

## COMPARATIVE STUDY OF SOME PRODUCTION TRAITS IN VESSELINA, NEW ZEALAND WHITE AND CALIFORNIAN RABBITS BREEDS

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### Abstract

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The purpose of this study is to trace the rabbit weight development from 30 to 150 days of age of newly bred Vesselina and most widely used in the country meat breeds - White New Zealand and Californian, under extensive farming conditions. The experiment was conducted in a rabbit farm at University of Forestry, in wooden cages. The results showed that with the highest live weight and weight gain are characterized animals from Vesselina and with the lowest - animals by the Californian breed.

*Key words:* rabbits; extensive farming; live weight; weight gain; Vesselina, White New Zealand and Californian breeds

### Introduction

The interest of consumers to rabbit meat is mainly due to its high protein content (21.3%), low fat (6.8%) and cholesterol (45 mg/kg) (Dalle Zotte, 2000). Rearing the animals in accordance with the hygienic requirements provides high vitality and good fattening abilities of young rabbits (Kowalska, 2002).

In our country there are different technological solutions for growing different categories rabbits - growing outdoors, under shelter or indoor, with of one- or two-floor cages with various systems of cleaning, watering and feeding (Dimitrova et al., 2008). Fattening period depends on the desired body weight, which must be reached, the average daily gain, and also of the general production conditions on the farm. In intensive farms in Europe weaning and slaughter is carried out at a younger age and lower body weight, while the specifics of the market in Bulgaria have a longer growing period and realization of larger carcasses. To achieve durable success in rabbit production, there is crucial importance mastery of the high mortality of the newborn in the period after weaning. Growth capabilities and death rate are established the 2 weeks after the suckling period, and vary depend on the type

of the ration (Nicodemus et al., 2002) and from the implementation of preventative measures in breeding animals. The most commonly used breeds in the country are New Zealand White and California (Papa et al., 2013; Abdel-Hamid, 2015), but the great interest is also new created breed Vesselina.

Aim of this study was to compare the weight development of the animals Vesselina with these of the breeds New Zealand White and California.

### Materials and Methods

The experiment was conducted in Rabbit farm of Training Experimental Place “Petrokhan” at the University of Forestry - Sofia. Extensively raising of rabbits was applied in wooden cages outdoor as the experiment was carried out during spring - summer - late autumn. Rabbits were weaned at 35 days of age. Animals received alfalfa hay and pelleted combined feed *ad libitum*. Pelleted feed contained 16.3% crude protein, 13% crude fiber, 2.7% crude fat and 2500 kcal/kg digestible energy. For the purpose meet the needs of young people rabbits included in the survey, was supplement lucerne hay. It was compared weight development of females and males separately from age 30 to 150 days.

## Results and Discussion

All calculated results presented in Tables 1, 2 and 3 are highly significant at  $p = 0.001$ . The average live weight in male rabbits at 30 days of age were respectively:  $0.494 \pm 0.129$  kg for Vesselina,  $0.455 \pm 0.094$  for New Zealand White and  $0.380 \pm 0.112$  kg for Californian breed (Table 1). In female rabbits the average weights of the same age were as follows:  $0.512 \pm 0.157$  kg,  $0.462 \pm 0.122$  kg, and  $0.399 \pm 0.126$  kg (Table 2). As observed from the obtained results in both sexes with the highest body mass are distinguished animals of breed Vesselina and the lowest of animals of Californian breed. Comparing the results establish that on this age values are higher in females compared with males.

Tables 1, 2 and 3

On the 60<sup>th</sup> day in male rabbits of the breeds Vesselina, New Zealand White and Californian average live weight are respectively  $1.433 \pm 0.222$  kg,  $1.244 \pm 0.316$  and  $1.125 \pm 0.291$  kg (Table 1). In female rabbits of this age, average live weight were respectively  $1.326 \pm 0.253$  kg,  $1.243 \pm 0.301$  kg and  $1.139 \pm 0.321$  kg (Table 2). At this age, again with the highest indicators are Vesselina animals, and the lowest - those of the Californian breed.

On day 90 after birth, the average weight of male rabbits from Vesselina, New Zealand White and Californian were respectively  $2.543 \pm 0.409$  kg,  $2.185 \pm 0.375$  kg and  $1.939 \pm 0.300$  kg (Table 1). In females of this age, the average rabbit weight were respectively  $2.349 \pm 0.353$ ,  $2.201 \pm 0.364$  kg and  $1.929 \pm 0.321$  kg (Table 2).

In the study the weight of the 120-day male rabbits, the average weight of breed group Vesselina, New Zealand White and Californian were as follows:  $3.256 \pm 0.313$  kg,  $2.687 \pm 0.300$  kg and  $2.594 \pm 0.361$  kg (Table 1). In females of this age, the average weights are respectively  $3.303 \pm 0.376$  kg,  $2.996 \pm 0.457$  kg and  $2.713 \pm 0.331$  kg (Table 2).

Statistically significant differences between the groups in the weight gain in male rabbits were observed in the period 30 - 60 day and 60 - 90 day (Table 3). The highest values in the weight gain were observed in males Vesselina ( $0.939 \pm 0.136$  and  $1.11 \pm 0.214$ , respectively) and lowest in Californian ( $0.744 \pm 0.266$  and  $0.814 \pm 0.191$ , respectively). In female rabbits statistically proven values of the differences between the groups for this trait were established only in the period 60-90 day as the highest value was found in animals of Vesselina -  $1.02 \pm 0.218$  and the lowest in Californian breed -  $0.790 \pm 0.172$ . Other authors also establish higher live weight of rabbits from New Zealand White breed in comparison with those of Californian breed (Maj et al., 2009).

