

## Do Horses See What We See? By Lynn Acton

My optician is uniquely qualified to shed light on this question because he is red-green color blind, as current research indicates that horses are. Interestingly, being red-green color blind as Russ describes it is not entirely a liability. It also comes with advantages that explain some otherwise puzzling behaviors in horses.

Remember those rods and cones on the retina that we learned about in science class? Cones see color. (Both start with “c”.) Rods mediate shapes and depth perception. There’s a trade-off. Fewer cones mean more rods; therefore, less color recognition allows for better depth perception and shape recognition. An avid hunter, Russ is invariably the first person to spot a deer, because he notices the shape. He is also an efficient tracker, able to recognize very subtle disturbances (variations in depth of field) on the ground. This tradeoff was logical for horses as prey animals, because spotting the shape of a predator was more important than knowing what color it was, and seeing variations in footing would be crucial for safe travel. Unfortunately, these traits can cause problems for domestic horses because they often notice things we don’t.

When horses react to things their humans haven’t seen, their behavior may be misinterpreted as irrational spookiness, resistance, or an attempt to evade work. However, once we also factor in our horses’ superior senses of smell and hearing, we can rarely assume that a horse has reacted to “nothing”. I used to joke that trolls lived in the woods beside our riding arena, because horses stared suspiciously, or outright spooked, when I didn’t see a thing. Then I noticed that deer hang out there, sometimes standing statue-like and staring at the horses while we ride.

I have found that when a horse reacts to something I haven’t seen, the most successful response is let him observe, *with no pressure*. Usually in a few minutes he has relieved his own anxiety, or satisfied his curiosity, and is ready to refocus on my agenda. Meanwhile, I am being a responsible leader by observing along with him, and conveying through my body language and tone of voice that I am satisfied there’s no danger. When a horse has the opportunity to check something out, undistracted by pressure, he is less likely to react to it in the future.

Distracting the horse by “keeping him busy” may address the immediate behavior but not resolve the cause. Correcting a horse for reacting to something we’ve missed is worse than useless. It teaches him

that humans are inept leaders who not only fail to see what he sees, but correct him unfairly for pointing it out!

Enhanced depth perception, the other advantage of more rods-fewer cones, can also prompt behavior that *appears* disobedient. Sapphire once refused to cross a culvert she had crossed many times before. One look at it, and she arched her pretty palomino neck, backing away and snorting dramatically. Though we could see no problem, she obviously did, and we were very glad we heeded her warning. We later learned that erosion around the culvert had created dangerous sinkholes.

Excellent depth perception is clearly an advantage for equine athletes like jumpers who calculate the optimal take-off point for each jump, sailing neatly over at just the right height. While a skilled rider can help a horse find a good take-off spot, horses often judge distances better than their riders do. In any case, the horse still has to calculate the height and width of each jump, even when approaching an unfamiliar obstacle at high speed. Horses' depth perception also allows them to manage such mundane tasks as negotiating uneven terrain, respecting our personal space, and *not* smacking our knees on trees or gate posts.

Fly masks alter a horse's depth perception, as I discovered the first time I put one on Sapphire and she dunked her face into the water tank nearly up to her eyeballs. Her indignant snorts suggested that the water level was not where it appeared to be. This is why jumpers don't wear fly masks. It is also something to be aware of on uneven trails.

So the answer to our question (Do Horses See What We See?) is that they do indeed see what we see, with subtle but important variations: a more limited range of colors, but better depth perception and shape recognition. The better we understand how they see things, the more accurately we can interpret their behavior, and work together as partners.

Many thanks to Russ Avery of Knauf Optical in Endicott, NY for his insights on red-green color blindness.

Reference: "Color Vision in Horses" by Dr. Evelyn Hanggi

<http://www.equineresearch.org/support-files/hanggi-colorvision.pdf>