

Dwarf rabbits and “peanuts”: is dwarf rabbit breeding ethical?

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Abstract. In this article we discuss on dwarf rabbits. We also discuss how ethical it is to raise a breed with a genetic disability like dwarf rabbits. By mating two dwarf rabbits with Dw dw genotype, results, according to Mendelian laws, 25% normal rabbits (Dw Dw), 50% dwarf rabbits (Dw dw) and 25% “peanuts” rabbits (dw dw – lethal or semilethal). At a first view, it is unethical to intentionally reproduce varieties that generates offspring with hereditary diseases for the sake of the commercial objective. However, looking at the issue specifically, the situation is not so unethical in the case of rabbit breeding. The domestic rabbit is a very prolific animal. The doe produces more kits than she can actually breastfeed under optimal conditions. A percentage of about 10% of the kits that is born perishes during the competition with siblings in the nest for breast milk. It is known that this percentage decreases as the number of kits in the nest decreases. The chance of survival of each kit increases with decreasing the number of kits in the nest. This is why some of the newborn kits are redistributed by farmer to other nests, with fewer individuals per litter. Because there are not always nurse females available, farmers often resort to the elimination of kits with physical defects or underdeveloped. Because this practice of removing a limited number of individuals from overcrowded nests does not significantly affect the number of rabbits that survive to weaning, it is not considered barbaric. For this reason, the production of 25% “peanuts” in dwarf rabbit lines is neither economically counterproductive nor unethical, as it is close to the percentage usually eliminated by farmers. In reality, these “peanuts” are generally eliminated from the nest by farmers, in order to make the best use of maternal colostrum by healthy kits.

Key words: *Oryctolagus cuniculus*, European rabbit, domestic rabbit, birth defects.

Introduction. The domestic rabbit (*Oryctolagus cuniculus*) had primarily the role of farm animal and only secondarily pet. Its value as a functional food is indisputable (Petrescu & Petrescu-Mag 2018), rabbit being an affordable food production option with minimal costs for any novice farmer (Petrescu-Mag et al 2011a, b, 2012). With the urbanization and development of medicine, the rabbit gained increasing importance as a pet (especially dwarf varieties) or, unfortunately for it, a model organism for biomedical research (Botha et al 2014; Jin et al 2019).

Dwarf rabbits are improved lines or breeds of rabbits that carry a heterozygous dwarfism gene (Rosahn & Greene 1935). As in the case of Papillon breeds (Petrescu-Mag et al 2016), these dwarf rabbits cannot generate homogeneous lines of offspring, because dwarfism in the homozygous state is lethal or semi-lethal (Carneiro et al 2017). Therefore, dwarf rabbits are called breeds due to a construct based on phenotypic standards (European Association of Poultry Pigeon and Rabbit Breeders 2003), not due to scientific evidence such as the case of the New Zealand rabbit, Californian rabbit or the Transylvanian giant rabbit (which are consolidated and relatively homogeneous breeds) (Daszkiewicz et al 2012; Petrescu-Mag et al 2014; Wanjala 2015).

In this article we aim to discuss on dwarf rabbits, which is the gene that makes them dwarf and whether this gene affects their health. We will also discuss how ethical it is to raise a breed with a genetic disability.

Genetic basis of dwarfism. Dwarf rabbits (Figures 1-5), regardless of breed or show line, have a pair of alleles at the dwarf locus, one of which is normal (Dw) and the other mutant (dw - which encodes dwarfism) (Carneiro et al 2017). By mating two dwarf rabbits with this genotype, $Dw\ dw$, results, according to Mendelian laws, 25% normal rabbits $Dw\ Dw$, 50% dwarf rabbits $Dw\ dw$ and 25% "peanut" rabbits $dw\ dw$ (Table 1).