The same tendency continued at 90 and 120 days old in males, as well as in female rabbits, and also in females at 150 days of age. According Lazzaroni et al. (2009) the gender affects less productive and slaughtering performance, as the females showed a higher feed consumption and better productive performance, similar trend was observed in the obtained from results in this study do outdoor reared rabbits. According Preziuso et al. (2008) meat of rabbits grown in the open less pale indicates significantly higher content of fat, which is likely positive, as it is associated with reduced loss during cooking

**Table 1**  
Mean live weight in the male rabbits from the different breeds on different ages, kg

Mean weight in the male rabbits in the different ages, kg $\bar{X} \pm SD$	Breeds			Significance of the differences between the breeds
	Veselina (A)	White New Zealand (B)	Californian (C)	
Age of 30 days	n=10 $0.494 \pm 0.129$	n=82 $0.455 \pm 0.094$	n=35 $0.380 \pm 0.112$	A-B → NS A-C → * B-C → ***
Age of 60 days	n=10 $1.433 \pm 0.222$	n=82 $1.244 \pm 0.316$	n=35 $1.125 \pm 0.291$	A-B → *** A-C → *** B-C → NS
Age of 90 days	n=10 $2.543 \pm 0.409$	n=82 $2.185 \pm 0.375$	n=35 $1.939 \pm 0.3$	A-B → *** A-C → *** B-C → ***
Age of 120 days	n=7 $3.256 \pm 0.313$	n=19 $2.687 \pm 0.3$	n=21 $2.594 \pm 0.361$	A-B → *** A-C → *** B-C → NS

NS-non significant, \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$

**Table 2**  
**Mean live weight in the female rabbits from the different breeds on different ages, kg**

Mean weight in the female rabbits in the different ages, kg $\bar{X} \pm SD$	Breeds			Significance of the differences between the breeds
	Veselina (A)	White New Zealand (B)	Californian (C)	
Age of 30 days	n=25 0.512 ± 0.157	n=80 0.462 ± 0.122	n=29 0.399 ± 0.126	A-B→NS A-C→** B-C→**
Age of 60 days	n=25 1.326 ± 0.253	n=80 1.243 ± 0.301	n=29 1.139 ± 0.321	A-B→NS A-C→** B-C→NS
Age of 90 days	n=25 2.349 ± 0.353	n=80 2.201 ± 0.364	n=29 1.929 ± 0.321	A-B→NS A-C→*** B-C→***
Age of 120 days	n=18 3.303 ± 0.376	n=34 2.996 ± 0.457	n=18 2.713 ± 0.331	A-B→* A-C→*** B-C→**
Age of 150 days	n=14 3.874 ± 0.503	n=17 3.698 ± 0.358	n=9 3.483 ± 0.417	A-B→NS A-C→NS B-C→NS

NS-non significant, \*P<0.05, \*\*P<0.01, \*\*\*P<0.001

**Table 3**  
**Mean weight gain of rabbits of different periods, kg**

Mean weight gain in the different period, kg $\bar{X} \pm SD$	Breeds			Significance of the differences between the breeds
	Veselina (A)	White New Zealand (B)	Californian (C)	
Male rabbits				
30 – 60 days	n=10 0.939 ± 0.136	n=82 0.789 ± 0.279	n=35 0.744 ± 0.266	A-B→** A-C→** B-C→NS
60 - 90 days	n=10 1.110 ± 0.214	n=82 0.941 ± 0.227	n=19 0.814 ± 0.191	A-B→* A-C→*** B-C→NS
90 – 120 days	n= 7 0.701 ± 0.220	n=10 0.709 ± 0.161	n= 21 0.706 ± 0.184	A-B→NS A-C→NS B-C→NS
Female rabbits				
30 - 60 days	n=25 0.814 ± 0.168	n=80 0.781 ± 0.281	n=29 0.740 ± 0.229	A-B→NS A-C→NS B-C→NS
60 - 90 days	n=25 1.020 ± 0.218	n=80 0.958 ± 0.213	n=29 0.790 ± 0.172	A-B→NS A-C→*** B-C→***
90 – 120 days	n=18 0.916 ± 0.163	n=34 0.872 ± 0.204	n=18 0.811 ± 0.215	A-B→NS A-C→NS B-C→NS
120 – 150 days	n=14 0.612 ± 0.236	n=17 0.639 ± 0.211	n=9 0.776 ± 0.293	A-B→NS A-C→NS B-C→NS

NS-non significant, \*P<0.05, \*\*P<0.01, \*\*\*P<0.001

and positive low saturated fatty acids and high mono saturated fatty acids. Outdoor rearing is possible alternative system which meets the ethical concerns of contemporary consumer about way of growing and in relation to meat quality.

## Conclusion

This is first comprehensive research, which was carried out on animals of new Bulgarian breed Vesselina. The results showed that the highest body mass and weight gain is characterized both females and males of the breed Vesselina, and the lowest - the animals of the Californian breed. Females tend to be higher mass on 30 and 120 days of age.

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