

≈ COLORFUL ≈

WHITE-HOT

White is a decorating scheme that recently has come alive in our breed. In this third in a series the author explains where the genes are hidden, sometimes for decades.

By Laura Hornick Behning

Perhaps no other colors have generated as much controversy over the history of the Morgan breed than the various types of white patterning. Morgans with white markings so extensive as to be visibly pinto were once thought to be the result of outside blood. From 1962-1995 the White Rule prevented the registration of Morgans with white markings on the body or extending above the knees or hocks. Some Morgans with white outside the lines were registered any way, and their white markings attributed to a scar from an injury. With the advent of DNA parentage testing, these little white lies (pun intended) were no longer necessary, but Morgans with flashy white markings still had an uphill battle for acceptance. To some extent, this same prejudice was extended to grays and roans.

Fortunately, modern knowledge of color genetics—and the ability to test for most major color genes—has gone a long way towards changing prevailing opinion about what used to be thought of as excessive white. We now know that pinto patterns can hide for generations in seemingly solid colored horses that carry the genes, only to result in a fully expressed pinto when the

right cross is made. The old term for these was “crop out,” and that is not a bad descriptor. Let’s examine the way these pinto Morgans appear from seemingly out of the blue, and what genes cause their flashy markings, as well as discover more about the other genes that add white hairs in various types of distribution.

PINTO PATTERN 1: SPLASH WHITE

There are five currently identified pinto patterns in the equine: tobiano, sabino, splash, frame, and what was formerly called “dominant white,” but is now known as “white spotting.” Three of these five mutations are known to exist in the Morgan. The first of these is a pattern that is making headlines in Morgan color circles these days: splash. It was just a decade ago (2005) that splash was discovered to exist in the Morgan breed. There was one particular genetic mechanism of splash that allowed it to remain hidden in our breed for so long.

Splashed white is an incomplete dominant. What this means is that heterozygous splashes (only one copy of the splash gene) have less white than homozygous splashes (which have two copies

PINTO PATTERN 1: SPLASH WHITE



SPLASH, HETEROZYGOUS (minimal)



SPLASH, HETEROZYGOUS (typical)



SPLASH, HOMOZYGOUS

LEFT TO RIGHT: MARVELOUS MAGIC MOMENT (Marvelous Intrigue x Marvelous Moon-Glo), a 2004 black splash mare, would not be identified as a “pinto” by most people—but testing proved she is one! Her only white marking is a partial coronet on her left fore. It is easy to see how the splash gene can remain hidden. Heterozygous splashes can be very minimally marked but will pass their splash gene on to 50 percent of their offspring. Breeding them to another heterozygous splash results in a full blown, homozygous splash “pinto” 25 percent of the time. Photo by Sue Beach; Most people would identify MEMC CROWN ROYAL (Robbi Sue’s Mr. Alert x King Blaze Mint) as a “pinto,” even though he does not have white on his body. The four white feet, white stripe on the face and partial blue eyes are a big clue that he carries the splash gene. This 2003 buckskin splash stallion is owned by MEMC Morgans. Photo courtesy of Jennifer Monroe; MEMC ON TARGET (MEMC Crown Royal x W-B Her Royal Highness), 2007 buckskin splash stallion owned and photographed by MEMC Morgans, Jennifer Monroe. Two copies of the splash gene, one from each parent, result in a horse with a white pattern that begins on the legs and travels up the body, as seen here.

