



Equine Ophthalmology 101

HOW DOES YOUR HORSE SEE YOU?

Guest Columnist

Jeff Johnson,
DVM

Blue Sky
Animal
Hospital



When you look into the eye of a horse you can read its heart. I like that statement. I still would never wrap the lead rope around my hand — but it has a nice sentiment. I want to help our readers understand the horse eye. The eye is one tissue we do not want to delay starting treatment on. It can quickly develop into a significant problem.

The visual acuity of a horse is about three times that of a cat, and one and a half times that of a dog. It is only six-tenths of the acuity of a human. This means a horse viewing an object at 20 feet sees it about as clearly as a person viewing the object at 33 feet. So the horse has roughly 20/33 vision. Most of the adaptations of the horse eye increase peripheral vision and are to detect motion.

The horse has a total visual field of nearly 350 degrees. Large unocular fields of 146 degrees result in a total visual field of about 215 degrees per eye. The increased peripheral vision is due to the horizontal shape of the pupil, the lateral position of the orbits and a nasal extension of the retina. Horses can also use monocular depth cues in judging distance. The primary retinal photoreceptors in the horse are rods for light and dark perception, not color. Yellow pigments in the lens limit the transmittance of short-wavelength light. Thus, the horse probably sees red and blue better than yellow or green.

The fibrous tapetum of the dorsal fundus is an adaptation for night vision. The tapetum is a reflective layer that lies within the inner capillary layer. It amplifies light perception by reflecting light back through the photoreceptor layer. You know how a cat or dog's eyes shine at night when you shine a light into them? That is the tapetum. The retina is the innermost tunic of the eyeball, containing the neural elements for reception and transmission of light stimuli. The pupil is the hole in the center of the iris that controls the amount of light allowed to reach the retina. It corresponds to the lens aperture of a camera. The corpora nigra is the soft brown, irregular body at the edge of the iris that shades the pupil.

So, you look at your horse's eye and you see:

- The cornea, the clear surface of the eye. This is where we get ulcers.
- Descemet's membrane, which is like the inner tube of a tire. The term descemetocoele comes from a herniation of the basement membrane of the corneal endothelium. To you and me, it looks like a water blister on the surface of the eye. It



is not a good sign. It means the ulcer or cut to the eye is so deep that the eye is dangerously close to rupturing. That would leak aqueous, the clear fluid in the anterior

(front) chamber of the eye. Hypopyon is a cloudy leakage of protein into the aqueous fluid.

- The iris. The brown tissue with the fuzzy dark corpora nigra.
- The ciliary body that opens and closes the pupil, stretches the lens to focus, and produces the aqueous fluid. Cyclitis is inflammation of the ciliary body.
- The lens is a firm, normally clear ball that bends light to focus it on the retina. Cataracts form in the lens.
- The choroid is a vascular fibrous tissue that nourishes the retina.

Systemic infections can cause inflammation of these tissues, referred to as iridocyclitis.

These tissues also comprise the Uveal tract. Disease of the front portion of the eye is anterior uveitis, and the back part of the eye is posterior uveitis. Infections associated with anterior uveitis include Salmonella, Rhodococcus, Escherichia coli (E. coli), Streptococcus (strangles), Actinobacillus, adenovirus, equine viral arteritis (EVA) and lepto (moon blindness). Glaucoma occurs when the pressure increases in the eye. This increase in pressure can damage the retina and optic nerve and cause blindness.

A new foal exam includes checking the eyes. We look for congenital, inherited and acquired disorders. We can see microphthalmos — a small globe that can be a result of uterine infection. We see this congenitally in some Thoroughbreds. Entropion is a rolling of the lower lid in against the eye. It is seen with dehydration, malnutrition, prematurity and dysmaturity, eye lid trauma, secondary to microphthalmia and primary anatomical conditions. We can fix this and prevent corneal ulceration. We also look for subconjunctival and retinal hemorrhages. We look for jaundice such as with neonatal isoerythrolysis. We look for birth trauma and corneal ulcers, Horner's syndrome and tetany.

