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# Assessment and most common exterior faults in medium breeds of rabbits, Part II: In position coat, topcolor and undercolor

## Abstract

The breeders as well as the judges of rabbits pay great attention to the color and quality of the coat. Therefore, in the second part of this study we evaluated exterior errors and advantages that are the main indicators of coat color, structure and quality in selected medium breeds of rabbits from 11 exhibitions. The study included 1133 rabbits in weight category between 3.25 to 5.5 kg of breeds Big Light Silver (308 pcs; BLS), Chinchilla Giganta (184 pcs; ChG) and Vienna group breeds (641 pcs; VB).The qualities and exterior faults of typical breed traits were evaluated in three positions: coat, topcolor or markings and undercolor according to the current Book of Rabbit Standards in the territory of Czech and Slovak Republics. The results of this study showed that some individuals at the time of the show were not in optimum show fitness (moulting), which negatively affected the characteristics and the structure of their coat. The exterior deficiencies typically observed in most selected breeds were thinner coat and its lower elasticity. Especially in ChG (34.2%), BLS (19.8%) and in the group of Vienna breeds (16.8%), the coat was less elastic. The exterior faults in the fifth position - topcolor- were manifested mainly by uneven coloration of a certain part of the body, e.g. limbs, hips, loins or chest. Another frequent fault was a slightly rusty coloring or isolated white hairs in topcolor, or the edge of the ears in Vienna Blue and black varieties. In the position undercolor we mostly observed slight variations in uneven or lighter undercolor. The biggest problems of all selected breeds were evaluated with a wild type factor (Agouti) in which the width and borders of the intermediate color are considered within the undercolor. The results of this study showed the importance of evaluation of the exterior of rabbits because their final score and breeding value is largely influenced by the structure of the coat and the quality of undercolor.

**Keywords:** rabbits, exterior, chinchilla giganta, big light silver, vienna blue, coat

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František Zigo,[1] Ondřej Pyskatý,[1] Silvia Ondrašovičová,[2] Martina Zigová,[3] Vlastimil Šimek,[4] Peter Supuka[5]

[1]Department of Animal Husbandry, University of Veterinary Medicine and Pharmacy, Slovakia
[2]Department of Physiology, University of Veterinary Medicine and Pharmacy, Slovakia
[3]Department of Pharmacology, University of Pavol Jozef Šafárik in Košice, Slovakia
[4]University of Veterinary and Pharmaceutical Sciences Brno, Faculty of Veterinary Hygiene and Ecology, Department of Animal Husbandry, Animal Nutrition and Biochemistry, Brno,Czech Republic
[5]Vetservis s.r.o, Kalvária 3, Nitra, Slovakia

**Correspondence:** František Zigo, University of Veterinary Medicine and Pharmacy, Department of Animal Husbandry, Košice, Komenského 73, 040 01, Slovakia, Tel +421-908-689-722, Email frantisek.zigo@uvlf.sk

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## Introduction

Organization of exhibitions with an evaluation of the external appearance of animals has a long tradition in Slovakia and the Czech Republic. Exhibitions are one of the most effective measures to improve the level of breeding and exterior characteristics of individual breeds. Breed standards represent certain criteria which the breeders of rabbits must respect. Breeders make efforts to achieve the most optimal exterior in order to maximize its similarity to the standard of the breed. The standard also contains a list of defects or deviations from the ideal. Trained judges evaluate rabbits at exhibitions by comparing the relevant exterior characteristics of the rabbits with the standard requirements. The resulting evaluation is a guide for selection of animals for further pure-bred breeding.[1] A summary of all standards is given in the current breed sample book. In Slovakia, the Book of Rabbit Standards from 2009 is still applicable.[2] The currently valid Book of Rabbit Standards in the Czech Republic is from 2020.[3] Samples of rabbit breeds are developed and continuously updated to respond to the breeding trend of each breed.[3]

The aim of this work was to study and compare the morphological changes in three exterior positions, coat, topcolor and undercolor, in 1133 medium-sized breeds of rabbits (Big Light Silver, Chinchilla Giganta and rabbits of Vienna breeds) according to the Book of Rabbit Standards currently in force that was issued by breeders' associations in the Slovak[2] and Czech[3] Republics.

