

Evaluation of Selected Morphological and Carcass Traits in Broiler Rabbits

Jozef Bujko¹, Anna Trakovická¹, Ján Rafay², Július Žitný¹, Alica Rafayová¹, Cyril Hrnčár³

¹Slovak Agricultural University in Nitra, Faculty of Agrobiological and Food Resources, Department of Genetic and Breeding Biology 949 76-Nitra, A. Hlinku, 2, Slovak Republic

²Animal Production Research Centre Nitra, Slovakia

³Slovak Agricultural University in Nitra, Faculty of Agrobiological and Food Resources, Department of Poultry Science and Small Animal Husbandry, 949 76-Nitra, A. Hlinku, 2, Slovak Republic

Abstract

The aim of the work was evaluation of selected morphological and carcass traits in broiler rabbits. The selected morphological traits were length of heads, cross size of heads, length of ears, cross size of breast, depth of breast, under-voltage, length of skillet, cross size of skillet, length of trunk, circumference of breast, semi-circumference. For analyse carcass traits was selected rabbits with morphological traits. The analyses carcass traits were weight of skin, weight of body, weight of head, weight of thigh, recovery and slaughter age. Traits of morphological and carcass were analysed using the Statistical Analysis System version 9.3.1. Between morphological traits was the high of variability in district of breast (6.18 %), district of breast (6.91%) and the lowest in length of ears (3.43 %), cross size of skillet (3.82 %). The high variability of carcass traits was in weight of skin (9.43 %), the lowest in weight of head (2.26 %) and recovery (2.5 %). The high of significant correlation was between weight of thigh and length of heads (0,188⁺⁺), cross size of heads (0,227⁺⁺). Obtained results will be exploitable for future rabbits breeding in the Slovak Republic.

Key words: carcass traits, correlation, morphological traits, rabbits

1. Introduction

The characteristics of foreign genetic resources and indigenous breeds can be described in many ways, the phenotype compared to the analysis of differences at the molecular level [1].

In many countries, as well as in Slovakia started to deal with hybridization programs which aim to produce a final product - broiler rabbits. The most preferred breed for breeding work in this direction will show a group of meat breeds medium sized breeds [2].

The evaluation of breeding, morphological traits and carcass in broiler rabbits were evaluated in other countries [3-6] and to deal with Slovakia [7-11].

The aim of the work was evaluation of selected morphological and carcass traits in broiler rabbits.

2. Materials and methods

Morphological and carcass traits were evaluated in a population of broiler rabbits New Zealand White, who farmed the Research Institute of Animal Production in Nitra. The populations of 100 individuals were evaluated.

Rabbits were kept in the air conditioning-metal grate in the cage. Fed the standard compound mixture unlimited KIL CH-1, oats and grass hay. The morphological characteristics were evaluated following characters: length of heads, cross size of heads, length of ears, cross size of breast, depth of breast, under-voltage, length of skillet, cross size

*Corresponding author: Jozef Bujko, Tel: +421 37 641 4294, Email: Jozef.Bujko@uniag.sk

of skillet, length of trunk, circumference of breast, semi-circumference. Measurements were made just prior to slaughter at the age of 84 days, the weight of 2 500 g. The measure we used special instruments and tailor meter. The values of morphological traits are expressed in cm.

For evaluation of the properties we have selected for slaughter to the same animals on which they made measurements of morphological traits. Animals are defeat in aged 84 days at an average weight of 2 500 g followed by carcass dissection - weighing and measuring various parts of the carcass. The carcass dissection was evaluated by the following selected properties: weight of skin, weight of body, weight of head, and weight of thigh, recovery and slaughter age.

In the evaluated group of individuals, we calculated basic statistical characteristics (average - \bar{x} , standard deviation (SD), the mean average

error (SE), coefficient of variation (CV) in %) for morphological and carcass characteristics. Next, we evaluated the correlation between morphological and carcass traits. The results were processed using the Statistical Analysis System version 9.3.1 [12].

3. Results and discussion

The basic statistical characteristics of the 11 morphological characters listed in table 1. In a group of 100 individuals were evaluated following traits: length of heads, cross size of heads, length of ears, cross size of breast, depth of breast, under-voltage, length of skillet, cross size of skillet, length of trunk, circumference of breast, semi-circumference.

