

Propagating a Breed and the Responsibilities Incurred

by Lisa Dubé Forman (Ballyhara) ©2016

"The only defensible purpose for breeding Irish Wolfhounds is to bring their natural qualities to perfection."

This passage from the IWCA website gives rise to my thoughts on breeding versus mating dogs, but we need to elaborate by adding that breeding entails a conscience and ethical responsibilities. We are safeguarding this breed. Therefore, we are its guardians.

Breeding is understanding essential genetics but more importantly, applying this knowledge while planning a breeding. The science and fundamentals behind breeding dogs sometimes are overwhelming and confounding to many fanciers, both rookies and veterans alike. This includes, and I mention just a few of the most important factors, the Coefficient of Inbreeding (COI); Coefficient of Relationship (COR); Homozygosity, Heterozygosity, and Genetic Diversity.

Technically, breeding and mating have the same definitions, but they most certainly are not the same act. By and large, fanciers plan a litter with much anticipation and excitement for perhaps, waiting in the wings, is the next sublime specimen — one slated for greatness in the wolfhound dog world. Adversely, though, many times hounds are mated based on preconditions of show ring wins and phenotype paying no heed to elementary canine husbandry. Additionally, nearly all modern day breeding programs are based on regular appearances of significant names in horizontal pedigrees, with typically five (5) generations listed. What fanciers may not realize is that this obsolete version of genealogy is based on ideological nineteenth-century attitudes that still have firm footholds in mainstream canine husbandry today. Breeders, particularly wolfhound fanciers, must not proceed solely on rudimentary information that originated from social beliefs, but on science. We are living in the twenty-first century, and the science of canine husbandry has evolved, extensively.

Many might consider this surprising, but I believe that Irish Wolfhound breeders need to throw out their misguided dependence on the terms inbreeding, linebreeding, and outbreeding. There are far too many people both misinterpreting and misusing these methods because there is no clear distinction between inbreeding and linebreeding. There are too many gray areas, especially when dealing with purebred dogs and a closed AKC Stud Book. Instead, when propagating our breed, a good understanding of genetic fundamentals is mandatory, and we must apply this insight judiciously. Here are what I believe to be the most relevant to our situation today with simplistic definitions:

Coefficient of Inbreeding (COI) - Inbreeding is caused by the same ancestor showing up on both the maternal and the paternal sides of the pedigree. The COI measures the probability that both alleles of any gene are inherited from the same ancestor, and therefore, it is an indicator of homozygosity. Interestingly, nearly all Wolfhound COI's are underestimated as they are based, incorrectly, on too few generations such as

five or even ten generations. Reviewing a reduced number of generations produces insufficient information, and is a faulty custom that conceals a hound's actual state of inbreeding. It is a mathematical truth that statistical data is more and more accurate the larger the sample size.

Next is the **Coefficient of Relationship (COR)** which is a measure of the level of blood relation, aka consanguinity, between two given hounds. In short, the coefficient of relationship is the significance of an ancestor(s) who may be making major genetic contributions to the dog in question, particularly if the ancestor appears in multiples, as is common in many Wolfhound pedigrees that include Popular Sires. To illustrate a COR calculation, I will use my wolfhound "Ballyhara Cinneide." Her COR with ancestor "Gartha of Ambleside" is 19.10 percent as Gartha appears 714 times through Cinneide's 13th and 20th generations. The COR percentage will rise or fall according to how many times the ancestor saturates the earlier generations. If Gartha appeared 500 times in the later 19th and 20th generations, then the COR with Cinneide would be much lower than 19.10 percent because Gartha's appearances are more distant. COR percentages can be very surprising because genes are individual pieces of information that cannot be diluted indefinitely. When breeding our hounds, we must bear in mind this significant factor as this will have the most meaningful impact on our breed's genetic diversity.

The conventional terms inbreeding, linebreeding, and outbreeding are bandied about far too much. We know that Inbreeding is a mating of dogs who are closely related genetically, e.g., full siblings, parents, and offspring. However, Linebreeding is chiefly the same principle but with variation and is just a weaker form of inbreeding. Incidentally, depending on the breed or species, some geneticists consider an animal 'inbred' if there is the appearance of common ancestors in the first four or five generations of the pedigree. Notwithstanding, many uninitiated wolfhound fanciers do not agree and believe that the presence of common ancestors in the first four or five generations is an example of a linebreeding scheme. Ergo, there is too much ambiguity surrounding linebreeding and its improper use by fanciers who are primarily inbreeding. Next, Outbreeding or Outcrossing is the mating of two unrelated dogs. However, in our breed, this is not possible because all wolfhounds are distantly related. Our resuscitated breed was established by a handful of founders, but even more impactful is the fact that this breed's genealogy has suffered at least four genetic bottlenecks over these one hundred and fifty plus years. To get a bottleneck, not only does one need a Popular Sire, but one whose offspring are frequently and widely used.

According to Silvan Urfer, Dr. med. vet., and his comprehensive Irish Wolfhound research, for all practical purposes, Sanctuary Rory of Kihone accounts for more than 25 percent of the wolfhound breeds' genetic variability. Clonboy of Ouborough represents 20 percent; Kevin of Ouborough (a bitch despite the name) is responsible for 10 percent, and Cragwood Barney O'Shea represents 8 percent. His data

concludes that these four hounds account for 63 percent of the wolfhound breeds' genetic variability, and just ten ancestors account for over 95 percent genetic variability. Per se, these wolfhounds created bottlenecks forming a subpopulation and can be considered Founders as they provided a significant amount of genetic material into the population, as each contributed equally to the next generation. Therefore, the inherited genetic makeup of these few ancestors is no longer a variable, but a constant. In essence, any outcrossing in our breed is surely a distant linebreeding.