## Material and methods

### Selection of rabbit breeds from individual exhibitions

Generally speaking, while in the Czech Republic the breeding of medium-sized and small breeds of rabbits is quite widespread, in Slovakia the medium and large breeds are very popular. In order to monitor the group of rabbits as broadly as possible, and to be able to objectively display the current exterior status (strengths and weaknesses) within the selected breeds and evaluated positions, only the extended medium-sized breeds of rabbits exhibited at 11 selected exhibitions in the Czech Republic and in Slovakia were studied. The study included 1133 individual rabbits from the group of medium-sized breeds of different colors.

From among the medium breeds (Table 1), the following were selected: Big Light Silver (BLS; 308 pcs), Chinchilla Giganta (ChG; 184 pcs), and the Vienna rabbit (V; 641 pcs) which is recognized in five color breeds namely White, Blue, Black, Agouti and Blue-Gray (Opal; Figure 1). Due to the similarity of breeds of the Vienna rabbit, they were merged into one group for the purpose of this study.

### Exterior evaluation

The selected breeds of rabbits were evaluated according to the Books of Rabbit Standards currently in force, that was issued by breeders' associations in the Slovak[2] and Czech[3] Republics. Each Standard book for rabbits consists of a general and a special part.

The first (general) part describes the general conditions of the seven positions in which the exterior of the rabbits is evaluated. A special section includes the standards of individual breeds and their minor or major exterior faults. The maximum sum of all positions equals to 100 points which corresponds to the animal with ideal exterior. Distribution of points on the rabbit's show remark card is described in Table 2. The minor faults are slight deviations from the breed standard and are resolved by deduction of points in the positions. The disqualification fault is a significant deviation from the breed standard and excludes the animal from breeding because of the supposed hereditary defect.

**Figure 1** Vienna Agouti and Vienna Blue-Gray.
Source: Foto by Supuka P (2018).

**Table 1** Overview of coat color in Vienna rabbits

| Breed/Vienna group | Top color of coat, eyes and distal part of legs | Undercolor and intermediate color |
|---|---|---|
| V-Blue | shiny deep, dark blue, | deep blue |
| | eyes blue-gray, top nails dark shade | |
| V-Black | deep black with slight shine | intensely dark blue |
| | eyes dark brown, top nails dark shade | |
| V-White | pure white, eyes light blue, top nails white | pure white |
| V-Agouti | wild color as u Flemish Giant | like in Flemish Giant |
| | fire shade with agouti factor - reddish | red-reddish (agouti factor) |
| | eyes brown, top nails dark shade | |
| V-Blue-Gray (Opal) | wild blue color - 3 shades | blue-gray undercolor, |
| | light gray and dark hairs = pearled, | brown-red intermediate color |
| | eyes blue-gray, top nails dark shade | |

Source Modified table according to Zadina[4]

## Characteristics of individual positions

In the second part of this study we focused on evaluation of the qualities and exterior faults of typical breeding marks in 4–6 exterior positions: coat, topcolor (possibly markings) and undercolor (possibly intermediate color). However, the remaining seventh position of condition and health was not evaluated in this study as it does not include breed exterior traits. These exterior positions are similar in most Books of Rabbit Breed Standards but its specific name, arrangement and the points maximum depends on the specific country.

Position 4 – Coat: The texture of the coat is individual for each breed. For all breeds, however, there is a required hair length, density, flexibility and balance of these features that should be as uniform as possible throughout the body. The coat length and texture are described for each breed separately in relevant standards. Also the ears must be well coated.

Positions 5 and 6 – Specific breed traits: The breeding criteria described in positions 5 and 6 are given in each specific breed standard. According to the Czech and Slovak books of the rabbit breed standards, predominantly the topcolor and undercoat color (possibly the intermediate color) is judged at position 5 and 6, respectively.