Table 1. Statistical characteristic of morphological traits of rabbits

Morphological traits	n ¹	\bar{x} ²	SD ³	SE ⁴	CV ⁵
Length of heads		7.92	0.32	0.032	4.01
Cross Size of heads		4.41	0.20	0.020	4.59
Length of ears		11.67	0.40	0.040	3.43
Cross Size of breast		8.74	0.45	0.045	5.20
Depth of breast		8.69	0.54	0.054	6.18
Under-voltage	100	7.31	0.29	0.029	3.92
Length of skillet		9.24	0.43	0.043	4.64
Cross Size of skillet		5.16	0.20	0.020	3.82
Length of trunk		41.88	1.84	0.184	4.39
Circumference of breast		35.16	2.43	0.243	6.91
Semi-circumference		32.50	1.37	0.137	4.23

¹number of observation, ²average, ³standard deviation, ⁴standard error, ⁵coefficient of variation

Between morphological traits was the high of variability in depth of breast (6.18%), circumference of breast (6.91%) and the lowest in length of ears (3.43 %), cross size of skillet (3.82 %). The head, from tip of nose to the top of the head, reaching average of 7.92 cm, the minimum value was 7.20 and 8.60 cm maximum. Distance base of the ears, head width, therefore, ranged from 3.90 to 4.80 cm, 4.41 cm in diameter. The average length of ears in a set of rabbits was 11.67 cm and varied in the range from 10.60 to 12.90 cm. Breast, which actually expresses the width of the breast, averaged 8.74 cm, the range of values was from 7.50 to 9.90 cm. Depth of chest, measured as the distance line connecting the

lowest point on the sternum and the highest point on the last thoracic vertebrae ranged from 7.10 to 10.10 cm. The mean numbers of individuals was 8.69 cm. Another trait of morphological under-voltage is characterized by low variability ($v = 3.92\%$). Mean was 7.31 cm.

The length of skillet, measured as the distance cranial and caudal tip of the left coxy reached an average of 9.24 cm. The average value of cross size of skillet was 5.16 cm, range of minimum and maximum values were 4.70 to 5.60 cm. The length of trunk measured as the distance between the highest point of the hull of the skull between the ears and base of the tail reached an average of 41.88 cm. In the group of subjects, values ranged

from 36.90 to 46.40 cm. Circumference of breast is characterized by high of the coefficient of variation ($v=6.91\%$). These results were similar to the results morphological traits in evaluated broiler rabbits [2, 3, 6].

For carcass traits were evaluated: weight of skin, weight of body, weight of head, weight of thigh, recovery and slaughter age (Table 2).

Table 2. Statistical characteristic of carcass traits of rabbits

Slaughter traits	n ¹	\bar{x} ²	SD ³	SE ⁴	CV ⁵
Weight of skin		431.18	40.64	4.064	9.43
Weight of body		1 232.96	56.75	5.675	4.60
Weight of head	100	138.64	3.13	0.313	2.26
Weight of thigh		398.37	19.75	1.975	4.96
Recovery		54.95	1.37	0.137	2.50
Slaughter age		95.01	3.47	0.347	3.65

¹number of observation, ²average, ³standard deviation, ⁴standard error, ⁵coefficient of variation

The high variability of carcass traits was in weight of skin (9.43%), the lowest in weight of head (2.26 %) and recovery (2.5%). Weight of skin ranged from 310 to 523 g, with an average value of 431.18 g. The basic product of slaughter - carcass was evaluated as trait of weight of body. His average was 1 232.96 g ranging from 1 085 to 1 347 g. The other trait evaluated for slaughter, the weight of the head, averaged 138.64 g was varied in the range 131 to 147 g. The most valuable parts of the carcass are rabbit thighs. In the evaluated group of individuals' weight of thighs ranged from 356 to 448 g and

reached average of 398.37 g. Recovery as the most characteristic trait of carcass yield ranged from 51.3 to 57.5%, averaging the value of 54.95%. The slaughter age of the group of rabbits ranged from 85.7 to 101.9 days in the overall average rate was 95.01 days. These results were corresponding to the results carcass traits evaluated other breed rabbits in different breeder provisions and methods [2, 3, 4, 6, 11]. The correlation between morphological and carcass traits in the study group, are listed in Table 3.

