

GRAY

isn't a "color."

Breed associations have co-opted the term for registration purposes, but graying is actually an aging process that eliminates a horse's normal coat color.

By Tracy Gantz

When a person's hair starts to turn gray, we realize they are getting older. Yet, when we think of gray in horses, we often simply see color—he's sorrel, bay or gray.

But when it comes to graying, horses aren't that different from us. People are born with blond, brown, black or red hair, and, at different rates for each of us, our hair gradually loses its color and becomes gray, perhaps even white. In humans, gray isn't a color, and this is a principle we should also apply to horses.

"There's the misconception that gray is a color, and it isn't," said Dr. Bonnie B. Beaver. "Gray is a white pattern imposed on a base color."

A veterinarian and specialist in animal behavior at Texas A&M University, as well as a breeder of Palominos, Beaver co-authored the book *Horse Color* with Dr. D. Phillip Sponenberg, professor of pathology and genetics at the Virginia-Maryland Regional College of Veterinary Medicine.

It's easy to label a horse a particular color based on what we see. That's how breed associations initially began registering colors, before equine genetic research revealed that a gene separate from body color controls gray.

"Gray is dominant," said Sponenberg, who has also written the book *Equine Color Genetics*. "So gray horses should have a gray parent."

Horses are born with a particular body color, and if they inherit the dominant gray gene from their sire or dam, they will eventually lighten to gray. Some become gray at a very young age, while others take years to gray out.

"I don't know of any way to predict the speed with which a horse will go gray," said Sponenberg. "It does differ somewhat breed to breed, implying that genetics plays a role."

Graying can dramatically change a horse's look as it ages. Five-time World Champion HBF Iron Man, for example, looked much darker when he was winning at the World Show as a 3-year-old in 1999, than he does today.

"HBF Iron Man was bay when he was foaled," said Celeste Fender, who co-owns the stallion with Robin Degrafe and who raised him from a colt. "He had a little rim of gray around his eye. His barn name when he was young was 'Rusty' because he was a rusty color."

Yet, by the time HBF Iron Man was winning his first world championship at age 3, he was a dark gray. Today, the now-10-year-old stallion is a much lighter gray, with only the black points of his original color left on his legs and the tips of his ears.

Gray in Paints

Because the Paint breed developed from the amount of white that occurs on a horse's body, graying can be a challenge for Paint breeders and owners. As the gray lightens a horse's original body coat color, it becomes harder to distinguish between the color and the white areas of a horse's body. If a horse is going to gray, it's important to register the animal early, especially if it has minimal white.

"When people submit their registrations early in the foal's life, determining eligibility isn't difficult," said Cindy Grier, manager of APHA's reg-



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Horses are not born gray. They "gray out" over time. For example, HBF Iron Man was a bay foal. The only clues to his eventual coat change were the rims around his eyes.

istration department. “It’s when they wait until the horse has grayed that determining eligibility can be more difficult. The contrast between a true white marking and a gray coat color can sometimes be difficult to differentiate in photographs.”

In most horses, the skin retains the original body color when the horse grays, whereas white patches have no pigment at the skin level. Because of that, one trick that works to show the contrast between gray and white is hosing down the horse with water.

“Often, a trusty garden hose will help us ‘see’ the horse’s original body pattern,” Grier said.

Grays make up only 1.6 percent of the total number of Paints registered, according to Grier. But she added that the number should probably be higher because it doesn’t include horses that were originally registered as their base color without the registration being updated when they grayed.

Paint breeders are more likely to breed for typical Paint color patterns, such as tobiano and overo, or performance traits, which may be another reason for the small amount of gray in the breed. By contrast, breeds such as the Lipizzaner and the Percheron are almost all gray, while gray is also very common in breeds like the Arabian.

Gray genes

Because the gray gene is dominant, it is relatively easy to get a gray horse. While the study of genes is by no means complete, we do know that genes occur in pairs, with each parent giving one of the pair to its offspring. We can designate the gene for gray as “G” and the gene for non-gray as “g” to indicate that gray will dominate over non-gray. In other words, if a horse receives a “G” from one parent and a “g” from the other, it will gray because the “G” is dominant and the “g” is recessive.

