



# THE FOUNDATION STOCK OF A BREEDING PROGRAM

By Dr. Carmen Battaglia

*This article first appeared in The Canine Chronicle, August 2009,  
and is reprinted with permission.*

## **Adversity Does Not Build Character, It Reveals It**

When it comes to the animals that make up the foundation stock of a breeding program and the plan for a particular individual, the dog world is chock full of folklore, rumors and general opinion. This mix of ideas confirms there is a general lack of agreement about the planning needed to find the best dog(s) in order to eliminate unwanted diseases and correct certain traits of conformation (Brackett, 1960). Such an approach requires planning and the willingness to think smarter using new ideas. With new ideas and improved management, breeders can make better selections and reduce the confusion caused by the uncertainties surrounding the risk of producing the unwanted traits and disorders that lie hidden within the pedigrees of the breeding stock.

## **FOUNDATION STOCK**

The building blocks of a breeding program are called the foundation stock. These are the dogs whose traits and pedigrees serve as the base from which future generations will be produced. Therefore, these individuals should be healthy and as close to the breed standard as possible. Finding those who are best suited for this purpose must be done with care and study. Without a good understanding about the strengths and weaknesses of their pedigrees and how to manage

risk, frustration becomes the inevitable. A few examples illustrate this point. Let's begin with one of the most popular myths found among those who are the least skilled in selecting foundation stock. It is the notion that one breeding to a superior animal can be used to eliminate health problems. Occasionally this seems to work, but only because most litters do not show health problems by the time they are sold. This is what leads many into believing they are on the right track. Not seeing their pups after they have been sold misleads many breeders about the health and quality of their litters. Too often breeders rely on buyer feedback as the primary means by which they determine if they are making progress. If all of the pups from each litter were evaluated at maturity a different story might be told. In a mobile society that relocates with regularity it is less likely that puppy buyers will take the time to give breeders feedback. This causes much information to be lost particularly if there are health problems that have a late onset. In a majority of these instances, what a breeder could learn will go unnoticed.

Another myth about selecting foundation stock is the folklore that surrounds the use of outcross breedings. In the past, the outcross was thought to be a useful breeding method for hiding or protecting breeders against recessive traits. This method was thought to improve

risk aversion. Misguided about the outcross, many breeders used this method in an attempt to avoid genetic disorders. Others simply excluded those found to be affected or known to be a carrier. Neither of these approaches have proved to be very effective. Time, experience, and science have demonstrated that those who repeat outcross breeding in an attempt to dilute the detrimental effects of the recessive genes might hide the carriers, but only temporarily. The risk of producing them and their unwanted traits does not diminish because the recessive genes cannot be diluted; they are either present or not (Bell, 2000).

Today we know that the principles described by Mendel (1850's) can be used to make improvements. He discovered that the recessives can skip one or more generations before they reappear (Battaglia, 2009). This means that breeder should not rely on the rumor and folklore that surrounds many stud dogs. Instead they should do their own homework and learn about their direct ancestors (14) and the littermates of these ancestors. As the number of relatives studied increase, so do the opportunities to understand the complexities of the problems to be solved (Felix, 2005). Therefore, when pedigree analysis is coupled with breeder tools, the odds begin to shift in the direction of the breeder.

The most successful breeders are central figures in their breed because they are the individuals who select the stud dogs, choose the method of breeding (outcross, inbreeding, and line breeding) and provided advice to the buyers about puppy management, AKC registration and micro-chipping. In short, they have distinguished themselves as being "in the know".

Seasoned breeder understand that the job of making improvement in never done and that the process is not straightforward or easy. It has its ups and downs and a sampling of the unexpected. One of the challenges facing most is to understand the real meaning behind the time tested principle that "the strength of ones breeding program is based on the quality of its bitches." Over the years this popular phrase has been passed down from father to son as folklore. The rationale and data necessary to support it did not surface until researchers interested in this subject began to study why this principle worked in practice. Hedhammer (1979) led the way when he conducted a longitudinal study using 401 litters (or approximately 2,500 German Shepherd Dogs). His study also demonstrated the importance of the dam's role for improving structural soundness. He found that the dam's influence on her offspring was greater than that of the sire by as much as ten percent. His study supports the notion that the dam is central to making improvements, particularly in the muscular skeletal areas. Hedhammer was not alone in his efforts to uncover the usefulness of this idea. Hutt (1979), a famous geneticist, in his book *Genetics for Dog Breeders*, also refers to research that supports placing emphasis on quality dams in the breeding program.

After years of effort, five principles have been associated with the selection of foundation stock:

1. Use only quality bitches.
2. Remember that the traits and characteristics seen in a puppy may change by the time it becomes mature.
3. Outcross breeding do not necessarily produce dogs free of recessive traits or lessen the risk of producing carriers.

4. One breeding will not concentrate enough genes to produce a litter of superior animals.
5. Success requires the combination of quality animals, good management and proper nutrition.

