

Reconstituting a Breed

From time to time the question has been asked: Have any studies been done to show that genetic problems are increasing?

I do not believe that any one has even tried to answer this question. I think nobody can, as there are no statistical observations from bygone times, nor appreciable new ones (we know more or less *what* defects there are, but rarely the *incidence*).

But simple scientific reasoning says it can't be otherwise: breeds were created from relative few individuals of a population, so they passed on *few* defects but these to the whole offspring generation. Elite breeding and standard selection made few males eligible for breeding in each new generation thus steadily thinning out what genetic heritage was still left, but accumulating defect genes. Long time, hard natural selection (absence of vaccinations and advanced vet care, often scrap feeding, etc.) helped keep up sound genetic combinations in spite of inbreeding effects by incest matings, line breeding and [favorite sires](#).

Today, sophisticated feeding, general care and veterinary advancement allows to continue breeding dogs with high inbreeding coefficients and defect incidence, if at considerable costs and emotions. Theoretically, the persistent inbreeding regime should have purged a lot of defects, but obviously not or by far not enough so. In addition, new defect mutations seem to pop up in higher proportions than geneticists would think. These in turn are readily multiplied by more favorite sire use etc. in the successive generations.

So, how can a highly beset breed be reconstituted? In my opinion, only by a lot of idealism, co-operation, trustfulness and discipline. People must find agreement that they can't go on in this way, their beloved breed must be helped by common effort. They must unite, world-wide if possible, make a genetic breed analysis (pedigree and DNA), find out which "families" are most riddled with defects, which dogs show highest heterozygosity, which combinations are genetically most distant. Then a plan must be made, using a combination of least-kinship matings and avoidance of dogs from "infected" families *1(e.g. by means of BLUP), thus gradually decreasing the mean

inbreeding coefficient in every generation, and severely limit the use of individual sires, in other words increasing the number of sires per generation, taking care to achieve a minimum *2effective genetic population size of 200.

In that way, both defect incidence and inbreeding depression could be efficiently tackled, provided the breed is sufficient numerous and general background inbreeding level not too high. Otherwise only a crossbreeding scheme could help but not by crossing breeds as distinct like setters and sight hounds but e.g. Irish with Gordon Setters or even with LGPs or French épagneuls.

In this way, much of the original vitality could be recuperated. Utopian ? Maybe, but realistic. Only by using both tools, defect screening and population genetics the goal can be achieved. A breed's future requires vet care, genetic hygiene, health selection, and defect control, all of them, not patch work. I think the target could be achieved in ten years. There could be setbacks, of course, for bad surprises may come up but should not discourage. The German Landseer action I mentioned AFAIK is the (so far only) tangible proof. BTW, the best thing would be to abstain from showing with kennel clubs during the "genetic quarantine" (or for good). A well revitalised breed may be demanded just by the health bonus (if conformation is maintained).

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*1 BLUP -Hmm.., sorry, a thorough explanation would take a lot of time. BLUP is a mathematical method to find out which dogs are more or less liable to develop defects, eg. HD, based on kin data, and the dogs with lower than average index are to be bred as concerns HD (or other defect/traits if so adapted.) It was successful eg. dealing with HD in Hovawarths in Germany.

*2 Effective genetic population size means a computed value indicating the genetic loss of a breed by genetic drift per generation that is always smaller than the actual breeding population. It depends mainly on the relatedness within the breed (eg. one sire for (theoretical) thousand bitches would produce an offspring generation with an effective population of 4!! Real population: effective population size = $1001 : 4$) This illustrates how favorite sire use is a kind of genetic genocide :-(. (If the effective size is too small, inbreeding

problems arise even without actual inbreeding, because the breed gets more related in every generation.)

As far as I know, pedigree programs mostly do not compute effective size, I know of one called Optimate of the Hanover Vet College in Germany that does it. It is destined for endangered domestic animal breeds, they tell me it is used for some dog breeds in Germany. A size of 200 is the level that allows a breed to survive (provided it is not further inbred and sufficient sires are used to maintain the 200 level.)

I hope these few lines explain more or less what is meant

Regards,
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