

## The Rabbit of Cluj: a new phenotype obtained, maintained and improved in Cluj-Napoca (Transylvania), Romania

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**Abstract.** Beside the Transylvanian Giant Rabbit a new rabbit breed, *Oryctolagus cuniculus* (L.) is currently in forming in Cluj-Napoca, Transylvania, Romania. According to the Standards 2003 for the judgment of the exhibition rabbit acknowledged by European Association, regarding the body weight, the Rabbit of Cluj fits in the medium size breeds, with a minimum of 3.50 kg and a maximum of 5.50 kg limit. Yet, there is no other breed that rake together the Chinchilla color pattern with a New Zealand White show phenotype. Because for commercial meat production, the New Zealand White appears to be the principal breed, the genetic improvement of the Rabbit of Cluj will follow the same means of the commercial rabbits (prolificacy, milk yield, maternal instinct, weaned kits, number of valorified young's/doe, growth rate, forage capitalization, slaughter indicators, advantageousness).

**Key Words:** Romania, Transylvania, new rabbit breed, Rabbit of Cluj, Chinchilla gene, genetic improvement, new breed, new phenotype, first record, *Oryctolagus cuniculus*.

**Rezumat.** În Transilvania, Cluj-Napoca, România, alături de Uriașul de Transilvania se pun bazele formării unei noi rase de iepure de casă (*Oryctolagus cuniculus* L.). Conform ultimei rectificări a Standardului (2003), de către Asociația Europeană, pentru arbitrarea în competiții de gen a iepurilor de rasă, privind clasificarea raselor în funcție de greutatea corporală, Iepurele de Cluj se încadrează în categoria raselor de talie medie, cu limita minimă admisă de 3,50 kg și limita maximă admisă de 5,50 kg. Actualmente nu există rasă de iepure care să întrunească fenotipul rasei Neozelandez Alb, linia de expoziție cu coloritul chinchilla. Având în vedere faptul că Neozeelandezul Alb figurează ca și principala rasă de iepuri pentru producția de carne, ameliorarea rasei Iepurele de Cluj va urmări aceleași obiective (prolificitate, capacitatea lactantă, instinctul matern, procentul de pui înțărcați, număr de pui valorificați/femelă, dinamica de creștere, consumul specific de furaje, indicii de sacrificare, rentabilitate).

**Cuvinte cheie:** România, Transilvania, rasă nouă de iepure, Iepurele de Cluj, gena Chinchilla, consolidare genetică, rasă nouă, fenotip nou, primă relatare, *Oryctolagus cuniculus*.

**Introduction.** Considering the rabbit species zoo economic potential (meat, fur, hair, secondary products, valuable organic fertilizer etc), the rabbit rearing branch compete to the full potential capitalization of the Romanian animal husbandry.

As Petrescu-Mag et al (2009, 2011) report, there is no homologated Romanian rabbit breed yet, although there where some attempts, if we remember the White of Cluj (Petrescu-Mag et al 2009; Zaharia 1991). We also should mention here the unique Romanian meat hybrid rabbit Supercuni, the result of 15 years of work, selection and improvement (Frățilă et al 1985) which features was competed with any commercial rabbit at that time (Botha et al 2007ac).

Beside the Transylvanian Giant Rabbit (TGR) (Petrescu-Mag et al 2009) a new rabbit breed, *Oryctolagus cuniculus* (L.) is currently in forming in Cluj-Napoca, Transylvania, Romania. Since 2005 the team consisting of Botha, Petrescu-Mag and Hettig started to work to a new rabbit strain in order to develop a valuable Rabbit of Cluj (RC) (the name in Romanian: Iepurele de Cluj), although this is the first record about RC. This paper aims a preliminary and general presentation of RC.

**Material and Method.** In 2005, Botha purchased a pregnant pure breed New Zealand White (NZW) doe from Budapest, Hungary. Surprisingly, at giving birth we observed in the nest a colored individual, which became a light chinchilla colored ( $a_{chi}$  gene), with brown eyes and dark nails (Figure 1). This kit was a male, and became the founder of Rabbit of Cluj. At the adult age this male showed a perfect NZW phenotype, stocky body, a strong short head with a broad forehead and mouth, short and straight ears with extremely strong structure, well furred and rounded (Figure 2). We made a crossing test to find out what kind of genetic background has the founder male (FM). In this order, the FM was mated with a recessive homozygote doe, NZW. This mating scheme served for two desiderates, one of them was to maintain the typical NZW phenotype, and the other was actually the crossing test. In the  $F_1$  generation we obtained albino (recessive) and colored (dominant) individuals in 50-50%. This crossing test proved that our FM was a heterozygote individual.



Figure 1. The founder male (FM) at 1 month age (original).

The second breeding scheme was represented by the crossing between the FM and a pure breed Chinchilla  $\left(\frac{a_{chi}BCDG}{a_{chi}BCDG}\right)$  doe (Ch), purchased from Austria. The aim of this mating was to improve the chinchilla ( $a_{chi}$ ) color pattern. All the kits showed chinchilla ( $a_{chi}$ ) color (with light and dark shades), because the FM was heterozygote dominant and the doe homozygote dominant. As it is known, the  $a_{chi}$  color gene is dominant to its albino white allele. Further, the males from the FMxNZW were mated with the females from the FMxCh and vice versa to maintain a low consanguinity, and to prevent the inbreeding depression.

