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Some egg and hatching traits of local ducks, Turkish Pekins and Muscovy ducks in Isparta/Turkey (short communication)

Abstract

The purpose of the research was to study some egg and hatching traits of Boz, Yeşilbaş, Kara ducks (as the local names) in comparison with Turkish Pekin and Muscovy ducks in intensive conditions in Isparta province of Turkey.

Average egg weights of Boz, Yeşilbaş, Kara, Turkish Pekin, Black Muscovy, Black-white Muscovy, White Muscovy ducks were 68.6, 71.5, 71.0, 71.5, 73.3, 76.3, 75.5g; average percentages of fertility were 70.2, 73.0, 54.2, 78.5, 63.4, 33.5, 64.5 %, respectively.

Black-white Muscovy ducks had the highest egg weight. Minor differences were found in the values of egg shape index and values of fertility. The percentage of hatchability of fertile eggs and embryo mortality did not differ among genotypes. The weight of day-old bird there were significant differences between the genotypes. A high weight reached Black-White Muscovy ducks with 46.2 g and the lowest weight were found in Boz genotype with 41.7 g. The results were discussed.

Key Words: local duck, Pekin, Muscovy, egg, hatching, trait

Zusammenfassung

Titel der Arbeit: **Einige Ei- und Bruteigenschaften von einheimischen Entenrassen, Türkischen Peking- und Muscovy-Enten in Isparta/Türkei** (Kurzzusammenfassung)

Zweck dieser Arbeit war, einige Ei- und Bruteigenschaften von Boz, Yeşilbaş, Kara (lokale Namen) Enten im Vergleich zu Türkisch Peking- und Muscovy-Enten in der Isparta Provinz der Türkei zu untersuchen.

Die durchschnittlichen Eigewichte der Rassen Boz, Yeşilbaş, Kara, Türkisch Peking, Schwarz Muscovy, Schwarz-Weiss Muscovy und Weiss Muscovy waren 68,6, 71,5, 71,0, 71,5, 73,3, 76,3, 75,5 g; die durchschnittliche Befruchtungsrate bei diesen Rassen lag bei 70,2, 73,0, 54,2, 78,5, 63,4, 33,5, 64,5 %. Schwarz-Weiss Muscovy Enten hatten die höchsten Eigewichte. Geringe Unterschiede wurden bei dem Merkmal Eiformindex gefunden. Für die Schlupfrate der befruchteten Eier und die Embryomortalität fanden sich keine Unterschiede zwischen den Genotypen ($P < 0,05$). Die größten Eintagskückengewichte erreichten die Black-White Muscovy mit 46,2 g, die niedrigsten die Tiere der Boz Population mit 41,2 g. Die Ergebnisse werden diskutiert.

Schlüsselwörter: Lokale Entenrassen, Peking-Enten, Muscovy-Enten, Eier, Brut

Introduction

In some regions of Turkey the local duck genotypes have been extensively raised for many years in small family farms. But, there is no information available on characteristics and performances of local duck breeds in Turkey (SELCUK and AKYURT, 1986). We have no statistical data on duck breeding potential in Turkey, it is only known that there are very few small-scale duck farms raising Pekin ducks (TESTIK, 1995).

In Turkey, on this subject, the first development was in 1984 and with Pekin ducks which the number reached 46.000 ducklings (TURKOGLU, 1993). Different duck genotypes are brought by various lines from abroad to Turkey. On the other hand, the

local duck genotypes, Turkey's animal protein sources, are bred by the rural areas population under the extensive conditions as primitive and innocuous (ISGUZAR and TESTIK, 1999). ISGUZAR et al. (2002) reported about growth, carcass traits and meat quality of local ducks and could prove that these breeds could be important for crossbreed programs.

The purpose of this research was to bring to light of the local duck's some egg and hatching traits, to compare with different duck genotypes.

Material and method

Research materials consisted of breeder eggs of local duck genotypes (Kara, Yeşilbaş, Boz) which are widespread around Şarkikaraağaç/Isparta province, Turkish Pekin and Turkish Muscovy duck genotypes (black, black-white and white varieties).