**Table 2** Rabbit scoring system and distribution of points

| Position number | Country Characteristic of Position | Czech[1] standard | Slovak[2] standard |
|---|---|---|---|
| 1 | Weight | 10 | 10 |
| 2 | Shape | 20 | 20 |
| 3 | Type | 20 | 15 |
| 4 | Coat | 15 | 20 |
| 5 | Specific breed traits[4] | 20 | 20 |
| 6 | Specific breed traits[5] | 10 | 10 |
| 7 | Condition and health | 5 | 5 |
| | Total | 100 | 100 |

Note: Distribution of points on the rabbit's show remark card in the individual positions are according to the valid national Rabbit Breed Books of Standards in the Czech Republic[1] and Slovak Republic[2]; [5,6] Specific breed traits are given in each specific breed standard.

### Statistical analysis

Evaluations of strengths and weaknesses with regard to the positions of coat, topcolor or markings and undercolor from the rabbit show judges' remark cards were summarized and statistically compared. Statistical analysis was performed using software Microsoft Excel 2007. Chi square test ($\chi^2$ test) was used to compare the individual position between the selected groups of rabbits. The dependence of the individual signs was tested at a significance level of $\alpha$=0.05.

## Results and discussion

By 2017, at least 305 breeds of domestic rabbit were kept in 70 countries around the world. Most often, according to their weight the breeds of rabbits are divided into different groups: giant, medium, small and dwarf. Depending on the length and structure of the coat, the breeds of rabbits are classified as normal fur breeds, rex breeds, long-haired breeds[3,4] and breeds with a special satin coat structure.[5] This classification is also used in the European EE Rabbit Breed Standards Book.[6]

The judges of rabbits pay attention to the importance of evaluation of the exterior of rabbits because their final score and breeding value is largely influenced by the structure, color and quality of the coat. The next three positions are aimed at assessing the quantitative and qualitative characteristics of the coat.

Position - Coat. Zhang et al.[7] & Simek[8] stated that five basic coat parameters are evaluated for all breeds of rabbits as part of the show requirements. These are length, balance, density, elasticity and texture. Some individuals at the time of the show were not in optimum show fitness (moulting), which negatively affected the characteristics and structure of their coat. In such individuals, the hair was often softer and less elastic in the moult, in rare cases unevenly overgrown areas of the buttocks or abdomen were visible (Figure 2). In rabbits in ideal show condition the coat had very good density and flexibility (Table 3).

The exterior deficiencies typically observed in most evaluated medium breeds involved less dense and elastic coat. Especially in BLS (19.8%) and in the group of Vienna breeds (16.8%), the coat was uneven and less elastic. In 7.1% of BLS and in 9.6% of ChG breed, uneven and less elastic coat was observed, particularly in young individuals. Longer or inflexible coat was a typical defect in Vienna whites. In the small group of Vienna rabbits and ChG, the coat was longer, softer and completely non-elastic with more pronounced hairs (Figure 3 & 4). On the other hand, many of BLS (21.1%), ChG (17.6%) and VB (14.7%) rabbits had a very good texture and density of the coat (Table 3).

According to Rogers et al.[9] and Neirurerova et al.[10], the chinchilla breed of rabbit is specific in particular for its coat. Longer and less elastic coat, which imparts optical volume to this breed, is undesirable. Up to 34.2% of ChG included in our study showed a coat of adequate density but less elasticity, whereas in contrast 17.6% of individuals excelled in very good hair structure.

**Figure 2** Exterior faults in the fourth position – Coat.
From left: Less elastic and unevenly overgrowth coat with less optimum show fitness – moltingin Chinchilla Giganta
Source: Foto by Zigo F (2018).

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**Figure 3** Exterioridеal and faults in position – Coat.
From left: Very good texture, density and elasticity of coat. Less elastic and density of coat in Vienna blue
Source: Foto by Pyskatý O (2018).

**Figure 4** Exterioridеal and faults in position – Coat.
Note: Longer and less elastic coat with poor density in Chinchilla Giganta
Source: Foto by Brigantova M (2019).

