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COLOR PREDICTION IN POODLE

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SUMMARY

Colors are one of the pylons of animal diversity. As a result we can observe a divers range of colors in the animal kingdom, not only in different species, but also inside a specie's population. Despite this fact, when we are talking about pets, only the colors accepted in shows are considered valuable, so colors have became an important criteria in establishing an animal's value. Taking in consideration the case of poodle, from over twenty colors that exist in this race, only seven are accepted in sows. In consequence, breeders are interested in obtaining only these colors, so color prediction in puppies becomes extremely important. This can only be done with the help of genetics, science that hides a lot of secrets.

Consequently, this paper refers to the genetic mechanisms that generate coat color in poodle and the possibility to predict the phenotype of the future puppies. The bibliographic research pointed out that today there are 9 known pairs of genes that influence color. Knowing these genes and their effect at the molecular level, color prediction becomes a question of hybridizing. Nonetheless, the big number of genes that are involved make color prediction impossible without using modern technologies.

In order to help poodle breeders, the practical part of this paper consists in a software that generates all the possible colors of the puppies of two known parents. This software has been designed specially for breeders and has an user-friendly interface that can easily be used by anyone, even if the user has no knowledge of genetics what so ever. The only information that the user must fill in are the colors of the mother and father. But this simple interface hides a complicated algorithm that analyzes the input data in order to calculate the response. Although we pointed out that there are nine known genes that influence color, the software only takes in consideration seven of them, because the other two are extremely controverted and not all scientists agree upon their influence. Still, this is a step forward in this domain, considering that the only similar software only considers five genes.

Another innovation of this software is that the only data that is required is the phenotype, as the program translates it in the genotype pattern with the use of an input table. Most importantly, after this it fills in the gaps in the genotype pattern generating all the possible genotypes for each parent. This results in 16 possible genotypes for each, which are than split in 2048 gametes that are than are combined with the gametes of the other parent resulting all the possible genotypes of the puppies. In the end the software attributes the puppies' genotypes to their phenotypes and calculates the percentage of each, percentage that will be written on the screen, giving the user the information it needs concerning the possible colors of the puppies. We must point out that after optimizing this software by only considering the distinct gametes, it analyses over 21,5 million answers (there would be over 1 billion without optimization) for each couple of parents in order to give a result.