The local duck genotypes were determined by ISGUZAR and TESTIK (1999) of Boz, Yeşilbaş, Kara (as the local names) in Isparta region of Turkey. And then, these genotypes (three types of local duck, three types of Muscovy duck and one type Turkish Pekin duck) were bought from the duck farms in Isparta region. The genotypes were 1/3 ratio of male/female, and in hen house there were hay litter on the ground and the long plastic feeder and the water canal of 25x20 cm for only drinking water under intensive conditions. The genotypes had no artificial nesting-box and they had built the himself natural nesting into the hay litter on the ground. The breeders were only fed with a commercial layer breeding feed (pellets of 16% protein and 2850kcal/kgME) since appropriate hatching duration and storage conditions were also provided by the laying period. The breeder ducks had have ad libitum feed and water with no grazing, no access to water-pool and no meadow, ect. They were kept under intensive conditions in the hen house. Breeder ducks started to lay and each genotype group's eggs consisted of 30-126, and identified with the different numbers according to each genotype groups and weighted by electronic weight tool before each hatching time. All egg's length and width were measured by scale. The egg shape indexes were calculated by formula that were the egg's width / the egg's length x 100. Thus, egg shapes were determined. The breeder duck's eggs were placed into pre-incubator at ones in the end of two weeks as three different hatching in the spring laying period. The hatching of fertile eggs and the mortality of embryo were determined by the finishing data of hatching and at 14 days of fertility.

Statistical analyses were done with MINITAB for WINDOWS (version 10.5). MstatC was used for the test of significance between groups. The proportional values related with hatching which are fertility %, hatching of fertile egg % and embryo mortality % were transformed to angular values for variance analysis.

Results

Table 1 and 2 show the means of egg weights and egg shape index of genotypes according to hatching times in the same laying period, respectively.

The average egg weights of local ducks, Turkish Pekin and Muscovy ducks were 68.6 to 71.5 g respectively 71.0, the egg weight of the other races lay about these (Table 1). General average egg shape indexes was similar at all races 0.75. Only Black-White Muscovy reached 0.76 (Table 2).

Table 1

Average egg weights in different hatching (g) (Durchschnittliche Eigewichte in unterschiedlichen Brutzeiten (g))

DUCK GENOTYPES	H A T C H I N G							
	(1)		(2)		(3)		GENERAL	
	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$
Boz	95	70.3 \pm 0.5 ^d	105	67.6 \pm 0.5 ^c	71	67.8 \pm 0.5 ^c	271	68.6 \pm 0.3 ^d
Yeşilbaş	126	76.3 \pm 0.6 ^a	115	69.2 \pm 0.6 ^{bc}	79	69.1 \pm 0.8 ^c	320	71.5 \pm 2.4 ^c
Kara	76	72.2 \pm 0.7 ^{bcd}	87	70.3 \pm 0.7 ^b	52	70.7 \pm 1.0 ^c	215	71.0 \pm 0.6 ^c
Turkish Pekin	63	73.1 \pm 0.6 ^{bc}	41	70.7 \pm 0.9 ^b	25	70.8 \pm 1.2 ^c	129	71.5 \pm 0.8 ^c
Black Muscovy	31	71.1 \pm 1.0 ^{cd}	45	74.9 \pm 0.6 ^a	25	74.0 \pm 0.7 ^b	101	73.3 \pm 1.2 ^b
Black-white Muscovy	44	74.1 \pm 1.3 ^{ab}	46	77.2 \pm 0.9 ^a	32	77.5 \pm 1.0 ^a	122	76.3 \pm 1.1 ^a
White Muscovy	30	71.3 \pm 1.2 ^{cd}	39	77.2 \pm 1.3 ^a	24	78.0 \pm 1.8 ^a	93	75.5 \pm 2.1 ^a

^{a,b} = Different letters in the same column show significant difference (P<0.05).

