

Re: Dark adaptation on exit pupil size

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billferris@aol.comic (Bill Ferris) wrote in message
news:<20040907104734.07582.00000295@mb-m11.aol.com>...

> *canopus wrote:*

> > *One would expect to find a reduction in the ability to see faint stars*
> > *with the naked eye with age, since a reduction from 6.9mm (15 year*
> > *olds) to a 6.2mm (50 year olds) in average dark adapted eye pupil size*
> > *corresponds to about a 20% reduction in the eye's light grasp.*

>

> *However, dark adaptation is primarily a chemical process within the eye. The*
> *additional light grasp of the fully dilated eye pupil accounts for just a*
> *fraction of the total improved light sensitivity of the dark adapted eye. I'm*
> *not aware of research showing a correlation between pupil size and naked eye*
> *limiting magnitude among experienced observers. All the research I've seen*
> *points to the chemical process as the key to dark environment light*
> *sensitivity. So, while there may be age-related degradations of scotopic*
> *vision, I wouldn't assume constriction of the eye pupil to have a measurable*
> *impact.*

>

> *Regards,*

>

> *Bill Ferris*

While it's true that most of the sensitivity of the dark adapted eye is in the retina, pupil size is important too. Going from a 7mm to a 6mm pupil will decrease the amount of light the retina receives by over 30%. Assuming that the sensitivity of the retina does not change (eye already full dark adapted) this could be significant. Especially if you are observing 'naked eye' or just going for a walk in the dark.

Animals that rely on their eyes at night tend to have large pupils – even if they are very small. Your average 10 pound housecat probably can dilate its pupils to over 8mm – more than most people. Some of the screech owls I've come across while hiking at night have enormous pupils – larger than a person's, and these are not large birds. An owl has an impressive retina when it comes to dark adaptation – and a large pupil to match. Birds with smaller pupils tend not to be nocturnal, again leading some credence to the importance of

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pupil size.

-Eric