



PEDIGREE DYNAMICS

Cheating at Genetic Lotto

Thoroughbred breeders are a diverse lot. They range from the stud group which employs more administrative and hands-on staff than it has brood mares, through to the racehorse owner using the mare he has retired from the track (not necessarily covered in glory) to produce his next runner.

Whereas the owner-breeder may be happy to see the fruit of his efforts win a race at the hometown country track, a major commercial operation requires an impressive tally of 'black type' races against the well advertised names of their stallions or the catalogue pedigrees of their mares in order to keep the business profitable. The primary goal remains constant however - to breed horses which win races.

Until recent times, most Australian breeders were content to use a handful of criteria to help select a stallion for their mares. A breeder's 'cocktail', often made up of stud accessibility, service fee and/or commerciality as well as conformation, size and average winning distance topped with a dash of personal preference.

Of course, even some of these fundamentals have been ignored. The very nature of racing invites emotion and sentiment to override sensibility and the reason why a breeder patronises a stallion may be down to little more than the memory of a courageous and talented win.

Mated with his mare however, the progeny has the potential to hit its straps at four thousand metres and as both parents have bad knees, it is unlikely to be able to gallop any further than four hundred metres without going lame. These factors may not have received the required consideration.

Some with fatter wallets also go by the adage, "Breed the best to the best - and hope for the best." Even though this theory must work better on average than randomly breeding the mediocre to the mediocre, there is still a large risk involved. Even great progenitors such as Sir Tristram and Northern Dancer have produced slow racehorses from fast mares.

What creates a good racehorse? Factors such as nutrition training techniques, soundness and good old Lady Luck play a part, but all these factors rely on a base of inherited ability to throw them over the finish line.

Considering the fact that a foal inherits half its genes through the sire and half through the dam, the most important decision for breeders each year has to be the selection of stallions most genetically compatible with each mare.

Unfortunately, inheritance is a no guarantees-no refunds aspect of procreation. As many purchasers of the full brothers or sisters to champion racehorses will bitterly agree, the wonderful genes which were combined in one mating will not necessarily volunteer for inheritance in a repeat of that mating.

Although racehorse breeding does share a lot in common with a game of lotto, there are ways in which to influence the chances of the desired 'numbers' coming up on your foal's genetic game card. The trick is in targeting the numbers needed to win and putting more of these in the lotto machine!

If you are really playing lotto, this is known as cheating, however with regards to genetics this tactic is known as the reinforcement of predominant ancestors.

While some say that what isn't shown in the three and a half generations of a catalogue page has little genetic influence on the outcome, many Australian breeders both large and small are now beginning to follow the lead of their counterparts in the USA and Europe by turning to specialist

pedigree analysis to help them to increase their chances of breeding top class racehorses, and more of them.

The word 'pedigree' itself has an interesting ancestry. It comes from the Old French phrase 'pied a grue'-, literally translated, 'crane's foot'. The line diagram used to indicate the succession from individual to parents and grandparents and so on resembled the mark left in the sand by the claw of this majestic water bird.

Planning matings through pedigree analysis is not a new idea. Ever since it was obvious that certain lines were enjoying more success than others on the track, people have been peering into the workings of pedigrees to see what made them tick.

Breeding theories conservative and outlandish have been put to the test - some involving mathematical equations and genetic 'dosage', some the grouping of ancestors under various titles of influence such as Chefs de Race, Elite and classic, others relating to the position of ancestors in the pedigree - and still others using physical measurements as a basis.

Of course, great breakthroughs in the study of genetics and inheritance have knocked over many of the frailer theories.

One of these, a widely held belief of the latter part of the 1800's, was the 'telegonic theory'. It proposed that a pregnant mare was herself infused with the blood of the covering stallion through the developing foetus. Even after foaling, traces of the blood, and hence the characteristics of the stallion were believed to remain in her veins and be passed on to the next foal. Her blood was regarded as the vehicle for the accumulation of characteristics of all stallions by which she was covered. Therefore, the more foals she had, the more prepotent her blood! This line of thought contributed to the use of the term 'bloodlines' to describe a horse's ancestry.

Bruce Lowe, an Australian who was head-down in the General Stud Book around this time in history, used the telegonic theory to account for the difference in ability of full relations. He believed that if a mating produced a good result it should not be repeated, as the subsequent foals would then have too much of the sire's 'blood', and thus upset the balance!

In the second quarter of this century, Italian breeder Federico Tesio used selective linebreeding (reinforcement of desirable ancestors further back in the pedigree) to achieve amazing results with a band of around just twenty mares. He was responsible for producing Nearco, Ribot, Donatello II, Navarro, Niccolo dell'Arca, Apelle and Brueqhel amongst others - horses to which we are linebreeding today.

Inbreeding - the duplicating of an ancestor within the first four generations - was rife early on in the development of the thoroughbred and was also used, somewhat more selectively, by Tesio. Nearco was not only strongly linebred, he was also inbred to the great St. Simon, while Brueghel was inbred to the matriarch Pilgrimage and Niccolo dell'Arca to both St. Simon and Carbine. Although inbreeding between the third generations (and closer!) is regarded by most with great caution today, we are nevertheless reaping the benefits of the close inbreeding employed by breeders going back to the 1700's.

Through natural processes, the inbred lines that regularly produced inherent faults have died out over time, while lines represented further down the ancestral track by such greats as St. Simon, Hermit, Sundridge, Melton, Ayrshire, Hampton and Stockwell survive. Their representatives now sought after in the breeding of today's racehorses include Northern Dancer, Star Kingdom, Ribot, Sir Tristram, Native Dancer and Princequillo in male descent.

