

# Comparison of exterior traits in selected large breeds of rabbits

## Abstract

The aim of this work was to evaluate the exterior and morphological changes in selected large breeds of rabbits according to a current Book of Rabbit Standards in the territory of Czech and Slovak Republic. Out of 1298 rabbits from 11 exhibitions, 376 large rabbit breed individuals of different color varieties were selected. From large breed rabbits weighing 5.5 kg and over, were selected 160 pcs of Flemish Giant (FG), 97 pcs of Giant Papillon (GP) and 119 pcs of French Lop (FL). The qualities and exterior faults of typical breed traits were evaluated in six positions: Weight, Shape, Type, Coat, Top color (or Markings) and Undercolor. The results of the work show that in the most common exterior faults were in positions Shape, Type and Top color (or Markings). The significant exterior faults as the slightly or more prominated hips and forelimbs with worse standing position and bowed or splayed legs were found in evaluated positions. Females often have very loose skin under the neck, which in some individuals formed a dewlap. The Coat was most often less elastic. Faults in the Top color, showing a paler hips, or the appearance of lighter bands on the forelegs, were observed in the agouti variety of these breeds. The Giant Papillon breed showed mainly exterior faults as the insufficient butterfly on the head, a small break in the saddle stripe from in front of the shoulder blades to the base of the tail, pattern on flanks too weak, too strong or irregular, the spots on the flanks joined up.

**Keywords:** exhibitions, breeds, standard, rabbit judging, exterior faults

Volume 4 Issue 3 - 2019

František Zigo,<sup>1</sup> Ondřej Pyskatý,<sup>1</sup> Vlastimil Šimek,<sup>2</sup> Silvia Ondrašovičová,<sup>3</sup> Martina Zigová,<sup>4</sup> Ladislav Takáč,<sup>5</sup> Jana Takáčová<sup>5</sup>

<sup>1</sup>Department of Animal husbandry, University of Veterinary Medicine and Pharmacy, Slovakia

<sup>2</sup>Department of Animal Husbandry and Animal Hygiene, University of Veterinary and Pharmaceutical Sciences Brno, Czechia

<sup>3</sup>Department of Physiology, University of Veterinary Medicine and Pharmacy, Slovakia

<sup>4</sup>Department of Pharmacology, University of Pavol Jozef Šafárik in Košice, Slovakia

<sup>5</sup>Public Veterinary Medicine and Economics, University of Veterinary Medicine and Pharmacy, Slovakia

**Correspondence:** František Zigo, University of Veterinary Medicine and Pharmacy, Department of Animal husbandry, Košice, Komenského 73, 040 01, Slovakia, Tel +4219 0868 9722, Email frantisek.zigo@uvlf.sk

**Received:** June 17, 2019 | **Published:** June 27, 2019

## Introduction

Rabbit husbandry is well-known and widespread throughout the world. Due to the varied genotype, a large number of varieties with a varied gene pool became breeds in a relatively short period of time.<sup>1-3</sup> As of 2017, there were at least 305 breeds of domestic rabbit in 70 countries around the world.<sup>4</sup> A rabbit breed is a distinct created through natural selection or, more often, though selective breeding for specific characteristics, including size, coat (length, quality, or color), feed conversion ratio<sup>4,5</sup> climate adaptability, or temperament.<sup>6</sup> Most often, the breeds of rabbits are divided by weight to large (5.5kg and over), medium (3.5 to 5.5kg), small (2.0 to 3.25kg) and dwarf (1.0–2.0kg). Depending on the length of the coat, the breeds of rabbits are classified as normal fur breeds, rex breeds (18–20mm), long-haired breeds (hair longer than 6 cm), and breeds with a special coat structure (satin gloss).<sup>7,8</sup> Determination of breeding value by assessing the exterior of rabbits was each extensive problem. The breeding efforts related to any animal species are subject to certain limits within which the relevant branch can operate.<sup>9</sup> Each rabbit breed is considered to benefit when a reputable breeder strives to emulate the purpose for the breed, often defined by the individual breed standard by which it may be judged. It is in fact the detailed description of the appearance of the individual breed which characterizes the ideal representative of the breed. There is also a list of exterior deficiencies—faults from the ideal state. The faults are divided according to their relevance to minor and disqualification faults. When exhibited, the purebred rabbit is evaluated by trained rabbit judge, the observed current animal characters, which are then compared with the standard requirements. The resulting evaluation serves as a guide for the further selection of breeding animals.<sup>10</sup> A summary of all rabbit breed standards is

given in the current Book of Rabbit Standards. Actual Book of Rabbit Standards is a specific publication that is published under the auspices of a breeders' association associating breeders on a given territory.<sup>11</sup>

