Breeding Winners to Winners

and "Soft Wired Breeding"

Part II

By Dr. Carmen L. Battaglia

This report updates the findings and disappointments found among breeders who bred quality bitches to high quality males with unimpressive results. The study was first discussed in Part I. In this article, I will continue with a discussion about the methods and information used to select the sires and dams and the preliminary finding that most of the breeders believed that they should have had better results given that the breedings involved the "best to the best". Further analysis showed that most of the decisions about the selection of sires and dams placed emphasis on one or two traits and most of the breeders stated they had only a limited knowledge of genetics.

The interviews further confirmed that breeding plans were not used nor was pedigree analysis that involved determining the strengths and weaknesses of the sire and dam. As noted in Part I, Mendel in the 1850s focused on how specific traits can be passed down from one generation to the next. His First Law involved the dominant and recessive genes and the methods he used to find them. In this study, one of the breeder problems involved not knowing if either the sire or dam was a carrier, normal or an affected for certain disorders. Mendel's discovery was originally difficult to understand, but another researcher named Reginald Punnett found a way to explain what Mendel discovered using letters of the alphabet to explain inheritance. Punnett used capital letters (B) to represent dominate genes and lower case letters (b) to represent recessive genes. Figure 1 illustrates how Mendel's research would have approached this problem based on what was known about the parents. Figure 1 shows that a black female (Bb) was bred to a brown male (bb) and they produced a litter of five pups, two were black (Bb, BB), and a third pup (bb) a chocolate. The key to understanding what would occur is in knowing about the parents.

Figure 1. DNA Results

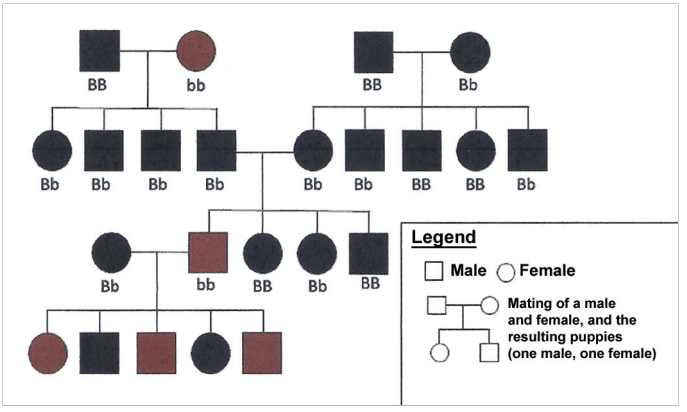

Figure 1 illustrates how Punnett explained what Mendel found when he said that each parent and each ancestor has two alleles for every gene: one allele is inherited from the dam and the other one is inherited from the sire. The combination of the two alleles carried by each parent/ancestor is called a genotype. When a puppy receives the exact same allele from its father and its mother, it is said to be homozygous for that allele and it

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will have a homozygous genotype for that gene. Alternatively, when a puppy receives different alleles from its mother and father, it is said to be heterozygous and that puppy will have a heterozygous genotype for that gene. Figure 1 shows a litter of five pups–three are chocolate and two are black. The two black pups are also carriers of the color chocolate because they each received one recessive gene (b) from their father.

Knowing about genetics makes us better educated as breeders, but it does not always help us make better breeding decisions. For example, knowing about Mendel helps in planning and trying to predict traits but it does not answer the question about what breeding method to use. For example, when and how to use Inbreeding, Linebreeding and Outcross was a lingering problem. The answer lies in having a good understanding of these three methods. If in a litter there is one good pup but all of its littermates are average or below average in quality, the one good pup is likely to carry many of the traits, faults or undesirable characteristics observed in its littermates. In this study most of the breeders said they used an Outcross breeding. A few reported using a Line breeding and none used an Inbreeding. By definition, **Inbreeding** means breeding dogs that are closer than cousins to cousins. **Linebreeding** means breeding cousins to cousins and **Outcross** means a breeding where there are no common relatives in the first four generations.