**Table 3** Summary of the most common exterior faults in the fourth position-Coat

| **Minor faults** | **BLS** | | **ChG** | | **VB** | | **P** |
|---|---|---|---|---|---|---|---|
| | **pcs** | **%** | **pcs** | **%** | **pcs** | **%** | |
| | **308** | | **184** | | **641** | | |
| less dense and elastic hair | 61 | 19.8 | 63 | 34.2 | 107 | 16.7 | P<0.05 |
| uneven and less elastic | 22 | 7.1 | 18 | 9.6 | 43 | 6.7 | P<0.05 |
| longer or inflexible coat | 15 | 4.9 | 2 | 1.1 | 34 | 5.3 | NS |
| **Exterior ideals and advantages** | | | | | | | |
| very good texture, density and elasticity | 65 | 21.1 | 32 | 17.6 | 94 | 14.7 | P<0.05 |

Note: Percentual and statistical significance (P<0.05) are calculated from all selected breeds of 308 pcs of Big Light Silver(BLS), 184 pcs of Chinchilla Giganta (ChG) and 641 of Viennabreeds (VB), NS – non significant

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Dopitovaet al.[11] found significant coat deficiencies in the French lop and ChG. The coat was often thin and less flexible. Sometimes it had a softer look with a tendency to felting. The authors also observed a thinner coat at the back of the nape and slight deviations from the desired coat length. The coat of ChG evaluated in our study was in many cases less elastic (34.2%) and uneven (9.6%).

Position specific breed traits – topcolor. According to Supuka et al.[2] topcolor or markings is another evaluated position which in many cases is very closely related to the show fitness of the rabbit, and this was confirmed also in our study. These deviations were manifested mainly by uneven coloration on a certain part of the body, e.g. limbs (Figure 5) hips, loins or chest. Another frequent fault was a slightly rusty coloring or isolated white hairs in topcolor, or the edge of the ear in Vienna blue and black varieties.

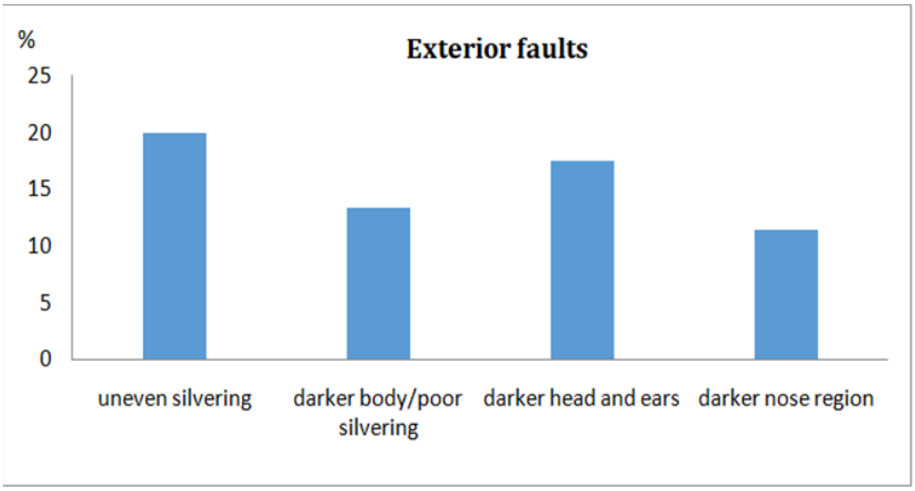
According to Neirurerova et al.[10], the color of the chinchilla body is relatively uniform, although it is sometimes influenced by imported individuals from abroad. At the National Animal Show in Slovakia, the authors observed that the most common coloring fault in Chinchillas was a different coloring or shading with the head or chest area s brighter than the rest of the body. Similar results were recorded in our study, where out of 184 ChG subjects, 8.0% had bland shading.

Supuka et al.[2] stipulated that the guard-hair coloring of BLS should create an overall silky, milky impression. Silverness should have as much uniformity on the head, torso and limbs as possible. Among the most common deviations from the standard color in BLS which we found in our work was irregular distribution of silver coloring (20.0%), manifested mainly by darker head and ears (17.5%) or a darker butterfly on the face (11.4%) (Figure 6 & Graph 1).

**Figure 5** Exterior faults in the fifth position – Top color.
From left: Inconsistent coloration or shading on limbs
Source: Foto by Pyskatý O (2018)

**Figure 6** Exterior deficiencies in BLS coloring: irregular silver distribution with a darker head and ears as well as a darker nose region.
Source: Foto by Šimek V (2018).

