

### **Potential problems associated with breeding colours.**

Genes are always in pairs, you can have two dominant genes, one dominant and one recessive, or two recessive genes. A dominant gene is always visible, no matter what it is paired with; a recessive gene can be 'carried' without being visible, two of the same recessive genes are necessary for a recessive trait to be visible.

For the most part, colour-to-colour mating's are perfectly safe to do. You may end up with some colours you do not like very much, but you will not produce any more health problems than you would normally get from a black/white-to-black/white mating.

There is however one main exception to this rule and that is merle-to-merle mating's.

Merle is a pattern, not a colour, and can be produced in any coat colour. The merle gene is also dominant, as opposed to recessive, unlike most other coat colour/patterns.

Genetically this is shown as MM – double merle , (often predominantly white defective pups.)

Mm – 'Normal' merle carrying non merle

and mm – non merle.

This also means that one parent has to be merle to produce merle pups, and that the merle pattern cannot be 'carried' down from previous generations.

The merle gene acts by diluting random areas of pigment in the coat, creating a marbled affect. The merle gene has the strongest affect on black/dark brown pigment, and little or no affect on yellow pigment. Therefore, a tri dog, with the addition of the merle gene, would have the main body colour diluted in random patches to become merle with tan trim. The tan area would not appear to be merle.

So long as mating's consist of one merle, and one non merle parent, there should not be any more problems expected than you could expect from the mating of two non merle parents.

However if two merles are mated together, there is an unacceptably high risk of producing defective pups. This is because the merle gene is 'semi lethal'. As well as diluting areas of pigment, when present in a 'double dose' the merle gene has a serious affect on the development of certain organs. This can result in pups being produced that have very small eyes or even no eye at all, resulting in blindness, they can be deaf, and have defects in internal organs. These 'double merles' are normally predominantly white, with just a few areas of pale merle on their bodies.

So in theory, mating merle to non merle should be perfectly safe.

There is absolutely nothing to be gained from mating a merle to a merle, and a lot to be lost. Mating merle to merle WILL NOT result in a completely merle litter. (See diagram)

However, a few more things need to be taken into consideration when breeding with a merle.

Firstly, the amount of merle in a dog's coat can vary greatly. It can range, for example, from a dog that has an almost completely diluted coat, with just a few small dark patches, to an almost completely solid looking colour, with just the smallest amount of diluted merle coat, maybe only the size of a five pence piece. But genetically both dogs are equally merle, and the dark dog can, and will, produce pups with far more marbling in their coats.

Dogs that have this very small amount of merle pattern are sometime referred to as 'cryptic' merles, and can obviously pose a danger when breeding, as the merle can go un-noticed, they could then be mated to a merle and produce MM defective pups.

For this reason, it is important that pups be checked very thoroughly, if they have a merle parent, to be absolutely sure that all merle pups are recognised, AND REGISTERED as merles.

Even the smallest amount of merle is normally visible in very young pups, but as merles tend to get darker with age, these very small patches of merle can be harder to identify in an adult.

As stated earlier, the merle gene has little or no effect on yellow pigment, so if a merle is mated, for example to an ee red (yellow) dog, the merle individuals in the resulting litter can be impossible to detect. For this reason, it seems to make sense to register ALL ee red (yellow) individuals from a merle parent as merle. – Better safe than sorry.

ee merles can be identified later if they produce merle pups when mated to a normal non-merle.

They can occasionally also be identified by eye colour, as some ee merles may have blue or marbled eyes, but this is not a sure way of telling, as it is also perfectly normal for merles to have two brown eyes.

Similarly, merles can be harder to detect from a sable to merle mating. Depending on the amount of shading, the sable has, as the merle will only show on the darker shaded areas of the coat. It can normally be identified in a young pup, but as the pup grows and the coat darkens, it can become almost impossible to identify, and in a sable with little or no shading, it would be undetectable.

The only other colour mating that should be given careful consideration, is Blue (dilute solid blue as opposed to merle) to blue mating's. As very occasionally, this could result in blue dilution alopecia.

The hair on a blue dog is often a finer texture than on, for example a black/white dog. In extreme cases, this can be seen, particularly on the ears, which can be almost or completely devoid of hair. The ear leather can also appear thinner than normal and the skin finer. In very extreme cases hair can be also be absent from other parts of the body. It would therefore be inadvisable to breed two individuals together if they both exhibit this lack of hair, as it seems obvious that pups showing the same amount, or more, hair loss could result. So long as both parents have normal hair growth, particularly around the ears, this problem should not occur. If it does occur, it has no serious effect on the dog's quality of life, being purely cosmetic.

Non merle X non merle

	Non merle	m	m
m		mm	mm
Non merle		Non merle	Non merle
m		mm	mm
		Non merle	Non merle

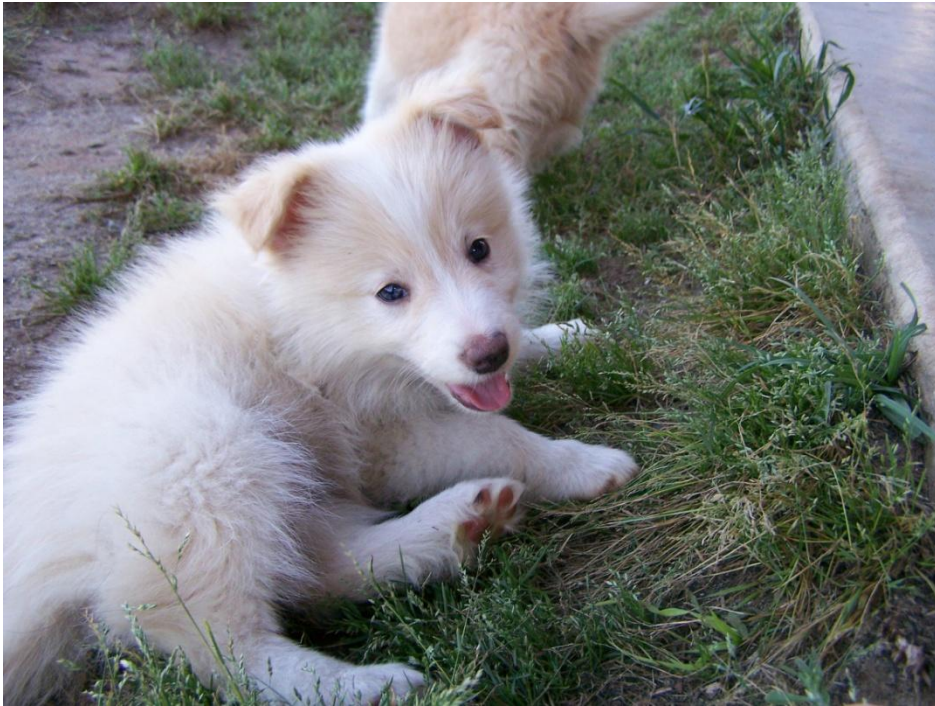
Non merle X Merle

	Non merle	m	m
M		Mm	Mm
Merle		merle	merle
m		mm	mm
		Non merle	Non merle

Merle X merle

	Merle	M	m
M		MM	Mm
Merle		Defective merle	merle
m		Mm	mm
		merle	Non merle

ee merle pup



ee merle adult ( has sired merle to non merle bitches)



ee showing merle eye



Sable merle pup



Blue merle



Red merle