Groups such as the Slovak Association of Breeders and the Czech Association of Breeders coordinate and standardize the desired qualities of their recognized breeds, through promotion and exhibition. The Books are continuously updated or newly issued for the given expertise.<sup>7,9</sup> In Slovakia, there is a current Book of Standards for rabbits from 2009.<sup>7</sup> The current Book of Standards for rabbits in the Czech Republic is from 2003 and includes a total of 68 recognized breeds.<sup>9</sup> The importance of the various characteristics of a breed is shown by the number of points (out of 100) allotted to each. Thus from the breed standard the breeder can picture the ideal specimen, and can judge its quality from an exhibition standpoint.<sup>12</sup> The aim of work was to evaluate from 11 exhibitions the exterior and morphological traits in selected large breeds of rabbits as Flemish Giant, Giant Papillon and French Lop according to a valid Books of Standards for rabbits in the territory of Czech and Slovak Republic.

## Material and methods

### Animal's selection

Due to the large number and variability of breeds, only large breeds of rabbits were selected for this study, so that the largest and most objective group (preferences or deficiencies) within the breed was observed. Out of 1298 rabbits from 11 exhibitions, 376 large breed rabbits weighing 5.5kg and over were selected. From large breed rabbits, were selected 160 pcs of Flemish Giant (FG), 97 pcs of Giant Papillon (GP) and 119 pcs of French Lop (FL).

## Standards description of selected great breeds of rabbits

### Flemish giant (FG)

The FG is an old breed of rabbit thought to have originated from the Flemish region as early as the 16th or 17th century, around the city of Ghent, Belgium. Is the largest breed of rabbit in the world, weighing around 7-8kg (15-18lbs) and measuring around 80 cm



long. Flemish Giants have long bodies and a wide back with well-rounded and solid-fleshed hindquarters. The strong, muscular legs are of average length; the head is wide with full cheeks; the ears are large (approx 20 cm long) and held in a Vee-shape above the head. Bucks have a broader, more imposing head than does, but the does can often outweigh the bucks. The coat is smooth with medium length guard hairs and a dense undercoat. There are now 7 colors: Agouti, Black, Blue, Yellow, Agouti, Steel Grey and Red Eyed White, with the least common color being Blue (Figure 1).



**Figure 1** From left: Flemish giant and French lop.

Source: Foto by Šimek V (2018)

### French lop (FL)

French Lops were named after their country of origin. They were developed in France, and were first shown in that country in 1850. The French Lop is a very large rabbit, typically weighing around 10-15lbs. Their ears are typically between 5 and 8 inches long and hang down below the jaw. They have a stout, compact body and a large head. The front legs are short and straight and the hind legs are carried parallel to the body. The French Lop has a dense, soft coat that comes in two color groups, Solid and Broken. Within these categories can be found a number of different color varieties, including e.g. Agouti, Black, Chinchilla and Yellow (Figure 1).

**Exterior faults:** Poorly muscled, lacking firmness, loose skin over hind legs. Body too long or too lean. Head not sufficiently characteristic of the breed. Pimpled or damaged ears. Poor ear carriage. Crown not

developed. Fly back coat. Bowed or splayed legs. Excessive white hairs in colored exhibits, white tail in sooty fawn (excessive white hairs in nose and top lip applies to butterfly exhibits).<sup>11</sup>

### Giant papillon (GP)

The GP is one of the largest breeds with a minimum weight of 5kg (11lbs) and many weighing over 6kg (13lbs). The muscles are firm, the head is well developed, the ears strong of good structure, well furred and straight, the minimum length being 15 cm (5.9in). The topline is gently curved to a full well rounded rump. The back is broad and the thighs well-muscled. A small regular dewlap is only permissible in the doe. They have a white coat with the pattern of the ears, eye circles, cheek spots and a butterfly-shaped marking on the nose. A saddle stripe runs down the spine from ears to tail, with the side markings (Figure 2).