Since most of the breedings were Outcrosses, the results were not surprising because Outcross breedings, which are often described as "type" to "type" breedings, are based on appearances and the winning records of the sires, dams or ancestors rather than on the traits observed in the pedigrees of the ancestors. Many times these breedings are described as mating the winners to winners, or the "best to the best". In practice, these breedings fail to take advantage of what the science of genetics has taught us about inheritance and pedigree analysis. Outcross breedings are best used when new genes are needed that are not present. They result in pups that are likely to have many of the traits found in the breed.

Inbreeding has an important historical purpose dating back to the beginning of most breeds when it was widely used to establish the function of a breed and its needed traits and characteristics. Inbreeding was a good way to stamp in these needed traits while establishing breed type (silhouette, coat, color, etc.). In those days, the use of close relatives who shared a common set of genes allowed breeders to concentrate and establish specific traits. Once a breed was established, inbreeding declined because it also was known to hide problems. Breeders learned over time that Linebreeding was a better alternative because it offered many options with less risk.

The well-known breeder and writer Lloyd Brackett had much to say about Inbreeding and Linebreeding. He often reminded breeders of the need to use Linebreeding as a way to make improvements. When he heard breeders recommending its use he would raise the question, "linebreed to whom? The sire, the dam, to one side of the pedigree or to both sides?" Most did not have an answer to his question. That lack of understanding about breeding methods continues to be a lingering problem today.

The history of pedigree analysis shows that when Inbreeding, Linebreeding or Outcrosses are correctly used, important traits and characteristics have been produced. Experience shows that Inbreeding and Linebreeding should be avoided if both the bitch and the prospective stud dog carry a common fault. When a weakness or fault is observed in the bitch, breeders should find a stud dog with ancestors who do not carry that same fault. It is also safe to say that the recurrence of certain traits further back more than four generations is not likely to be a reoccurring problem and can be easily lost via careful selection. The challenge for breeders is to find sires who not only possess the attributes needed but are dogs who come from dogs who also had the desired attributes. The breeding of better dogs should include plans to maintain genetic diversity. It is essential for the fitness and survival of a breed [7, 11], meaning that breeders should be concerned about the desirable characteristics while guarding against genetic diseases. With the advancement of genetic testing, breeders can look at the actual genetic diversity of a dog rather than worrying about it or relying upon calculating the level of inbreeding.

In this study of interviews with the breeders, it was confirmed that the most popular method used was the outcross, meaning that the sires and dams were unrelated dogs and would introduce new genes resulting in a wide variety of breed characteristics in the litters. Given this information, each generation of outcrosses will also introduce more new genes, lessening the opportunity to concentrate genes and establish litters with consistent traits throughout. Outcross breedings are sometimes called "Soft Wired Breeding". It is a term that means the breeder relies on breeding type to type or the winners to the winners as the preferred method of selection. The problem with it is that in a three generation pedigree there are 14 ancestors, each with seven traits of conformation (head, neck, ears, front, back, rear, tail). Soft Wired breeding ignores most of the traits in the 14 ancestors.