Table 2

Average egg shape indexes in different hatching (Durchschnittlicher Eiformindex bei unterschiedlichen Brutzeiten)

DUCK GENOTYPES	H A T C H I N G							
	(1)		(2)		(3)		GENERAL	
	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$
Boz	95	0.77 \pm 0.01 ^a	105	0.74 \pm 0.00 ^b	71	0.75 \pm 0.00 ^a	271	0.75 \pm 0.00 ^{ab}
Yeşilbaş	126	0.78 \pm 0.01 ^a	115	0.73 \pm 0.00 ^c	79	0.72 \pm 0.00 ^b	320	0.75 \pm 0.00 ^b
Kara	76	0.74 \pm 0.00 ^{bc}	87	0.75 \pm 0.00 ^{ab}	52	0.75 \pm 0.00 ^a	215	0.75 \pm 0.00 ^b
Turkish Pekin	63	0.76 \pm 0.01 ^{ab}	41	0.75 \pm 0.00 ^{ab}	25	0.75 \pm 0.01 ^a	129	0.75 \pm 0.01 ^{ab}
Black Muscovy	31	0.76 \pm 0.01 ^{ab}	45	0.75 \pm 0.00 ^{ab}	25	0.75 \pm 0.01 ^a	101	0.75 \pm 0.00 ^{ab}
Black-white Muscovy	44	0.76 \pm 0.01 ^{ab}	46	0.76 \pm 0.00 ^a	32	0.76 \pm 0.00 ^a	122	0.76 \pm 0.00 ^a
White Muscovy	30	0.72 \pm 0.00 ^c	39	0.76 \pm 0.00 ^a	24	0.76 \pm 0.01 ^a	93	0.75 \pm 0.01 ^b

^{a,b} = Different letters in the same column show significant difference (P<0.05).

The Tables 3 to 6 shows the results of hatching traits. The values of fertility in different hatching times at the same laying period (Table 3) show high differences between the genotypes from 33.5 % to 78.5 %. The best values reached Turkish Pekin (78.5 %), and the two local populations Boz (70.2 %) and Yesilbas (73.0 %). White Muscovy reached only 33.5 %.

Table 3

Average values of fertility in different hatching (%) (Durchschnittliche Befruchtungsrate bei unterschiedlichen Brutzeiten (%))

DUCK GENOTYPES	H A T C H I N G							
	(1)		(2)		(3)		GENERAL	
	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$	n	$\bar{X} \pm S_{\bar{X}}$
Boz	95	64.4 \pm 13.4 ^{ab}	105	76.1 \pm 5.8 ^a	71	70.0 \pm 9.7 ^{ab}	271	70.2 \pm 5.5 ^a
Yeşilbaş	126	66.7 \pm 2.8 ^{ab}	115	79.1 \pm 6.2 ^a	79	73.4 \pm 4.4 ^{ab}	320	73.0 \pm 2.9 ^a
Kara	76	67.9 \pm 18.8 ^a	87	50.5 \pm 4.6 ^{ab}	52	44.2 \pm 3.7 ^{ab}	215	54.2 \pm 6.7 ^b
Turkish Pekin	63	82.8 \pm 15.2 ^a	41	75.9 \pm 5.8 ^a	25	76.8 \pm 9.4 ^a	129	78.5 \pm 5.7 ^a
Black Muscovy	31	65.2 \pm 13.6 ^{ab}	45	64.8 \pm 12.4 ^a	25	60.1 \pm 14.2 ^{ab}	101	63.4 \pm 7.0 ^{ab}
Black-white Muscovy	44	27.3 \pm 16.2 ^b	46	35.6 \pm 15.3 ^b	32	37.5 \pm 18.4 ^b	122	33.5 \pm 8.8 ^c
White Muscovy	30	67.0 \pm 10.5 ^{ab}	39	64.2 \pm 8.5 ^{ab}	24	62.5 \pm 8.0 ^{ab}	93	64.5 \pm 4.8 ^{ab}

^{a,b} = Different letters in the same column show significant difference (P<0.05).

The values of hatchability of fertile eggs and of the embryo mortality (Table 4 and Table 5) show that there were not significant differences (P<0.05) among genotypes,

but, there were significant differences for the day-old bird weight among the genotypes. The low and high weights reached Boz and Black-White Muscovy respectively. (Table 6)

Table 4

Average values of the hatchability of fertile eggs in different hatching (%) (Schlupfrate befruchteter Eier bei unterschiedlichen Brutzeiten (%))

