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BREEDING AND PRODUCTION PARAMETERS OBTAINED FROM THE COMMON DUCK

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Abstract

Observations has been performed on biological material inside teaching waterfowl farm of the University of Agricultural Sciences and Veterinary Medicine Bucharest during December 2019 - June 2020 and results are compared with those recorded in year 2001 for groups of 60 birds of races Peking, Campbell khaki and Indian Runner. During this period there were monitored and analyzed the following breeding and production parameters: body weight, egg production, egg weight, fertility, hatchability, egg weight and day-old body weight. Peking Duck had an average body weight of 2358 g for females and 2696 g for males and an egg production of 120.42 eggs/bird and an egg weight of 77,62 g and a fertility of 87.34 % and a hatchability of 54.52% and a day-old body weight of 44.04 g. Campbell khaki Duck had an average body weight of 1683 g for females and 1954 g for males and an egg production of 189.77 eggs/bird and an egg weight of 68.37 g (significantly lower compared to 2001) and a fertility of 89.61% and a hatchability of 58.42 (significantly higher) and a day-old body weight of 35.05 g (significantly lower). Indian Runner Duck had an average body weight of 1791 g for females and 2040 g for males and an egg production of 173.74 eggs/bird and an egg weight of 69.86 g (significantly higher) and a fertility of 83.31% and a hatchability of 51.11% and a day-old body weight of 37.25 g (significantly higher).

Key words*: body weight, common duck, hatchability, hatching.*

INTRODUCTION

If rational raised waterfowls are bringing big and quick benefits and are able to use less costly feeds and are more resistant to diseases and are more quickly to respond to specific treatments (Cherry & Morris, 2008).

England has been world's first producer and breeder of Muscovy ducks. A type of Muscovy duck lighter than the Asian one has been created in England by crossings with races Aylesbury, Campbell, White Indian Runner etc. Cherry Valley from England is considered the biggest duck producing company in the world (Watt Poultry Statistical Yearbook, 2019; Creswell, 2002, 2013; Gerzilov et al., 2013).

Duck production is also highly developed in Netherlands which are exporting breeding material and duck meat in several European countries such as Germany and France.

In the Independent States Community where waterfowl production has a firm established tradition Peking duck is being produces from 1925. Populations of this race originating from different imports from England, China and Germany are being raised in several zones of this area such as Moscow, Kazakhstan, Byelorussia, Ukraine, etc. Generally adult ducks' weight is of 3-3.7 kg for females and 3.3-4 kg for males. Weight of young ducks rose for meat production has slightly large variations depending on population (Kinh et al., 2013).

Presently Peking is highly used for meat production both as pure race and as hybrids with other races. It has the disadvantage to produce too fat carcasses. Meat is very tender and juicy and it is well known worldwide for its pleasant taste.

Campbell race was created at the end of XIX century and it received the name of farm which created it and introduced it in English standard of poultry races in 1901 as a race with high egg production.

Campbell ducks were obtained from Indian Runner docks and local material and Mallard and Rouen ducks had also an important role in conception of this race. It was introduced in our country in 1949 and it was imported from Netherlands (Popescu-Micloşanu, 2004).
Campbell ducks are very precocious concerning both egg laying age and age of slaughtering for meat production. Eggs have good hatching results and they have high fertility and hatching capability (Linden, 2015).
It is one of the most widespread duck races in the world next after Peking because of their several qualities.
Indian Runner came from India where it came into being naturally and race was brought to England during last century. Color types are chestnut, chestnut with white spots, wild, black, chocolate, white, blue and trout colored (Van et al., 2000).
Hatching quality is good and fertility and hatchability are high.
This race is suitable for the improvement of egg production. It has been raised in parks or on different properties as a decorative bird for expositions or pure and simple for its beauty (Farrell D.J., 2000).

