

HOW TO CHOOSE THE TESTS SUITABLE FOR YOUR HORSE

The Genetic Basics and Terms

Each colour site (or **locus**) tested has a pair of **alleles** (or markers) that we measure. One of each pair has come from the dam and one from the sire.

The alleles are given letters – the **dominant** allele is in upper case, and the **recessive** allele in lower case.

Dominant allele – only needs one of the pair to produce the effect (in this case a colour variant)

Recessive – needs 2 copies of the pair to produce it's effect

If the 2 alleles at the site are the same the horse is **homozygous** for that site.

If the 2 alleles of the pair are different the horse is **heterozygous** for that colour site.

Extension/red /chestnut marker
alleles **E e**

Agouti/black/bay marker
alleles **A a**

These 2 genetic markers determine the **base coat colour** of your horse.

-chestnut

-bay

-black

Extension/Red/Chestnut marker

Alleles **E** or **e** (black is dominant over red)

ee = chestnut (red pigment)

EE or **Ee** = bay or black (black pigment)

Agouti/Black/Bay marker

Only affects horses with black pigment, at least one copy of **E** (**EE** or **Ee**)

Alleles **A** or **a** (bay is dominant over black)

aa = black (black all over)

AA or **Aa** = bay (black distributed to points)

Which test will give maximum information for your horse?

- Test for the marker which is hidden by the base coat colour, so you can then predict possible colours of offspring and choose suitable matings.
- **Chestnut horses** are all **ee** for the Extension locus.
Test for the Agouti locus to see if the profile is **AA** or **Aa** or **aa**.
Aa or **aa** can produce black offspring. **AA** can not produce black offspring.
- **Bay horses**, could be **EE** or **Ee** and **AA** or **Aa**.
Test for Extension to see if there is one copy of the **e** allele (**Ee**), and therefore could produce chestnut offspring.
Test for Agouti to see if **AA**, with no chance of black offspring, or **Aa**, which could produce black offspring.
- **Black horses** are all **aa** for Agouti.
Test for Extension to see if **EE** or **Ee**, as only the profile with a copy of **e** (**Ee**) could produce chestnut offspring.

The above information applies to all diluted and patterned variations.

Overo Lethal White locus – alleles **n **L****

n normal wild type allele

L overo lethal white allele

nn = normal

nL = carrier of Overo Lethal White syndrome

LL = affected Overo Lethal White foal

- Frame overo horses should be tested to see whether they are **carriers** of the **hidden** Lethal White gene (**nL**), in order that suitable matings are chosen to avoid the possibility of Lethal White foals (**LL**).

Tobiano – alleles **TO (tobiano pattern) **to** (nontobiano)**

- Although the Tobiano pattern is generally obvious visually, the test will tell you if your horse is homozygous for Tobiano (**TOTO**) and will therefore produce all Tobiano offspring, or heterozygous (**TOto**) and only produce a percentage of Tobiano patterned foals.
- This test uses a DNA marker closely associated with the tobiano pattern, not the actual tobiano gene. It is possible therefore for false positives and negatives to occur. There is no direct test for the tobiano gene available at present

Cream dilution – alleles **C (normal) **Ccr** (cream dilution)**

- In combination with Extension and Agouti the test for cream dilution will give the full genetic profile of the cream diluted group of horses (palamino, buckskin, smokey black, cremello, perlino and smokey cream), including the number of copies of the cream dilution gene.

CC = no dilution

CCcr = palamino (if base is chestnut)

= buckskin (if base is bay)

= smokey black (if base is black)

CcrCcr = cremello(chestnut) or perlino(bay) or smokey cream(black)

If you have the full colour genetic profiles of both dam and sire you can then make very informed predictions of the outcomes of a mating with respect to colour of offspring.