Genetic diversity is measured by the number of alleles available in the whole gene pool. We must focus on a severe lack of diversity in our breed which has been exacerbated by an impending bottleneck. In recent decades, four widely used offspring from a Popular Sire has created an imminent Population Bottleneck (Table 1). This bottleneck has the potential to be devastating because it is fundamentally different from previous ones in that it is occurring in a population that is still growing exponentially. First, the far-reaching use of the four prevailing hounds, along with the population increase, has inevitably concealed the significantly increased levels of distantly related ancestors, and the appearances of the bottleneck hounds who have fallen off of the 5 and 10-generation paper pedigrees: incomplete pedigrees that appear to have more unique ancestors. Secondly, the global use of so few hounds hinders genetic variability and has inadvertently spread whatever deleterious alleles they may have had through a preponderance of the wolfhound population. In other words, mutations once rare may be seen as moderately frequent. This is significant for today's conscientious breeder because according to Urfer, it creates a scenario where a particular group of ancestors becomes so widespread within pedigrees that it threatens the availability of alternatives in breeding, and hence, the freedom of breeders to choose other lines that are not subject to the bottleneck. Indeed, many breeders already have hit a brick wall as to where to go next while reviewing their options.

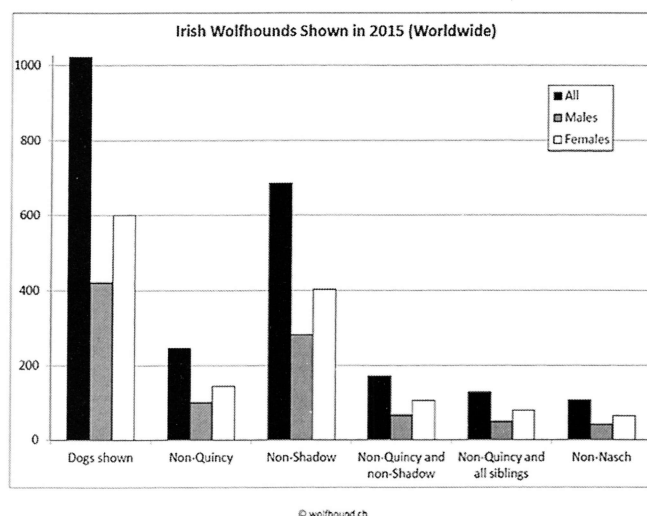
Table 1.

From a bottleneck avoidance point of view,

breeding ...	to ...	is ...
Bottleneck male/semen	Bottleneck female	mostly neutral.
Bottleneck male/semen	Non-bottleneck female	highly detrimental.
Non-bottleneck male	Bottleneck female	slightly detrimental.
Non-bottleneck male	Non-bottleneck female	beneficial.
Non-bottleneck semen	Bottleneck female	highly detrimental.
Non-bottleneck semen	Non-bottleneck female	beneficial.

Dr. Urfer's research findings in the wolfhound populace are alarming as the data exposes such large-scale use of those bottleneck hounds. Just one example: Of the 1,022 Irish Wolfhounds exhibited or entered in a dog show, worldwide, during 2015 alone, only 107 were not subject to the current population bottleneck (Table 2). In 2016, one North American regional club has had the dubious honor of holding the first specialty show with none — zero — no non-bottleneck wolfhounds entered. This may be the first wake-up call for some

Table 2.



fanciers as to the ensuing universal loss of genetic variability in our breed. Consider also the findings by Carol Beuchat, Ph.D. of The Canine Institute of Biology who compiled data for the median heterozygosity of most of the breeds in the Finnish company MyDogDNA (MDD) database. She concluded that the Irish Wolfhound's heterozygosity percentage is only 25.3 percent. Beuchat's results revealed that of the 181 breeds in the MDD database, the Irish Wolfhound ranked number fifteen (15) out of (181) with the lowest heterozygosity rates. To explain why this is important: Genes come in pairs or alleles, and Heterozygote is having a copy of two different alleles for the same trait — these two genes are not identical for any hereditary characteristic. Conversely, Homozygote is identical gene pairs for a corresponding characteristic and having two copies of the same allele determines a particular trait or breeding true for that characteristic. The lower the heterozygosity rate, the higher the level of inbreeding. Parenthetically, Beuchat is also quoted as saying that it would be fair to assume that the average COI in Wolfhounds is at least 60 percent. As well, Dr. Silvan Urfer has yet to find a Wolfhound with a complete pedigree whose inbreeding coefficient is below 30 percent, nor does he believe this is possible.

In conclusion, I wholeheartedly support Dr. Urfer's logic that the way forward now is to breed non-bottleneck Wolfhounds to one another. This may ensure that this population bottleneck will not change into a worldwide breed certainty. I suspect that the future will hold many, many difficulties, as there are only a few non-bottleneck breeders remaining and we, especially, need to come together for the preservation of genetic variability in this magnificent sighthound. Keep foremost in mind a passage by Joel Samaha in his 1985 forward - "We are fulfilling our custodial responsibility to leave the breed in at least as good condition as we found it."

Illustrations courtesy of Silvan R. Urfer, DMV