To maintain as well as possible the specific New Zealand (NZ) phenotype we were enforced to use inbreeding, thereby the FM was bred with the females resulted from the FMxCh matings, and with the females resulted from the FMxNZW cross.

The rabbits were kept and feed in household conditions. Their food consisted of cereals (oat, barley, corn, wheat, sunflower oil meal and soy oil cake) and fibrous feed (graminaceae and papilionaceae in 1:1 ratio). Veterinary activities consisted in vaccination against Rabbit Hemoragic Diseases (RHD) and coccidiostatic drugs administration. The cages used in RC project are 80x75x50cm. Nest boxes dimensions 25x25x50cm.



Figure 2. The founder male (FM) at maturity (original).

Table 1

The biological material used in the creation of RC

Strain	Origin	Color pattern	Adult weight (kg)	Role in RC project
FM	Cluj-Napoca, Romania	???	3.70	Breed founder
Ch	Wells, Austria	$\frac{a_{chi}BCDG}{a_{chi}BCDG}$	5.00	Color improvement
NZW	Budapest, Hungary	$\frac{a_{----}}{a_{----}}$	4.80	Phenotype consolidation

$\frac{a_{chi}BCDG}{a_{chi}BCDG}$  - Chinchilla colour pattern,  $\frac{a_{----}}{a_{----}}$  - Albino colour pattern

**Results and Discussion.** From the FMxCh breeding resulted kits with high viability and growth rate (Figure 3) which presented precise Ch color pattern with all the details. The true Ch color pattern consist in: „The top color appears very shiny, light ash-grey with bluish toning and a flaky black shading, which is emphasized by black hair tufts which are close together. It is more noticeable on the back. The top color should reach quite far down the sides if possible and the chest and legs should be in accordance with the overall color. The ears edges are seamed in black. The neck part is small, grey-white. The tail is black and dotted with grey-white hairs, the underside however to be as white as the belly color. The eyes are brown, nails are dark. The undercolour on the whole body is dark blue. A white to whitish grey intermediate band is about 5mm, which causes a sharp demarcation between the top and undercolour” (Standard 2003 for the judgment of the exhibition rabbit acknowledged by the European Association).





Figure 3. Kits from FMxCh breeding, at 1 month age (original).

As shown in Figure 4, on the juvenile age the individuals (FMxCh) have all the features of the Ch color. As an observation, we can remark that the ear length is bigger than at the NZ rabbits, where the maximum limit is 10-11cm (Holdas 2000). Among the RC project, it is a goal to reduce the ear length of RC to the ear length of NZ rabbit standard.



Figure 4. Youngs from FMxCh breeding, at 4 month age (original).

Not at least the FMxCh  $F_1$  generation inherited very precise the three well delimited colors (blue, white, black) on the hair length, noticeable if we blow in the rabbits fur (Figure 5).



Figure 5. The three color circles that define the true Ch color pattern (original).

The kits resulted from the FMxNZW breeding had a slightly poor viability; moreover their growth rate was also modest. We had the same situation when we used inbreeding and appealed at PxF<sub>1</sub> (P-parental line) breeding. Meant very young individuals we have lost because of coccidiosis, even if they received medication against this illness, the other cause of mortality proved to be the low viability, the kits died at average ages of one month.

All the survived kits were kept and used to obtain the further generations according indications from Table 2.

Table 2

The resulted offsprings phenotype after the first 2 breeding scheme  
in order to obtain the Rabbit of Cluj (RC)

Matings	Obtained phenotype in F <sub>1</sub> generation	Observations
FMxNZW	50% albino, 50% a <sub>chi</sub> color pattern (with 2 shades: light chinchilla and dark chinchilla)	Kept for breeding just the color individuals
FMxCh	100% a <sub>chi</sub> color pattern with 2 shades: light chinchilla and dark chinchilla	All the kits kept for further breeding

FM – founder male, NZW – New Zealand White, Ch – Chinchilla.

As an observation among the reproductive activity of the breeding nucleus, are noticeable the lymphatic temperament of some buck's. They does have an healthy manageable temperament, unlike some results observed at Californian females (Botha et al 2007b) or White Giant males and females (unpubl. data), which showed a nervous temperament in relation with humans or conspecific individuals.

**Conclusions and Perspectives.** Considering the high mortality rate due to inbreeding, further we consider NZW infusion to obtain more bloodlines and then to proceed at cross between those lines. The NZW infusion will help also to maintain the specific phenotype we would like to improve. We are conscious that the inbreeding cannot be avoided in a creation and genetic consolidation of a population, especially when one of the goals is to create a homogeneous population. Therefore the breeding schemes will not allow a



bigger consanguine rank than 25%. Knowing that the milking capacity of the does can be influenced by the food composition (Botha et al 2007d), we will test the milk yield of does and improve them if it will be necessary in order to grow the weaning rate. Not at list a better reproducer buck's management is necessary, to increase the adult weight, using the isolation of the bucks from does (Botha et al 2007e). Can also consider a sex ratio manipulation (Botha & Hettig 2007) to increase the number of females or males depending on the stage of the project. Beyond the phenotypical features, the formation and improvement of the RC main goal is to develop a veritable, advanced meat producer rabbit. Popularization of the RC project, and it's stages will be done through scientific communication, exhibition participation, forum description, online posts and so on.

**Note.** Due to the first author's preference, the gene notation system used in this paper is the German one, definitely different from that used by Petrescu-Mag et al (2009, which is an English system of gene notation).

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