MATERIALS AND METHODS

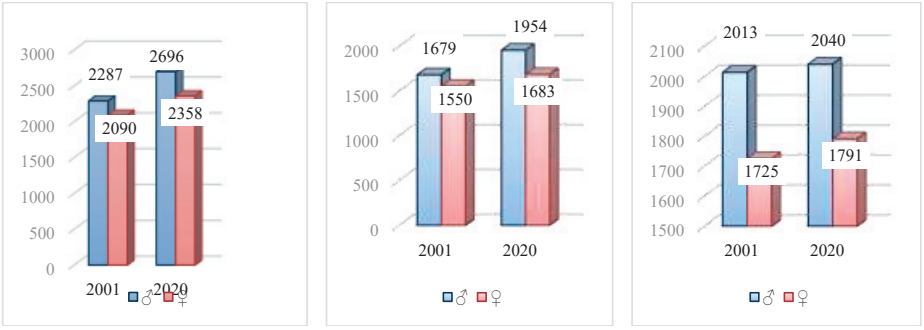
Researches were performed at Educational Farm Belciugatele - Waterfowl Farm which is located in Moara Domnească and it is belonging to University of Agronomic Sciences and Veterinary Medicine of Bucharest on three races of common duck respectively Peking, Campbell khaki and Indian Runner and 180 adult birds (60 bird/race) were studied in a proportion between sexes of 1:5 for which body weight and individual egg production were measured, s-au incubated eggs were weighted and main hatching parameters were evaluate. Some of the hatched ducklings have been kept to replace the parent flock and the others have been sold.
Study was carried out during an interval of six months (December 2019 and average yearly results were compared with those registered in year 2001 in the same Educational Farm of the University. These parameters (monitored weekly/monthly and on average by lying cycle) are as following: body weight (monthly - between December, 2019 - May, 2020) of adult birds, egg production/lying cycle (February - May), egg and chick weight (February - May), fertility and hatching (February - May).
Obtained data were statistically processed by classical means by calculating the average, variation, standard deviation, error of average and variability coefficient.
Student test has been used to study the significance of differences between calculated averages (between groups) (Sandu, 1995). Calculated Student test value has been compared with its critical (tabular) value at corresponding liberty degrees (cumulated liberty degrees n_1+n_2-2) and desired significance level ($\alpha = 0.05$; $\alpha = 0.01$; $\alpha = 0.001$; at a probability of 95%, 99% and respectively 99.99%).

RESULTS AND DISCUSSIONS

Production and breeding performances of the three studied races are presented in the followings.
In Peking duck:
- head is almost round with wide beak of orange color; torso has a rectangular shape and a characteristic oblique orientation; chest is rounded and uplifted; feathering is completely white;
- males average body weight is 2696 g and females average body weight is 2358 g with no significant differences between months and years; by fattening they can reach a body weigh of 3-4 kg;
- duckling's growth rate is very high;
- average egg production was 120.42 eggs by laying cycle and egg weight was 77.62 grams with no significant differences between months and years; eggs had white colored shells;
- fertility is very good - 87.34 % ranging between 82.84 - 90.35 with significant differences between months February - March and February - April;
- hatching percentage is 54.52%, ranging between 44.21 and 62.07% with clearly significant differences between months March - April and very significant differences between March - May;
- duckling's weight at day one age was 44.04 g with limits between 43.08-44.69 g and without significant differences.

Table 1. Body weight of common duck populations (grams)

Mention		Peking			Campbell khaki			Indian runner		
		2020	2001	Student 2001-2020	2020	2001	Student 2001-2020	2020	2001	Student 2001-2020
♂	X	2696	2287	2.0277	1954	1679	2.2446	2040	2013	0.1917
	sx	184.98	80.43		106.85	59.59		87.18	109.27	
	CV	15.35	7.86		12.23	7.93		9.56	12.14	
♀	X	2358	2090	1.4520	1683	1550	1.7896	1791	1725	0.3907
	sx	149.88	107.71		59.59	85.06		117.29	120.15	
	CV	14.21	11.52		7.93	11.30		14.64	15.57	



(a) (b) (c)

