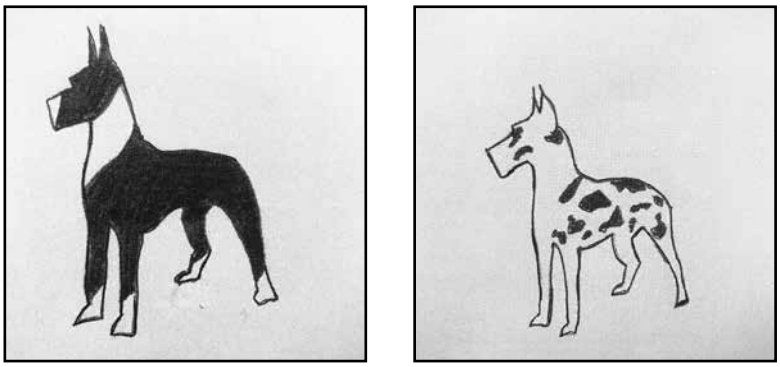
Systematic Loss of the Irish Spotting Gene

Wrtiiten by Kristianne Delorme Cilka Great Danes

Below you will find some examples of breeding combinations in the Harlequin family of dogs and the statistically expected outcomes of these breedings. The statistical information was derived from "Colors of my World" Authored by JP Yousha and Dr Leigh-Ann Clarke at Clemson University.
Visit https://www.clemsoncaninegenetics.com/harlequinbreeding.htm for additional punnet squares illustrating predicted outcomes. Please be gentle when judging my hand drawn artwork, as I don't generally do any better drawing stick figures.

Harlequin breeding practices have long been shrouded in mystery even though we have been armed with genetic testing and new information since 2008. I also want specifically touch on the term "Preservation Breeding" at this time. Preservation breeding according to Wikipedia is defined as "An attempt by many animal breeders to preserve bloodlines of animals, either of a rare breed, or of rare pedigrees within a breed. One purpose of preservation breeding is to protect genetic diversity within a species, another is to preserve valuable genetic traits that may not be popular or in fashion in the present, but may be of great value in the future. Preservation breeding can also mean the breeding of animals to populate or repopulate an area where a species previously existed. It can also mean the breeding of species that are healthy and releasing the healthy individuals into a population that is defective or infected for the purpose of strengthening the overall health of the population."

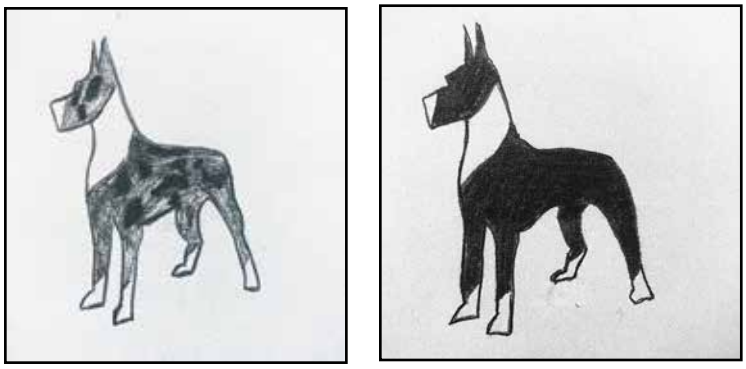
If we now have the definition of the term "Preservation Breeder", I want to exemplify that when we are making breeding decisions, or decisions regarding our puppies, statements or sentiments such as "Preservation breeding matters no matter what colour the dog is painted in" are grossly dangerous to this particular colour family of dogs. Colour does matter in the Harlequin family and further throughout this article I will try to explain why it does so. Preservation breeding should include the entire Genotype of the dog, which includes coat colour. A breeder simply should not have the opinion that only parts of the genotype matter when in fact the entire genotype matters as a whole. It is there for us to guard, protect and generate future Great Danes. The loss of genetic information which includes the Harlequin gene and the Irish Spotting Gene is the aim every breeder should have in mind. It is of fundamental importance that every breeder strives for correctness in their breed which includes colour.



Mantle X Harlequin

Since both parents here exhibit two copies of the irish gene (Which we would know if the parents do not carry piebald, they must carry Irish spotting gene) the offspring results would look like:
50% Irish Marked Mantle
25-33% Irish Marked Harlequin
17-25% Irish Marked Mantle Merle.

All puppies in this breeding would have two copies of the Irish Spotting Gene which gives us the desired white stockings, white blaze and white neck/chest. Note, if the Mantle in the above equation carries the Harlequin gene, some of the puppies will be affected by H/H homozygosity, which is lethal in utero. This breeding produces 100% Irish Marked puppies. Now that Canada and the USA can show Mantle Merle as well, this breeding would produce 100% showmarked offspring.



