

# Analysis of Selected Benefits of the Rabbit of Nitra Breed

Martin Fik\*, Petra Neirurerová, Jaroslav Andreji, Henrieta Arpášová

Department of Poultry Science and Small Animal Husbandry, Faculty of Agrobiological and Food Resources, Slovak University of Agriculture, Nitra, Slovakia

---

## Abstract

The Nitra rabbit is the Slovak breed characterised and typical for its high meat production performance and dressing percentage. The aim of the research was to analyse the Rabbit of Nitra in terms of its reproduction and production performance. All rabbits used for research were raised within a home environment (4 breeding sources). The research was focused on reproduction parameters (the number of live born pups, the number of weaned pups), growth parameters – growth performance (1st day, 21st day, 42nd day to 119th day), slaughter parameters (dressing percentage, the weight of individual parts of carcass body). The weight of live born pups of rabbits was  $56.73 \pm 1.07$  g, weight on 21st day  $308.05 \pm 7.16$  g, weight on 42nd day  $1073.10 \pm 30.04$  g, 119th day  $3288.25 \pm 41.09$  g. An average dressing performance was  $62.47 \pm 0.23$  %, ranged from 56 % to 66.02 %. An average weight of skin was  $538.10 \pm 7.79$  g, weight of gastrointestinal tract was  $497.05 \pm 7.93$  g, weight of intestines was  $126.55 \pm 2.89$  g, weight of head was  $167.35 \pm 2.15$  g, weight of back was  $444.25 \pm 10.50$  g, weight of thorax was  $396.60 \pm 10.77$  g, weight of shoulder blades was  $232.75 \pm 3.54$  g and weight of thighs was  $542.80 \pm 12.21$  g.

**Keywords:** rabbit, reproduction, production performance.

---

## 1. Introduction

A group of medium rabbit breeds is one of the most numerous bred and exposed rabbits in Slovakia and the Czech Republic. This is probably due to the fact, that our breeders use rabbits, in addition to exhibitions, for the benefit of quality meat or aesthetic fur. In traditional breeds of rabbits in Slovakia, Rabbit of Nitra has a large representation. The Rabbit of Nitra is the 3<sup>rd</sup> Slovak national breed. The goal was to create a white rabbit for traditional home-farming and for intense-farming also. Three basic breeds were used in the process of breeding. In the first step were used Argente Champagne (AA BB CC DD gg PP) and Russian rabbits (anan BB CC DD gg). The progeny of these rabbits were labeled RFR and in the next generation was mated *inter se*. Only acromelanistically coloured individuals have been selected for the next breeding. The selection

criteria were earliness, a larger body frame and intensity of growth. By coincidence, at that time, the Californian rabbits were imported into the territory of Slovakia and were involved in process of breeding as a third breed [1]. Using the inbreeding were formed two lines: the P line, which formed the basis for the Rabbit of Nitra with a 50% of the Californian rabbit blood and the K line with a 75% of Californian rabbit blood. The breed was recognized on November 16, 1977 at the National Show in Nitra (Slovakia). The creator of the breed is doc. Ing. Jaroslav Zelník, CSc. from Nitra. In honour of doc. Ing. Jaroslav Zelník, CSc., the Memorial doc. Ing. Jaroslav Zelník, CSc. is yearly organized. At the National Show in Nitra, 157 individuals of Slovak national breeds were exhibited in 2015, of which 42 were the Rabbits of Nitra [2].

The live weight is 3.5 - 5 kg, in ideal conditions 4.5 to 4.8 kg. Typical feature of the exterior of the Rabbit of Nitra is a cylindrical, heavy-set body with uniformly spaced musculature and a well-rounded back. Breasts, chest and back are broad

---

\* Corresponding author: Martin Fik, + 421 37 6414707, [martin.fik@gmail.com](mailto:martin.fik@gmail.com)

and limbs are strong, medium-long, with half-straight stand. The coat is very dense, elastic, stiff with distinctive finer coats overlapping the undercoat. The length of the coat is approximately 30 mm, with a basic white colour, which has a matching shine of the top coat. The white base of the coat is enriched with a blue shade pattern with grey hue [3].