Table 1

Heredity of the dwarf phenotypic trait

<i>Parents of dwarf type</i>	<i>Dw gene</i>	<i>dw gene</i>
Dw gene	$Dw\ Dw$ – normal phenotype	$Dw\ dw$ – dwarf phenotype
dw gene	$Dw\ dw$ – dwarf phenotype	$dw\ dw$ – "peanuts" (lethal or semilethal kits)



Figure 1. Colored Dwarf Red (picture generously provided by one of the most famous Transylvanian dwarf rabbit breeders, engineer Zsolt Attila Grabán).



Figure 2. Dwarf Papillon Tricolored (photo by Zsolt Attila Grabán).



Figure 3. Dwarf Himalaya (photo by Zsolt Attila Grabán).



Figure 4. Himalaya Dwarf Lop (photo by Zsolt Attila Grabán).



Figure 5. Mantelgescheckte Dwarf, black and blue varieties (photo by Zsolt Attila Grabán).

Rabbits with a normal genotype (Dw Dw) will gradually differentiate from dwarfs (Dw dw) as they grow, but their commercial value as pets is small. At the other extreme are the so-called "peanut" kits (dw dw), which will die sooner or later. Some farmers eliminate "peanuts" immediately after birth. "Peanuts" have a special morphology and can be easily identified from day one. The removal of "peanuts" from the nest is done in order not to waste the maternal colostrum for the kits that will die anyway in a few days. Important to note that Komatsu et al (1990) reported a second locus for dwarfism, whose effect is more severe than the previously known dwarfism.

Dwarf rabbits and ethics. An increasingly common and intensely disputed issue in animal husbandry is the reproduction of breeds and varieties characterized by lethal mutant genes or which induce a physical or physiological discomfort to the animal (Spencer et al 2006; Eşanu et al 2015; Röcklinsberg et al 2017). In the case of dwarf rabbits, they are generally perfectly healthy. However, they produce 25% of lethal or semi-lethal individuals, which is apparently unethical. It is unethical to intentionally reproduce varieties that produce offspring with hereditary diseases just because dwarf rabbits have a higher commercial value.

Looking at the issue specifically, the situation is not so unethical in the case of rabbit breeding. The domestic rabbit is a very prolific animal. The doe produces more kits than she can actually breastfeed under optimal conditions (Agea et al 2020). From our experience we know that a percentage of about 10% of the kits that is born perishes during the competition with siblings in the nest for breast milk. It is known that this percentage decreases as the number of kits in the nest decreases. The chance of survival of each kit increases with decreasing the number of kits in the nest (Petrescu-Mag, unpublished data). This is why some of the newborn kits are redistributed by farmer to other nests, with fewer individuals per litter (Abubakar & Bello 2020). Because there are not always nurse females available, farmers often resort to the elimination of kits with physical defects or underdeveloped.

Because this practice of removing a limited number of individuals from overcrowded nests does not significantly affect the number of rabbits that survive to weaning, it is not considered barbaric. For this reason, the production of 25% "peanuts" in dwarf rabbit lines is neither economically counterproductive nor unethical, as it is close to the percentage usually eliminated by farmers.

In reality, these "peanuts" are generally eliminated from the nest by farmers, in order to make the best use of maternal colostrum by healthy kits.

Conclusions. Dwarf rabbits are economically important for the pet shop trade worldwide. However, maintaining and breeding dwarf lines of rabbits supposes producing 25% kits with birth defects ("peanuts") as a "side effect". The production of 25% "peanuts" in dwarf rabbit lines is neither economically counterproductive nor unethical, as it is close to the percentage usually eliminated by farmers to avoid overcrowding the nest. Overcrowding induces random and late losses of kits.

Acknowledgements. We thank Mr. Zsolt Attila Grabán for pictures; we also thank the two anonymous reviewers for reading the manuscript.

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Received: 29 October 2020. Accepted: 01 December 2020. Published online: 10 December 2020.

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How to cite this article:

Oroian D., Proorocu M., Oroian I., Gavriiloaie C., 2020 Dwarf rabbits and “peanuts”: is dwarf rabbit breeding ethical? *Rabbit Gen* 10(1): 19-25.