



What Do Rabbits See?

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We are so used to looking at the world from our own perspective. Naturally, we assume that our companion rabbits see the world in much the same way. But do they? Sight has evolved in animals to meet a wide variety of special needs that depend on the lifestyle of the species.

To get an idea of your rabbit's visual perspective, lie prone with your chin on the floor. Even now, your eyes may still be above your rabbit's normal eye level. You immediately notice that everything is an obstacle to your vision. You cannot survey even the tiniest portion of your environment from where you are sitting – you have to EXPLORE.

The field of vision is the total angle of view where objects can be perceived. In the human, this angle is about 180 degrees. The rabbit, with his unusually large protruding eyes located high on the sides of his head, has a field of vision of almost 360 degrees, and he can see well above his head too. This allows him to see danger coming from just about any direction without moving his head. Due to the placement of his eyes, a rabbit ends up with a small blind spot of about 10 degrees directly in front of his nose and below his chin. This explains his inability to find immediately a treat you have placed there.

Depth perception is another important aspect of viewing the world. It is the ability to determine how far away things are. This is done by viewing the world from two different angles. In humans, who have both eyes pointing forward in the head, there is a large overlap between what each eye sees. This overlap is interpreted by the brain, and what results is a three-dimensional view of the world. Rabbits, on the other hand, have paid for their enormous visual fields by having a very small overlap between images seen by each eye. Thus, a rabbit only has about a 30 degree area directly in front of him where he has depth perception, and 10 degrees of this is his blind spot!

There are other ways to gauge distance, and rabbits may use these. One is to pick up on subtle visual cues, similar to the ones we notice when we watch a three dimensional scene on a two dimensional television screen. These include size differences between objects and the blurring of far away objects. Another interesting method which rabbits and other animals, such as birds, employ is to bob up and down while looking at an object in the distance. If an object is close, it will appear to move more than an object that is far away (this is known as parallax), and an estimate of its distance can be made.

Visual acuity is how well and at what distances objects can be focused upon and recognized. This is extremely difficult to determine in rabbits, but the consensus seems to be that the muscle (the ciliary body) which is used to focus the eye in rabbits is fairly weak, and thus their ability to focus on an object close up is poor, although their vision of distant objects is sharper.

Rabbits' eyes are adapted to being able to see moderately well in half-light conditions rather than extremely well in either light or dark. This is because they are crepuscular, that is, preferring to be active at dawn and dusk, when natural light is dim. But unlike the eyes of other animals who can see in muted light but who also have enhanced night vision, rabbits' eyes have no tapetum, that is, the structure that acts to amplify light that has entered the eye. And so they cannot see well at night.

In consequence of these factors, your rabbit's view of you is likely to be "grainy," and he will recognize you by your shape and manner of movement rather than, say, the details of your face. If you enter the room carrying something large enough to alter your shape, your bunny most likely will not recognize you and will be afraid.

Another component of visual acuity is the ability to distinguish colors. There seems to be no information on color vision in rabbits, although on the basis of behavioral studies, some scientists speculate that rabbits can distinguish between blue and green, although they probably see those colors differently than we do. If the retinas of rabbits' eyes are similar to those of dogs, whose retinas have only two kinds of color sensitive cones instead of the three that human retinas have, and many fewer of them than do human eyes, then the spectrum of colors they can see is greatly restricted, and part of that spectrum is black and white.

One point to mention about the rabbit eye, although it does not pertain directly to vision, is the function of the "third eyelid". Many animals, from amphibians to birds to mammals, possess this structure, known as a nictitating membrane. The primary role of the third eyelid is to protect the eye against injury. And people with albino rabbits whose light eyes make the membrane very visible, will tell you that the membrane comes down over the eye when the bunny is frightened. In the

rabbit, the third eyelid also helps keep the eye moist, which may explain why rabbits only blink 10 to 12 times an hour.

So many questions about rabbit vision remain unanswered. When a rabbit wants to get his best look at something, he will turn sideways to look with just one eye. But the eye on the other side of his head must be seeing a completely different image. How does the brain relate these two images? Rabbits, especially albinos, will “scan”. When they do this, they look as if their heads are slowly drifting to the side, as if they have lost motor control. Why are they doing this? How does a rabbit interpret his image in the mirror, and does the sideways angle of vision affect his ability to identify himself? What role, if any, does vision play in the way rabbits recognize and communicate with each other?

What we do know is that rabbits’ vision has evolved to cope with life as a prey species. While their view may not be clearly detailed, rabbits are extremely good at watching out for anything that might be a t(h)reat anywhere around them. They truly do have eyes in the back of their heads.