Figure 1. Body weight in common duck (a - Peking, b - Campbell khaki, c - Indian Runner, adults, g)

Table 2. Egg production in common duck (eggs/laying cycle)

Mention		Peking		Campbell khaki		Indian runner	
		Total	t 2001-2020	Total	t 2001-2020	Total	t 2001-2020
2020	X	120.42	0.7367	189.77	0.1571	173.74	0.5877
	sx	10.62		11.417		10.687	
	CV	17.64		12.03		12.30	
2001	X	110.14		192.38		182.64	
	sx	9.049		12.065		10.728	
	CV	16.43		12.54		11.75	

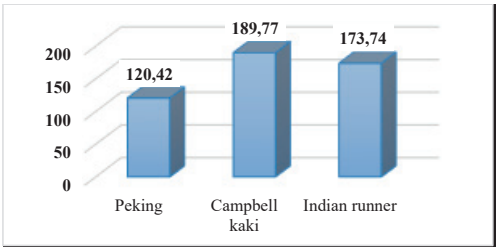


Figure 2. Egg production/lying cycle in common duck

The following morphological production and breeding characters have been analyzed in the population do Campbell khaki race:

- outside characters are external appearance of small race with torso having a cylindrical shape and a characteristic oblique orientation. Beak has a dark greenish color. Chest is rounded and uplifted and abdomen is bulky. Feet are being of average size and set apart at a good distance and feathering color is khaki;
- adult body weight is 1954 g for males and 1683 g for females with no significant differences between months and years;
- production characteristics: egg production is high of 189.77 eggs/laying cycle on average (with no significant differences) with eggs having an average weigh of 68.37 g with white and sometimes greenish shell (with significant differences between years);
- it is precocious race with egg laying starting at 5-6 months;
- fertility is very good - 89.61% with significant differences between months February - May and distinctive significant between February - March, February - April and between years;
- hatching percentage - 58.42%, ranging between 45.76 and 64.92%, with significant differences between years and with very significant differences between months March - April and March - May;
- ducklings weight at day one age - 35.05 g ranging between 34.24-35.57 g with significant differences between years.

Morphological, production and breeding traits of analyzed population of Indian Runner ducks were the followings:
- color types: brown with whit spots;
- adult ducks body weight is: female duck 1791 g and male duck 2040 g; with no significant differences between mounts and years;
- average egg production during last egg laying cycle: 173.74 eggs with an average egg weight of 69.86 g with significant differences between years;
- this race is very good for the improvement of egg production;
- it is starting to lay eggs at just 4 mounts of age;
- fertility is good - 83.31% with significant differences between months February - March, February - April;
- hatching percentage is 51.11% ranging between 40.31 and 51.11% with very significant differences between months March - April and March - May;
- ducklings weight at day one age - 37.25 g ranging between 36.38-37.81 g. with significant differences between years.

Table 3. Egg and ducklings' weight in common ducks (grams)

Mention		Peking			Campbell khaki			Indian runner		
		2020	2001	Student 2001-2020	2020	2001	Student 2001-2020	2020	2001	Student 2001-2020
Egg weight	X	**77.62**	**78.28**	**0.5614**	**68.37**	**73.34**	**3.6568***	**69.86**	**65.67**	**3.4141***
	s_X	0.799	0.869		1.036	0.881		1.018	0.688	
	CV	2.30	2.48		3.39	2.69		3.26	2.34	
Ducklings weight	X	**44.04**	**42.81**	**1.8712**	**35.05**	**38.29**	**4.6802***	**37.25**	**34.75**	**3.7696***
	s_X	0.454	0.475		0.541	0.430		0.544	0.378	
	CV	2.27	2.48		3.45	2.51		3.27	2.44	