During the breeding process, the standard of colouring of this breed was adjusted. The original genotype predicted the occurrence of the dominant G allele, which in the translation means the zonal distribution of the pigment in the coat, the wild dye, or the homozygous recessive constellation dd, which means homogeneous pigment distribution over the whole length of the hair. The most recent explanation of the specimen speaks of the genotype of the Rabbit of Nitra in the pigment distribution gene (G) uniquely designed by the constellation alleles dd [4]. The Rabbit of Zobor, another national Slovak rabbit breed, was bred from the Rabbit of Nitra. Despite an increase in the part of farm rabbit production, total production in the SR is based on the home-farming sector. All home-farming production is consumed in Slovakia (mainly in breeders' families), the production of intense-farming is oriented almost exclusively on export. Only about 30 tons of rabbit meat is marketed in the inland sales network [5]. The aim of the research was to analyse the Slovak national breed - Rabbit of Nitra in terms of its selected utility properties.

## 2. Materials and methods

The data for the analysis were obtained from four home-farming holdings of the Rabbit of Nitra. The animals were stabled in outdoor wooden warrens with a compact floor and straw.

**Table 1.** Composition of the feed dose in the studied holdings

Composition of the feed dose	Daily dose
Hay	<i>Ad libitum</i>
Complete feed mixture 50 % + Barley 50 %	<i>Ad libitum</i>
Water	<i>Ad libitum</i>

We monitored growth parameters, reproduction parameters and slaughter parameters.

Growth parameters:

- Weight on 1<sup>st</sup> day *post partum*
- Weight on 21<sup>st</sup> day *post partum*

- Weight at weaning – weight of pups on 42<sup>nd</sup> day *post partum*,
- Growth performance – weight was detected once a week from 42<sup>nd</sup> day to the slaughter day
- Weight of adult females - weight detected after 10<sup>th</sup> month of life before the reproduction
- Weight of adult males - weight detected after 12<sup>th</sup> month of life before the reproduction.

Reproduction parameters:

- The number of live born pups
- The number of dead born pups
- Weaning mortality (42<sup>nd</sup> day)

Slaughter parameters:

- Weight of skin – the weight of whole body skin, including front and rear paws and tail
- Weight of gastrointestinal tract – the weight of intact gastrointestinal tract (stomach, appendix, small and large intestine, oesophagus, spleen, gall bladder, bladder, internal genitals)
- Weight of head – the weight of head including eyes, without skin, separated in the spot of the first neck
- Weight of eatable intestines – mutual weight of all eatable intestines (heart, lungs, liver without gall, kidneys)
- Weight of back – the weight of back part separated from the thorax in the spot in front of the first lumbar vertebra, with basal part of the tail, without thighs separated with pelvic bone
- Weight of thorax – the weight of thorax without head, front legs with blades, separated behind the last rib
- Weight of shoulder blades – the weight of front legs with blades and without the paws
- Weight of thighs – the weight of rear legs without the paws, separated with pelvic bone in tarsal part
- Dressing performance – the percentage of carcass body with head and eatable intestines from the live weight

Weighing was done on scales with an accuracy of 1 g. The carcass was processed according to the methodology reported by [6] and after processing we recorded the weight of individual carcasses according to [7]. Microsoft Excel has been used.

## 3. Results and discussion

The results of the work – growth, reproduction and slaughter parameters are shown in the tables.

**Table 2.** Weight of the Rabbit of Nitra – 1<sup>st</sup> and 21<sup>st</sup> day after birth

Live weight at age	n	1 <sup>st</sup> day	21 <sup>st</sup> day
$\bar{x}$ [g]	68	56.73	308.05
s		8.52	56.84
v [%]		0.15	0.18
$s_x$		1.07	7.16
min [g]		45.60	250.00
max [g]		72.00	560.00

Dissected live weight in adult males over 12 months of age ranged from 3.74 kg to 5.72 kg and the average weight was 5.09 kg. In adult females

over 10 months of age, average live weight was 4.79 kg and values ranged from 3.82 kg to 5.44 kg. The quality of the rabbit carcass defines its main features, including carcass weight, good dressing percentage (55 to 61 %) and proportions of the main carcass parts - hips and thighs, shoulder blades and thorax [8]. All these features should reach a certain level to accomplish the economic aim, especially in broiler rabbit farming, but also in some minor breeding conditions [9]. [10] mention for broiler rabbits a dressing percentage 58% of rabbits with an average live weight 2632.2 g. [11] came to a similar conclusion in hybrid rabbits – 57.67%.