DUCK GENOTYPES	H A T C H I N G							
	(1)		(2)		(3)		GENERAL	
	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$
Boz	95	46.8 ± 14.2 ^a	105	36.6 ± 10.8 ^a	71	36.4 ± 15.5 ^a	271	39.9 ± 7.3 ^a
Yeşilbaş	126	36.4 ± 7.1 ^a	115	25.1 ± 5.3 ^a	79	33.6 ± 11.4 ^a	320	31.7 ± 4.6 ^a
Kara	76	58.3 ± 25.0 ^a	87	41.3 ± 12.8 ^a	52	46.2 ± 21.7 ^a	215	48.6 ± 10.9 ^a
Turkish Pekin	63	48.4 ± 20.5 ^a	41	32.1 ± 7.4 ^a	25	39.2 ± 9.8 ^a	129	39.9 ± 7.5 ^a
Black Muscovy	31	41.7 ± 10.8 ^a	45	42.2 ± 10.0 ^a	25	39.6 ± 6.3 ^a	101	41.1 ± 4.8 ^a
Black-white Muscovy	44	42.7 ± 20.9 ^a	46	30.8 ± 10.8 ^a	32	31.5 ± 11.1 ^a	122	35.0 ± 8.0 ^a
White Muscovy	30	33.3 ± 23.6 ^a	39	47.3 ± 12.1 ^a	24	44.6 ± 12.8 ^a	93	41.7 ± 9.1 ^a

^{a,b} = Different letters in the same column show significant difference (P<0.05).

Table 5

Average values of the embryo mortality in different hatching (%) (Durchschnittliche Embryonenmortalität bei unterschiedlichen Brutzeiten (%))

DUCK GENOTYPES	H A T C H I N G							
	(1)		(2)		(3)		GENERAL	
	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$
Boz	95	53.3 ± 14.2 ^a	105	63.4 ± 10.8 ^a	71	63.6 ± 15.5 ^a	271	60.1 ± 7.3 ^a
Yeşilbaş	126	63.6 ± 7.1 ^a	115	74.9 ± 5.3 ^a	79	66.4 ± 11.4 ^a	320	68.3 ± 4.6 ^a
Kara	76	41.7 ± 25.0 ^a	87	58.7 ± 12.8 ^a	52	53.7 ± 21.7 ^a	215	51.4 ± 10.9 ^a
Pekin	63	51.6 ± 20.5 ^a	41	67.9 ± 7.4 ^a	25	60.8 ± 9.8 ^a	129	60.1 ± 7.5 ^a
Black Muscovy	31	58.3 ± 10.8 ^a	45	57.9 ± 10.0 ^a	25	60.4 ± 6.3 ^a	101	58.9 ± 4.8 ^a
Black-white Muscovy	44	57.3 ± 20.9 ^a	46	44.2 ± 15.1 ^a	32	68.5 ± 11.1 ^a	122	56.6 ± 9.0 ^a
White Muscovy	30	66.7 ± 23.6 ^a	39	52.7 ± 12.1 ^a	24	55.4 ± 12.8 ^a	93	58.3 ± 9.1 ^a

^{a,b} = Different letters in the same column show significant difference (P<0.05).

Table 6

Average weights of day-old birds in different hatching (g) (Durchschnittliches Gewicht der Eintagsküken bei unterschiedlichen Brutzeiten (g))

DUCK GENOTYPES	H A T C H I N G							
	(1)		(2)		(3)		GENERAL	
	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$	n	$\bar{X} \pm S_{\bar{x}}$
Boz	95	40.6 ± 1.0 ^b	105	42.1 ± 0.4 ^c	71	42.3 ± 0.2 ^{bc}	271	41.7 ± 0.4 ^c
Yeşilbaş	126	42.5 ± 0.2 ^b	115	42.9 ± 1.3 ^{bc}	79	42.5 ± 1.1 ^{bc}	320	42.6 ± 0.5 ^c
Kara	76	43.6 ± 0.6 ^{ab}	87	44.0 ± 0.1 ^{abc}	52	43.9 ± 0.7 ^{ab}	215	43.9 ± 0.3 ^{bc}
Pekin	63	44.3 ± 0.6 ^{ab}	41	46.6 ± 1.2 ^{ab}	25	46.4 ± 0.2 ^a	129	45.8 ± 0.5 ^{ab}
Black Muscovy	31	40.3 ± 0.9 ^b	45	42.8 ± 0.9 ^{bc}	25	42.2 ± 1.0 ^c	101	41.8 ± 0.6 ^c
Black-white Muscovy	44	47.1 ± 3.3 ^a	46	47.7 ± 1.3 ^a	32	43.7 ± 1.1 ^{ab}	122	46.2 ± 1.2 ^a
White Muscovy	30	41.0 ± 0.4 ^b	39	42.7 ± 2.0 ^c	24	42.3 ± 1.9 ^{bc}	93	42.0 ± 0.9 ^c

^{a,b} = Different letters in the same column show significant difference (P<0.05).

