

Editorial

The breeding of pedigree dogs: Time for strong leadership

A recent article in *Genetics* looked at population structure, genetic diversity and inbreeding in purebred dogs, not least as dogs are being used increasingly as models of human diseases (Calboli et al., 2008). The authors accessed the UK Kennel Club's extensive registration database and analysed the pedigrees of 10 breeds with relatively large numbers of dogs registered over about eight generations.

The timing of the report is important as its publication was followed a few months later by a BBC television programme, *Pedigree Dogs Exposed*, shown at prime time on 19 August 2008.¹ This was a hard hitting documentary, highlighting diseases such as syringomyelia in cavalier King Charles spaniels, and bulldogs that have been bred in such a way that most can no longer give birth unassisted. The programme's message can be summarised in the words of the RSPCA's Chief Veterinary Adviser that *'the welfare and quality of life of many pedigree dogs is seriously compromised by established breeding practices for appearance, driven primarily by the rules and requirements of competitive dog showing and pedigree dog registration'*. The Kennel Club hit back stating that the programme appeared to have *'a very specific agenda repeating prejudices, providing no context for the debate, and failing to put forward any constructive proposals'*, and that it *'left viewers with the mistaken impression that all pedigree dogs are riddled with a wide range of health problems and that the dog community is doing little or nothing to improve the situation'*.² The Club subsequently announced that it was to lodge a complaint with the UK's broadcasting regulator, Ofcom, as the programme was considered to be unfair and had failed to reflect the Kennel Club's *'deep commitment to the health and welfare of dogs and responsible dog ownership'*.³

The British Veterinary Association commented that this was an exposé of the very worst elements of pedigree dog breeding.⁴ The Association stressed that it continued to work closely with the Kennel Club in developing canine health schemes and in supporting the significant amount of genetics research funded by the Kennel Club's Charitable Trust.

So, despite the subsequent widespread outcry and publicity (and the understandable fury of a number of breeders), it does seem that at least the BVA and the Kennel Club are working towards the same end. But it has become increasingly clear that there are issues that need to be addressed now, and with some urgency. The stated primary objective of the Kennel Club is *'to pro-*

*mote in every way, the general improvement of dogs'*⁵ and of course many of its members and governance personnel are pedigree dog breeders. It is right therefore to pause and consider the extent to which welfare may have become subordinated to certain breed practices. It is not difficult to see how, after generations of owners have spent years focusing on the morphology of their dogs, some find it hard to see the proverbial wood for the trees. Breed standards can easily become entrenched in the minds of breeders, buyers and fanciers, as well as those (often interested parties) who are involved in the judging (and so promotion) of a breed and its 'established' characteristics.

There have been many pedigree analyses of other species of domesticated animals, but few on dogs. The study by Calboli et al. (2008) was therefore welcome, not least because it was so extensive, involving 2.1 million dogs. With the exception of the greyhound (for which the Kennel Club's pedigree records are incomplete as the database does not include most greyhounds bred for racing), all breeds in the analysis were numerically large, with numbers of registrants per breed exceeding the median number for all 207 Kennel Club breeds by at least five-fold. Indeed, the 10 breeds included in the analysis, while representing only 5% of breeds, accounted for 37% of all Kennel Club electronic pedigree records.

What seems to have been largely lost in the debate is that the study by Calboli et al. (2008) was actually enabled by the UK Kennel Club, as a reflection of its on-going commitment to genetics research and its desire to secure a scientific platform to obtain breeder support to increase genetic diversity. Indeed, one of the authors of the paper, Dr. Jeff Sampson, is the Kennel Club's Canine Genetics Co-ordinator, who has published widely, including contributing to the development of the canine genome map.

One of the major concerns expressed in the BBC programme, as exemplified in a press release, was that *'deliberate mating of dogs that are close relatives is common practice and the Kennel Club continues to register dogs bred from mother-to-son and brother-to-sister matings'*. However, contrary to implications of the first part of this claim, the results of the pedigree analysis of dogs with almost complete pedigree records for six or seven generations showed that, on average across the 10 breeds analysed, 88% of dogs had an inbreeding coefficient <0.10 (Calboli et al., 2008). To put this in context, the mating of first-degree relatives (e.g. mother-to-son, or brother-to-sister) produces progeny with an inbreeding coefficient of at least 0.25, and matings amongst second-degree relatives (e.g. an animal with a grandparent, or half-brother to half-sister) produce prog-

¹ See: <http://news.bbc.co.uk/1/hi/uk/7569064.stm>.