**Figure 2** Standard and exhibition of Giant Papillon.

Source: Foto by Šimek V (2018)

**Exterior faults:** Body narrow, cobby or coarse; insufficiently muscled, small spots on the head; the butterfly insufficiently defined;

the edges of the lips uncolored or flesh colored; a small break in the saddle stripe from in front of the shoulder blades to the base of the tail;

pattern on flanks too weak, too strong or irregular; one isolated chain spot; the spots on the flanks joined up; large dewlap in does; rear feet not parallel to the body; light soiling of feet; ears and genital organs; bare pads; fur slightly soiled or matted; long toenails; lack of vitality (Figure 2).<sup>11</sup>

### Evaluation of exterior and data collection

The selected breeds of rabbits were evaluated according to relevant Book of Standards for rabbits issued by associations in the Czech Republic<sup>9</sup> and Slovakia.<sup>7</sup> The Book of Standards contains detailed descriptions of all the breeds currently recognized in Czech and Slovak Republic. The qualities and exterior faults of typical breeding marks were evaluated in six exterior positions: Weight, Shape, Type, Coat, Top color (Markings) and Undercolor. The seventh position serves for evaluation of rabbit condition. Each position is assigned a certain number of points with the maximum sum of all positions equal to 100 points, therefore the exterior ideal animal. A 100-point system with half-point deductions is also widely used abroad. The minor faults are resolved by deduction of points in the positions. The disqualification fault excludes the animal from breeding for the supposed hereditary defect. The rabbit may also be non-classified because of an acquired character faults as injury, hair contamination and other.<sup>13</sup>

### Statistical analysis

Using Chi square test were evaluated the relationships between selected breeds of rabbits. Comparison of individuals faults and

advantages in positions Weight, Shape, Type and Color of the Rabbit Show Remark Cards were summarized the statistical differences between groups of Flemish Giant (FG), 97 pcs of Giant Papillon (GP) and 119 pcs of French Lop (FL) from 160 pcs of evaluated rabbits. The minimum criteria for statistical significance were set at  $P \leq 0.05$  for all compared faults and advantages in evaluated positions.

### Results and discussion

Correct interpretation of the exterior traits recorded on the Rabbit Show Remark Card requires good knowledge of their breed standard. The rabbit judge is a specially trained person who is educated in the current issue of expertise.<sup>13</sup> The exterior faults and advantages listed below are categorized according to the individual positions on the Rabbit Show Remark Cards. The Weight is an essential and very important feature of the breed. For each breed, there is a certain optimal weight range.<sup>11</sup> No disqualification faults from the required weight standards were observed in selected breed of rabbits. Only three individuals of the GP breed had a problem with the underweight. The Shape determines the general signs forming the exterior. Within the Shape, five areas are evaluated: the course of the topline, the position of the limbs, the position of the tail, the skin and the external genital organs (9). Along with the mind or worse standing position (Figure 3), the prominated hips were the most common exterior faults of the large rabbits in the position Shape. In this position were recorded three disqualification faults as missing scrotum, split penis and dewlap in bucks (Table 1).



**Figure 3** From left: Correct and incorrect standing position.

Source: Foto by Šimek V (2018)

**Table 1** Summary of the most common exterior faults in position shape

Faults	FG		GP		FL		P
	pcs	%	pcs	%	pcs	%	
Slightly prominated hips	87	54.4	46	47.4	59	49.6	$P < 0.05$
More prominated hips	3	1.9	2	2.1	2	1.7	NS
Worse standing position-bowed or splayed legs	26	16.3	9	9.3	32	26.9	$P < 0.05$
Hard tail	8	5	6	6.2	5	4.2	NS
Loose skin on the body	18	11.3	13	13.4	16	13.4	$P < 0.05$
dewlap (does)	5	3.1	10	10.3	10	8.4	$P < 0.05$
<b>Disqualification faults</b>							
Missing scrotum	3	1.9	3	3.1	1	0.8	NS



Table Continued....

Faults	FG		GP		FL		P
	pcs	%	pcs	%	pcs	%	
Split penis	2	1.3	3	3.1	2	1.6	NS
Dewlap (bucks)	4	2.5	2	2.1	1	0.8	NS

**Note:** Percentual and statistical significance ( $P < 0.05$ ) are calculated from all selected breeds of 160 pcs of Flemish Giant (FG), 97 pcs of Giant Papillon (GP) and 119 pcs of French Lop (FL), NS—non significant.