Mantle Merle x Mantle

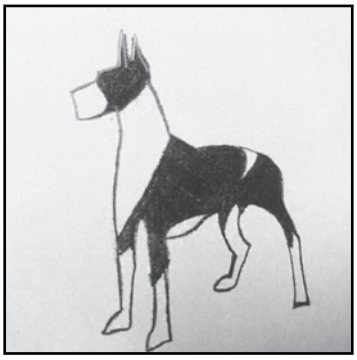
Since both parents here are exhibiting two copies of Irish Spotting gene, and knowing the Mantle here carries the harlequin Gene (because you colour tested it), This breeding would produce the same as the Harlequin x Mantle litter colour wise, however it would produce a larger litter as none of the puppies would be affected by two copies of the Harlequin gene. H/H is always lethal in utero. This is arguably the safest breeding that can be done to produce harlequin without having the potential for loss. This breeding produces 100% Irish Marked puppies. Now that Canada and the USA can show Mantle Merle as well, this breeding would produce 100% showmarked offspring.

50% Irish Marked Mantle
25-33% Irish Marked Harlequin
17-25% Irish Marked Mantle Merle.

The puppies produced in both of these breedings above will be irish marked since both parents carry two copies of the irish spotting gene. The irish spotting gene is what gives us the Mantle, the mantle merle. The white neck collar (Which may be full or partial), white stockings and white muzzle are traits exhibited in an even fashion by true Irish Spotting gene dogs.

A trick to start to envision Irish spotting gene on a Harlequin would be to use your eye and draw around all of the body spots on a Harlequin. The outcome should be an irish marked dog as seen, at right, in my not so artistic drawing.

If you have colour tested your dog and it carries even one copy of Piebald, it cannot then carry only irish. It would carry one copy Irish and one copy Piebald.

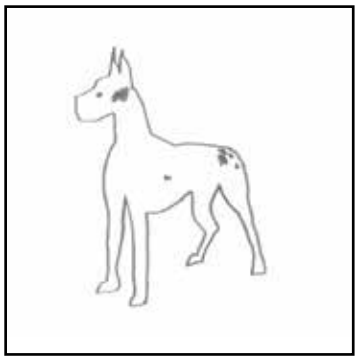


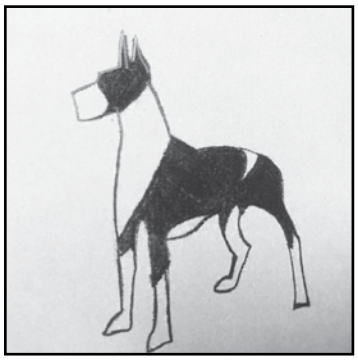
Mantle (Piebald Carrier) X Harlequin

Statistically this breeding will produce the same colours of puppies as in the Normal Mantle x Harlequin breeding however 50% of your entire litter will carry the piebald gene. Bear in mind that the puppy you keep based on it's physical virtues may be a piebald carrier, which will limit or impact the animals it can be bred to without having them affected by piebaldism.

This statistic may not itself matter for this individual generation, however over time we have been reducing the number of true irish marked Great Danes through the indiscriminate use of piebald in an effort to quickly clean colour.

Without Colour testing there is not a truly accurate way to determine a dogs coat colour.



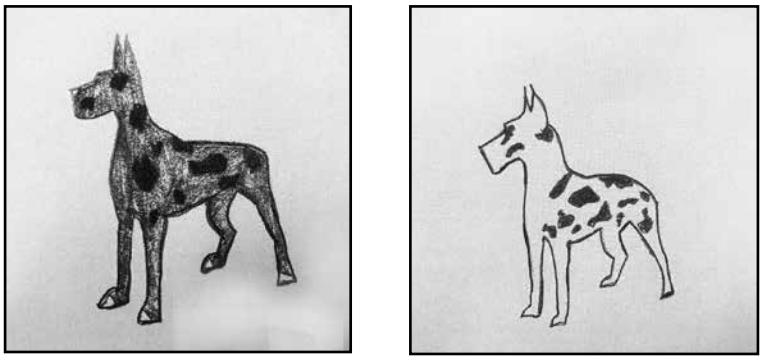


x

Harlequin (piebald carrier) x Mantle (piebald carrier)

The colour results of this litter would be statistically the same as Normal Harlequin x Normal Mantle however as both parents carry one copy of the Piebald gene, 50% of the litter will be carriers, 25% will be affected and only 25% of the litter will have no copies of the piebald gene. This means you will have 25% of your litter actually exhibit full piebaldism . These Piebald affected puppies would otherwise be normally marked puppies. "Harlequin Headed" piebald for example would otherwise be a normal Harlequin if it weren't affected by piebaldism. So the breeder must be aware that by doing a breeding such as this, the potential for loss of otherwise normally marked puppies is high.