PINTO PATTERN 2: FRAME OVERO



FRAME OVERO



FRAME OVERO (typical)

LEFT TO RIGHT: L A S FUTURE DE ORO (Heathermoor Dynaquiz x Q Tawny), 1989 palomino frame overo mare, pictured in 2013 at age 24. Registered as palomino with a connected star/strip/snip, both hind socks and a small scar on the lower right abdomen. This mare's dam, Q Tawny, was also the dam of the frame mare, AB Skywalker. This led the author to test "Future" for frame in September 2013, which proved that, like her half sister, she too was a frame overo—despite not being obviously "pinto." Photo courtesy of Future's owners, International Institute for World Peace; The infamous frame overo stallion, WAR PAINT (Chief Justin Morgan x Painted Girl), foaled in 1959, is pictured here in 1971 as a 12-year-old. War Paint's pattern demonstrates a typical medium expression of the frame pattern: a blaze face and large white spots on the sides, "framed" by the base color when viewed in profile, as here. This photo, never before seen in print, is courtesy of Lowell Rott.

of the splash gene). The gene has an additive effect when there are two of them present, and is like the cream gene in this respect. A heterozygous splash can actually be a solid colored horse with no white markings at all! Most of them, however, will have at least a star or snip and some leg white, and one or both eyes will be blue. This characteristic solid appearance of many heterozygous splashes certainly raises questions about the definition of pinto—because they most certainly are pinto, even though they may not fit the commonly accepted stereotype!

It is only when two heterozygous splashes are bred together that there is a 25 percent chance of producing a homozygous splash—a full blown, obviously pinto Morgan. Homozygous splashes usually have flamboyant white markings on the body. These markings are smooth edged and spread upwards from the horse's underside. The horse looks as though it was dipped, feet-first, in white paint, and they often have a white or white-tipped tail.

There is a genetic test for splash, which has been an absolute boon for breeders wishing to identify splash individuals in their herds. There are three splash mutations that have been identified so far, and the splash test checks for all three. So far, only SP1 has been found in Morgans. SP2 and SP3 are found only in the stock horse breeds, and appear to be embryonic lethals (affected foals die in the embryonic stage) when homozygous, unlike SP1 which is not. There are Morgans who have tested positive for splash who have no more expression of their splash gene than a few white hairs on their forehead. Hopefully as time goes on, more Morgans will be tested and proven to carry splash, even if by their outward appearance they may not appear pinto at all.

Morgan lines that are confirmed to be carrying splash include descendants of the mare Royal Glo (found in horses from the Marvelous Morgans breeding program); Old Ways Bimbeau (and other descendants of the blue eyed splash mare Lady In Lace, who is in his pedigree as well as other horses with the "Sweet's" prefix); and Morgans from the cross of Windover Enchantment on Icestone Whitewing (found in horses from Vicki Greer's W-B prefix and their descendants, including the splashes from the MEMC breeding program). All of these splash lines go back to the same old Midwest breeding through a mare foaled in 1913 named

Byrrh (Handy Allen x Abner Royce Mare) via two of her offspring, Archie O or his full sister Rose Bay. A third offspring of Byrrh, the stallion Selim's Best, also appears in one of the three splash source pedigrees. Interestingly, most of these ancestral splashes had very little white, which perhaps explains how they were bred on during a time when excessive white was frowned upon. There may be additional lines that carry this pattern, and it is hoped that the test for splash will identify them.

PINTO PATTERN 2: FRAME OVERO

Frame overo is a pinto pattern characterized by dark legs, a blaze or sometimes bald face, and white spotting on the sides of the horse, framed by the base color. Some individuals have leg white, but that is probably due to another pattern gene acting along with frame. As with other patterns of white, there are varying degrees of expression, from a narrow blaze as the only white marking to nearly white all over. Frame is a dominant gene, so a frame overo will have at least one frame overo parent, even though that parent may not look pinto at all.

Frame is lethal when homozygous; such individuals die shortly after birth due to an incomplete digestive tract and are referred to as Lethal White foals. Responsible breeders never mate two frame overos together for this reason. Heterozygous frames have no health-related problems other than possibly needing sun protection if they have pink skin around the muzzle and eye.

