

# Breeding for performance: to improve on showjumping, dressage or both?

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In the last article we discussed how we can genetically advance a population of horses based on their performance traits (in show jumping and/or dressage). This can be achieved by selection of the best stallions to produce the next generation. Studbooks usually have a policy to assist breeders who seek this goal by using a system for stallion approval and the publication of their breeding values.



*Figure 1. Rousseau (Olympic Ferro x Roemer), a specialised dressage horse, sire of three consecutive champions of the KWPN Stallion Selection in the Netherlands (2006, 2007, 2008). Sire of New Zealand's Champion Young Performance Bred Horse of the Year 2008 (Appleton DHU). Foto: Paul Melzer, courtesy Hassler Dressage, USA.*

The next practical question is, can we achieve genetic progress on multiple

traits simultaneously. In other words, can we improve show jumping ability and dressage ability at the same time?



*Figure 2. Indoctro VDL (Capitol I x Caletto II), a specialized showjumper, has been in the top of the WBFSH ranking for many years (World Breeding Federation for Sport Horses), and is still among the stallions with the highest breeding indexes in the KWPN. Foto: courtesy VDL-Stud, the Netherlands*

To be able to answer this question, we need to know how these traits genetically relate to each other, and we need an estimate of where the current mare population stands. Figure 3 is a plot of the breeding values of all approved KWPN stallions currently available in the Netherlands. The KWPN (Royal Dutch Warmblood Studbook) is used as an example, but the described principles generally apply to the other warmblood-studbooks as well. The horizontal axis represents the breeding value for show jumping; the vertical axis represents the breeding value for dressage ability.

Every point in the plot is an individual stallion. The top left quadrant contains the stallions that are typically known as dressage stallions (in blue), and the bottom right quadrant contains the stallions known as show jumpers (in red). The top right quadrant represents the all-round stallions, which pass on dressage and show-jumping ability

simultaneously. The plot tells us that most stallions are either in the top left or bottom right quadrants, and the number of stallions in the top right quadrant is quite limited. In geneticists terms: there is a negative genetic correlation between showjumping and dressage ability.

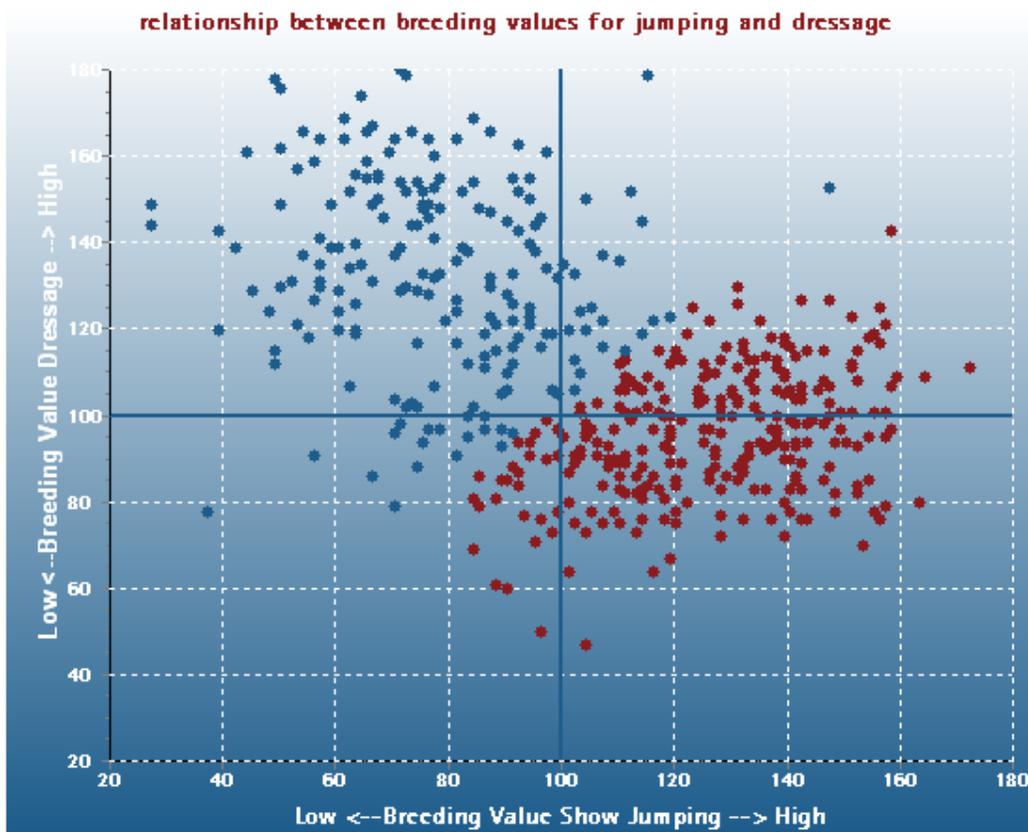


Figure 3. Relationship between breeding values for Show Jumping and Dressage.

This implies that, generally if you choose to breed with a stallion that has a high index for dressage, this would be compromising showjumping ability, and vice versa. However, within the sub-population of stallions with a high breeding index for one ability there is still quite a bit of variation with respect to the other ability, so it is possible to breed a showjumper without losing too much

in dressage ability.