Discussion

Conservation of genetically different duck races, existing in small populations and threatened with extinction is required for economic, scientific and histological reasons

(KSIAZKIEWICZ, 2003). Such flocks are being used in the duck to create new breeding or synthetic groups as well as to search for heterosis effects in commercial crossbreeds (ISGUZAR et al., 2002).

The purpose of this study was to compare some reproduction traits of local ducks of different genotypes. In this way, these values of egg traits of local ducks were similar to the results of KARACA et al. (1996) who found Turkish Pekin with 69.9 g egg weight or TESTIK and SARICA (1991) with 71.5 to 74.2 g. Generally the studies related to egg weight of Pekins ducks in literature show a high variability between 61.5 to 84.4g. ISGUZAR and TESTIK (1999) found in local ducks with extensive conditions lower egg weight's with 54.8 to 64.2 g, other authors similar results. For example Khaki Campell and Desi Ducks with 37.8 to 43.9 g (GAJENDRAN et al., 1990), Shaoxin ducks and Campbel ducks with 51.7 to 64.6 g (GE et al., 2000). Some authors reported about high egg weight's in Muscovy populations for example with 70.6 g (NIKOLOVA and GERZILOW, 2000) respectively 84.5 g (HARUN et al., 2001). ROMBOLI et al. (1987) found in Black, White and Sepia varieties Muscovy 81.2, and 84.3 and 84.8 g respectively. In this study the results of Boz, Yesilbas and Kara were similar to Turkish Pekin's, but expected lower to Muscovy ducks. The results had shown that there were significant differences among genotypes for egg weight, similarities between local and Pekin ducks and significant differences from those to Muscovy ducks for egg weight. A compare with literature results is difficult because many influences works.

No differences were found in the values of egg shape index in the different hatching in the same laying period.

The results of fertility show that there were significant differences among genotypes. The best values reached Turkish Pekin and the two local races Boz and Yesilbas. Despite the high egg weight Black-White Muskovy obtained the lowest values. The literature described very various values higher and lower than in this investigation. These values were higher to the native ducks having 25.0 to 55.0 % (SELCUK and AKYRUT, 1986) and to local Moscovy ducks having 17.8 to 36.8 % (HANH et al., 1995). FATTOUH et al. (2003) reported about Muscovy ducks with fertility values of 87.8 %.

The values of the hatchability of fertile eggs were similar in the literature (SELCUK and AKYURT, 1986). Other authors reported about higher values (KARAMAN and TESTIK, 1995; FATTOUH et al., 2003). Hatchability fertile eggs just like the values of embryo mortality there were not significant difference between local ducks, Turkish Pekin and Muscovy ducks. The percentage of the fertility, the hatchability of fertile eggs and the embryo mortality were relatively low (Tables 3 to 5). This is due to the fact that the breeder ducks were completely kept indoors without having access to outdoors and only fed with a commercial layer breeding feed since appropriate hatching duration and storage conditions were also provided. The breeder ducks had have no grazing, no meadow, no access to water-pool, no running ect., and they have the fresh drinking water, the clean hay litter and appropriate management in the breeder laying house under the intensive conditions.

The weight of day-old birds were similar to Pekin ducks with 45.0.to 59.0 g and 45.0 g respectively (KNIZETOVA et al., 1992; SHAHIN et al., 2000) but lower than results of KARAMAN and TESTIK with 47.8 to 55.8 g. Between genotypes in this investigation there were significant differences between genotypes. High weight

reached Black-White Muscovy ducks and the lowest were found in Boz genotype. There is certainly a positive correlation to the egg weight (KARAMAN and TESTIK, 1995). Egg and hatching traits are strongly influenced by environment therefore are compared with the literature heavily.

The aim of this study was to compare some reproductive traits of different Turkish local and other duck populations. The proved performances make possible a better judgment of this genotypes, their conservation, further development or to create new commercial crossbreds.

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