Frame is incredibly rare in Morgans, with only two living individuals identified at this time, one of which is unregistered, though purebred. The 1959 stallion War Paint (Chief Justin Morgan x Painted Girl) was a famous frame overo Morgan who still has a few descendants in the AMHA Registry today. It is possible, due to the nature of frame to hide in minimally expressed forms on certain individuals, that some of his solid colored descendants may carry the frame overo gene. It is also possible that frame could be hiding in relatives of the late Sky Walker AB, a palomino frame overo mare, through individuals related to her dam, Q Tawny. This is the same line present in the palominos behind the Goldtree prefixed horses, and also one of the silver lines. In September 2013, Sky Walker AB's maternal half sister, LAS Future De Oro (f. 1989),

OTHER PATTERNS: SABINO & WHITE SPOTTING



SABINO, ROANY



SABINO

LEFT TO RIGHT: All-over roaning along with flashy white markings is typically called “sabino” by horsemen, although in Morgans this phenotype is not, so far, actually attributable to the Sabino1 gene. They may also be mistaken for true roan. A good example is ALJAKS BRITE LIGHTS (Aljaks Double Whammy x Century Oak Denali), a 2008 chestnut gelding, pictured here ridden by Kelly Kraegel at the 2012 Grand National & World Championship Morgan Horse Show®. The darker spots on the gelding’s body are called “Bend Or” spots, after a famous racehorse who had them. Bend Or spots are commonly seen on chestnuts and palominos (photo © Howard Schatzberg); ULTRAS EZ DOES IT (Menomin Flash Dancer x RMF Wild Child), a 2005 chestnut gelding, shows the lacey-edged markings typical of what is commonly called “sabino.” On the hind legs, the white typically travels to a point up towards the stifle. The facial white tends to wrap around the lower jaw. What gene(s) actually causes this phenotype is, at this time, unknown. Taylor Rebman up. Photo by Nancy Rebman.

tested positive for frame, proving the gene may still be present in other individuals from this line. If Q Tawny, her dam Tia, War Paint or related lines from Cross Ranch breeding are in your horse’s ancestry, you should test it for frame (via the Overo/Lethal White test). It may be that we have other Morgans carrying frame out there, and that this very attractive pattern can be responsibly bred and preserved for the future.

OTHER PATTERNS: SABINO & WHITE SPOTTING

In 2005, the causative gene for the sabino pattern, Sabino1, was identified and a test was developed for it. Researchers expected to discover additional Sabino mutations in the KIT locus, where Sabino1 is found. So far, that has not been the case. What has been discovered is another series of mutations in KIT that were originally called Dominant White but now are labeled with the fairly ambiguous term White Spotting. Not very creative, and a bit confusing, especially as all of these mutations are somewhat similar in appearance.

Sabino1 has not been found in the Morgans that have been tested for it so far, but it is a common mutation in the Tennessee Walking Horse and related breeds. Like splash, it is an incomplete dominant; one sabino gene produces a roany, chromed out individual, and two copies create a nearly all-white horse, sometimes retaining a bit of the base color hair on the topline and/or ears.

The type of coloring in Morgans that is generally called sabino is similar in appearance to actual Sabino1. These Morgans have high white stockings, a blaze that often wraps around the chin,

an overall sprinkling of roaned hairs or roaned patches, and perhaps a belly spot or two. The markings may have jagged or lacey edges, and the hind leg white tends to travel upwards in a point towards the front of the stifle. There may be an increase in the number of roaned hairs as the horse ages, and roany sabinos can be mistaken for true, dark headed roans, but they are not. This sabino phenotype is fairly common in the Morgan breed, and runs strongly along certain family lines. Old government breeding (particularly horses from Devan and Orland Leader lines), some Lippitt lines, and descendants of Menomin Flash Dancer and Aljaks Double Whammy are all strong sources of sabino. A good example of this roany sabino phenotype was the late Dawnhill Stormcloud, a famous carriage driving gelding owned by the Homer family.

At this time there are only tests for a few of the 20 currently identified White Spotting patterns, and to my knowledge, no Morgan has yet tested positive for any of those, either. Interestingly, there is one White Spotting pattern, W20, which shows promise as the causative factor in horses with chrome that do not test positive for one of the other pinto patterns.

