Observations on the Inheritance of Intermediate Gait

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My observations, and that of Steve Chasko and Eldon Eadie, not backed by any rigorous analysis, are that the gaitedness of foals is on a bell curve. 80% will fall in the middle of the bell curve, about halfway between the strength of gait of each of the parents. About10% will gait as well as the strongest gaited parent, and about 10% will gait as well as the weakest gaited parent. That is why it is so important to start with the strongest gaited parents you can get your hands on, because then at least if the foal is only as well gaited as the weakest gaited parent, it will still be a good gaited horse. It is also why I do not recommend the gaited to non-gaited breeding's, because if you think about it, there is about a 75% chance that the foal of that breeding will not be strong enough gaited to be classified by most people as having an intermediate 4 beat gait.

But when starting with very strong gaited parents, it is at the fringes that things get interesting. About 5% will not gait as well as the weakest gaited parent, and about 5% will be stronger gaited than the strongest gaited parent. That's the jackpot, the foals that should be used for breeding the next generation, providing they also have the other characteristics that are necessary, of temperament and conformation, height if that is a consideration. There is an example of just how powerful that jackpot can be when applied to a breed consistently over time. The Peruvian breeders rigorously selected for strength of gait and culled their horses for 400 years. I well remember a Peruvian breeder saying to me that the Peruvians do not let their feelings for any one horse stand in the way of the good of the breed. As a result, the Peruvian Paso, is, in my opinion, genetically programmed to gait, and is the strongest gaited breed of horse in the world today. That is how a breed can "move the bell curve over." Over time, by rigorously culling and selection for the strongest gaited horses to be the parents of the next generation, the breed can become genetically stronger and stronger in gait. That is exactly what the Peruvian breeders did.

There are other factors at work, because gaitedness is passed by poly genes that have a range of expression, like height. We can do some Mendelian based analyses that are a convenient framework in which to think, but we have to recognize that Mendelian analysis will not work as well as it does with color predictions. It is more of a crap shoot, like height. In Mendelian genetics, you can have red peas and white peas, and red is dominant to white, so you will have red peas or white peas, and you can get white peas from red parents where each red parent carries a white recessive, but there's no way to get pink. With polygenes, there are ways to get pink. Other ways to "break" Mendel's laws can result in more pinkness, and pinker, and pinkest: genes that are partial penetrants, partial dominants, accordion genes and Xerox genes. Many years ago in an article published in 1993 or 4, I predicted that we would find such genes influencing our horses. I was proved right in the late 90's with the appearance of ASD, which is a partial penetrant, a partial dominant, and is also both an accordion gene and a Xerox gene.

We see the same non Mendelian mechanisms impacting gaitedness, and the prepotency of certain stallions and mares in their ability to pass on their characteristics at a higher rate than would otherwise be the case with straight Mendelian genetics. The real jackpot is a horse that passes on its own desirable characteristics consistently, or even puts down better than himself or herself.