When a horse receives both a dominant and recessive gene, it is heterozygous for the trait—it has one of each. If the horse receives two dominant genes (graying would be indicated by “GG”), then it is homozygous dominant, whereas if it receives



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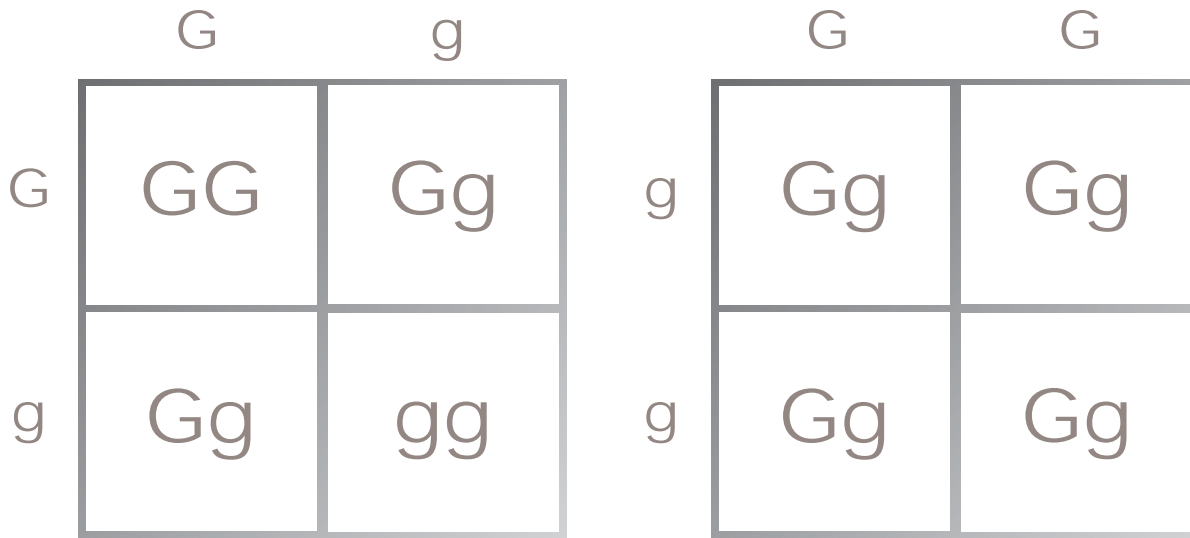


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A horse of a different age—not color. As is the case with all horses that go gray, 10-year-old HBF Iron Man has appeared to develop more white hair each year of his life. In truth, the stallion’s bay hair has simply lost its color.



Above, the box on the left shows that a heterozygous gray (Gg) sire and dam have a 25 percent chance of producing a homozygous gray (GG) foal, a 50 percent chance of producing a heterozygous gray foal and a 25 percent chance of producing a non-gray (gg) foal. On the other hand, as the box on the right indicates, having one homozygous gray parent will guarantee a foal that will turn gray, even if the other parent is another color.

two recessive genes (“gg”), then it is homozygous recessive.

If a horse is a homozygous gray (GG), all of its offspring will be gray. If it is homozygous recessive for the trait (gg), then it will not be gray and will not be able to pass gray on to its foals. However, such a horse could get a gray foal if bred to a horse with a dominant gray gene (GG or Gg).

Most gray horses are heterozygous gray (Gg). That means that they can contribute either a dominant or recessive gene for the trait. Theoretically, two heterozygous gray horses would produce 25 percent homozygous grays, 50 percent heterozygous grays,

and 25 percent non-grays (homozygous recessive for gray). Visually, that would mean 75 percent gray horses.

Of course, just like a coin flip would theoretically produce 50 percent heads and 50 percent tails, but doesn't, breeders won't get those exact percentages either.