² See: <http://www.doggenetichealth.org/response.php>.

³ See: <http://www.thekennelclub.org.uk/item/2040/23/5/3>.

⁴ See: <http://www.bva.co.uk/newsroom/1343.aspx>.

⁵ See: <http://www.thekennelclub.org.uk/>.

eny with an inbreeding coefficient of at least 0.125. Taking account of the fact that this latter limit is higher than the 0.10 that delimits 88% of dogs, the analysis suggests that more than 90% of dogs in the 10 breeds studied were the result of matings less close than second-degree relatives.

Of course some animals do result from matings of first-degree relatives, and a strong case can be made for the Kennel Club to stop registering the progeny of such matings. Furthermore, the situation in some of the numerically small breeds is likely to be worse than the picture presented here. However, the results of Calboli et al. (2008) provide strong evidence against the suggestion that close inbreeding is common practice, at least so far as the 10 breeds in the study are concerned. It is to be hoped that Calboli et al. (2008) will revisit their analysis very soon to provide exact figures on the extent of close matings (both now and in past years) for all 207 Kennel Club breeds.

All of this is not to deny the many concerns with pedigree dog breeding: the problems created by some breed standards are very serious and have major welfare implications, and the mating of close relatives remains genetically undesirable.

Recommendations for practical solutions were proposed nearly 10 years ago (McGreevy and Nicholas, 1999). Suggesting that some show standards placed more importance on appearance than on functionality, and that breeders ‘*compete with one another to see how well they can produce phenotypes that conform to a written standard – including traits that have, at best, questionable welfare benefits*’, the authors focused attention on limited gene pools in numerically small breeds and cautioned that the known lists of inherited genetic defects were just the tip of the iceberg. McGreevy and Nicholas (1999) urged introducing ‘new’ genetic material into the stud books of numerically small breeds – a seemingly heretical act that, in fact, can greatly benefit a breed without, in itself, affecting breed type. They also encouraged pedigree breeders to join forces to breed first-cross animals to be sold as neutered pets – a practice that would reduce the risk of inherited disorders and would strengthen the role of stud breeders as the source of pets. They recognised the pressing need for greater funding to identify more genetic markers for the control of inherited disorders and for geneticists to communicate better with breeders.

More recently, McGreevy (2007) re-examined the problems of certain closed stud books, with morphological criteria creating unacceptable conformation and temperament defects, pain, physiological dysfunction and distress, leading at times to the need to euthanase dogs on humane grounds as their quality of life had become so compromised. He discussed a strategy, first suggested in 2005, where veterinary practices would contribute to the continual collection of data on the incidence of inherited disorders (McGreevy et al., 2005). The data would then be submitted automatically to one central site, generating real-time reports on trends in the prevalence of diagnoses of inherited disorders. This exciting proposal would allow potential pet buyers, breeders and veterinarians to draw informed conclusions, on the basis of which positive proactive decisions could be taken. The time has come to give serious consideration to this strategy.

Breeders and regulators have no choice but to make the welfare of the dog paramount. This means that breed standards must be reviewed scientifically and rationally as a matter of the utmost priority. Enforcement technology is available thanks to sophisticated IT and data retrieval and storage systems, with

microchipping to guarantee correct identification. As Paul McGreevy commented in *New Scientist* in its issue of 11th October 2008,⁶ ‘*the best dog breeders have the passion to bring about the necessary transformation. They are very good at what they do – the problem is that what they currently do is not very good. Welfare charities, veterinary associations and dog breeders must unite in using the latest advances in genetics and epidemiology to find a new model of dog-breeding practice*’.

Armed with welfare-friendly breed standards, breeders will have many genetic tools at their disposal. As shown so elegantly by Karlsson et al. (2007), we now have sufficient DNA markers to create a DNA test for most single-locus disorders. In the next few years, breeders will be provided with a veritable arsenal of DNA tests that will enable them to eliminate many more single-locus inherited disorders from their breeds. They will also be able to do a far better job at decreasing the incidence and severity of multifactorial disorders via the increased use of estimated breeding values, in some cases calculated partly on the basis of the genotypes at tens or possibly hundreds of DNA marker loci.

Change will take time and will require difficult negotiation, which may be a real challenge for the Kennel Club in UK and other breed standard regulators around the world. However, it is a challenge that must be addressed or governments, under public pressure, are likely to get involved and impose legislation to protect the health and welfare of man’s favourite companion.

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⁶ See: <http://www.newscientist.com/contents/issue/2677.html>.