

Understanding Inbreeding and “Line breeding”

Karen Hedberg BVSc 2010

Inbreeding and line breeding are often thought to be totally different types of matings by many novice breeders.

Inbreeding is generally considered by the older breeders to be close or incestuous breeding, whereas **line breeding** is thought to be where the common ancestors are slightly further removed. People differ in opinion as to where each one starts and stops. ***Basically it is all one and the same thing, only the degree varies.***

Inbreeding (or line breeding) is where an animal appears more than once on a pedigree. If this occurs after the fifth generation, the effect is held to be negligible. When inbreeding, the animal being ‘doubled up’ or inbred upon, should be a very superior individual having qualities which hopefully he/she transmits strongly. By inbreeding on this animal, or set of animals (eg. a particular set of litter mates), you are trying to set or fix a type.

Genetically, you are trying to make the offspring homozygous for certain features, so that the offspring will:

- (a) Exhibit the desired characteristic.
- (b) Reproduce the characteristic consistently.

Inbreeding of any degree results in the doubling up of an individual's genetic makeup. With increasingly close inbreeding, or heavy saturation of a particular individual, there are various consequences that may appear. As you double on the good points, you double your chances of producing the bad points, some of which may have been hidden until the individual was inbred upon.

Increasing homozygosity - As increasingly more points becoming homozygous, your 'type' will stabilise, ***but the potential for change is reduced.*** As the chances for change are reduced, so are the factors that affect survival and reproduction.

The effects of heavy inbreeding include:-

- (a) Reduced litter size in bitches; reduced percentage of viable (normal) sperm in males.
- (b) Reduced survival rate; offspring are more susceptible to infections or changes of climate. The ability to adapt to these changes is reduced by too many factors becoming homozygous i.e. both parents have donated the same form of the gene, therefore the ability to change is reduced.
- (c) Reduced lifespan for the same reasons as above.
- (d) Decreasing mental stability as the animals become more and more highly strung or neurotic, i.e. poor temperament.

*****To summarise, inbreeding is useful in helping to establish a type and should be done only on exceptional individuals. If grave faults appear on a regular basis, do not continue. For the average breeder, the best results of inbreeding (line breeding) generally occur using the third and fourth generation i.e. grandparents and great-grandparents.***

Applying this information to GSD Breeding

Germans Shepherds, particularly speciality German Shepherds, are generally bred with fairly open pedigrees, i.e. outcrossing would be more far common than inbreeding. Close inbreeding is generally not done unless there is an exceptional individual one may be tempted to inbreed or linebreed upon.

As noted above, care must be taken when inbreeding as while one will double up on the good points, one also doubles up on the faults.

Recently I saw the results of some of the worst inbreeding I have ever seen in 30 odd years, and certainly the worse I have seen within German Shepherds. In the pedigree, within 5 generations there were 9 crosses to the same bitch – half via a son, the other half via a daughter. Both the son and daughter appeared in every quarter of the pedigree. The problem that arose within the resulting litter was severe hip dysplasia in several puppies (those that are known of at this stage – they are currently only 9-10 months old). This result is not surprising as the bitch being inbred upon, her father did not throw particularly good hips and additionally, there were more hip problems further behind in the bitch line.

Any inbreeding, particularly with the information available to GSD breeders, should be thoroughly researched before being under taken. While breeders may be lucky with health issues on a single close linebreeding, but every time it is repeated, the odds double of a problem appearing.

With the constant importation of new lines from overseas as well as developing some very sound lines within Australia, there is little need to closely inbreed. This is not to say that there are not some very good bloodline “knicks” between various lines and that a third generation cross back to an exceptional dog is occasionally very worthwhile, particularly if there is a co-linked dog i.e. part of a well know nick.

Continuing to linebreed or inbreed beyond this third generation cross, unless the animals are extremely typical of the original dog, is rarely ever worth the restrictions that genetically begin to apply to close inbreeding. Out crossing to bring back strength and homozygosity of the genes should follow any close inbreeding.

Please, think before you breed. Consider all the health issues as well as the genetic health of the subsequent litter. We have in depth knowledge on hip and elbows information on existing Australian lines for quite a number of generations. With the imported dogs coming in these days, they nearly all have BV's for hips (the lower the better) and one can usually research behind these dogs for several generations, certainly for hips, however there is less depth of knowledge on the elbow history.

In Australia, we are lucky to have an enormous genetic pool for GSD's in this country.

We need to keep that pool as open and varied as possible for the long term health of our breed.