The Type is a very important position where the characters that define the exterior nature of the breed are evaluated. The body frame, length and strength of the limbs, head and ears are evaluated in this

position.<sup>9</sup> A large number of GP, FL and FG had a narrow chest, a more delicate head construction with thinner structure of the ears that diverged (Table 2).

**Table 2** Summary of the most common exterior faults in position type

Faults	FG		GP		FL		P
	pcs	%	pcs	%	pcs	%	
Narrow chest/shorter/longer body	7	4.4	18	18.6	6	5	$P < 0.05$
More delicate head	5	3.1	11	11.3	3	2.5	NS
Thinner, softer or finer ears*	19	11.9	28	28.9	/	/	$P < 0.05^*$
Pimpled or damaged ears*	25	1.7	16	16.5	/	/	NS*
Poor crown developed	/	/	/	/	22	18.5	NS

**Note:** Percentual and statistical significance ( $P < 0.05$ ) are calculated from all selected breeds of 160 pcs of Flemish Giant (FG), 97 pcs of Giant Papillon (GP) and 119 pcs of French Lop (FL). \*P—statistical significance was calculated only from comparison of GP and GB, NS—non significant.

On the contrary, there were also FG and GP with a very good body frame, head shape, ears and perfect muscles of the limbs, who were

able to show off their very good constitution and advantages in a perfect show position (Table 3).

**Table 3** Summary of the most common exterior advantages in position type

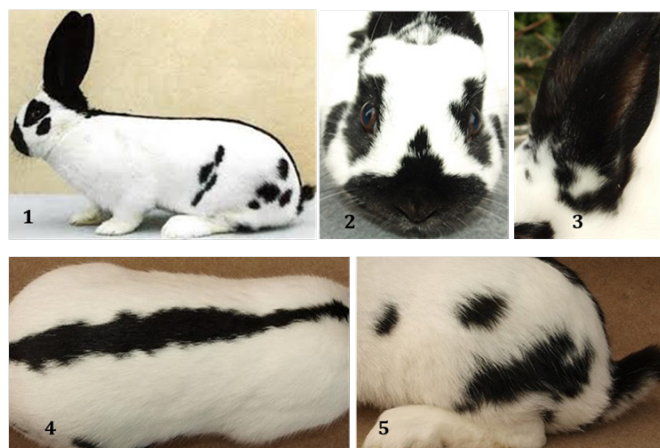
Exterior ideals and advantages	FG		GP		FL		P
	pcs	%	pcs	%	pcs	%	
Very good body frame	23	14.4	11	11.3	17	14.3	$P < 0.05$
Very good head and ears	18	11.3	9	9.3	12	10.1	$P < 0.05$
Very good standing position with muscle legs	12	7.5	18	8.6	2	1.7	NS
Very good constitution and shape	5	3.1	9	9.3	7	5.9	NS

**Note:** Percentual and statistical significance ( $P < 0.05$ ) are calculated from all selected breeds of 160 pcs of Flemish Giant (FG), 97 pcs of Giant Papillon (GP) and 119 pcs of French Lop (FL), NS—non significant.

Not all rabbits were in the optimum exhibition condition at the time of the shows, which negatively affected the characteristics and structure of their coat. Especially in breeds of FG and FL, the coat was uneven, less elastic but with good density. In GP, the coat was elastic with very good structure, but in a few cases it was thin. A softer, longer coat with a more pronounced guard hairs was typical in the Red Eyed White variety of the FG breed. The top color in many cases very closely related to the rabbit show condition.<sup>9,13</sup> In rabbits who were not in optimal exhibition condition, variations in the top color were manifested mainly by non-uniform and uneven coat color on different parts of the body (e. g. on the sides, back and chest). In agouti variety of selected breeds, there were often paler patches on the forelegs. In many cases, the markings of GP had deficiencies such as poor or too rich markings, insufficient butterfly on the head with

white spots around the ear base, a small break in the saddle stripe from in front of the shoulder blades to the base of the tail, the spots on the flanks joined up (Figure 4). On the other side, many individuals of GP with very good white base top color or color of the markings was found.

