

HORSE COAT COLOR / PATTERN TEST REPORT

Provided Information:		Case:	NQ127599
Name:	PICTURE PERRFECT	Date Received:	04-Aug-2025
Registration:	6143790	Report Issue Date:	20-Aug-2025
		Report ID:	4892-5416-4216-4120
		Verify report at vgl.ucdavis.edu/verify	
DOB: 01/18/2021 Sex: Stallion Breed: Quarter Horse			

RESULT		INTERPRETATION	RESULT		INTERPRETATION
RED FACTOR	E/e	Both black and red factors detected.	SPLASHED WHITE (SW1, SW3, SW5, SW6, SW7, SW8)	N/N	No copies of MITF Splashed White detected.
AGOUTI	A/A	2 copies of agouti present. If present, black pigment is restricted to the points.	SPLASHED WHITE (SW2, SW4)	N/N	No copies of PAX3 Splashed White detected.
CREAM	N/N	No copies of Cream dilution detected.	TOBIANO	N/N	No copies of Tobiano detected.
PEARL	N/N	No copies of Pearl dilution detected.	LEOPARD	N/N	No copies of Leopard Complex detected.
SILVER	N/N	No copies of Silver dilution detected.	PATTERN-1	N/N	No copies of PATN1 detected.*
DUN	nd1/nd2	Horse is not Dun dilute but may have primitive markings.	BRINDLE 1		Not requested.
CHAMPAGNE	N/N	No copies of Champagne dilution detected.	TIGER EYE		Not requested.
LETHAL WHITE OVERO	N/N	No copies of lethal white overo detected.	MUSHROOM (SHETLAND PONY)		Not requested.
SABINO 1	N/N	No copies of Sabino 1 detected.	GRAY COPY NUMBER	N/G3 or G2/G2	Unresolvable -four copies detected. The horse either has one copy of the triplication (G3) OR two copies of the duplication (G2). Horse will gray.
DOMINANT WHITE (W5, W10, W13, W20, W22)	N/W20	1 copy of W20 detected.	ROAN		Not requested.

HORSE COAT COLOR / PATTERN TEST REPORT

Client/Owner/Agent Information: KELSEY PRICE	Case: NQ127599 Date Received: 04-Aug-2025 Report Issue Date: 20-Aug-2025 Report ID: 4892-5416-4216-4120 Verify report at vgl.ucdavis.edu/verify
Name: PICTURE PERRFECT	

Additional Information

If testing for a disease or a disorder was performed and results indicate the animal is affected or at risk, we recommend contacting your veterinarian for further clinical evaluation and for additional information on disease and management.

For more detailed information on Coat Color test results, please visit our website at:
vgl.ucdavis.edu/resources/horse-coat-color

*Pattern-1: In order for high levels of white spotting to be visible on horses that inherit PATN1, LP must also be present.

License Information

Tests for Tobiano are performed under license.

For terms and conditions of testing, please see vgl.ucdavis.edu/about/terms-and-conditions

Results are determined using PCR-based methods. The results relate only to the sample tested as identified by the submitter (for example, identity and/or breed).

Report authorized by Dr. Rebecca Bellone, VGL Director

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Red Factor and Agouti

Horse coat color depends on many genes. There are two known genes that contribute to a horse's base color, namely Agouti (also known as Agouti Signaling Protein or *ASIP* for short) and Red Factor (also known as extension or *MC1R*).

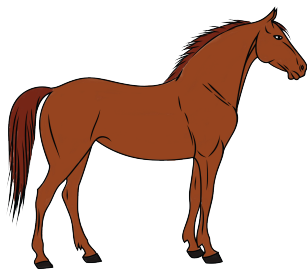
Genetic variation at the Agouti and Red Factor loci work together to determine the base coat color as well as the color of a horse's points (mane, tail, lower legs, and ear rims). Together these genes determine if a horse is chestnut/sorrel (shade of red body and red points), bay (shade of red body with black points), or black (black body and black points).

Agouti controls the distribution of black pigment, and alleles of this gene determine whether a horse will have a bay or black base coat color. The dominant **A** allele restricts black to the points. To read more about Agouti, visit <https://vgl.ucdavis.edu/test/agouti-horse>.

Red factor is responsible for determining whether a horse will have a chestnut base coat color or not. Horses with two recessive alleles (e or e^a) will be chestnut regardless of the genotype at the agouti locus. Horses with at least one dominant allele (E) will not be chestnut, and whether they are bay or black is dependent on the genotype at the agouti locus. To read more about Red Factor, visit <https://vgl.ucdavis.edu/test/red-factor-horse>.

Genotype results for Agouti and Red Factor can be helpful in predicting breeding outcomes.

