PEDIGREE DYNAMICS

Sex Bias In The Thoroughbred

It is generally accepted that the Thoroughbred inherits its racing ability, among other traits (physical features, temperament etc) via the sire and dam. Obviously, this is the reason we send our mares to well performed or well bred sires in preference to any old Tom, Dick or Neddy.

To "breed the best to the best and hope for the best" is statistically more likely to beget a winner than indiscriminate choices, but is a more expensive gamble.

Using any method to plan a mating or select a yearling is about trying to maximise probability in your favour.

Conflicting opinions abound about what may or may not contribute to racing ability, therefore, it stands to reason that sone theories are groundless.

Racing ability is not a tangible characteristic; unlike other features such as colour and sex, you cannot tell on inspection of the new born foal whether he or she will be a good racehorse. Whether you consider conformation, pedigree patterns or stakeswinning parents as the vital factor/s when planning a foal or selecting a yearling, it must be admitted that inheritance, and therefore genetics, is behind it all.

The very sound of the word 'genetics' smacks of science and mathematics and therefore may seem a far cry from the essence of horeseracing - the anticipation and excitement of breeding or racing a top quality Thoroughbred. Having a working knowledge and respect for genetic influence however, can assist the breeder and buyer to maximise the chances of success.

An interesting exercise in genetics is the inheritance of colour and sex. At this more visually obvious level as well as at more complex levels, there are theories in abundance. Do some stallions produce better colts than fillies, or vice versa? Does a particular coloured offspring by a certain stallion perform better than the others?

In this article, I have chosen to use the stallion "Jungle Boy" as an example, examining data from 1980 to 1990 - ten of his sixteen years at stud. As a grey horse who produced 'all' colours over his long stud career, he is a good subject on which to demonstrate colour inheritance. He is also said to produce more good fillies than colts, and some would say, more good greys than other colours.

Although these theories can be proven or disproved by statistics, a basic understanding of genetics can help us to interpret those results.

GENDER - CAN PERFORMANCE BE SEX LINKED?

With only two options for the gender of a foal, sex inheritance is easy to follow. Male horses possess an X and a Y chromosome (rod-like structures which carry the units of

heriditary material called genes), while females possess two X chromosomes. On the meeting of the egg and sperm, one of her X's pairing up with the stallion's X will result in a female, while one of her Xs pairing up with the stallion's Y will result in a male. Therefore, the resulting embryo's sex is determined by its sire - the dam can only contribute 'female' X's. This basic fact of life, paired with the law of probability, negates statements such as "My mare only produces colts," or "That stallion produces more fillies than colts." Although both these statements may be accurate at the time, given an opportunity to produce more progeny, laws of probability should correct any imbalance.

There is scientifically supported evidence however, that racing ability can, in some stallions, be more readily passed on to one gender than the other. Examples of stallions which appear to have a sex bias are; Prince Echo (fillies); Salieri (colts); Luskin Star (fillies); Jungle Boy (fillies); Rubiton (fillies), Tantieme (colts) and Secretariat (fillies). Luskin Star has a 'double whammy' in that he is also said to produce better chestnuts.

There are a total of thirty two pairs of chromosomes in the horse, and although the exact number is not yet known, there are believed to be thousands of genes located on each chromosome, each responsible for determining one or more characteristics, or traits. Put simply, it is possible that a certain combination of desirable traits may have located on some stallions' X chromosome (that which is passed on to create fillies), and some other stallions' Y chromosome (that which is passed on to colts) resulting in a sex bias for ability.

If a mare possesses a sex chromosome containing all the racing ability goodies, she would also conceivably pass it on to half her progeny, however as her X chromosome can go toward making either a male or a female with the addition of the stallion's X or Y, there would be no sex bias.

An extension of this theory is that it can also explain the "broodmare sire" effect; that is, that desirable traits sex-linked to a stallion's X chromosome, and sometimes not even expressed in some of his daughters, can be passed on and manifested in their progeny,

It is assumed however, that in the majority of stallions, the combination of traits which determine racing ability are not located on a sex chromosome and both male and female progeny stand an equal chance of inheriting these traits.

On Table. 1 we can analyse the relationship of Jungle Boy's progeny to their gender and performance.

With the comparatively large number (250) of individual yearlings in this study, it is not surprising to find that there was almost an even anmount of fillies and colts (49% to 51%). At the risk of appearing pedantic, perhaps that 1 % difference could be attributed to the odd filly being retained by breeders for stud and therefore not offered through the sales. The percentages differ radically in the performance statistics, with black type fillies (67%) doubling the number of colts (33%) attaining this status.

The results reconfirm that in Jungle Boy's case and therefore feasibly in some other stallions, there can be a definite relationship between the sex of the progeny and the likelihood of above average racing ability.

A joint research effort by three international groups recently resulted in a revolutionary technique which pre-selects the gender of offspring, with the beef and dairy industries in mind. The technique involves 'sorting' the artificially collected male sperm into X and Y

chromosome groups before fertilisation of ova in the laboratory. The embryos are then implanted using the in-vitro fertilisation method.

With AI getting a firm and sustained NO from Thoroughbred breeding authorities, it is highly unlikely that this 'breakthrough' would be accepted by the racing industry in the foreseeable future, and to me, this is a comforting thought.

Tradition does have its upside. Although I am a great proponent of maximising the odds of breeding a winner through pedigree analysis, perhaps after selecting a mating, nature should be left to take, its course. When you look at it, removing all the possibilities, permutations and odds in breeding would take the 'gamble' out of racing, and where's the fun in that?

TABLE 1.	
JUNGLE BOY PROGENY ANALYSIS FOR THE YEARS 1980 to 1990	
In Relation to Colour, Sex and Performance	
Number of Yearlings sold at Goodwood Premier & Autumn Sales	**250**
FILLIES	49%
COLTS	51%
Greys	52%
Bays (browns, blacks)	21%
Chestnuts	27%
Number of Stakes Winners and Stakes Placed Horses	**46**
(individuals appearing in more than one year's statistics only counted once)	
FILLIES	67%
COLTS	33%
Greys	48%
Bays (browns, blacks)	28%
Chestnuts	24%