In addition, some Morgans have blue eyes and/or white markings that seem indicative of splash, but do not test positive for splash. The cause for the coloring on these horses is a mystery. It may be another unidentified Splash-type or Sabino variant, one of the White Spotting mutations, or something as yet unnamed and unidentified. As time goes on, more and more discoveries are being made in the field of color genetics. In another decade hence

OTHER PATTERNS: RABICANO AND ROAN



RABICANO



ROAN

LEFT TO RIGHT: KATHARINE SERENITY (UVM Tennyson x Run Brook Tiffany), 1994-2008 brown rabicano mare owned by Buffy Tarr. The characteristics of rabicano are white hairs in the flanks and white hairs forming a “coon tail” at the tailhead. Photo by Erin Branch Lillienthal; The late CADUCEUS HEROD (Patchett Hill x Doll Rose), f. 1987, was ridden by his owner Barbara Putnam to many titles in open dressage competition. Herod was a blue roan—the result of the roan gene on a black horse. He and a 1985 mare, Viv Lamae, were the last known true roans in the Morgan breed. Photo courtesy of Barbara Putnam.

we may well have a better handle on just what is causing a lot of white patterns that presently remain unidentified.

RABICANO AND ROAN

Rabicano is a pattern of white hairs sometimes confused with roan. It is expressed as white hairs interspersed in a faintly brindled pattern along the flank area, belly, and up between the front legs. It also causes a coon tail of white banding at the tailhead. The rabicano gene is presumed to be dominant, so rabicano horses should have at least one rabicano parent. Rabicano horses can have such minimal expressions of this pattern that it is missed. This is a fairly rare pattern in our breed and, as of yet, no family lines have been identified as consistently carrying it.

Roan is a pattern of white hairs over the horse’s body, mixed in with the base color hairs. The points and head remain the base color. Roan can be present on any base color, although there are terms only for the base color roans: blue roan is roan on black, strawberry roan is roan on chestnut, and red roan is roan on bay or brown. As with all the patterns of white, there are degrees of expression, so that some roans are nearly white on the body while others remain fairly dark. Roan is dominant, so all roans have at least one roan parent, though there are documented cases of roan spontaneously appearing in other breeds. These spontaneous roans are likely due to a different mutation than true roan.

There are two known sources for roan in Morgans. The first came through the 1964 chestnut roan mare Doll Rose, by Easter Vermont out of the roan mare Rosemont. Doll Rose had just four registered foals, including the well known blue roan dressage

gelding, Caduceus Herod. This source of roan is probably gone unless there are as-yet unidentified roan individuals from related lines out there. The other roan line in Morgans descended from the 1940 chestnut roan mare Torchy (Mansfield x Daisy of Willowmoor, roan). Torchy’s line comes down to us through the Double J prefixed horses. At the present time her last known roan descendant was the 1985 bay roan mare Viv LaMae (Double J Apollo x Carlyle LaMae). It is hoped that there are additional roans from this family yet to be discovered; otherwise, the roan gene is probably extinct in our breed.

GRAY

Gray is a modifier that works similarly to graying in humans. The horse is born any color and their hair becomes depigmented over time. Probably the most famous grays are the Lipizzaner horses of Austria, who are almost invariably gray but with a few blacks, browns, and bays. Because gray is dominant, all grays will have at least one gray parent.