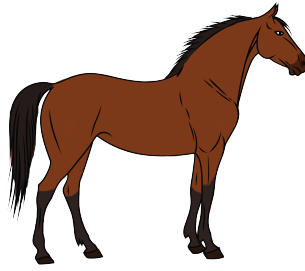
Please note that additional known and yet unknown genes influence shade, dilution, and white patterning, and ultimately the overall coat color phenotype observed.



Chestnut or Sorrel

Possible genotypes:

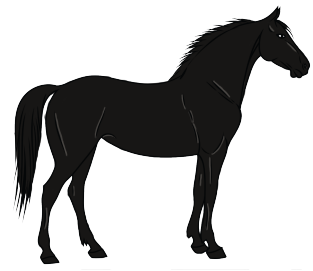
e/e A/a
e/e A/A
e/e a/a



Bay

Possible genotypes:

E/e A/a
E/e A/A
E/E A/a
E/E A/A



Black

Possible genotypes:

E/e a/a
E/E a/a

For more on horse coat color visit. <https://vgl.ucdavis.edu/resources/horse-coat-color>.

Gray (Copy Number)

Gray is a progressive depigmentation of the hair, often resulting in a coat pattern that is almost completely white by 6-12 years of age. Horses that inherit the progressive gray variant(s) can be born any coat color and/or pattern, then begin to gradually show white hairs mixed with the pigmented hairs throughout the body.

The initial cause of graying in horses was reported by researchers at Uppsala University, in Sweden, as a 4.6 kilobase (kb) duplication in intron 6 of the Syntaxin 17 (*STX17*) gene.

However, a 2024 follow-up research study revealed that there are actually 2 different alleles responsible for graying in horses: the **G2 allele**, which consists of a tandem duplication of the 4.6kb sequence (i.e., 2 copies side by side on the same chromosome) that leads to slow graying, and the **G3 allele**, which is a tandem triplication of the 4.6kb sequence (i.e., 3 copies side by side on the same chromosome) that results in fast graying and increased risk for melanoma (Figure 1).

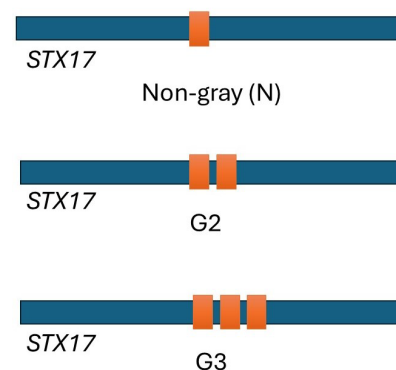


Figure 1: Image illustrating the three known alleles when testing for gray copy number (G1, reported by VGL as N; G2 and G3). A duplication (G2) or triplication (G3) in the *STX17* gene causes graying in horses.

The Gray Copy Number test determines the total number of copies of the 4.6kb sequence a horse has (denoted as orange bars in both Figures). Horses with 2 copies of the 4.6kb sequence have one copy on each chromosome, meaning they have two non-gray alleles (N/N). Horses with 3 copies of the 4.6kb sequence have one copy on one chromosome (N) and two copies on the other chromosome (G2), meaning their genotype is N/G2. Horses with 5 copies have two copies on one chromosome and three copies on the other chromosome, meaning they have one G2 allele and one G3 allele (G2/G3). Horses with 6 copies have three copies on each chromosome, or two G3 alleles (G3/G3).

Due to the length of the sequence that is copied and the available testing methodology, horses that have **4 copies** of the 4.6kb sequence, as determined by the test, have unresolvable genotypes. This is because 4 copies may be distributed as 1 copy on one chromosome (N) and 3 copies on the other chromosome (G3), or 2 copies on each chromosome (G2/G2), as seen in Figure 2 below.

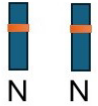
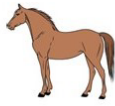
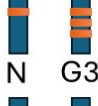
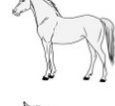
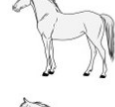
Genotype	Chromosome Representation	Phenotype
N/N	 N N	Non-gray 
N/G2	 N G2	Gray 
G2/G2 [*]	 G2 G2	Gray 
N/G3 [*]	 N G3	Gray 
G2/G3	 G2 G3	Gray 
G3/G3	 G3 G3	Gray 

Figure 2: Image showing the genotype, chromosome representation and expected phenotype based on the number of copies of the *STX17* variant present. Each orange bar represents 1 copy of the 4.6kb sequence.

^{*} It is currently not possible to distinguish between the two possible genotypes in horses that have 4 copies of the 4.6kb sequence.