**Table 3.** Growth performance

Live weight at age	42 days	49 days	56 days	63 days	70 days	77 days
n	68	68	68	67	67	67
$\bar{x}$ [g]	1073.10	1298.66	1527.79	1776.82	1981.63	2180.40
s	247.69	280.60	351.23	345.24	323.17	397.00
$s_x$	30.04	34.03	42.59	41.87	39.19	48.14
v [%]	0.23	0.22	0.23	0.19	0.16	0.18
min [g]	650.00	770.00	821.00	1140.00	1332.00	1417.00
max [g]	1690.00	2015.00	2275.00	2480.00	2725.00	3014.00
Live weight at age	84 days	91 days	98 days	105 days	112 days	119 days
n	67	66	65	63	63	62
$\bar{x}$ [g]	2331.14	2501.72	2713.10	2926.38	3098.26	3288.25
s	425.94	293.85	372.43	350.04	305.70	338.87
$s_x$	51.65	35.63	45.16	42.45	37.07	41.09
v [%]	0.18	0.12	0.14	0.12	0.10	0.10
min [g]	1472.00	1870.00	1910.00	2202.00	2425.00	2480.00
max [g]	3055.00	2925.00	3225.00	3468.00	3540.00	3790.00

**Table 4.** The number of live born and dead born pups and the number of weaned pups in litter

	Number of litters	Number of live born pups in litter	Number of dead born pups in litter	Number of weaned pups in litter
$\bar{x}$	35	6.96	0.08	6.00
s		1.70	0.28	1.68
v		0.24	3.46	0.28
min		3.00	0.00	3.00
max		9.00	1.00	8.00
$s_x$		0.29	0.05	0.28

**Table 5.** Slaughter parameters of the Rabbit of Nitra

Indicator	n	$\bar{x}$	s	$s_x$	v	min	max
Live weight [g]	67	3051.25	429.30	52.45	0.14	2500	4065
Weight of skin [g]	67	538.10	63.79	7.79	0.12	385	632
Weight of gastrointestinal tract[g]	67	497.05	64.91	7.93	0.13	313	625
Weight of intestines [g]	67	126.55	23.69	2.89	0.19	86	167
Weight of head [g]	67	167.35	17.56	2.15	0.1	134	196
Weight of back [g]	67	444.25	85.97	10.50	0.19	340	651
Weight of thorax [g]	67	396.6	88.17	10.77	0.22	307	630
Weight of shoulder blades [g]	67	232.75	29.01	3.54	0.12	197	291
Weight of thighs [g]	67	542.8	99.97	12.21	0.18	403	792
Dressing percentage [%]	67	62.47	1.92	0.23	0.03	59.56	66.02

[12] said closer value to our results in hybrid rabbit EuroLapHylagenetics – more than 60 % dressing percentage. [13] came in broiler rabbits from home-farming holdings slaughtered between 2470 – 3425 g to dressing percentage 54.89 – 55.18 %. Dressing percentage 57.03 – 60.81 % detected [7] in selected populations of broiler rabbits at slaughter weight 2500 g. The closest values to our recognized [14], an average dressing percentage 61.81 % with genotype includes 75 % of traditional breeds and 25 % of broiler rabbits. Their slaughter weight was 2847.8 g, while the group of rabbits of weight 2500 – 3200 g analysed by us had an average slaughter weight 2820.77 g. [15] found out an average dressing percentage from 60.9 % for Zika rabbits to 62.4% for HY2000 rabbits. [16] detected an average dressing percentage for medium breeds of rabbits 59.50 %. They also detected thighs percentage from the carcass body 31.30 %. We found out in our research 28.41 %. Back percentage from the carcass body they recognized the value 19.5 %. Back percentage from the carcass body in our research was 23.26 %. [17] detected in Czech albino rabbit breed dressing percentage with head 60.18 % and thighs percentage from the carcass body 33.42 %. [18] recognized in Czech albino rabbit breed dressing percentage 59.8 %. [19] in his research figured out a dressing percentage 57.27 – 60.27 % in broiler rabbits slaughtered at weight 2500 g. He also figured out thorax percentage from carcass body 19.71 – 20.64 %, back percentage 21.14 – 20.93 %, shoulder blades percentage 12.51 – 12.63 % and thighs percentage 27.79 – 29.01 %. We found out these values of percentages from the carcass body: thorax – 20.64 %, back – 22.71 %, shoulder blades 12.51 %, thighs