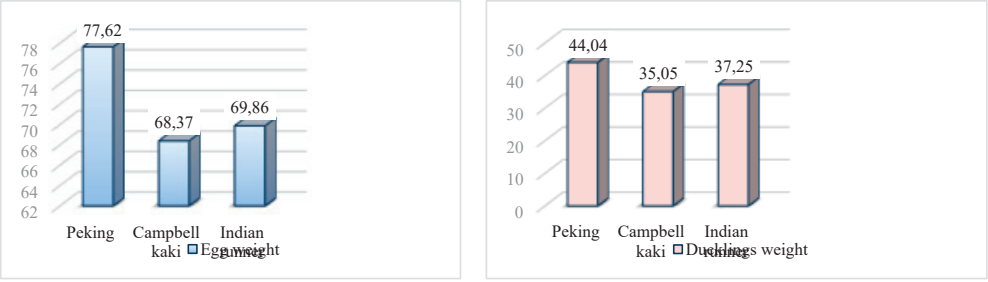


Figure 3. Average egg and ducklings' weight in common ducks (grams)

Table 4. Fertility (%) and hatchability (%) in common ducks

Mention		Peking			Campbell khaki			Indian runner		
		2020	2001	Student 2001-2020	2020	2001	Student 2001-2020	2020	2001	Student 2001-2020
Fertility	X	**87.34**	**84.16**	**2.1759**	**89.61**	**80.34**	**6.5215****	**83.31**	**88.28**	**2.5225**
	s_X	0.984	1.080		0.763	1.198		1.328	1.456	
	CV	2.52	2.87		1.91	3.33		3.57	3.69	
Hatching	X	**54.52**	**52.84**	**1.1267**	**58.42**	**51.38**	**5.0856***	**51.11**	**54.84**	**2.6492**
	s_X	1.259	0.80		1.184	0.717		0.970	1.02	
	CV	5.16	3.39		4.53	3.12		4.24	4.17	

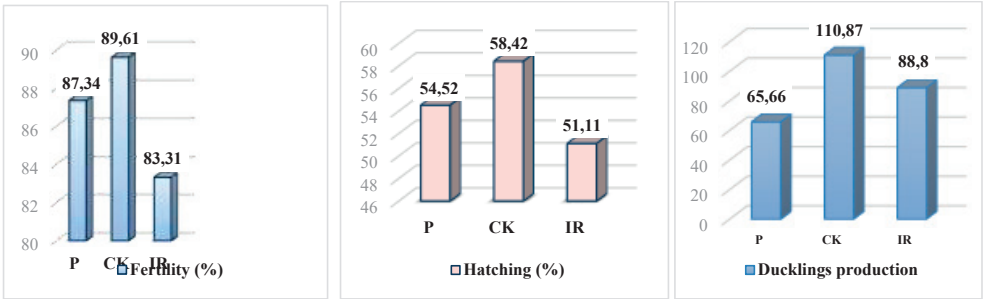


Figure 4. Fertility (%), hatching (%) and ducklings production by female in Muscovy duck
(P - Peking, CK - Campbell khaki, IR - Indian runner)

Comparative analyze of results revealed that males body weight ranged between 1954 g in Campbell duck and 2696 g in Peking duck; female body weight values had the same profile with 1683 g in Campbell ducks and 2358 g in Peking ducks.

Average egg weight ranges between 63.37 g in Campbell duck and 77.62 in Peking duck.

Fertility is high in all duck populations monitored and is ranging between 83.31 and 89.1. Hatching percentage had very good values ranging between 51.1-58.42% with highest value in Campbell ducks.

Ducklings' number by breeding female had average values ranging between 65.66-110.87 ducklings. In Peking Ducklings number by breeding female was 65.66 and biggest values have been obtained in small races: 88.80 ducklings by female were obtained in Indian Runner ducks and 110.87 ducklings by female were obtained in Campbell ducks.

CONCLUSIONS

Common duck races present in this study (Peking, Campbell khaki and Indian Runner) had production and breeding performances good and similar to those described in literature.

Flocks from the farm Moara Domnească are being a valuable gene pool which might be the foundation of both obtaining biological material suitable to be marketed as pure race (Peking and small races with good egg production) and producing mullards by crossing females of Peking lines with males of Muscovy duck lines.

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