

The Popular Sire Effect

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"The popular sire effect, which results from the over use of a particular stud dog and/or his progeny, is thought to produce a reduction in genetic diversity by effectively excluding other males from the gene pool. It has been estimated, based on pedigree analysis of 10 representative breeds for which the Kennel Club has electronic records dating back to the 1970s, that on average no more than 20 per cent of registered dogs have recorded offspring. The inference being that in the context of pedigree dog breeding there can be widespread loss of genetic diversity over relatively few generations. This is hardly surprising as many purebred dogs live out their lives as companion dogs with owners who have no interest whatsoever in breeding from their dogs.

It can sometimes be misleading to quote percentages without reference to the underlying values. Take for example a breed with an average of 10,000 registrations per year and an active reproductive life, in the case of males, of say ten years. In such a population one might expect that at any one time there is a potential breeding population of 50,000 males. If only five per cent of this population is used for breeding this gives an effective population of at least 2,500 males over a ten-year period. However, for a breed with only 100 dogs registered per year the maximum size of the breeding population of males becomes 500 and even if 20 per cent of registered males are used the effective population will be limited to about 100 males over a ten-year period. Taken at face value such calculations might suggest that the popular sire effect is most likely to occur in the case of numerically smaller breeds.

However, the popular sire effect is not necessarily confined to the numerically smaller breeds. There are likely to be instances of sires which, although not bred with a large number of females, produce sons and/or grandsons for which, even if they are individually used at relatively low frequencies, the cumulative summation of their contribution to the gene pool is to make the original sire a "founder" who appears in the pedigree of a high proportion of descendants born in later generations. This phenomenon has the potential to cause a diminution in the variety of available genes within a breed and increase the risk of introducing and disseminating defective genes.

The aim of a show breeder is to breed dogs of outstanding quality and which fit the ideal for the breed in terms of conformation, temperament and characteristics. In most breeds it is quite rare for there to be more than a handful of top notch males being exhibited at any one time and breeders may well give preference to the dog or dogs which dominate the show ring when choosing sires. It is nonetheless important to recognise that this approach to breeding can be associated with the rapid introduction and spread of undesirable traits. Diseases that have been attributed to the popular sire effect include copper toxicosis in Bedlington Terriers, rage syndrome in English Springer Spaniels and histiocytic sarcoma in Bernese Mountain Dogs. Such effects may not become immediately apparent and it may take several generations before the tell tale signs of inherited disease emerge.

Governing bodies such as the Kennel Club are aware of the potential impact of the effects of popular sires on genetic diversity and the need to educate breeders to understand and avoid the pitfalls that are associated with the over use of particular stud dogs and/or their progeny. Indeed, some overseas organisations have looked at restricting the number of litters that can be sired by a particular male. Owners of stud dogs should carefully consider the desirability, whenever possible, of ensuring that potential sires are carefully screened for any known genetic defects prior to being used at stud. The responsible stud dog owner will not permit widespread use of a young male until there has been

adequate opportunity to study the offspring that are produced during his initial period at stud. Once a young sire's performance has been evaluated and the potential for him to pass on genetic defects has been assessed a decision can then be made as to whether he can be used more extensively at stud. Semen is easily stored for many years and then used to produce offspring long after the donor dog has died. Such an approach surely commends itself to sensible breeders and is likely to be both more, desirable and more effective than placing restrictions on the number of litters that can be registered from any particular sire."

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