

Cat Vision

Our topics for this week relate to how well cats see, including their:

- **Clarity of vision: acuity**
- **Perception of motion**
- **Ability to see in darkness**

Vision is the primary sense used for detecting danger for many species. Vision involves more of the brain's activity than any of the other senses. Impaired vision can even affect an animal's tractability. For example, cat muzzles also cover the eyes, blocking vision, and calming cats.

Vision Components are field of view, depth perception, acuity (focus), perception of motion, and color differentiation and night vision.

Field of View

Cats have a horizontal field of view similar to dogs (200 degrees) but a wider vertical field of view due to their vertical pupils. Domestic cats are low profile hunters. These animals have vertical pupils which may permit an enhanced ability to focus through thin vertical gaps in tall grass where they frequently hunt. They have large corneas and pupils for their body size. Dilation and constriction of the pupil are the primary means of accommodating to changes in lighting. Cats' eyes, accommodate rapidly to darkness.

Depth Perception

Depth perception and estimation of distance require overlapping fields of vision from each eye. Humans and predator animals, such as cats, have binocular vision, focusing on objects of interest with both eyes. The central overlap that permits depth perception in cats is about one-half that of humans, but better than prey animals, such as mice. Cats binocular vision is 140 degrees.

Acuity and Perception of Motion:

Visual acuity is the ability to see details. Domestic mammals do not have the visual acuity of humans. Near vision is relatively poor. Normal humans have 20/20 acuity. Cats have 20/100 acuity. In other words, normal humans can see clearly at 100 feet with the clarity that cats see at 20 feet). In most predators the area of greatest acuity is a circular area in the retina, called the fovea or area centralis. To visually evaluate the greatest detail, predators have to hold their head still and concentrate the image on the fovea.

Color Differentiation and Night Vision:

Most animals see better in low light than do humans but animals perceive fewer colors. The retina of the eye contains two types of light receptors: rods and cones. All mammals have more rods than cones and animals have more than humans. Because rods perceive lower intensity light than cones, rods aid in night vision. Nocturnal mammals having a preponderance of rods may be unable to distinguish colors. Cones perceive objects best in bright light and can differentiate colors.

Humans have three types of cones which permit trichromatic color vision (tones of red, green, and yellow). Cats have two types of retinal cones and dichromatic color vision (yellow and blue). They cannot distinguish colors in the range of 510 to 590 nm, red wavelength. Animals with dichromatic vision appear to see blue and yellow best, and have trouble perceiving red and green. With dichromatic vision, red is dark and green is light gray. Dichromatic vision may aid in seeing sudden movements and objects in low light.

Rod cells are responsible for magnifying light impulses. Rods are able to detect low intensity light, motion, and differentiate shades of grey, but they provide poor resolution. Most domestic animals, especially cats, have many more rods than do humans. Species that are scopic (have vision in dim light) or nocturnal also have a tapetum lucidum (reflective structure in the retina that increases the gathering of light). This results in superior night vision and more intense differences in greys, plus better detection of motion. The tapetum increases light detection at night up to seven times in cats. In the dark, humans can dilate their round pupils to let 15 times more light to their retina. Cats' vertically slit pupils can dilate enough to let up to 135 times more light into their eyes in the dark.

If you have comments or you're interested in particular animal handling subjects, contact us at CBC@BetterAnimalHandling.com

Now let's recap the key points to remember from today's episode:

- 1. Cat's eyes rapidly accommodate to even severe darkness.**
- 2. Cat's often remain motionless when hunting to increase their acuity (ability to see detail).**
- 3. Cats can see small movements, even in the dark, far better than humans.**

Ginger says it is time to wrap up this episode.

More information on animal handling can be found in my books, *Animal Handling and Physical Restraint*, *Concise Textbook of Small Animal Handling*, and *Concise Textbook of Large Animal Handling* all published by CRC Press and available on Amazon and from many other fine book supply sources.

Additional information is provided at: www.betteranimalhandling.com . This website has more than 250 past podcasts with notes on handling of dogs, cats, other small mammals, birds, reptiles, horses, cattle, small ruminants, swine, and poultry.

Don't forget, serious injury or death can result from handling and restraining some animals. Safe and effective handling and restraint requires experience and continual practice. Acquisition of the needed skills should be under the supervision of an experienced animal handler.

Thanks for listening. Ginger and I hope you will come back next week when I'll talk about:

Handling Methods Adverse to the Health and Safety of Cattle

Hey Ginger, when a body dies why are the eyes the last organs to go. (Bark) She said because they dilate.