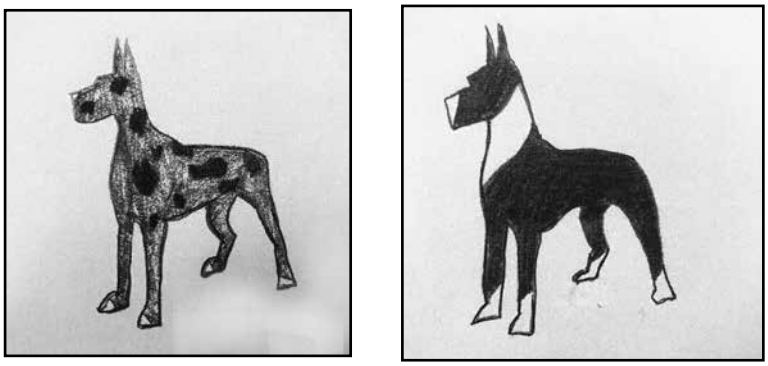
Solid Merle
As solid merle does not carry either any copies of Irish Spotting gene or piebaldism, it is safe to treat this breeding partner as a solid colour. It will not produce the desired tuxedo pattern called for in the Harlequin, Mantle and Mantle merle.



Solid Merle x Harlequin

The Solid Merle bred to the Normal Harlequin will only give you these basic percentages however, make note that since the Harlequin carries two copies of Irish Spotting Gene and the Solid Merle by definition does not, the entire litter will only have 1 copy of the irish spotting gene. This means that the blacks will not have enough white to be a Mantle, the Merles will not have enough white to be a Mantle Merle, and the Harlequins will not have that desired clean white neck, chest and forelegs as sported by those dogs with two copies of the Irish Spotting Gene.

25% Merle
25% Mantle
25% White
25% Harlequin



Solid Merle X Mantle

This breeding will produce :50% Black and 50% Merle
*Potential For Harlequin exists if the Mantle carries the Harlequin Gene

I want to again illustrate that because the Mantle dog carries two copies of Irish Spotting Gene and the Merle Carries none, that all the puppies will carry only one copy of the Irish spotting Gene. This means that the blacks will not have enough white to be a Mantle, the Merles will not have enough white to be a Mantle Merle, and the Harlequins (Should there be any) will not have that desired tuxedo marking as

sported by those dogs with two copies of the Irish Spotting Gene. All these puppies will resemble more solid coloured dogs with only the very extremities being white tipped.

By Concentrating on breeding our correctly Irish Marked dogs (Harlequin, Mantle, Mantle Merle) we can better control the outcome of our breedings, have better color in our litters to choose from and we can widen the gene pool back up as we wouldn't be restricting dogs breeding partners right out of the gate based on color or fear of losing half or more of a litter to undesired coloration. If we can freely choose from our litter of all Irish marked Puppies, we can make our choices more geared toward the physical attributes of the puppy rather than the coat colour. Colour is so important in making a breeding choice that it should be unimportant in the breeding result. We as breeders should be aiming to have as many correctly marked puppies in each litter as we can so that we can choose our puppies on physical virtues and leave the colour to the end.

Conversely, by not stopping to take the time to colour test, breed and exhibit our normal Irish Marked dogs we pave the way for generation after generation of Piebald carriers bred to other carriers. Statistically over time, everything will be affected, our pigment lost, our Irish Spotting Gene lost and with it goes the Normal Harlequin.

Every breeding a breeder does impacts every single generation down the line after him and you cannot expect to see Statistical results in each individual litter. Statistics are the factual data gathered from a large number of samples. While individual results do vary sometimes, the facts contained herein this article, the facts of colour testing from a reputable laboratory, and applying those facts will always yield a better statistical results and help to improve and stabilize the Harlequin colour family.

The takeaway I hope that every reader will have is that Solid Merle breeds like a solid colour, it will breed like a black, so be aware of this in your breeding programs. The Irish Marked dogs (Harl, Mantle, Mantle Merle) represent the most valuable of breeding animals in the Harlequin colour family as they will produce consistent markings when bred to another correctly marked dogs leaving you with a decision as a breeder that is geared more toward conformation rather than colour. The loss of Harlequin or the Irish Spotting affects the entirety of this colour family unless breeders start making breeding decisions using fact and science like colour testing to achieve their goals and striving to breed correct Irish Patterned dogs.

Thank you to JP Yousha who has taken the time to mentor me properly on Harlequin Family breeding.