



Wirehaired Pointing Griffon Coat Color Genetics

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In the past year or two I have received several emails from owners of versatile hunting dogs about dogs or pups that don't have quite the coloration that the owners or breeders expected for that breed. I receive these because I have a website, <http://homepage.usask.ca/~schmutz/dogcolors.html>, on this subject. This website is based on the DNA research we've done in my lab or that has been done in the labs of my collaborators or colleagues.

Our first DNA study was on brown in dogs. We proved that brown was caused by a dog having two mutant copies of the TYRP1 gene. There are actually three different mutations that can cause brown. The dog need not have two of the same mutations to be brown, but it must have two. If it has only one mutant copy of the gene TYRP1, it will be black. At least two of the mutations have been found in Griffons. It is possible the third, more rare one, is also there and that we have just not tested enough Griffons to detect that one yet.

I was recently surprised to discover that the AKC and the FCI and the Quebecois standard all say that the Griffon can be brown or orange. Brown is a eumelanin pigment in the black family and orange is a pheomelanin pigment in the red family.

Does this also mean that brown Griffons can have tan markings on them as in the tan of Gordon Setters? That tan is also a pheomelanin color in the red family. I was not expecting that either orange or therefore tan would be considered an expected color in this breed.

When I look at photos of Griffons on various websites, I note that some do have mostly brown fur (with white hairs intermingled usually, known as roan to geneticists) but some have tan eyebrows and muzzle. Often one can't see the feet because they are in the grass or cut off of the photo. Such dogs would be called brown-and-tan in most breeds or tricolor in others since they have brown, tan and white.

The "and-tan" markings are sometimes called tan points. Although dogs must have two mutant alleles at the ASIP gene to have tan points (i.e. a^t/a^t genotype), this is not sufficient. They must also be ky/ky at the DEFB103 gene. Most European hunting breeds are K^B/K^B at this gene instead and do not show any pheomelanin coloration at all. So we don't expect a tricolor German Wirehair or a tricolor German Shorthaired Pointer, but we do expect a tricolor English Pointer or a tricolor English Setter. All four of those breeds are usually a^t/a^t at the ASIP gene or A locus. The difference between the German breeds and the English ones is that the German ones are expected to always be K^B/K^B .

If a pup turns up with tan points or "and-tan" markings in a litter then it automatically means that each parent must have at least one K^B and one a^t . Intuitively if one wanted to breed out the "and-tan" one might at first assume that one would order a DNA test for a^t , but actually it is best to order a test for K^B instead. If the dog's test results say it is K^B/k^y instead of K^B/K^B , then the owner knows that this dog could have pups that show tan points.

There are a couple choices then. One could decide not to breed such a dog at all or one could decide that other great hunting traits warrant that it still be bred and that a pup that does not carry the k^y be chosen from among its offspring to carry on the line. If a K^B/k^y heterozygote is bred, then ideally its mate would be DNA tested as K^B/K^B . In such a mating no pups will be born that have the undesired tan point pattern, but half of the pups would be carriers of k^y . Essentially the choice is whether one wants to eliminate the allele immediately or just the pattern immediately.

DNA testing can be done by collecting a cheek brush sample and mailing it in to a company that offers testing for K^B , with the appropriate payment. Cheek brushes travel easily through the mail and so the company need not even be in the same country as the dog.

The DNA test for the K^B allele was published in SCIENCE in October 2007. Therefore the test has not been available for very long yet and many dog owners are not aware that this test could be used to help them select dogs that are brown from those that are brown-and-tan.

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Tan above eyes, Tan muzzle, Tan on Legs



Tan legs, Tan around anus, Tan muzzle and cheek



Tan above eyes, Tan muzzle and cheeks



*He's wet and Tan becomes even more obvious.
Note: muzzle, and legs at back and insides*