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FOUNDER'S EFFECT

by

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When a popular sire appears in so many pedigrees that it causes the gene pool of a breed to drift in the direction of that sire, the gene pool loses genetic diversity and the phenomena is called the "Founders Effect". The underlying fear from this phenomenon is that one dog will have an extraordinary effect on his breed through his genetic influence. This includes not only his qualities but whatever detrimental recessives he carries. The excessive use of inbreeding and line breeding on such a dog will further reduce genetic diversity. Eggleston (2000) reported on the range of genetic diversity among the AKC breeds. She constructed a continuum for all of the breeds. At one extreme she placed the Bull Terriers which had the least amount of genetic diversity. This means that they tend to be line or inbred. At the other extreme were the Jack Russell Terriers who she found to have the most amount of genetic diversity. This means their pedigrees were for the most part the result of outcross breedings. This meant that the ancestors tended to be unrelated to each other.

In the world of purebred registered dogs, it can easily be demonstrated that the most popular dogs are those who are more likely to have influence over future generations. At the same time these same animals can also be shown to have contributed a disproportionately higher number of defective genes into the gene pool of their breed. In the case of a "Founder", who is usually a popular stud dog, there are four reasons to explain why such a dog will have produced a higher number of defective traits than other stud dogs who are not well known and who are used less often.

A prominent stud dog including a "Founder" is usually well known and popular. This is because the breeders choose to use them based on what they produce and their winning offspring that have been observed by many exhibitors and breeders. If several poor quality pups are produced, gossip about them usually spreads quickly which causes others to avoid using them. Hence, their status is reduced to a lower popularity.

It can also be shown that there are other sires that will have produced the same defects. Less will be known about these sires because they will be used less often and they will have fewer litters and offspring to be seen. These less popular studs may have produced the same number of defective traits and health problems, but the gossip about them is controlled and minimized because fewer breeders are involved and there are less offspring

to be seen. It must be remembered that in order for a genetic disease or a recessive trait to exist in a breed there must be three kinds of dogs. Those that are affected, the carriers, and the normals. Suffice it to say that popular sires and those called the “Founder”, are animals that are widely used. These dogs will have a better chance to come in contact with carrier bitches, which is why they will have more opportunities to produce genetic problems than the other stud dogs that are only bred a few times.

When a pedigree begins to show an over emphasis on one individual, the traits of that individual are generally well known. It makes no sense to exclude such a dog, a "Founder" or one of his close relatives without good reason. It must be remembered that each time a breeding occurs, one half of the genes of the sire and one half of the genes of the dam are carried forward to their new pups. By the third generation, only 25% of the grand parent's genes are carried forwarded. The impact of one dog even if he were the "Founder" would have been minimized.

TABLE 1. RELATIONSHIP OF ANCESTORS

Relationship	Common Ancestor	Coefficient of Inbreeding
Father/daughter	1/2 on sire	.25
Mother/son	1/2 on dam	.25
Brother/sister	2/2 grandsire 2/22 grand dam	.25
Paternal half sibs	2/2 on grandsire	12.5
Maternal half sibs	2/2 on grand dam	12.5
First cousins	3/3 grandsire 3/3 grand dam 4/4 on ancestor	6.25 .78

When a stud dog that is closely related to the “Founder”, is bred to an unrelated bitch only 50% of his genes will appear in their pups. Thus, the effect of the "Founder" is reduced and will continue to be reduced in each subsequent generation simply by using an outcross. These breedings will dissipate rather than concentrate the genes needed to retain and strengthen traits. The continued use of an outcross is equivalent to throwing genes away. A better strategy is to analyze each pedigree that includes the "Founder" or one of his other close relatives to see what traits and risks are involved.

In every breeding there will be some degree of risk. The key is to minimize the potential for problems. For example, if the "Founder" was a quality dog known to produce desired traits it would make no sense to eliminate him or a pedigree with him in it just because he had produced an undesirable trait. If the “Founder” was a popular dog what he produced is a reflection of the pedigrees bred to him. Because he was popular explains why he has produced some or all of the undesirable traits known to his breed. A certain percentage of

these bitches will have been carriers. Avoiding these popular dogs because of a known fault provides a false sense of security based on undefined “fears”. It makes more sense to make decisions about their use after their pedigree has been analyzed for breadth and depth of the traits desired along with what they have produced.

Planned breedings are the best way to avoid problems. A breeder's objective is to find the best stud dog for each bitch. Experienced breeders know there are always risks. It is the novice who continues too avoid using the popular sires because they have produced faults. Their preference is to use unknown and untested dogs that have little or no track record. Experienced breeders know to avoid using these untested sires because they represent test breedings most of which are nothing more than the breeding of "likes to likes", “winners to winners” etc. These are not effective ways to retain traits. A series of planned breedings using a variety of relatives (close and distant) has been shown to be a superior method.

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