduced reproductive capacity of Pharaoh quail breed, which is one of the first meat breeds bred in the middle of the last century, apparently, is a consequence of the lack of breeding work with this breed because of the recent emergence of more advanced species of quail.

V. RECOMMENDATIONS

To improve the reproductive qualities of quails there is need for selection in terms of egg production, the eggs hatchability, day old hatchability. In the process of poultry keeping, it is highly recommended to observe the optimal sex ratio.

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