– 28.17 %. All these values are very similar, but we figured out higher value at back percentage. Growth parameters belong to the important indicators of the rabbit meat production process to the basic economic efficiency factors [20]. [18] said in analysis of Czech albino breed live weight at 42 days of age – 882 g, 63 days of age - 1715 g, 70 days of age – 2018 g at 91 days of age – 2704 g. Compared to Czech albino rabbit breed has the Rabbit of Nitra higher growth performance to 70 days of age and from this age is the intensity compared to that breed considerably lower, at 91 days of age is this difference approximately 200 g. According to the breed standard, a 56-day old Rabbit of Nitra should have a live weight of about 1400 g, at 84 days of about 2200 g and at 112 days of about 2900 g. We found out average values of live weight at 56 days of age approximately 130 g higher, at 84 days also about 130 g higher and in 112 days almost 200 g higher. The average live weight at birth was 56.73 g, and on day 21 the live weight was 308.05 g. [20] figured out the live weigh in 1<sup>st</sup> day after birth 56.92 – 93.23 g and live weight in 21<sup>st</sup> day after birth 325.50 – 552.20 g. In our research of the Rabbit of Nitra were these values lower in both cases. According to the breed standard should be the ideal live weight of adult rabbits 4.25 – 5.25 kg. We found out in our research that only 9 from 21 females meets these requirements but 12 from 15 males meets the value of the live weight. The number of born pups is among the most important reproductive indicators. In the rabbit population we analysed the average number of babies born 6.96 pieces. [7] shows values from 5.96 to 10.22 pieces for each hybrid line, with only 3 of the 13 lines observed reaching a lower average than the

animal population surveyed by us. As another parameter, Šmehýl shows the number of weaned puppies 4.10 to 7.93 pieces and the average mortality values until weaning 8.90 – 32.20 %. Our average number of weaned pups was 6.00 pieces and we recorded weaning mortality 13.79 %, which is a relatively low value. This rabbit is suitable for intensive and extensive breeding conditions [2].

#### 4. Conclusions

The weight of live born pups of rabbits was  $56.73 \pm 1.07$  g, weight on 21<sup>st</sup> day  $308.05 \pm 7.16$  g, weight on 42<sup>nd</sup> day  $1073.10 \pm 30.04$  g, 119<sup>th</sup> day  $3288.25 \pm 41.09$  g. An average dressing performance was  $62.47 \pm 0.23$  %, ranged from 56 % to 66.02 %. An average weight of skin was  $538.10 \pm 7.79$  g, weight of gastrointestinal tract was  $497.05 \pm 7.93$  g, weight of intestines was  $126.55 \pm 2.89$  g, weight of head was  $167.35 \pm 2.15$  g, weight of back was  $444.25 \pm 10.50$  g, weight of thorax was  $396.60 \pm 10.77$  g, weight of shoulder blades was  $232.75 \pm 3.54$  g and weight of thighs was  $542.80 \pm 12.21$  g.

#### Acknowledgements

This work was financially supported by the project VEGA 1/0511/15.

