The Welfare of Pedigree Dogs

By Albert Tsang

Word count: 990

Introduction

Since Victorian times, the breeding of pedigree dogs has been performed under a closed studbook system, which allows only descendants from an initial population of animals to breed (McGreevy, 2008). This system inevitably increases the risk of inherited disorders and jeopardises the health and welfare of many animals (McGreevy, 2008). This paper reviews recent literature investigating genetic diversity and the incidence of inbreeding in purebred dogs as well as exploring the consequences of these breeding practices on the welfare of animals.

Discussion

Inbreeding and loss of genetic diversity in any animal is known to cause an increase in the prevalence of genetic disorders (Nicholas, 2003). A recent study by Calboli *et al*. (2008) focused on investigating the population structure and incidence of inbreeding in purebred dogs. By developing novel approaches for examining population structure and using previously defined formulae for presenting inbreeding, Calboli *et al*. (2008) analysed the electronic pedigrees of 10 breeds of dogs (2.1 million dogs in total) from the UK Kennel Club database. Extremely inbred dogs were identified in each breed and the effective population size was estimated to be between 40 and 80 dogs for all but two breeds. Alarmingly, the effective population size of these breeds was several orders of magnitude smaller than the actual number of dogs registered in each breed. It was also discovered, in all but three breeds, that greater than 90% of unique genetic variants are lost over six generations, which indicates the dramatic effect that breeding patterns have on genetic diversity (Calboli *et al*. 2008). Although this was a large-scale study of many generations of pedigree dogs, it mainly concentrated on the most popular breeds; the incidence of inbreeding and loss of genetic diversity could be a lot higher in rarer breeds with smaller populations. This study asserts a need for change in breeding practices to improve the health and welfare of pedigree dogs. By opening studbooks and relaxing breed rules, controlled out-crossings could be performed to enhance genetic variation within breeds (McGreevy, 2008; Calboli *et al*., 2008).

In conforming to stringent breed standards, breeders have had to rely on inbreeding that has resulted in loss of genetic variability and led to the high prevalence of recessive genetic disorders. A study performed in Poland, based exclusively on the Polish hound (a rare breed of scent hound originating from eastern Poland), also looked at genetic diversity through analysis of pedigree records (Glazewska, 2008). Data from 247 litters born at 105 kennels were evaluated to characterise the genetic variability of the breed and assess breeding practices over a span of 44 years (1960-2004). Through extensive analysis of the pedigree, the authors found that the breed originated from only 19 founders, with only two individuals making a predominant contribution to the gene pool (Glazewska, 2008). This finding relates to the overuse of the “popular sire”, whereby, a small number of individuals father most of the litters in a breed, due to their desirable traits (Calboli *et al*., 2008). The low number of founders and the high disproportion of particular dogs in breeding use resulted in the increasing incidence of inbreeding. The inbreeding coefficient was higher than 25% in 69.25% of litters; with 20.2% of litters having an inbreeding coefficient of 40%. The poor gene pool seems to be strictly connected to the deteriorating health of the population, which draws into question the future of the breed (Glazewska, 2008). It is paramount that breeders and regulators rationally and scientifically review breed standards to improve welfare standards by removing any aspects or traits that could be contributing to welfare problems (McGreevy & Nicholas, 1999; Higgins & Nicholas, 2008).

According to a study performed by Jensen *et al*. (2008), disk calcification at 2 years of age is a significant indicator of clinical disk herniation in Dachshunds. This study, on the relationship

between intervertebral disk calcification and clinical disk herniation, included 61 animals that had been scanned for calcification of the intervertebral disks at two years of age in previous studies. Only 36 dogs had survived to the present day, with the age of all dogs being greater than eight years. Radiographic examination was performed on the surviving dogs, while information on the occurrence of disk herniation between 2 and 8 years of age was obtained from owners via questionnaires. Associations between the numbers of calcified disks and clinical disk herniation were analysed with a maximum likelihood logistic regression. It was found that the number of calcified disks at 2 years of age was a good predictor of clinical disk herniation. Furthermore, the risk of euthanasia following disk herniation was significantly greater in dogs with >4 calcified disks (Jensen *et al*., 2008). Although this study was performed on a small sample of dogs, it highlights the relationship between clinical disk herniation and disk calcification, which is known to be a highly heritable trait within Dachshunds (Jensen & Christensen, 2000). This study also emphasises the need for surveillance of breeding populations of pedigree dogs, so that dogs can be screened before their use within breeding programs. Furthermore, appropriate surveillance would allow tracking of new disorders as they emerge (McGreevy, 2008).

Show judges have a large influence on the selection of dogs used in breeding; hence, they have a profound impact on the health and welfare of purebred dogs. Educating judges in proper functional anatomy is almost as vital as making them recognise their responsibility in enhancing the health and welfare of pedigree dogs (Indrebo, 2008).

Conclusion

Veterinary associations, breeders and welfare charities must unite to create a new model for dog-breeding practices that utilises the latest advances in genetics and epidemiology (McGreevy, 2008). The goal of modern breeding should be based on a comprehensive understanding of biology, so that all dogs are able to live long, happy and healthy lives (McGreevy, 2008; Indrebo, 2008). Action must be taken now to improve the health and welfare of already suffering breeds and to protect the future of these dogs.

References

Calboli, F.C.F., Sampson, J., Fretwell, N., Balding, D.J. (2008) Population Structure and Inbreeding from Pedigree Analysis of Purebred Dogs. *Genetics* 179, 593-601.

Glazewska, I. (2008) Genetic diversity in Polish hounds estimated by pedigree analysis. *Livestock Science* 113, 296-301.

Higgins, A., Nicholas, F.W. (2008) The breeding of pedigree dogs: Time for strong leadership. *The Veterinary Journal* 178, 157-158.

Indrebo, A. (2008) Animal welfare in modern dog breeding. *The role of the veterinarian in animal welfare. Animal welfare: too much or too little?* The 21st Symposium of the Nordic Committee for Veterinary Scientific Cooperation (NKVet), Væløse, Denmark.

Jensen, V.F., Beck, S., Christensen, K.A., Arnbjerg, J. (2008) Quantification of the association between intervertebral disk calcification and disk herniation in Dachshunds. *Journal of the American Veterinary Medical Association* 233:7, 1090-1095.

Jensen, V.F., Christensen, K.A. (2000) Inheritance of Disc Calcification in the Dachshund. *Journal of Veterinary Medicine*. Series A, 47, 331-340.

McGreevy, P.D. (2008) Sick as a dog: outraged by the health problems pedigree dogs suffer, Paul McGreevy argues that it's high time dog breeders threw away the rule book. *New Scientist* 200:2677, 18.

McGreevy, P.D., Nicholas, F.W. (1999) Some Practical Solutions to Welfare Problems in Dog Breeding. *Animal Welfare* 8, 329-341.

Nicholas, F.W. (2003) *Introduction to Veterinary Genetics*, 2nd edn, Blackwell Publishing, Oxford, UK.