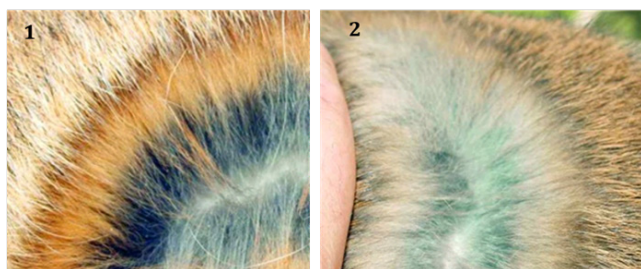
Problems in the undercolor were in the breeds and color varieties with the agouti factor (FG and FL—wildly colored) in which the color, width and limitation of the intermediate color is judged. Intermediate color is a colored ring located between the undercolor and the top color. In many cases, the undercolor was lighter at the base of skin with a non-sharply defined intermediate color (Figure 5). In Red Eyed White variety of the FG breed, the yellowish undercoat was frequently found.



**Figure 4** Breed standard and exterior traits in the prescribed drawing in GP.

Source: Foto by Šimek V (2018)

Note: 1. Ideal bred standard of GP, 2,3. The insufficient butterfly on the head with white spots around the ear base, 4. A small break in the saddle stripe from in front of the shoulder blades to the base of the tail, 5. The spots on the flanks joined up.



**Figure 5** Assessment of intermediate color in Agouti variety of the FL.

Source: Foto by Šimek V (2018)

Note: 1. Very good intermediate color, 2. Lighter under color at the base with a non-sharply defined intermediate color.

## Conclusion

In conclusion, it can be unequivocally stated that every breed of rabbits included in this study has currently some specific exterior advantages as well as the faults. The difficult task the breeders in the coming years will include methods of the selection breeding of these but also other breeds with aim to support the typical exterior traits and at the same time eliminate defects to the greatest possible extent. This is the only way to preserve a sufficient number of qualite

representatives of rabbit breeds with a diverse world gene pool for future generations.

## Acknowledgments

This work was supported by grant KEGA no. 013UVLF-4/2019: Innovating the teaching of mathematics and statistics through modern forms for students of general veterinary medicine and pharmacy (Slovak).

## Conflicts of interests

Author declares that there are no conflicts of interest.

## References

1. Alves JM, Carneiro M, Afonso S, et al. Levels and Patterns of Genetic Diversity and Population Structure in Domestic Rabbits. *Plos one*. 2015;10(12):e0144687.
2. Zita L, Tůmová E, Bízková Z. Czech rabbit genetic resources. *Acta fytotechnica et zootechnica*. 2010;3(1):34–36.
3. Branco M, Ferrand N, Monnerot M. Phylogeography of the European rabbit (*Oryctolagus cuniculus*) in the Iberian Peninsula inferred from RFLP analysis of the cytochrome b gene. *Heredity*. 2000;85(4):307–317.
4. Tůmová E, Martinec M, Chodová D. Analysis of Czech Rabbit Genetic Resources. *Scientia Agriculturae Bohemica*. 2011;42(3):113–118.
5. Bole G, Baselga M, Monnerot M, et al. *Evaluation, conservation and utilisation of rabbit genetic resources: situation and prospects in the Mediterranean region and in Europe*. France: Proceedings of 6<sup>th</sup> World Rabbit Congr; 1966. p. 249–253.
6. Abdel Azeem AS, Abdel Azim AM, Darwish AA, et al. *Body Weight and Carcass Traits in Four Pure Breeds of Rabbits and their Crosses under Egyptian Environmental Conditions*. Egypt: Fifth International Conference on Rabbit Production in Hot Climates Hurgada; 2007. p. 67–80.
7. Supuka P, Supuka M, Adamec Š. *Book of the rabbit standards (Slovak)*. Nitra: Slovakia; 2009. 452 p.
8. Whitman BD. *Domestic Rabbits and Their Histories: Breeds of the World*. Leathers Publishing; 2004. 456 p.
9. Zadina J. *Book of the rabbit standards (Czech)*. Brno: Print-Typia, spol. sro; 2003. 371 p.
10. Zadina J. *Rabbits breeding*. Praha: Brázda sro; 2004. 207 p.
11. BS. *Standards of the rabbit breeds as officially recognized by The British Rabbit Council 2016-2020*. 4<sup>th</sup> edn. British Rabbit Council. 2016. 200 p.
12. Šimek V. Judging rabbits in pictures. *Fauna*. 2015;25(10):54–55.
13. Cieslak M, Reissmann M, Hofreiter M, et al. Colours of domestication. *Biol Rev*. 2011;86(4):855–899.