Coat colour: Black/Bay ("*Agouti*")

Applicable breeds: Numerous breeds

The basic horse coat colours are controlled by the interaction of two genes: Extension and Agouti. The Extension gene, also known as the "Red Factor" controls the production of red and black coat colour pigment, while the Agouti gene controls the distribution of black pigment either uniformly over the body, or restricted to the points of the horse (the mane, tail, lower legs). In order to comprehensively assess the basic coat colour of the horse both Red and Bay/Black should be investigated.

The Agouti gene has two variants referred to as A and a. Horses which are aa will have a uniformly black basic body colour. Horses which are AA or Aa will have a bay colouration with black pigment restricted to the mane, tail and lower legs.

This test is particularly useful for breeders:

- o to identify whether horses with an apparently uniform black coat colour are truly black (aa), or are dark bay (Aa or AA). Breeders wanting to breed black horses need to select those with a alleles in conjunction with E alleles at the Red factor.

This test will be reported as:

AA   : black pigment restricted to the points and therefore bay in the absence of other modifying genes. The bay gene (A) will be passed to all offspring.
Aa   : black pigment restricted to the points and therefore bay in the absence of other modifying genes. The bay gene (A) will be passed to 50% of offspring and the uniform black gene (a) will be passed to 50% of offspring.
aa   : black coat colour which is distributed uniformly over the coat.

Typical breeding outcomes:

AA X AA = 100% AA
AA X Aa = 50% AA, 50% Aa
Aa X Aa = 25% AA, 50% Aa, 25% aa
aa X aa = 100% aa

Please study the Horse Coat Colour Inheritance Chart below to identify probable outcomes from different mating combinations.

Reference:

Rieder S, Taourit S, Mariat D, Langlois B, Guerin G (2001) Mutations in the agouti (*ASIP*), the extension (*MC1R*), and the brown (*TYRP1*) loci and their association to coat colour phenotypes in horses (*Equus caballus*). Mammalian Genome 12: 450 – 455

Horse coat colour inheritance (E-Locus and A-Locus)

Dam \ Sire	EEAA Bay	EeAA Bay	EEAa Bay	EeAa Bay	eeAA Chestnut	eeAa Chestnut	eeaa Chestnut	EEaa Black	Eeaa Black
EEAA Bay	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay	All Bay
EeAA Bay	All Bay	¾ Bay ¼ Chestnut	All Bay	¾ Bay ¼ Chestnut	½ Bay ½ Chestnut	½ Bay ½ Chestnut	½ Bay ½ Chestnut	All Bay	¾ Bay ¼ Chestnut
EEAa Bay	All Bay	All Bay	¾ Bay ¼ Black	¾ Bay ¼ Black	All Bay	¾ Bay ¼ Black	½ Bay ½ Black	½ Bay ½ Black	½ Bay ½ Black
EeAa Bay	All Bay	¾ Bay ¼ Chestnut	¾ Bay ¼ Black	9/16 Bay ¼ Chestnut 3/16 Black	½ Bay ½ Chestnut	3/8 Bay ½ Chestnut 1/8 Black	¼ Bay ½ Chestnut ¼ Black	½ Bay ½ Black	3/8 Bay ¼ Chestnut 3/8 Black
eeAA Chestnut	All Bay	½ Bay ½ Chestnut	All Bay	½ Bay ½ Chestnut	All Chestnut	All Chestnut	All Chestnut	All Bay	½ Bay ½ Chestnut
eeAa Chestnut	All Bay	½ Bay ½ Chestnut	¾ Bay ¼ Black	3/8 Bay ½ Chestnut 1/8 Black	All Chestnut	All Chestnut	All Chestnut	½ Bay ½ Black	¼ Bay ½ Chestnut ¼ Black
eeaa Chestnut	All Bay	½ Bay ½ Chestnut	½ Bay ½ Black	¼ Bay ½ Chestnut ¼ Black	All Chestnut	All Chestnut	All Chestnut	All Black	½ Chestnut ½ Black
EEaa Black	All Bay	All Bay	½ Bay ½ Black	½ Bay ½ Black	All Bay	½ Bay ½ Black	All Black	All Black	All Black
Eeaa Black	All Bay	¾ Bay ¼ Chestnut	½ Bay ½ Black	3/8 Bay ¼ Chestnut 3/8 Black	½ Bay ½ Chestnut	¼ Bay ½ Chestnut ¼ Black	½ Chestnut ½ Black	All Black	¾ Bay ¼ Chestnut

Use this chart to identify the likely coat colour for offspring of parents already tested for the E-Locus and A-Locus.

These proportions are average expectations and are subject to variation due to chance.