Usually, the graying process begins on the head. Gray foals are often very dark—darker than a non-gray foal of the same color would be. They may have lighter hairs around the eyes (called goggles) and muzzle giving a further clue that they will eventually gray. Often they go through a roany stage along the way, when they are sometimes mistaken for roans. Most grays go through a very attractive dappled phase as they gray out, and some retain some pigment in the form of “flea bites”—small freckles of base-colored hair all over their head and body. Occasionally roany white spots appear on grays in the roany, steel gray phase. These are called chubari, or Tetrarch spots after a famous gray racehorse that had them. They will disappear as

OTHER PATTERNS: GRAY



GRAY, FOAL



GRAY, YOUNG HORSE



GRAY, MATURE

LEFT TO RIGHT: This 2014 black-based gray filly (raf) (CWs SpecialEditionSilver x Ragtime Easy Street) shows the gray “goggles” around the eyes and gray hair appearing around the muzzle that often is the first clue that a foal will go gray. Owned and photographed by Carrie Hazel; The “roany” stage of graying is demonstrated in this photo by SEASONS SWEET TEMPTATION (Winter Moon Enlightenment x Seasons Sunburst), a 2007 chestnut-based gray mare, pictured here as a two year old. Photo courtesy of Colleen McNichol; A bit of faint dappling still remains on the sides and hindquarters of this 2003 gray stallion, RDK’S KNIGHT HAWK (Winter Moon Enlightenment x Blacksaddle Jasmine). This classic expression of “dapple gray” will continue to fade to the “white” of an aged gray. Owned by Stone Temple Farms, photo courtesy of Erica Parker Trager

the horse continues to gray out. Most grays will be completely or nearly white by age ten. Homozygous grays go gray faster than their heterozygous gray counterparts.

There are two sources for gray in the Morgan breed. The largest family descends from the 1969 gray mare Hy Crest Satina (Hy Crest Koko x Lady Satin, an X-registered gray mare and the source of Satina’s color). The grays from the pivotal breeding program of Carol Guay’s Crosswinds Farm (CW’s prefix), who was instrumental in saving the gray color in the Morgan breed, are from this family. The other, more rare line of gray Morgans originates from the 1925 gray mare Toy (Troubadour Of Willowmoor x Rachel, gray) and is represented by the 1983 mare Miss Frosty Shadow via her daughter, Silvershoe Sun Frost, and her descendants.

THE FUTURE LOOKS WHITE

Morgan color enthusiasts have a tendency to want to discover just where certain color genes originated in their breed of choice. It’s a fascinating treasure hunt, tracing backwards through pedigrees, finding old photos and using production records to try and determine if a certain ancestor had a particular color gene. Even if color is not your thing, I hope you’ve enjoyed this series of articles and maybe come away with a better understanding of how the genes work

and how they could remain hidden in our breed for so long. It was not, as some have mistakenly thought, due to outside breeding, but is instead a direct result of the way many of these genes work. The Morgan breed owes much to the hard work of those dedicated breeders who gathered up the last of these colors and bred them on, especially during a time when color was frowned upon. Sadly, not all of the possible party colors were saved, but what remains adds a little variety to the traditionally somber-hued Morgan palette.

The addition of white hairs—whether in patches as with pintos, over time as with grays, or in a roany pattern as with roans and sabino roans—results in some very attention getting colors. White is a decorating scheme that is just coming into itself in the Morgan, and

the increasing availability of these colorfults cannot help but attract new enthusiasts to our wonderful breed. The famous British author G. K. Chesterton wrote, “White...is not a mere absence of colour; it is a shining and affirmative thing, as fierce as red, as definite as black...God paints in many colours; but He never paints so gorgeously, I had almost said so gaudily, as when He paints in white.” ■

*For more information about color in the Morgan breed, with numerous photo examples, please visit the Morgan Colors website at www.morgancolors.com. If you are interested in a more in-depth discussion of horse color, the author highly recommends reading *The Equine Tapestry* by Lesli Kathman. It is available on amazon.com.*

ROUGH
DIAMOND
GEM

(DESIDERATA DESERT STORM X
BPM TRECE DE MAYO BY PRIMAVERA VALDEZ)

2004 BAY MARE LOCATED IN CLIFF,
NEW MEXICO. EASY TO HANDLE AND
BREED. \$3,000.00 OBO.

EMAIL P12HOLLYD@GMAIL.COM FOR MORE INFORMATION.

