

Pinto Patterns

For years horsemen have been defining the differences between tobianos (which were covered in our last issue) and overos. Undoubtedly many hobbyists have seen some of these lists of guidelines: overos have one or more dark legs, overos have white that does not cross the back, overos have dark tails, and so forth. The inherent problem was that overos broke these "rules" more often than they followed them! This is because the guidelines did not take into account that there were three different types of overo patterning. In this issue, we will cover the one pattern that does follow these rules - frame overo.

What Frame Overos Look Like

When pinto breeders began publishing guidelines for identifying overos, the frame overo is undoubtedly what they had in mind. While tobianos look like white horses with dark spots, frame overos look like dark horses with white spots. Instead of conservatively marked faces, they have conservatively marked legs; their leg markings resemble those of a solid horse. Their face markings, on the other hand, are often exaggerated, with bald faces rather common. The eyes are sometimes, though not by any means always, blue. The spots are generally concentrated on the sides of the horse, most often the neck and barrel. These spots often look like large pieces of torn paper, and in some horses they have a more intricate, lacey outline.

Pattern Progression

In the most minimally marked frame overos, horses usually will have unusually wide face markings. While the face markings of sabinos tend to spread over the nose and wrap under the lips and jawline, the face markings of a frame overo will more often spread across the face in the area under the eye and before the muzzle. There may also be a small spot of white on either the side of the neck or body. Often there is no white on the legs, or perhaps a small sock

or two. If the body spot is small enough, or not present, these minimally marked horses can often be mistaken for (and registered as) solid-colored horses.

In horses with a little more patterning, the spot on the neck or body might be a bit larger. Nonetheless, it is unusual for either area to cross the outer edges of the body when viewed in profile. Most of the spread in more visibly marked individuals will be contained within the neck and barrel in a roughly symmetrical fashion; while not identical to each other, the areas where white appears will be roughly the same on each side of the horse. The legs will usually remain dark, as will the hindquarters, tail and topline.



The face markings on a frame overo will tend to spread across the face in the area between the cheekbones and the muzzle (left), whereas sabinos have markings that travel down the front of the face, over the mouth, and continue under the jaw (right).

It is not really known what is the whitest extreme for this pattern. It may be that once the pattern gets large enough it begins to spread down the legs, or it may be that those frame overos with white legs are merely carrying the sabino gene in addition to the one for frame. Because frame is primarily characterized by where white is not rather than where it is (the other two overos are often white on both the neck and sides, too), it is more difficult to visually determine the presence of the pattern once the horse is predominantly white.

How the Frame Overo Gene Works

For many years the common thinking among horsemen was that overo (of any type) was recessive. This theory, which is still widely held within the horse community, was based on the fact that wildly marked overos sometimes "cropped out" from otherwise solid parents. In 1994, a study in the *Journal of Heredity* by Dr. Bowling proved that overo spotting was actually the products of a dominant gene. By examining the production records of thirteen overo Paint stallions when bred to solid mares, it was determined that they threw their color roughly 50% of the time, which would be expected if the gene were dominant. The only way to get those numbers with a recessive gene would be for all the mares in the study to have carried an overo gene. If that were the case, the incidence of "crop outs" in the general



Frame overos follow the "rules" for overo patterns - white that does not cross the topline, one or more dark legs, bald face and a dark tail.



While most frames have blazes or bald faces, some are found with far less facial white. This filly has a modest star and snip.

population of Quarter Horses and Thoroughbreds (the breeds of the mares in the study) would be roughly 25%, which is of course, not the case.

So frame overo is the result of a dominant gene. This means that horses with the gene will pass it along to 50% of their offspring when bred to solid mates. It also means that all frame overos have at least one frame overo parent, although that parent may well have been so minimally marked as to not seem to be a pinto.

There are, however, no homozygous frame overos. Frame overo is what is known as a dominant lethal. When a horse inherits two copies of the frame gene, it is born with what Paint breeders call "Lethal White Foal Syndrome". Foals born with LWFS are completely white and die within 72 hours due to a defect in their digestive system. In 1997, researchers at the University of Minnesota developed a test for the frame overo gene, enabling breeders to avoid crossing frame overos and getting lethal whites. To date, they have found no viable horses with two copies of the frame gene, even though they have tested several all-white horses with pinto parents.

Colors Confused with Frame Overo

Extremely minimal frames may have nothing more than unusual face markings, and are often registered as solid horses. Despite this fact, they still produce like an overo, and can have patterned foals 50% of the time. These minimally marked horses are likely the source of the crop out overos from "solid" parents.

It is also difficult to determine, when horses have only a small amount of patterning, just which overo pattern is present. In the case of minimally marked frames, the gray area tends to be with those horses who have a lot of facial white and one or more blue eyes. Horses such as these could be minimally marked frames or splashes; the only real test is to look at the ancestors or offspring. Splashes will tend to very reliably pass on their blue eyes from generation to generation, whereas the presence of blue eyes in frame overos is more sporadic. Minimally marked sabinos are not generally confused with frames since sabinos are characterized by the presence of white on the legs, while frames have dark legs.

The real problem with identifying frame overos is not so much confusing them with something else as it is with other patterns hiding it. While testing horses for the frame gene, researchers have found the genetic markers for frame even in individuals that were obviously

tobiano. Anecdotal evidence has pointed to other patterns such as sabinos occasionally throwing lethal foals. This is likely due to the fact that the frame pattern could easily be hidden in the white areas already present in the tobiano or sabino pattern. Such horses might never be identified as carrying the gene until they were bred to another frame and threw a lethal foal.