#### References

1. Supuka, P., Supuková, A., Ondrejková, A., Ondruška, Ľ., Maženský, D. Nitriansky králik – okrasné a úžitkové plemeno králikov. Králik ako produkčné a modelové zvieratá. Centrum výskumu živočíšnej výroby Nitra, 2012, 153-155.
2. Macháč, M. Aktuálny stav Slovenských plemien králikov, Bachelor thesis. Slovak Agricultural University in Nitra, 2017, 32-34
3. Malík et al. Encyklopédia drobného chovu. Bratislava: Príroda, 1991. 831 IN. Macháč, M. Aktuálny stav Slovenských plemien králikov, Bachelor thesis. Slovak Agricultural University in Nitra, 2017, 32-34
4. Sika, J. Starostlivosť a výber králikov pred výstavňou sezónou. Magazin chovateľa, 2005, 42-43
5. Butyka, P., Rafay, J. Súčasný stav v chove brojlerových králikov v SR. Aktuálne smery v chove brojlerových králikov. Nitra : SCPV, 2006, 9-12
6. Blasco, A., Ouhayoun, J. Harmonization of criteria and terminology in rabbit meat research. Revised proposal. World rabbit science, 4, 1993, 93-99

7. Šmehýl, P. Šľachtenie špecializovaných línii brojlerových králikov pre intenzívne chovy, dissertation work. Slovak Agricultural University in Nitra, 2010, 146
8. Dalle, Z.A. Main factors influencing the rabbit carcass and meat quality. Proceeding 7th World Rabbit Congress, 2000. <https://world-rabbit-science.com/WRSA-Proceedings/Congress-2000-Valencia/Papers/Growth&%20Meat/Q00-DalleZotte.pdf>
9. Bianospino, E., Wechsler, F.S., Moura, A.S.A.M.T., Fernandes, S. Growth traits and dressing percentage of straightbred and crossbred rabbits. Proceeding 8th World Rabbit Congress. 2004, <https://world-rabbit-science.com/WRSA-Proceedings/Congress-2004-Puebla/Papers/Meat%20Quality/Q-Bianospono-2.pdf>
10. Mach, K., Majzlík, I., Zavadilová, L. Výkrmnosť a jatečná hodnota finálnych hybridů ♂PS59x♀PS19 v závislosti na porážkových hmotnosti. Aktuálne smery v chove brojlerových králikov. Nitra: SCPV, 2006, 21-30
11. Ondráček, J., Mach, K., Majzlík, I. Vliv probiostanu na užitočnosť a zdravotní stav králiků ve výkrmu. Aktuálne smery v chove brojlerových králikov. Nitra : SCPV, 2006, 73-80
12. Barlík, D. Na návšteve v chove hybridných králikov Eurolap Hyla genetics. Chovateľ, 54, 2018, 12-13
13. Jenisová, E. Kvalita jatočného tela brojlerových králikov z drobného chovu. Diplomová práca. Slovak Agricultural University in Nitra, 2013, 54
14. Dokoupilová, A., Mach, K., Majzlík, I., Zavadilová, L. Využití tradičních plemen pro šlechtění a hybridizaci brojlerového králíka. Aktuálne smery v chove brojlerových králikov. Nitra : SCPV, 2006, 31-38
15. Skřivanová, V., Marounek, M., Tůmová, E., Skřivan, M., Laštovková, J. Performance, carcass yield and quality of meat in broiler rabbits: a comparison of six genotypes. Czech Journal of Animal Science, 2000, 45, 91-95
16. Bizková, Z., Tůmová, E. Hodnocení masné užitočnosti králiků. Maso, 20, 2009, 48-50
17. Tůmová, E., Hrstka, Z. Porovnání kvality masa nutrií a králiků. Maso, 24, 2013, 47-50
18. Volek, Z., Volková, L., Tůmová, E., Chodová, D. Vliv restriktce krmiva na užitočnosť, kvalitu masa a jatečného tela králiků plemene český albin. Maso, 24, 2013, 55-57
19. Kováčik, R. Vplyv vybraných faktorov na kompozíciu jatočného tela brojlerových králikov. Diplomová práca. Slovak Agricultural University in Nitra, 2012, 74
20. Šmehýl, P. Rastové parametre syntetických línii brojlerových králikov. Slovak Agricultural University in Nitra, 2017, 86.