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## **Investigating the effect of the number of daily egg collecting times on the grade percentage of hatchable eggs, egg weight, weight of the hatched chicken, broken and cracked egg percentage in broiler parent stock farm**

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**Abstract**--This experiment has been conducted for investigating the effect of the number of hatchable eggs' daily collecting times on such indices as egg weight, the weight of the fertilized eggs and percentage of the cracked and broken egg in the broiler parent stock. The study was carried out on 46-week-old Arbor Acers Plus Chicken within a completely randomized block design with four treatments and 6 replications for 24 days. Every replication was conducted in a single day in such a way that eggs were collected twice, four times, six times and eight times respectively on the first, second, third and fourth day. These fourfold treatments, i.e. twice, four times, six times and eight times of egg collecting were replicated six times. Eggs' weights were measured daily and the percentage of the daily production, grade percentage of the hatchable farm-raised eggs, percentage of broken and cracked and infected eggs were recorded on farm. Moreover, samples were sent to the laboratory daily for E-Coli, Salmonella, and staph aureus tests. Based on the results obtained through the use of Duncan Method and parametrical chi-square test in this study, it can be concluded that the number of the Daily Egg Collecting Times has a great effect on the grade percentage of the eggs bred on farm and in

incubator, percentage of the broken, cracked and infected eggs on farm. The results also indicated that the number of daily egg collection times has a significant influence on the infection with E-coli. In the third and fourth treatments (six and eight times of egg collection), the E-coli level is negative and the number of positive answers is increased in regard to the infection with E-coli in the first and second treatments (two and four times of egg collection).

**Keywords**--*broiler parent stock, fertilized eggs, number of hatchable eggs collected, production indices.*

## **Introduction**

In the communities that have shortages in natural pastures and graze lands and, on the other hand, also have limitations in terms of the artificial pastures, the maximal development of the poultry industry is an inevitable must for supplying sufficient animal protein for the human consumption because the raising and breeding of the poultry does not need vast pasture and grazing lands and adequate meat and egg can be harvested from the chickens in a small environment through the use of special technology and foodstuff within a short period.

The companies specialized in breeding and raising broiler breeder hens have expectations in regard to the production percentage of the broiler breeder stock. Although the broiler breeder hens have high genetic ability, their performance is not as expected. Therefore, various aspects should be taken into account in the evaluation of the unfavorable results. The evaluation of the broiler breeder hens' performance is not a simple task; the phenotypic diversity of every trait is divided into two parts of genotypic and environmental diversities. Achievement of a good and ideal trait, as well, entails the optimality of both of the aforesaid factors. The common mistake made by the companies is that they imagine that their stocks can exhibit their genetic power under any environmental conditions but the environmental and managerial conditions should be enhanced along with the genetic power improvement in practice. Essentially, there are two groups of factors involved in the achievement of effective production. The first group includes the genetic power which is related to the bird itself; the second group includes managerial factors wherein the human beings and the environmental diversity play a substantial role but, unfortunately, the bird is not involved in the last case. Careful sampling and selection of the broiler breeder hens for the achievement of bulker body and higher performance results has led to the increase in the weight of the broiler breeder hens in the new millennium and this has resulted in the widening of the chest surface and reduction in the ability for favorable mating and proper activity of the bird. In the end, the aforesaid cases have negative effects on the production of the broiler breeder stock as well as its health. Thus, the heavier broiler breeder hens would need vaster managerial preparations such as the spaces set in the nest area, feeder space, ventilation level and so forth (Portsmouth, 1999).

In the broiler chicks' unit, management of collection, manipulation, displacement, and maintenance of the incubated eggs is effective in the quality of the one-day-old chicks. The white, cracked, brushed and moist eggs cause the transferring of infections on the shell surface into the egg and explosion inside the incubation machine as well as the infection of the other eggs following which the hatched chicks would not have the appropriate quality; and, depending on the amount of infection, the chicks die on the first days and cause the horizontal transferring of pathogenic factors to the other poultry in the stock. Therefore, regular collecting of the hatchable eggs can exert a large deal of effect on the qualitative and quantitative indices of the one-day-old chicks.

After the eggs exited the hens, the growth of the embryo which has been commenced in the hen's body is ceased. Therefore, six hours after eggs were laid, the egg slowly cools down to below physiological zero (26 to 27°C). The cooling becomes a difficult task when the temperature is high. Thus, eggs' collection should be carried out faster so that the embryos are not exposed to the warmth of the environment (Voshe Commercial Company, 2017).

In line with this, the present study has been designed and carried out to investigate the number of eggs' collection times on the grade percentage of the hatchable eggs, eggs' weights, weights of the hatched chicken and the percentage of the cracked and infected and broken eggs.

### **Materials and Methods:**

The current study has been conducted in a broiler unit in Naz Morgh Company in Abhar County, Zanjan Province, for 24 days during the fall, 2018, to investigate the number of eggs' collection times on the grade percentage of the hatchable eggs on farm, egg weight, weight of the hatched chicks and percentage of the broken, cracked and infected eggs on farm.