Or, as Beaver added with a laugh, “We all know that if you breed for a particular color, you won't get it.”

Plus, a gray stallion's book won't consist entirely of gray mares. Likewise, a gray mare will probably not be bred to a gray stallion every year. Instead, gray horses are usually bred to horses of a variety of colors. All of the non-grays

they are bred to will be homozygous recessive for gray. When a heterozygous gray is bred to a homozygous recessive for gray, the offspring should be half gray and half non-gray.

Beaver said that she is not aware of a genetic test to determine whether a gray horse is homozygous or heterozygous. If a horse produces even one non-gray, then it is heterozygous for gray. The opposite is not necessarily true, however, because no matter how many foals a horse produces, chance—instead of genetics—could make them all gray.

HBF Iron Man is a good example of how a heterozygous gray stallion



Paint racehorse Aze Beduino was sired by the gray Thoroughbred Beduino. Since The Jockey Club began listing gray and roan as one color, Paint owners have had problems predicting if their half-Thoroughbred foals will turn gray.

typically reproduces. From his first 75 foals, the stallion has sired 36 grays from books that include mares of many colors.

When crossed three times with the sorrel overo mare Miss Sonny Bonanza, HBF Iron Man has sired three gray foals, whereas when crossed four times with the chestnut overo mare HBF Flirt N Fancy, he has sired two grays, a bay and a chestnut. And when bred twice to the sorrel mare Eagley Jazzed, he has sired a bay and a chestnut.

HBF Iron Man and the gray mare Eternally Matched have produced two grays, while he and the gray mare Wicks Park have produced one buckskin.

Fender said that though her bloodlines reflect the performance traits she is looking for, she was hoping HBF Iron Man would be gray. Likewise, breeders who take their mares to the stallion are also hoping that they will get a gray foal along with the stallion's performance ability.

"They consider gray a bonus," Fender said.

Determining color

Even though gray isn't genetically a color, when it comes to registering horses, it is considered a color. APHA, as do most other major breed associations, labels gray a color for registration purposes, and gray trumps all the others. In other words, if you have a sorrel, bay or black horse that will eventually turn gray, it should be registered gray.

It's still helpful to know the base color of a gray horse, especially since base coat color and gray are controlled by two different genes. In fact, in *Equine Color Genetics*, Sponenberg writes that horses get their color from 11 genetically independent processes. These include genes that cause white patterns in Paints, as well as genes that dilute such basic colors as bay and chestnut/sorrel into colors such as buckskin, palomino, cremello and perlino.

Because gray acts on the base coat as the horse ages, it is sometimes difficult to know the original base coat color of an adult horse.

"Gray doesn't tell me anything," said Beaver, who in breeding Palominos is very concerned with base coat color. "If you don't know a gray horse when it is young, you may not be able to know its base color."

Beaver cites the example of a gray horse that has black points on his legs, mane, tail and ears.

"People assume that the horse was originally black," she said. "But he could have been bay, grullo or buckskin. These horses are not going to breed like a black horse. They are going to breed what the base coat was."

Enter the "color" roan to confuse things even further. Like gray, roan isn't genetically a color. However, instead of introducing white hairs as a horse ages, like gray does, roan sprinkles white hairs among the horse's base coat color from birth, and the amount of white does not change with age. Also, the roaning pattern may not be consistent throughout the horse's body. It may concentrate in such places as the hindquarters, girth, barrel and tail dock. It is also possible for a horse to be a gray roan.

APHA and the American Quarter Horse Association distinguish between gray and roan. The two organizations even have different colors of roan. APHA allows owners to register blue, red and bay roans. Yet, The Jockey Club, which registers Thoroughbreds, has combined gray and roan into one color classification to reduce the number of corrected registration certificates. The Jockey Club acknowledges that the two colors differ genetically, but its combination of the two can introduce confusion when a Thoroughbred becomes part of a Paint or Quarter Horse pedigree.