From the studbooks perspective, the negative correlation is an awkward thing to deal with. It means it is more efficient to use the selection space (the number of stallions to be selected each year), on selecting specialized showjumpers and specialized dressage stallions than to try and select for both at the same time. For the individual breeder it means there is

more choice of stallions if you want to improve on one trait rather than both at the same time. For this reason, the KWPN decided to opt for specialized breeding directions, so instead of breeding a generic "sporthorse". Therefore in the selection protocol for showjumping stallions there are no longer requirements relating to dressage ability and vice versa. As a consequence, we can expect that the graph will change with the blue points

from figure 3 moving further up and left (showing improved dressage ability with a decrease in jumping ability) and the red points moving down and right (showing improved jumping ability with a decrease in dressage ability), as indicated by the arrows in figure 4. The speed at which these dots progress will be faster than if a choice was made to improve dressage and showjumping ability simultaneously (the dots moving up and right).

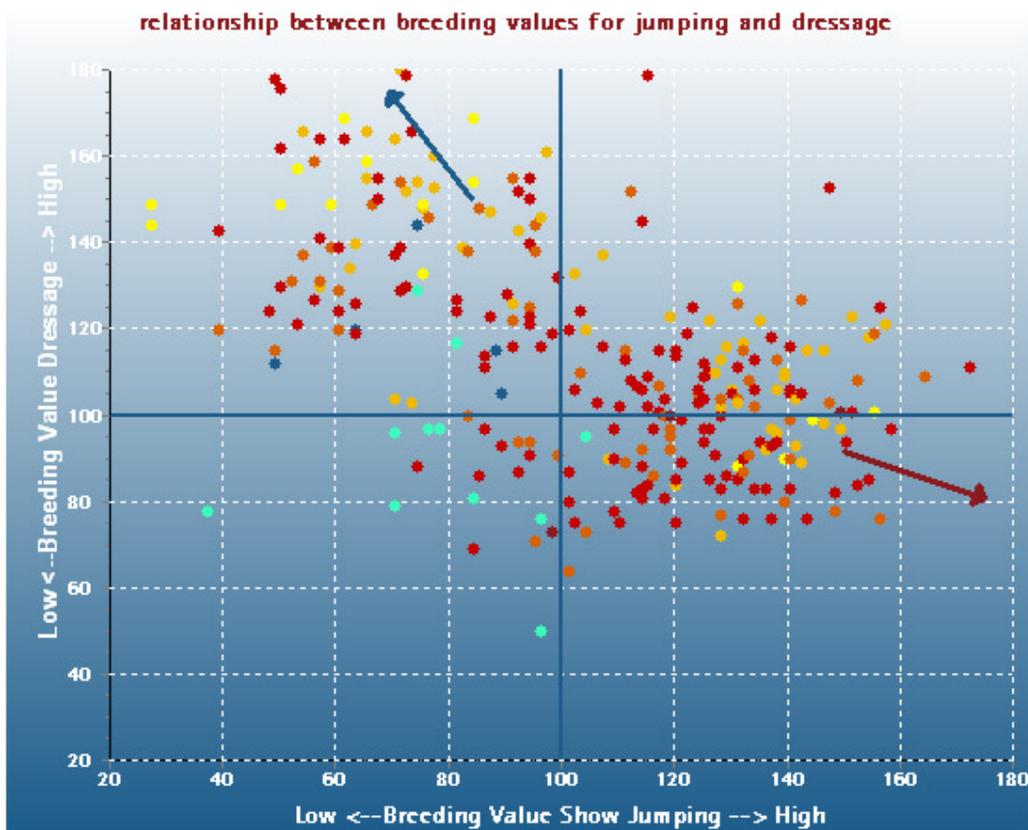


Figure 4. Stallions identified by type or age: thoroughbred: light blue, 3-6 years: yellow, 7 to 10 years : light orange, 11-14 years: dark orange, 14 years and older: red.

Also on the graph is the bottom left quadrant with stallions that have a breeding value below 100 for both dressage and show jumping, and you may wonder who these stallions are,

and why they are there since they are all approved stallions. Many years ago, thoroughbreds were introduced into the KWPN population to improve the old Gelderlander and Groningen

bloodlines, the original base of the KWPN horse, to produce a better performing sporthorse. There are still a number of thoroughbreds approved within the KWPN to improve certain mares on type (finer bone) and temperament (forwardness). These thoroughbreds are colored light blue in figure 4. The KWPN selected these stallions with the expectation that there would be virtually no loss in dressage and show jumping ability and their breeding values were established once their progeny were competing. Usually, these stallions had already proven themselves in international competition. The plot shows that over time, the population has advanced in terms of dressage and showjumping ability and these thoroughbreds are no longer needed to enhance the performance characteristics in the warmblood population. We also have to take into account that when the system of breeding values was introduced, the KWPN decided that every year the average of the population would be reset to 100. In the previous article we saw that

there is genetic progress in the population, which means the horses improve over time, but the scale of measurement moves equally with them. This means that the older stallions with an established breeding value effectively lose a few points every year. So also in the bottom left quadrant we find a high proportion of older stallions who have lost their significance for breeding since their better offspring have been selected to produce the next generation. Now that we know the genetic relationship between showjumping and dressage, we can give better consideration to breeding for dressage or showjumping or both. The next issue we need to address is the mare(s) we are to breed from. We need to know where the mare population is genetically, where our mare is in the population, how much genetic progress do we hope to make in one generation, in which direction do we want to make this advance, and how much we want to spend. This will be the subject of the next contribution.

### About the author

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Responsible for the formation and running of Dutch Horses Unlimited, alongside his wife, horse trainer and instructor Nicole Bours. Ane Visser's extensive experience in setting up breeding programmes for horses has gained a high visibility in The Netherlands. Now in New Zealand, he hopes to contribute to the genetic progress in the population of NZ sport horses. To this end, he and his wife have imported their breeding stock into NZ.