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Research article

Effect of Different Hatchery Practices on Pekin Duck[a]

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Duck, incubation, hatchability

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Abstract. In this research, three different study were carried out for improving hatchability of Pekin ducks. For this purpose, effects of egg storage time (0-7 days and 7-14 days), egg cleaning (clean, washed and dirty) and egg spraying were compared in hatching Pekin duck eggs. Hatchability of clean, washed with of disinfectant and dirty eggs were 69.38%, 62,00% and 54.90%, respectively. Obtained hatchability in stored hatching duck eggs were 69.49% for 1-7 days$_{\bar{7}}$ and 56.70% for 8-14 days. In addition, hatchability was 70.00% in sprayed eggs to increase hatchability and 58.40% in non-sprayed eggs. The differences between treatment groups were not significant (P>0.05). However, it is clearly seen that numerically highest hatchability can be obtained in 7 days stored clean eggs if spraying is applied.

Pekin Ördeklerinde Farklı Kuluçka Uygulamalarının Etkileri

Anahtar Kelimeler:

Ördek, inkübasyon, kuluçka randımanı

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Özet. Bu araştırmada, entansif şartlarda yetiştirilen Pekin ördeklerinde kuluçka randımanının iyileştirilmesi amacıyla birbirinden bağımsız üç deneme gerçekleştirilmiştir. Kuluçka randımanını yükseltmek amacıyla, kuluçkalık ördek yumurtalarında, depolama süresi(0-7 gün ve 7-14 gün), yumurta temizliği(temiz, yıkanmış ve kirli) ve spreylemenin etkisi incelenmiştir. Temiz, yıkanmış ve kirli yumurtalardaki kuluçka randımanı sırasıyla %69.38, %62 ve %54.9 olmuştur. 0-7 gün depolanan yumurtalarda %69.49, 7-14 gün depolananlarda %56.7 kuluçka randımanı elde edilmiştir. Ayrıca kuluçka randımanı, spreylenen yumurtalarda %70, spreylenmeyenlerde %58.4 olmuştur. Muamele grupları arasındaki fark istatistik açıdan önemsiz bulunmuştur (P>0.05). Bununla birlikte, spreyleme uygulandığı takdirde, 0-7 gün depolanan temiz yumurtalarda en yüksek randımanın alınabileceği açıkça görülmektedir.

[a]This article was compiled from Master Thesis carried out in consultation Prof. Dr. Rüveyde AKBAY.

1. INTRODUCTION

Hatchability of incubated duck eggs at suitable conditions was 70-75% at January, 55% at the end of February, fertilized eggs could be obtained during March due to chuckle, 60% in early April, 80% in May, 90-92% in early June, 75-85% in July, 70-80% in early and 60% in end of August, 65-70% in September, 70-75% in October, 80-85 in November, 80% in early December and fluctuated through the year (Luttitz 1987). In another study, 57.6% fertility and 65.1% hatchability were obtained in Pekin ducks by natural mating (Pingel 1985).

The required number of duck eggs usually can not be achieved in a short time, eggs are placed to setter after storage rooms with suitable temperature (15-18 ºC) and humidity (80%) (Brent 2009). As the storage time was increased, especially from 7th days (Onbasilar *et al*., 2007), hatchability was decreased and this decline was about 2.5% daily and faster drop from 14 days (Grow 1972).

Because of ducks contaminate their eggs with wet feet and body, sanitation of dirty eggs are necessary before incubation. The most practical method that can be used for this purpose is to spraying or dipping to a deep bowl (Hurst 1991). Fumigation of hatching eggs is also one of the most important stages of the sanitation (Farrell and Stapleton 1985; Sheldon and Carawan 1991). Also, washing process for sanitation of dirty eggs is applied in order to control for infections as Salmonella Pullorum, Mycoplasma Synoviae, Mycoplasma Gallinarum, and Eschercia Coli (Hurst 1987; 1992). Disinfectants most widely used for this purpose are chlorine, iodine, ammonium compounds and compounds with glutare aldehyde. Use of disinfectant solutions containing chlorine is more common because of faster preparing and more efficient as cheaper (Hodgetts 1988).

It is known that spraying and cooling increase hatchability when it is used by a suitable method. Cooling is made by reducing 1-2 ºC inner temperature of machine for a short time (North and Bell 1990), waiting in a short time at 20 ºC (Bogenfurst 1992) or at 23.9-26.7 ºC after 16th day (Lancester and Jones 1988) or 5minutes/day in 2nd week, 8minutes/day in 3rd week and 8minutes/day first 4 days in 4th week at 18-20 ºC (Holderread 1982). The cooling time must be set according to the eggshell temperature, and this temperature should be around 30 ºC (Turkoglu 1993). Otherwise, the cooling is expected to reduce the rate of embryo in an abnormal position, can lead to hatchability reducing by increasing embryonic deaths in last period (Lancaster and Jones 1988). In generally, spraying is carried out with the cooling and water at temperatures between 8-28 ºC (Holderread 1982; Turkoglu 1993; Onbasilar *et al*., 2014) and 40 ºC (Bogenfurst 1992) for spraying. Also, it was found that spraying with warm water (25-28 °C) decreased embryonic mortality and increased hatchability with duckling weighth (Onbasilar *et al*., 2014). The aim of this study is to determine effects of diffrent hatchery practices on hatchability of Pekin duck.