The studies and experiments were conducted on 46-week-old Arbor Acers Plus Chicken strains within the format of a complete randomized block design with four treatments and six replications (for a total of 24 replications). A coop was randomly chosen for the experiments. Every replication was conducted in a single day in such a way that eggs were collected twice, four times, six times and eight times respectively on the first, second, third and fourth day. These fourfold treatments, i.e. twice, four times, six times and eight times of egg collecting were replicated six times. All of the following items were recorded: eggs' weights daily, number and percentage of daily production, grade percentage of the hatchable egg on farm, percentage of the broken, cracked and infected eggs, number of times and method of collecting, eggs' collection hours, troubleshooting, candling and all the other daily cases of the farm. Moreover, samples were sent to the laboratory daily, as well, for E-coli, Salmonella, and Staph Aureus Tests.

The work method was as described in the following words: on the first day, i.e. in the first treatment, the eggs were collected twice, once at noon and another time at four o'clock in the afternoon; in the second treatment, eggs were collected four times, once at 9:00 AM, the second time at 11:00 AM, the third time at 2:00 PM and the fourth time in the last hour; in the third treatment, eggs were collected

six times, once at 8:00 AM, second time at 9:30 AM, the third time at 11:00 AM, the fourth time at 12:30 PM, the fifth time at 2:00 PM and the sixth time in the last hour; in the fourth treatment, eggs were collected eight times, once at 8:00 AM, second time at 9:00 AM, the third time at 10:00 AM, the fourth time at 11:00 AM, the fifth time at 12:00 at noon, the sixth time at 2:00 PM, the seventh time at 4:00 PM and the eighth time in the last hour.

The eggs were collected from the saloons in plastic boxes and every box had been marked with a specific color indicating the saloon from which it had been collected (figure 1). After collecting the eggs in every stage or time, they were transferred to the egg storehouse and exposed to permanganate and formalin gases for 20 minutes to be disinfected. The slat eggs were also separately and specifically collected.

The eggs were graded after being exposed to gas in such a way that the poop-stained, infected, cracked, broken, malformed and double-yolk eggs were separated and the completely clean eggs with proper forms were set aside as the grade-one eggs and the eggs cleaned of the bird poops or the white eggs but with a little malformations were categorized as the second-grade eggs.

All of the following cases were recorded; egg weight daily, number and percentage of the daily production, the hatchable eggs' grade percentage on farm, percentage of the broken, cracked and infected eggs, grade percentage in incubator, percentage of grades one and two hatched chicken, number of times and method of collection, egg collection hour, troubleshooting, candling and all the other cases of the daily farm issues. Furthermore, samples were every day sent to the laboratory for E-coli, salmonella, and staph aureus tests.

The collected data were analyzed using ..... Software Package.

## **Results and Discussions:**

### **1) The effect of the number of eggs' collection times on the egg weight:**

The results pertinent to the effect of the number of eggs' collection times on the egg weight are indicative of no significant relationship between the number of eggs' collection times and egg weight hence it does not have any effect on egg weight.

Based on an article by Mustafa Lotfi (production manager of Arya Dan Roshd Company, 11<sup>th</sup> of February, 2017), numerous factors influence the egg weight: 1) genetic; 2) rearing period; 3) nutritional factors; 4) the effect of amino acids in the feed; 5) nutritional management and 6) high temperature.

The egg weight is influenced by numerous factors so the change in some of the conditions can influence the egg weight; part of these methods pertain to the raising period and management of the chicken farms' coops and another part is related to nutrition. Of course, it is necessary to state that any change in the egg weight should be brought about with due care for the reason that in the same way that the low egg weight might be economically unfavorable for the breeders,

the high egg weight might make the breeders encounter problems like low quality of the eggshell.

**2) The effect of the number of eggs' collection times on the weight of the hatched chicken:**

The results related to the effect of the number of eggs' collection times on the weight of the hatched chicken is suggestive of the idea that there is no significant relationship between the number of eggs' collection times on the hatched chicken weight hence it does not affect thereon.

According to the studies performed and based on the article by Javad Mohammadi under the title of the "uniformity and factors influencing the broiler breeder stock and one-day-old chicks", the young broiler breeder stock produce small eggs because the nutrients are not adequately stored in the following which the chicks are found with deficiencies in the nutrients. There are performed studies during the recent years that are reflective of the idea that the uniformity of the broiler one-day-old stocks is closely associated with the uniformity of the broiler breeder stock. This issue is especially distinct in young broiler stocks. Nowadays, the broiler stocks reach the production stage at a faster pace and this has caused an increase in the production for a shorter period. Thus, having a specific nutritional program for the young broiler stocks is the most important factor in achieving the best performance in the broiler stocks produced on the chicken farms.

**Preheating the eggs before hatching:**

In this technique, the eggs are firstly preheated before being placed inside the incubator. Preheating leads to a reduction in the eggs' recreation and an increase in uniformity.