**Citation:** Zigo F, Pyskatý O, Ondrašovičová S, et al. Assessment and most common exterior faults in medium breeds of rabbits, Part II: In position coat, topcolor and undercolor. *Int J Avian & Wildlife Biol.* 2020;5(1):15–21. DOI: 10.15406/ijawb.2020.05.00168




**Graph 1** Exterior faults in BLS – position topcolor.

Position specific breed traits – Undercolor. The undercolor is usually evaluated in the sixth position and involves the color of the undercoat. Exceptions are breeds with a pattern and also white breeds. Then the color of the guard hairs or pattern is assessed in this position.[3] In the majority of breeds evaluated in this study the undercolor corresponded mostly to the standard. In the selected medium-sized breeds we observed slight variations in undercolor or lighter intermediate color.

In the Vienna white breed, the undercolor was often yellowish. The biggest problems of all selected breeds were evaluated with a wild type factor (Vienna Agouti and Opal, ChG) in which the width and borders of the intermediate color are considered within the undercolor.

The intermediate color is a color layer or ring located between the undercolor and the topcolor. In many cases, the undercolor was lighter at the base with a faint or blurred intercolor. In the Chinchilla Giganta, the intermediate color was often greyish and faint. According to Covriget al.[12] and Neirurerova et al.[10] the important part of the Chinchillas coat coloring is the white intermediate color, which creates a ring typical of the breed (Figure 7).

Out of total count of observed rabbits, 5.7% cases with of brighter undercolor were detected. Other faults were the changes in intermediate color, which was often bright, hence, usually less bounded.

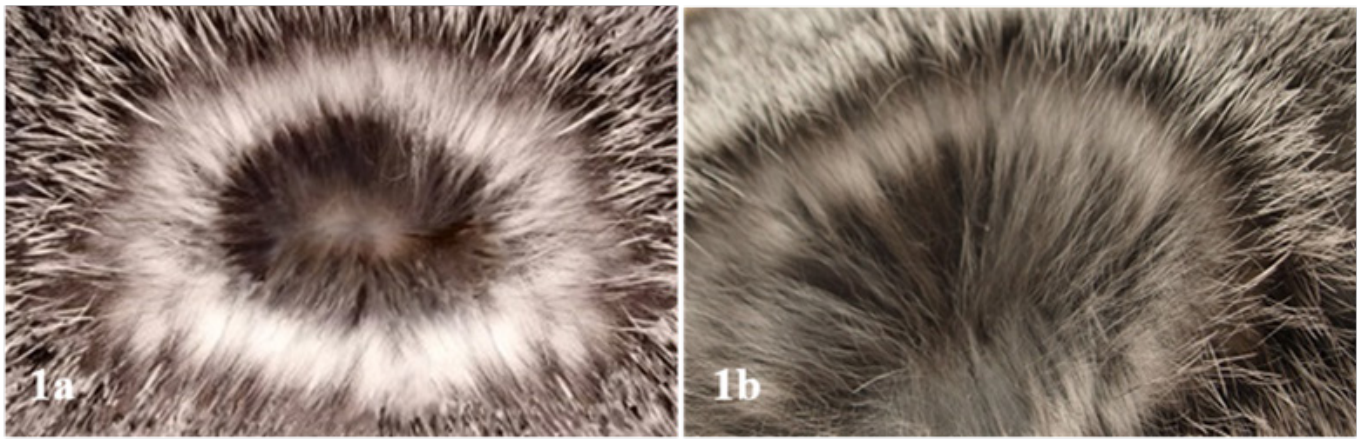



**Figure 7** Assessment of the undercolor in Chinchilla Giganta.
Note: 1a – good formed undercolor with a sharply defined intermediate color, 1b - greyish undercolor with poorly delimited intermediate color
Source: Foto by Šimek V (2018)

## Conclusion

The color and quality of the coat plays an important role in the assessment of rabbits and has a great influence on the breeding trend of pure-bred lines. The knowledge of the relevant analyses of the exterior faults and advantages is essential for both the rabbit judges and rabbit breeders in order to perform an accurate evaluation of the present state of the exterior in the monitored breeds and methods of selective breeding, respectively. Breeding of the show rabbits requires some patience, especially of the breeds with delayed maturation of external appearance. Only strict selection and some ability to estimate

the quality of the future appearance of the rabbits can result in successful breeding.

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## Conflicts of interest

Authors declare that there are no conflicts of interest.

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