2. MATERIAL AND METHODS

A total of 390 freshly laid eggs were used during storage time (Experiment A), egg cleaning (Experiment B) and spraying (Experiment C) experiments (120, 150 and 120 eggs, respectively). These hatching eggs were divided to treatment number and the groups experiments were planned to be 2 replications to be more confidence the results obtained in this study. Hatching eggs were obtained from a Pekin Duck breeder flock (85 females+15 males) in the house at Ankara University Cıfteler Aquaculture Breeding Station. Obtained eggs were incubated in a Petersime automatic incubator of Ankara University Faculty of Agriculture, Department of Animal Science it has capacity of 1000 chicken eggs, after following treatments were implemented and sprayed with a disinfectant solution is used for viruses, bacteria and fungi, and basically consist of per-oxygen compounds. Hatching phase of incubation process has also been carried out in the bottom section of the same machine is used for hatching. 55-60% RH and 38 °C temperature from 0th to 26th days and 70-75% RH and 38 °C temperature from 27th to 28th days of incubation were in the machine.

To determine the effects of storage time 120 hatching eggs were used in Experiment A. In this purpose, before incubation, hatching eggs is divided equally into 2 groups which were stored for 0-7 days and 8-14 days in storage room with 14-18 °C of temperature and 60-75% of humidity.

150 hatching eggs were used in Experiment B to determine the effects of egg cleaning. These eggs were divided into 3 equal groups as clean, dirty, and washed. Clean eggs (control group) without any treatment, dirty eggs (treatment 1) after dry cleaning with a fine abrasive paper (sandpaper tree number 0), washed eggs (treatment 2) after washing with plain water containing 1000 ppm disinfectant was placed into incubator. Clean and dirty eggs were sprayed with warm water containing 100 ppm of disinfectant prior to being placed into the machine. In the eggs were placed in horizontal position to machine, 180 degree turning horizontally were made every day.

To determine the effects of spraying 120 eggs were used in Experiment C. In this purpose, These eggs were divided equally into 2 equal groups as spraying and non-spraying. Hatching eggs were sprayed 1 times a day with warm water temperature at 18-24 ºC from 9th to 24th days of the incubation (1 to 5 minutes) in spraying group. Egg trays wee taken out of the machine during the spraying process.

Data were analyzed by using Khi-Square Goodness of Fit test in SPSS 22.0 software (SPSS 2013).

3. RESULTS AND DISCUSSION

The results obtained in this research, which was performed to improve hatchability are shown in Table 1.

When the results for storage time are examined, a significant difference was not seen (P>0.05) between hatchabilities of 0-7 days and 7-14 days stored eggs. Similarly, the difference between hatchabilities of sprayed and non-sprayed hatching eggs with were found not to be important statistically. In addition numerically difrences were not statistically important between hatchabilities of clean, dirty and washed eggs. The obtained results and numerically differences consistent with literatures However, the observed numerically differences were not significant statistically and it is thought that due to the small number of eggs. Also, it should not to be forgotten that even a difference of 1% is important in economic terms.

Table 1. Effects of different hatchery practices on hatchability of White Pekin Ducks.
Çizelge 1. Beyaz Pekin Ördeklerinde farklı kuluçka uygulamalarının kuluçka randımanı üzerindeki etkileri.

	The amount of eggs, pieces	**Fertility (%)**	**Fertile hatchability (%)**	**Hatchabiltiy (%)**
Storage Time (Experiment A)				
7 days	59	81.63	85.00	69.39
14 days	60	82.35	66.67	54.90
Egg Cleaaning (Experiment B)				
Clean (Control)	49	81.63	85.00	69.39
Washed (Treatment 1)	51	82.00	75.61	62.00
Dirty (Treatment 2)	50	82.35	66.67	54.90
Spraying (Experiment C)				
Control	60	83.33	70.00	58.33
Treatment	60	81.67	77.55	63.33
χ^2 Values				
Storage Time		0.114	2.132	2.604
Clean-Dirty		0.006	4.432	3.379
Clean-Washed		0.001	1.073	0.837
Dirty-Washed		0.001	1.150	0.857
Spraying		0.034	3.185	2.121
P values				
Storage Time		0.736	0.144	0.107
Clean-Dirty		0.937	0.035	0.066
Clean-Washed		0.971	0.300	0.360
Dirty-Washed		0.966	0.284	0.355
Spraying		0.854	0.074	0.145

4. CONCLUSION

In commercial and large egg enterprises, in the profits made by the spraying operation will increase as the number of eggs. Otherwise, spraying will not be a very useful process for small-capacity businesses. Because spraying requires additional labor, equipment and disinfectant costs and thus it increases the costs.

The observed numerically differences were not significant statistically in this reseach but it is thought that due to the small number of eggs. It should not to be forgotten that even a difference of 1% is important in economic terms. Further more, researches in order to improve hatchability of duck eggs and determine production characteristics of White Pekin ducks have to be continued, more detaile studies with more animals.

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