

PREPOTENT VS RECESSIVE SIRE

By Patricia Gail Burnham (Dog News Dec. 14, 2012)

What is prepotency?

Prepotency doesn't mean a sire is exceptionally potent (capable of sexual intercourse), it refers to the quantity of dominant genes that a sire has. Prepotency's dictionary definition is "the ability of one parent to impress its hereditary characters on its progeny because it possesses more homozygous, dominant, or epistemic genes." (Epistemic genes suppress the expression of a gene at another locus.) Prepotent sires stamp their offspring in their own likeness. They do this because they have a large number of dominant, and in many cases homozygous dominant, genes.

(Homozygous genes are when both the genes at one locus are identical. They can be either two dominant or two recessive genes, but they are identical and will be expressed in the puppies. Heterozygous genes describe when the two genes at one locus are different, in which case the dominant gene of the pair will be expressed.)

If the sire has a lot of homozygous dominant genes, all he can give the puppy is one of the same dominant genes that made the sire look as he does. In horse breeding, all Morgan horses trace back to a single founding sire, Justin Morgan's Figure, who stamped his get with his own muscular body type, good temperament and small size.

Prepotency is generally spoken of as a good thing. But that deserves a second thought.

When do you *NOT* want prepotency?

In my breed, bitches are generally thought to be better than their brothers. Forty years ago, one major breeder said that she wished she could breed her bitches to bitches, skipping the males altogether since the bitches were better. If you have a really fine bitch, do you really want her puppies to be stamped in the image of their sire? No. You would like to clone her, to produce more lovely bitches in their dam's image. The male is just a necessary element in that effort.

If you don't want the puppies stamped in their sire's image what you need is a stud dog that is the opposite of prepotent. You need a sire that has lots of recessive genes, the more of them homozygous the better. That way the bitch's recessive genes have a chance to match up with the sire's recessive genes and be expressed, and her dominant genes, along with the matched recessives, will control what the puppy looks like.

When do you want a prepotent sire?

If you have an outstanding male and want a son just like him, you want his sire to have a lot of dominant genes. If you want to found a new breed like the Morgan horses, you want a lot of dominant genes in the male.

If there are things about the bitch that you want to change, you might want puppies that are the image of their sire. But if the bitch needs that much improvement, why breed her at all? Find a better bitch to start your breeding program.

How do you found a line on a recessive dog or bitch?

I faced this problem when I started breeding Tiger. His head and his temperament came through in the puppies, but, other than that, the puppies looked like their dams. It was obvious that Tiger had a lot of recessive genes that remained hidden in the puppies. Something similar happened when Secretariat was bred. It was a great source of disappointment that his offspring didn't resemble him. But then he didn't resemble his own parents or grandparents. In Secretariat a lot of recessive genes matched up to create a super horse. A once in a lifetime horse. When he was bred, those recessive genes were overwhelmed by the dam's dominant genes. Race horse breeders have a horror of incest so nobody did the one thing that could have let those recessive genes pair up again. They would have had to cross back on Secretariat to recreate him. No one did.

Fortunately, dog breeders routinely line breed, so I did what you need to do to recreate a dog that is predominantly recessive: I bred Tiger to a half dozen different bitches. In the next generation I crossed back on him and started to get dogs that resembled their grandsire. There was no magic about it. Crossing back had let his recessives match up again and be expressed. This is easier to do if you are trying to recreate a dog than a bitch because unless you

start doing multiple sire litters you can't get enough half siblings from a bitch to cross back on her effectively. Sires routinely create more offspring and more half siblings than bitches do.

How do you tell if a sire is prepotent or recessive?

Look at his first offspring. If they resemble dad a lot, then he is prepotent. If they take after their dams, then the sire is mainly recessive. If the puppies are in between, and don't closely resemble either parent, then the sire is somewhere in between highly recessive and prepotent. And most sires actually fit into this in-between category.

So, the next time you set out in search of a stud dog, first decide whether you want a dominant or a recessive one. Because of the interplay between dominant and recessive genes, you don't always get what you see in either parent. Check out his puppies. Do you want your puppies to resemble dad or their dam? Good luck.