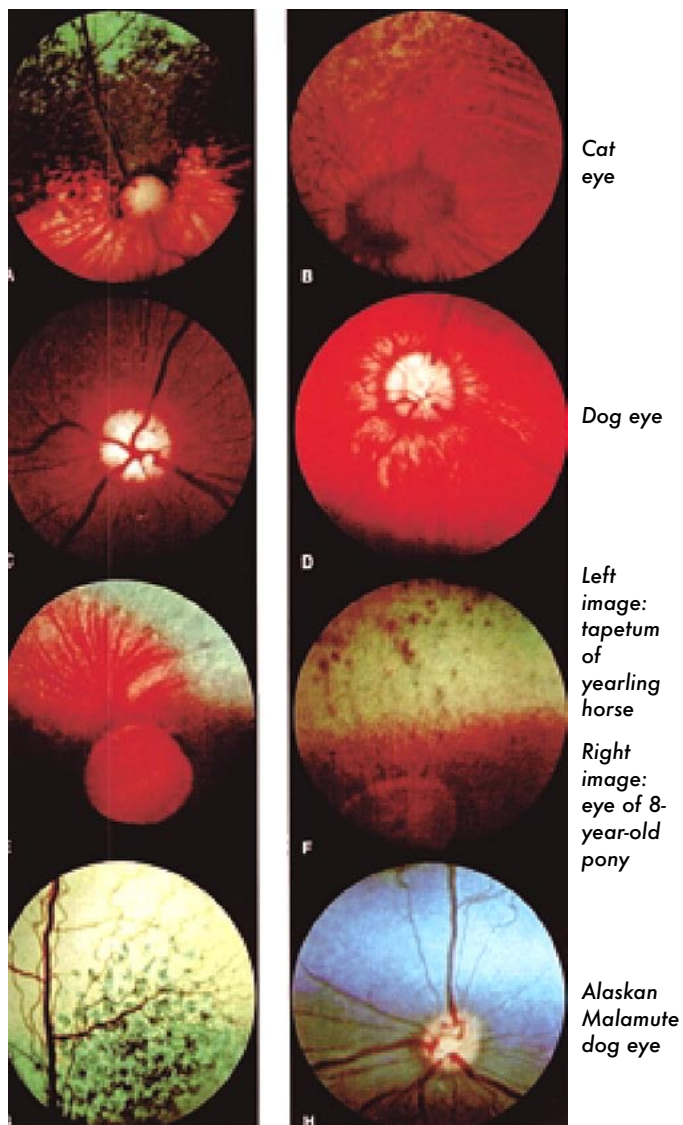
In all horses we check for patency of the nasolacrimal system. This is the tear duct that drains tears to the nose. Cataracts can be congenital in foals and heritable in Belgians and Thoroughbred horses. Morgan horses have a non-progressive, nuclear cataract that they seem to tolerate. Cataracts and lens luxations are associated with anterior segment dysgenesis in the Rocky Mountain Horse. Conjunctivitis can result from ammonia in recumbent foals, and from weeds, hay, sand, strep, bacteria and viruses. The viruses include adenovirus, EVA and equine herpes virus (EHV)-

1 that leads to keratitis. This looks like white opacities of the cornea. Squamous cell carcinoma is the most common tumor of the equine eye. Sarcoids and melanomas can form in the eyelids.

Head tossing behavior can be photic headshaking. Here, light stimulation of the optic nerve produces a referred sensation to the nasal cavity through optic-trigeminal nerve summation. Working the horse in a darkened environment or covering the eyes should lessen the behavior if it is photic headshaking. Serotonin antagonist medications can help.

Please do not use leftover medications from one horse to treat another horse. You can transfer infections and some conditions such as corneal ulcers can be adversely affected by the wrong medication.

Now, for staying with me through this unavoidably technical article, I will let you see what we see when we look into the eye. The following pictures show the optic disk and tapetum. 🐾



IMAGES COURTESY OF BLUE SKY ANIMAL HOSPITAL

Dr. Johnson is a veterinarian with Blue Sky Animal Hospital in Wyoming, Minn., and an avid horseman. For more animal-care information, visit Blue Sky's web site at www.blueskyanimal.com.

Biovance Ad