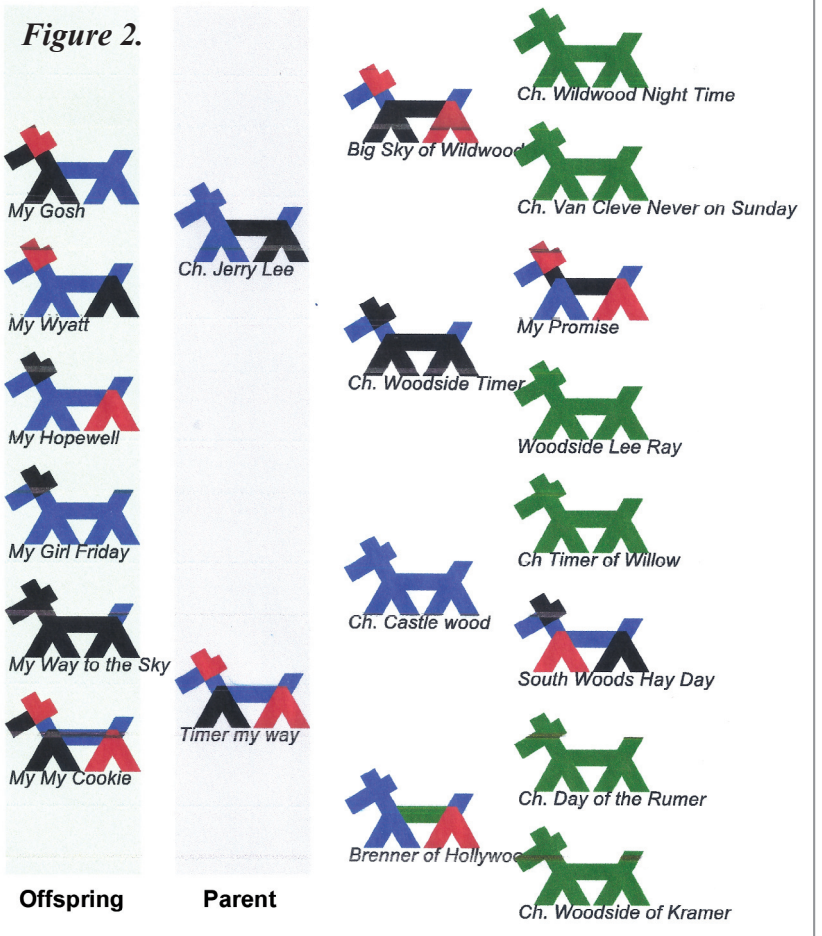
A better strategy is to make incremental improvements with each breeding which means taking small steps leading to big results. This is a building block approach that takes longer, but produces better results. The pedigree most suited for capturing and displaying this kind of information is the Stick Dog pedigree. It allows breeders to evaluate each ancestor based on their seven traits of conformation. The Stick Dog Pedigree uses the breed standard and color coding. The traditional pedigree displays the name of each ancestor, titles, etc.–none of which are heritable. The Stick Dog pedigree with four color codes for the seven traits of conformation as shown in Table 1 allows a breeder to see the strengths and weaknesses of a pedigree at a glance.

In Figure 2, the ears of "Ch. Jerry Lee" are coded blue, meaning they are correct based on the breed standard. The ears of his father (Big Sky of Wildwood) are coded red, meaning they are faulty based on the breed standard. A breeder evaluating this pedigree would see that, while the sire of the litter ("Jerry Lee") has correct ears, the grandsire of the litter does not. A third ancestor also has those same faulty ears. In the litter that was produced, three of six pups had faulty ears which could be suspected based on the pedigree. The value of color coding traits helps to identify the strengths and weaknesses of a pedigree. Fortunately for breeders software has been written for Microsoft computers that supports the Stick Dog pedigree. It automatically codes ancestors (green) if their traits are unknown. Further analysis of Figure 2, shows that the strengths and weaknesses of 8 of 14 ancestors are known. Six are coded green, meaning their traits are not known. When the amount of missing information is significant, the risk for surprises increase. The Stick Dog pedigree has proven to be of one the most powerful tools for planning and predicting litter quality. Information about this software is available at www.breedingbetterdogs.com.

Table 1. Color Coding Traits

Code	*Rank of Quality Based on Breed Standard*
• Blue	Correct based on breed standard
• Black	Could be improved
• Red	Is a fault
• Grey	Serious fault or disqualification
• Circle/green	Missing information

Figure 2.



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Carmen L. Battaglia holds a Ph.D. and Master's Degree from Florida State University. An AKC judge, researcher and writer, he is a leader in promoting ways to breed better dogs. He is the author of many articles, several books and is a popular TV and radio talk show guest having appeared on Animal Planet several times. His seminars on breeding dogs, selecting sires and choosing puppies have been well-received by breed clubs all over the country. Those interested in learning more about his articles and seminars should visit the website http://www.breedingbetterdogs.com