Bruce Lowe developed his own theory and set about tracing and numbering families back to 43 foundation mares in the first General Stud Book. According to their records for producing Classic winners, he numbered the families 1 through to 43, the application of the system being to breed to the lower numbered families 1, 2 etc to give yourself a greater chance of breeding a Classic winner.

Partly because Bruce Lowe did not regard the families of winners of America's top races as worthy of inclusion, and partly through the changing fortunes of various lines, his work has been disregarded as an accurate guide for this purpose.

The Bruce Lowe family number system has however left a legacy for linebreeders today. The number you see in brackets beside the lot's name or description in sales catalogues and next to names of ancestors in tabulated pedigrees are Lowe's family numbers. While not all horses with the same family number are 'related' to any useful degree, it narrows down the number of families and lines which need to be searched to assess the level of linebreeding present in the pedigree.

Linebreeding and inbreeding to dominant ancestors, and identifying the presence of successful pedigree patterns is one of the most popular combinations of pedigree analysis techniques used today.

One of the reasons why many breeders tend to avoid attempting in-depth pedigree analysis themselves is that it has always been a time consuming task.

In order to be able to analyse a pedigree, it must firstly be researched back at least six generations, and preferably further. In the past this task could only be carried out by breeders using such journals as stud books and stallion registers, however the Australian Stud Book is now on the Internet and specialist computer pedigree databases are also widely available.

It is then possible to mark the common ancestors and close relations in the pedigree, and with the help of female family charts, identify those whose common ancestors are 'off the page'.

Once the family strengths are identified, the mare's pedigree can be assessed against that of the various stallions which are suitable mates in other aspects such as conformation, commerciality and the ability to sire winners.

Pedigree 'patterns' created in matings have been observed to increase the instance of upgrading of ability in racehorses.

Such patterns are as simple as 'sex balancing', or having an influential ancestor present through both a son and a daughter (rather than through two sons or two daughters). This can increase the 'spirit' aspect of a pedigree. General Nediym is an example of this. He is closely linebred to Right Royal V, through a daughter (Nediym's dam) and a son (In the Purple, sire of General Nediym's 2nd dam). Although Right Royal V is regarded as a staying influence the 'sex balancing' has quickened the mating.

Kingdom, while his great granddam is a daughter of Star Kingdom.

Another simple pattern is a 'reverse cross'. A good example is provided by the pedigree of champion New Zealand bred racehorse Veandercross, whose pedigree certainly would not have earned him a place at the Premier Session of the Karaka Sales.

His sire Crossways is a grandson of Sir Gaylord, himself a son of Somethingroyal. Crossways' dam is a daughter of Nikinsky II. Veandercross' dam Lavender is by Super Gray, a son of Nifinsky II. Super Gray is out of a daughter of Somethingroyal.

Likewise, repeating an existing cross is also an effective way of boosting the pedigree.

Star Kingdom's granddam Thoughtless and Princequillo's dam Cosquilla for instance, are both bred on a cross of Papyrus over a daughter or granddaughter of White Eagle, as is Honeyway's dam Honey Buzzard.

Combinations of Princequillo, Star Kingdom and Honeyway have been very successful.

Other patterns are not so easy to spot, but like selecting the winner of the Golden Slipper, often devastatingly clear in hindsight. Studying the pedigrees of many outstanding racehorses can often reveal the presence of lines and individuals which appear to enjoy each other's company on a regular basis.

Copying these affinities in future matings is also a good way to increase the chances of producing winners. 'Nicks' such as Sir Tristram over Sovereign Edition mares and, further back in pedigrees, 'clicks' such as Forli with Round Table, are observed affinities.

There are now affordable pedigree research computer programs available to the public which can build a family tree in as little as seconds. Some do more of the background work by highlighting or listing the ancestors which are repeated in the pedigree, coming up with lists of stallions carrying ancestors nominated by you, and printing out hypothetical matings for your assessment.

Although computer technology can do the organisational work for you, it is still up to the human element to make decisions regarding the mating.

Armed with a short list of genetically 'compatible' stallions for a mare, the breeder can then narrow the field even further by considering the many other factors important to maximise the chances of breeding a top class horse.

Pedigree research may soon be roundly regarded as an essential part of the breeding process. Over the past couple of years the interest in pedigree analysis in Australia has soared, perhaps with the benefit of education articles on the subject, such as those written by Ken McLean. And not only can pedigree analysis be applied to breeding plans - it is also a very useful tool in assessing the likelihood of the racing success afforded by existing matings. Analysis of the pedigrees of weanlings, yearlings and other untried stock for compatibility between the sire and dam is another valuable application.

It will not be surprising to find within the next few years most stallion owners targeting the owners of specifically bred broodmares. Not only is it in the interests of the stud for their sires to be covering mares most likely to throw stakes winners to them, it is obviously also in the interests of the mare owners and the racing industry at large.

Vendors at yearling, weanling and broodmare sales should follow suit, catering to the demand for more genetic information on their offerings. Six or seven generation tabulated pedigrees of each yearling, highlighting linebreeding and inbreeding, may one day soon be displayed alongside the catalogue pedigree on each stable door.

Mares being sold in foal may not only be displaying their own tabulated pedigrees on the door, but also the pedigrees of the foals in-utero.

Despite the assistance of computer technology however, it is doubtful that the average breeder, trainer or even bloodstock agent will become as expert at pedigree analysis as he or she may be at say conformational and commercial assessment. Because of the significant amount of ongoing study and research required, informed and accurate pedigree analysis is a full time job in its own right.

Move over trainers, bloodstock agents, veterinarians and stud managers - as a consultant to the thoroughbred industry, the pedigree analyst is here to stay.