Breeds That Come in Frame Overo

It is believed by many that frame overo is a New World mutation, since it does not appear that the pattern exists in any of the European breeds. It also seems clear that while overo patterns are found in some Old World breeds, frame overo and the Lethal White Foal Syndrome are unheard of in those breeds. It is likely that it is unique to those breeds that originated on this continent.

The most common source for the pattern is without a doubt, the Paint Horse. Many of the influential stallions in that breed have been frame overos, including Yellow Mount, Dual Image, Mr. Norfleet, Wahoo King, and Ratchett. Of course, since the four pinto patterns are interbred within the Paint Horse breed, many horses that are not immediately recognizable as frame overos may still have the gene.

The Paints themselves probably got the color from the range-bred horses of the American West, since it is still possible to find the pattern in Spanish Mustangs. The color is also seen in grade ponies in the United States, who also may have gotten the color from the Mustangs. These ponies, with their Mustang background, may have been the source for the color in American Shetlands (where it is rare, but can be found) and Miniature Horses (where it is popular and has been specifically bred). The color is not found in British Shetlands, which would tend to indicate that it came from the outcrosses that have been permitted by the Shetland registry in this country.

There has been at least one frame overo Thoroughbred that I am aware of, which was Boundin LuLu. His pattern was unquestionably frame overo, but his purebred status is questionable. He does appear in occasional books as a "rare overo Thoroughbred", but research does show that his dam was not actually registered, having been out of a mare listed simply as "purebred Thoroughbred". The University of Minnesota has stated that Thoroughbreds have tested positive for



This moderately marked mare displays a more lacey version of the frame overo pattern. Although she has a fair amount of white on her forehead, notice the dark hindquarters as well as the dark legs.

carrying the gene, so it may well exist in registered stock (the study does not indicate if the horses in question were registered purebreds). Many have thought that the colt Tri Chrome is a frame overo, but with a high stocking on the hind leg, it is hard to rule out the sabino gene as the source for his color without a test. For those that wonder how Thoroughbreds might have a mutation known only in the New World, it might be beneficial to read about those Quarter Horses that were "snuck" into the registry in the past. This is touched upon briefly in some of the Western Horsemen Legends series, and there is a book due out by Victoria Short that specifically deals with this subject. (I have often wondered if this is also the explanation for the palomino Thoroughbreds out there, but must admit that I am not familiar enough with the bloodlines involved to say.)

The pattern did exist at one time in the Morgan breed in the form of one stallion: War Paint. War Paint is said to be the original reason behind the high white rule for that breed, and there have long been rumors about attempts by the registry to purchase his papers from his owner. Sadly, while the white rule was repealed in recent years, War Paint has long since passed on, making it impossible to blood-type his descendants and include them in the stud books. Nonetheless, even though they are not registered, his descendants have been bred to purebred Morgans in the hope that some day the situation can be remedied. From photos they appear typey as well as colorful.

There have been reports of frame overo Saddlebreds and Walking Horses as well, but to date I have not been able to verify them. Like the case with Tri Chrome, it is just impossible to rule out the sabino gene as the source for the patterning without a definitive test from the University. And since that test (and gene) are becoming increasingly associated with the lethal white defect, it is unlikely that the owners would want to test the horses, or publicize the results if they were positive.

This probably applies to other breeds as well. With a growing awareness within the horse community that there is more than one type of "overo", and that this one type has links to the potential loss of a foal, it is increasingly unlikely that anyone will call attention to the presence of the color in their herd.

Painting Frame Overo

One thing that will help any painter is to remember that the edges of a frame overo's markings are jagged rather than rounded.



Although the frame pattern does not typically cross the topline, on some horses the pattern does cross the top of the neck. It is more common for this to happen in frames with "loud" markings than in moderately marked horses.



This is a more extreme expression of the pattern. It is unusual to see this much white on a purely frame horse. Extensive white often indicates other patterns (usually sabino) in addition to frame. In this case, even though he is extensively marked, the pattern is weighted towards the forehead, and the topline, buttocks and even the legs are still dark.

Small, blobby white spots on a dark background are not realistic, even though they certainly are common enough on model horses! Many frames also have disconnected dark spots of varying sizes within their white markings, which also tend to have ragged edges. In some cases, these spots are not actually disconnected at all, but rather form a bit of a "peninsula" into the white area. In almost all cases, the edges of the markings (and any spots found within them) will follow the direction of the hair growth to a far greater extent than do the markings of a tobiano.

Remember also that if the markings are mapped, the mapping will come to a point itself where the marking comes to a point. Painting the map edge around the pointed edge is incorrect, and will make the final marking look blobby.

Just as with the tobianos, the real key to creating accurate frame overos is to look at as many pictures as possible. Seeing a wide variety of frame overo horses will allow a painter to get a feel for the "look" of frame overo markings. Frames do vary in the intricacy of their markings, with some being very blocky and others being lacey to the point of looking almost roany, but yet they are all similar in a way that defies description. It is only through looking at these varieties that a real feel for this look can be developed. Because the breed does have so many frame overo representatives, the best source for reference pictures is often The Paint Horse Journal.

In the next issue, we will move on to the next overo pattern - the much-varied sabino group.

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