**Norwich Terriers, 11-18**

Title: Working together for the common good: Genetic variation

The Norwich Terrier Club of America was fortunate to have Dr. Jerold Bell (Tufts University) speak at our annual health seminar in October. His presentation was chockfull of important information about population genetics and tailored to our Norwich Terriers. His insights about breed maintenance, genetic diversity, and the "popular sire syndrome" were the inspiration for this column; I have borrowed heavily from his material.

All breeds have influential ancestors. Ch. Chidley Willum The Conqueror is one example of an influential Norwich Terrier frequently found in our pedigrees. He made history in 1994, when he defeated 2,580 champions at the Westminster Kennel Club Dog Show to become the first Norwich Terrier awarded Best in Show. Willum produced 17 litters, but it was through his sons and grandsons that his influence propagated widely —his sons collectively produced 149 litters (of which 83 were sired by two popular sons). The contributions to the gene pool of influential ancestors, like Willum, are appraised by breeders over time, through generations of their offspring.

The "popular sire", in contrast, quickly disseminates his genes throughout the gene pool by producing a large number of puppies, without the benefit of evaluation over time. He's likely to have phenotypic characteristics desired by breeders and is often a top winning show dog. Breeders are taught to “breed the best to the best” to improve their bloodlines, so it follows that these winning dogs are more likely to become popular sires.

Dr. Bell described why excessive use of any dog can be harmful to the overall breed. Because the popular sire’s genes are spread widely and quickly, the long-term effects of his genetic contribution will not be known for several generations. So, there are risks. All dogs have genetic mutations —some may be dominant and expressed in the phenotype (and easily removed from the population). But others may be faulty autosomal-recessive genes, carried silently until combined with another carrier. The popular sire will pass on both good and bad genes to his puppies and, as time goes on, his recessive mutations will become more common in the genomes of his descendants. It may take several generations before any ill effects are known. When the sons of a popular stud dog become popular sires themselves, the effect of the popular sire’s genetic contribution, both good and bad, is multiplied. Besides increasing the risk of autosomal-recessive conditions, the overuse of popular sires reduces the gene pool.

Genetic variation is essential for breed maintenance. When our quality bitches are bred to the same dog, other quality dogs will not be used and we lose the opportunity to enhance the gene pool. If problems attributed to a popular sire manifest at some point in time, "backing out" can be difficult. It may be hard to find unrelated dogs, and purging the offspring of the popular sire also removes the genetic contribution of the high quality bitches mated to him. For these reasons, Dr. Bell explained, the popular sire syndrome is the single most influential factor in restricting breed gene pool diversity.

*So what's a breeder to do?* We know that breeding quality dogs depends on selection. That's why it's tempting to take our best bitches to the prize-winning popular stud dog. If he is truly worthy, whether line-breeding or out-crossing, the use of a popular sire should be gradual, and his contribution to the gene pool should be evaluated over several generations based on his offspring who themselves are bred. Ideally, his influence is through multiple offspring so that different combinations of genes are spread.

Maintaining genetic diversity within the breed requires that breeders work together and use a variety of dogs in their breeding programs and monitor the health and quality of their puppies. This requires a commitment to the "common good" of the breed, ahead of individual interests. For example, it might require limiting the use of your own popular stud dog, and forsaking that big stud fee! The "common good" is to everyone's advantage, and surfaces in discussions about the problems in our society and social responsibility. In the maintenance of Norwich Terriers, individual interests and the common good are not mutually exclusive. As breeders, we have different interpretations of the breed standard and what defines the ideal Norwich Terrier. This diversity in opinion helps maintain diversity in the gene pool as breeders select different breeding stock to develop their own individual, distinct lines.

We need to avoid the popular sire syndrome, wait and evaluate the offspring, and use a variety of dogs to expand the gene pool and provide diversity. Working together means that breeders monitor genetic breed-related disorders and share health information, and select their breeding stock on the basis of health and overall contribution to the breed.

Jane R. Schubart, AKC Gazette Breed Columnist ascot.js@gmail.com; The Norwich Terrier Club of America website: www.norwichterrierclub.org (717) 635-8464