Table 3. The correlation coefficients between morphological and carcass traits

Traits	Weight of skin	Weight of body	Weight of head	Weight of thigh	Recovery	Age
Length of Heads	0.033	-0.071	-0.126	0.188 ⁺	0.053	0.183 ⁺
Cross Size of Heads	-0.099	-0.020	-0.109	0.227 ⁺⁺	0.102	0.189 ⁺
Length of Ears	-0.057	-0.053	0.046	0.176 ⁺	0.060	0.160
Cross Size of Breast	-0.240 ⁺⁺	0.128	0.181 ⁺	0.123	0.122	0.015
Depth of Breast	-0.054	0.010	0.066	-0.099	-0.010	0.132
Under-voltage	-0.100	-0.068	0.054	-0.045	-0.049	-0.066
Length of Skillet	-0.034	0.070	0.061	0.188 ⁺	0.057	0.179 ⁺
Cross Size of Skillet	-0.084	-0.131	-0.037	0.104	0.158	0.205 ⁺
Length of Trunk	-0.249 ⁺⁺	0.108	-0.025	-0.118	-0.075	0.085
Circumference of Breast	-0.020	0.101	-0.023	0.094	0.157	0.103
Semi-circumference	-0.013	0.084	-0.002	-0.017	-0.047	-0.049

Weight of the skin is in negative correlation with all morphologic variables except length. The negative and highly significant correlation was found between the weight of the skin and cross size of breast (-0.240⁺⁺) and also the weight of skin and length of trunk (-0.249⁺⁺). The most

valuable of the carcass are thighs. For these traits, we found the most statistically positive correlation between weights of thigh with morphological traits. Weight of thighs are significant positive correlation with the length of head (0.188⁺),

cross size of heads (0.227^{++}), with length of ears (0.176^{+}) and length of skilet (0.188^{+}).

4. Conclusions

In this work we evaluated the morphological and carcass traits and their relationships in the population of New Zealand white rabbit. The morphological features with the lowest degree of variability were length of the ears, length of skilet and under-voltage. Signs of cross size of breast and circumference of breast were characterized by a higher degree of variability. The parameters evaluated for slaughter weight had the highest variability of the skin and the lowest head weight and yield. We found statistically significant correlations between some morphological and carcass traits.

Acknowledgements

This work was supported by the Slovak Research and Development Agency under the contract No. LPP – 0220-09.

References

1. Weigend, S., Romanov, M.N., Current strategies for the assessment and evaluation of genetic diversity in chicken resources. In: *Worlds Poultry Science Journal*, 2001, 57, 275 – 288
2. Zelník, J., Granát, J., Terlanday, L., Štúdium úžitkových vlastností plemien králikov mäsového typu a krížencov kalifornského králika s francúzskym striebornikom. ZSR-II-25, VÚ.V Nitra, 1970.
3. Negretti P., Bianconi G., Finzi A., Visual Image Analysis to Estimate Morphological and Weight Measurements in Rabbits, *World Rabbit Sci.*, 2007, 15, 37 - 41
4. Hernandez, P., Aliaga, S., Pla, M., Blasco, A., The effect of selection for growth rate and slaughter age on carcass composition and meat quality traits in rabbits. *J. of Animal Science*, 2004, 82 (11), 3138-3143
5. Nofal, R.Z., Szendrő, Z.S., Kenessey, A., Jensen, J.E., Crossbreeding effects on carcass traits at 12 weeks of age in pannon and danish white rabbits and their reciprocal crosses. *Proc. 8th World Rabbit Congress*, 7th - 10th Sept. 2004, Puebla Mexico, 2004, pp. 102 - 109.
6. Grimaud, F., Parental lines of hybrid rabbit, 2002, www.Grimaud.fr
7. Butyka, P., Rafay, J., Aktuálne smery v chove brojlerových králikov. In *Zborník prednášok z XXII. konferencie*. Nitra, 2004, 10.11. Nitra: VÚŽV. s. 9 – 11.
8. Točka, I., Šmehýl, P., Hanusová, J., Možnosti využitia plemena BOA na zlepšenie niektorých úžitkových vlastností brojlerových králikov. In *Možnosti a perspektívy zvyšovania produkcie v chove hydiny a malých hospodárskych zvierat*, Nitra 1.7. 2004, pp. 53-58.
9. Rafay, J., Chov brojlerových králikov [online]. Nitra: VÚŽV, 2008
www.agroporadenstvo.sk/zv/kraliky/kraliky_uvod.htm
10. Trakovická, A., Bežová, K., Rafay, J., RAPD Analyse in the Populations of Broiler Rabbits, *Acta fytotechnica et zootechnica*, Nitra: SPU, 9 (Special edition), 2006, 68-69
11. Rafay, J., Fľak, P., Parkányi, V., Ondruška, Ľ., Carcass Traits Crossbreeding Effects in Broiler Rabbits, *Acta fytotechnica et zootechnica*, Nitra: SPU, 2006, 9 (Special edition), 190-192
12. SAS User's Guide 2002-2003, Version 9.1 (TS1M3), SAS Institute. Inc., Carry. NC. USA.