Studies show that other factors are influencing the weight of the hatched chicken (Moslehi, 2006 and Gasm Elseid and Ahmed, 2010).

**3) The effect of the number of eggs' collection times on the grade percentage of the hatchable eggs on the farm:**

The results related to the effect of number of eggs' collection times on the grade percentage of the hatchable eggs on farm showed that there is a significant difference between the treatments (Table 1) in such a way that a significant difference was observed between the six and eight times of eggs' collection in terms of the grade percentage of the hatchable eggs on farm. There are suggestions made in all the books and articles and commercial guidelines as well as pamphlets that eggs should be collected four or six times a day but none of them presents the reason and the results of this number of eggs' collection times as well as the method of collecting eggs. In the book named "raising broiler chicks" (Lison and Desamers, 2012), it has been stated that the eggs should be collected four to six times a day. Zarbal Family Company additionally recommends that the eggs should be collected four times a day.

Hurbad Family Company's advice in the guidebook named "managing the broiler breeder hens' rearing" regarding the egg collection is six to seven times a day.

**4) The effect of the number of eggs' collecting times on the percentage of the broken, cracked and infected eggs on the farm:**

The results pertaining to the effect of the number of eggs' collection on the percentage of broken, cracked and infected eggs on the farm (as shown in table 1) signify that there is a significant difference between the treatments with the .....treatment being the highest and the ..... the treatment being the lowest. Based on the results obtained through using Duncan analysis, it can be concluded that the broken, cracked and infected eggs are in the lowest number when collecting eggs for eight times; the best results have been obtained for this treatment. The difference is also significant for the sixth treatment but the number of broken, cracked and infected eggs on the farm is the highest for the second and fourth treatments. Moreover, it can be concluded that the number of eggs' collection times has a direct effect on the reduction of the broken, cracked and infected eggs' percentage on the farm.

Table 1: the effect of the number of eggs' collection times on the egg weight, weight of the hatched chicken, grade percentage of the hatchable egg and percentage of the broken, cracked and infected eggs on the farm

Treatment	Egg weight (g)	Hatched chicken weight (g)	Grade percentage of the hatchable egg	Percentage of broken, cracked and infected egg
Two times of eggs' collection	66.99±0.01	45.66±0.05	95.29±0.13	4.58±0.12
Four times of eggs' collection	66.98±0.01	45.65±0.05	95.59±0.13	4.21±0.12
Six times of eggs' collection	66.98±0.01	45.65±0.05	96.16±0.13	3.69±0.12
Eight times of eggs' collection	66.99±0.01	45.64±0.05	97.97±0.13	1.87±0.12
p-value	0.8968	0.2062	0.0001	0.0001
Standard deviation (SEM)	3.35	11.42	31.76	1.25
Total mean	66.98	45.65	96.25	3.58
Coefficient of variation (CV)	0.05	0.25	0.33	0.35

Based on the results obtained from the present study, it can be concluded that the number of eggs' collecting times has a large deal of effect on the performance as well as on the quantitative indices of chicken production in the broiler breeder stock.

Considering the different recommendations by the family companies regarding the eggs' collection times and according to the advices presented in the books and articles for collecting eggs for more than four times with none of them have pointed to the results of collecting eggs for more than four times, the results obtained from this study signify that the number of eggs' collection times has a great effect on the grade percentage of the hatchable egg on farm and percentage of broken, cracked and infected eggs in farm as well as the hatched chickens. It was found out in the course of experiments and according to the obtained results that the number of eggs' collection time has a large effect on infection with E-coli in such a way that the increase in the number of eggs' collection times brings about reduction in infections with E-coli.

### References

- Abbas, S., A. A; A. Gasm Elseid and M. K. A., Ahmed, (2010), "Effect of Body Weight Uniformity on the Productivity of Broiler Breeder Hens", *Int. J. Poult. Sci.*, 9 (3): 225-230
- Costa, M. S., (1981), "Fundamental principles of broiler breeder nutrition and the design of feeding programmed", *World's Poult. Sci. J.* 37:177-192
- North, M. O., (1980), "Don't neglect the individual bird", *Poult Dig.*, 39: 502-506
- Portsmouth, J., (1999), "feeding broiler breeder stock into the next millennium", *world poultry-Elsevier*, vol. 15, pp:21-24
- Robinson, F. E., and N.A. Robinson, (1991), "Reproductive performance, growth rate and body composition of broiler breeder hens differing in body weight at 21 weeks of age", *Can. J. Anim. Sci.* 71:1233-123
- Zarbal Family Company, (2012), "Journal of preventing slat egg"
- Lotfi, Mustafa, (2016), Aryan Dan Roshd Company
- Lison, A. and Desamers, J., (2005), "raising broiler breeder hens", tr. Akbar Nik-khah and Javad Pourreza, 2<sup>nd</sup> ed., Isfahan's Industrial University Press
- Moslehi, H. R., (2006), "guidelines of rearing breeder stock", published by the higher scientific-applied education institute of Agricultural Jihad, p.432