The decision to select certain individuals as foundation stock begins with a careful study of their traits along with the relatedness of their close ancestors. Included in this process is an understanding of the modes of inheritance. Modes of inheritance are useful because they help in our understanding of how the desirable and undesirable traits are carried forward from parent to offspring. For example, a trait might be produced by breeding two carriers to each other or it might involve only one carrier acting alone. Many of the traits and diseases that are of interest to breeder seem to have a polygenic mode of inheritance (HD, heart disease, etc.) which means that many genes are involved. Without DNA test, managing the recessives becomes a more difficult problem. At the current rate of discovery, it appears that DNA tests for disorders caused by polygenes will be slow in coming. This should not discourage breeders because other protocols such as laboratory results, radiographs, and other phenotypic test, when combined with pedigree analysis, can still produce significant improvements in just a few generations.

### TOOLS OF A BREEDER

- My AKC (My Dogs, Dogs Of Interest)
- AKC Record Keeping Service
- Pedigrees (Traditional, Stick Dog, Symbol)
- DNA Health Tests (n=60+)
- Continuing Education –
- Free at: [info@breedingbetterdogs.com](mailto:info@breedingbetterdogs.com)
- Microchip and AKC Registration
- Statistics – Risk Level

- Health Aids – Keno Pet Pad
- Dual Sired Litters

### HIP DYSPLASIA

No one doubts the importance of structural soundness in the selection of foundation stock. For purposes of this discussion hip dysplasia (HD) will be used to illustrate the importance of this process and how the quality of information can influence the outcome. HD is a polygenic disease that was first discovered in 1935. As the popularity of the working dog increased in the late 1940's it became evident to breeders, dog owners, and veterinarians that the frequency of this disease would only be reduced when breeders learned how to manage the carriers in their pedigrees (Battaglia, 2009 a,b). Knowing that a dog has a defective hip based on a radiograph is only the beginning. The key to producing dogs with better hips involves an analysis of the fourteen ancestors in a three-generation pedigree along with the littermates of these ancestors. To help in this process, the Orthopedic Foundation for Animals (OFA) has provided information about the hip status of animals and their offspring through a database search option ([www.ofa.org](http://www.ofa.org)). They have also published the following guidelines and recommendations (Keller, 2007) for those interested in producing dogs with normal hips:

### GUIDELINES AND RECOMMENDATIONS

1. Breed normal dogs that come from normal parents and grandparents. This recommendation places emphasis on the immediate three generations (50% genetic contribution from each parent, 25% from each grandparent and 12.5% from each great grandparent.
2. Breed normal dogs that have more than 75% normal siblings.

This recommendation is more difficult because most animals in a litter become pets and are not radiographed.

3. Select dogs for breeding that have a record of producing a higher than breed average percentage of normal progeny. A stud dog with a superior track record (90%) normal progeny is a better choice than another with only 50% normal progeny. The OFA database can be used to search the records of stud dogs.
4. Choose replacement stock that exceeds the breed average. This recommendation assumes that either the breed club or the breeder collects this kind of data and can calculate the breed average.

## CONCLUSION

In summary, three major considerations apply to the selection and use of foundation stock. First, their identification must be based on the quality of their conformation, health, and temperament. Second, the information collected about their ancestors should serve as convincing evidence that quality is present. Third, breeders must have the courage to use the new techniques and guidelines that have been developed. When these efforts are combined with pedigree analysis, the results will yield quality foundation stock whose offspring can be saved to further improve a breeding program.

In a perfect world each breeder would have all of the information needed about all of the ancestors in their pedigrees and they would have a DNA test for each trait and disease. This is not yet possible; however there are more than 60 DNA tests available. For specific diseases and laboratories go to: [www.breedingbetterdogs.com/articles](http://www.breedingbetterdogs.com/articles).

## REFERENCES:

- Battaglia, C., 2009 a. Managing the carriers, part 1. Canine Chronicle, March, 2009, pp. 180-182.*
- Battaglia, C., 2009 b. Managing the carriers, part 11. Canine Chronicle, April, 2009, pp. 162-166*
- Bell, J., (2000) Choosing wisely, American Kennel Club Gazette, New York, N.Y., Aug., Vol. 117, Number 8, p. 51*
- Hutt, F., 1979, Genetics for Dog Breeders, WH Freeman Do., San Francisco, CA. p. 128.*
- Keller, G, 2007. The use of health databases and selective breeding. Orthopedic Foundation for Animals, St. Louis, MO. Pp. 9-11*
- Felix, J., 2005. Use of canine genetic testing in breeding programs. Proceedings, Tufts Canine and Feline Breeding and Genetics Conference, Sept., 30 – Oct., 1, Sturbridge, MA.*
- Hedhammer A., Olsson S-E, Anderson S-A, et al, 1979. Study of heritability in 401 litters of German Shepherd dogs. Jam Vet Med. Assoc. 174: 1012-1016*

## ABOUT THE AUTHOR

*Carmen L. Battaglia holds a Ph.D and Masters Degree from Florida State University. He is an AKC judge, researcher, and writer, and he continues to be a leader in promoting ways to breed better dogs. He is the author of many articles and several books and has appeared on TV and radio talk shows. 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 [www.breedingbetterdogs.com](http://www.breedingbetterdogs.com)*