

Looking To The Future

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Inbreeding was common practice back when many breeds including the Norwich Terrier were being developed. With such diverse antecedents as we have in our breed, it was the method to set type. But the downside was the risk of reduced genetic diversity.

The natural outgrowth of inbreeding, line-breeding, was espoused by such giants as Lloyd C. Brackett. He advised mating animals who are “closely related to the same ancestor ... by using for parents dogs who are closely related to that ancestor.” The objective was litter consistency. Breeders who heeded this advice, while succeeding in terms of cementing conformation traits, further limited the gene pool. In effect, we must now cope with the negative 20th-century practices, not least of which are some fertility and health issues.

The lynchpin to the future of our breed is health. In Brackett’s time, outcrossing and out-breeding were the only way to introduce new, hopefully stronger genes to counteract the deleterious effects of doubling up on negative recessive genes carried by related animals. Outcrossing is the mating of two dogs that are the products of linebreeding but of two distinctly separate lines. Out-breeding is the mating of two dogs who not only are the products of two distinctly separate lines but are not the products of line-breeding themselves. Fortunately we’ve progressed beyond this obvious and clumsy way of making breeding decisions.

Here’s how to help future generations: Test—X-rays for hips, palpation for knees/elbows, Doppler for hearts; scoping for UAS. We can also participate in studies and trials. In addition we must study 10-generation pedigrees to assess inbreeding coefficients. But in addition we can now look to exciting new developments in genetic testing.

Chromosomes come in pairs, one set from each parent. These in turn contain DNA, and segments of the DNA contain genes. If both alleles in the gene are of the same type they are homozygous. If they are different, they are heterozygous. Studies have shown that increasing heterozygosity can enhance reproductive fitness. A new test called Optimal Selection can help in this regard.

According to Mars Veterinary’s website, Optimal Selection “uses a small blood sample to analyze a dog’s DNA on many key chromosomes. The objective is to compare the chromosomes of potential breeding pairs. By comparing the potential sire’s and dam’s chromosomal similarities and differences, the breeder is given the opportunity to diversify the genetic makeup of their puppies and reduce the risk of recessive medical conditions while still selecting for the physical and behavioral traits that are important to them.”

OS is already paying off. A pilot study conducted with the Dandie Dinmont Club of America has seen very positive results in terms of average litter numbers and health. Also, supporting the contention that conformation does not have to be sacrificed to diversity, a Dandie from the first OS litter placed in the group at the Vancouver (Washington) KC show this past October.

Angela Hughes, DVM, Ph.D., Veterinary Genetic Research Manager for Mars Veterinary, advises breeders to still select potential mates through phenotype, pedigree compatibility, and standard health tests, but then also to have stud candidates tested (along with your bitch) to determine which

offers the least amount of chromosomal overlap. Then when the litter arrives, test each puppy to find out which carries the rarer genetic profile. This will ensure genetic diversity for future generations.

Dr. Hughes will be speaking at our national specialty in St. Louis on Thursday, June 14. Don't miss it.

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