HBF Iron Man received his gray gene from his dam, the Thoroughbred mare Strawberry Lane. The Jockey Club had registered her as a roan, an incorrect designation that can be discovered by looking at her pedigree and produce record. Strawberry Lane traces back through her sire to the gray Thoroughbred champion Native Dancer and through her "roan" dam to her gray second dam, Lou-Sepha. Strawberry Lane not only

Melanoma and GRAY horses

Because the skin of gray horses tends to have more melanin in it than that of other horses, gray horses can be more prone to developing melanomas, or small tumors on the skin. Though they are rarely fatal, melanomas can be unsightly and can cause chafing, if they interfere with tack.

Melanomas do not usually occur in younger horses. They can often be found under the dock of the tail, around the genital area, near the ears and eyes and in the jugular area. Most melanomas do not cause the animal any pain, and they don't often metastasize, as melanomas can do in humans. Thus, melanomas may not cause a problem to the horse during its normal lifespan.

Surgery and laser treatment can be used to remove melanomas, but veterinarians do not always recommend this course of action. As with any equine health issue, you should consult your veterinarian as to what, if anything, should be done in each particular case.

produced the obviously gray HBF Iron Man, but also the 1993 Thoroughbred filly Cranberry, who was registered as a “gray/roan.”

Registration difficulties

Even though APHA offers many different categories of color, people can still have trouble properly identifying their horse at registration time. Roans may not have enough of the roaning pattern for easy identification, while gray will often not show up before a horse needs to be registered.

“People who have raised a lot of gray horses know what to look for,” Beaver said. “A foal who will eventually turn gray may have a dustier color around their face. But if you’re not used to it, you won’t pick it up.”

APHA’s Grier agreed with Beaver. She said that an ultimately gray horse that as a foal looks sorrel or bay, for example, will often have an unusual hue compared to a non-gray foal of the same base color.

Fender noted that while she could tell that HBF Iron Man would gray as he got older, the stallion’s first foal, HBF Drop Your Irons, fooled them.

“Drop Your Irons was a bright cherry red when he was born,” Fender said. “He had no gray around his eye or anywhere.”

Registration photographs can often help in determining whether a horse should be registered gray. The APHA registration department can raise the question with an owner if a foal’s photos indicate that it may eventually turn gray.

Parentage also provides a clue because genetically a gray horse must have at least one gray parent. If it doesn’t, then usually a mistake occurred when the parent was registered.

“We see obviously graying foals that do not have a gray parent, but gray is apparent in the pedigree further back,” Grier said. “The sire or dam obviously was registered as its base color and never updated.”

If that happens, APHA contacts the owner of the parent whose pedigree suggests that’s where the gray came from, requesting current photos and the original registration certificate.

Most of the time, the parent is confirmed gray and its information is updated. However, if that cannot be confirmed or the photos of the parent show it not to be gray, then APHA will require parentage verification.

While it may be tempting with a possibly gray foal to wait on registration, that may not be convenient for those who want to show a foal early. Grier also advised registering early so that a Paint’s white areas show up their best, noting that it is easy to amend a registration certificate later.

“All a member needs to do is return the original certificate, current photographs of the horse and a note or completed correction form requesting the change,” Grier said. “Color changes are done at no charge to APHA members.”

If a horse’s base coat color is one of the lighter, diluted colors, such as palomino or cremello, gray can be especially difficult to determine.

“A cremello, for example, could go gray,” said Sponenberg, “but would still end up being a pale, pink-skinned, blue-eyed horse.”

Mapping the gray gene and developing a test for it may eventually solve these registration problems. Work is being done to map more of the equine genome, and it has been reported that a team of researchers in Sweden is working on the gray gene. Until then, gray will continue to draw primary attention through its dramatic “color.”

“A lot of people like gray horses,” Fender said. “They really stand out in the ring.” **PHJ**



Gray Paints, such as the tobiano mare Chiqua Little Lena (pictured with owner Sandy Kaplan), are growing in popularity because of their unique eye-appeal.

GAVIN EHRRINGER