

Artificial Light Brings Beneficial Sun Indoors

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Why Do Birds Need Light (and darkness)?

Ever wonder how migratory birds know when to fly south in the winter and north in the summer? Ever notice how your pair of lovebirds will ignore a nesting box for months and then one day be roosting on a clutch of eggs? Ever had a little extra spring cleaning as your indoor bird begins molting, despite his room having been the same temperature and humidity all winter long?

The answer to all of these questions and more is light. Used by animals to see, natural light and the angle at which it moves around the earth also drives feeding, sleeping, behavior, breeding, molting, and migration. It is no wonder, then, that the artificial light under which we keep our birds is such a hot topic in the avian community.

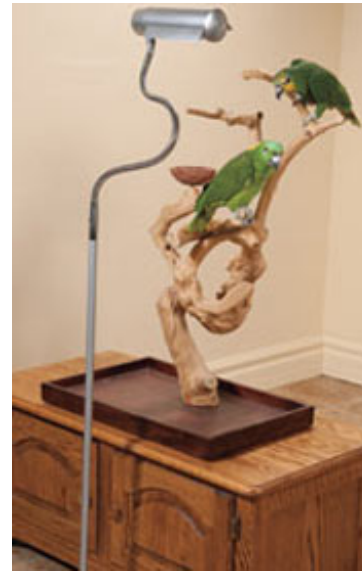
But why? Humans seem to get along just fine in a world of incandescent and fluorescent artificial lighting. But for a bird, the general lightbulb that is absentmindedly turned on at 9 a.m. and off again sometime later that night is not enough. Think about it. The natural habitat of most birds we own as pets is not in a city above the snowline of North America or Europe. Most pet birds are from the Tropics, that region of the globe immediately surrounding the equator, bordered on the north and the south by the Tropic of Cancer and the Tropic of Capricorn, respectively.

This region of the earth receives, almost year-round, 12 hours of darkness and 12 hours of intense natural sunlight every day. Because of the uniformity of light availability in this region, the animals that hail from here are very perceptible to even the smallest change in light quantity and quality. In fact, warm blooded animals, and birds especially, have adapted to depend on light in some of the most fascinating ways.

How Do Birds Use Light (and darkness)?

In addition to using the quantity and quality of daylight (known as the photoperiod) to signify when to sleep, birds - like humans - use sunlight to synthesize Vitamin D and - like other warm blooded animals - also use natural light to control growth, molting, and breeding.

A common misconception is that sunlight carries Vitamin D. It does not. Instead, sunlight is what our and our avian friends' bodies use in the chemical reaction that changes pre-Vitamin D compounds found naturally in our diets into usable and beneficial Vitamin D. In much the same way that oxygen is the catalyst necessary to start and sustain a fire of wood or gasoline, sunlight is the catalyst necessary to change our bodies' "good cholesterol" into pre-Vitamin D, which is then further synthesized by our kidneys and livers into Vitamin D.



In birds, the process is similar; however, where our good cholesterol meets the sun through our skin, a bird's skin is protected by its feathers. As such, most birds' bodies release its pre-Vitamin D through the preen glands, where it is then spread over the feathers, synthesized by the sun, and then re-ingested into the body when the bird again preens its feathers. So in essence, your bird's meticulous preening is not just a method of self-grooming, but actually also a method of good health.

In addition, birds - and other warm blooded animals with nictitating eyelids - also have a special gland near their eyes. This gland, known as the Harderian Gland (after its discoverer Johann Jakob Harder) is thought to help control body development, such as growth, molting, and breeding. Used in conjunction with the light received through their eyes, the Harderian Gland is believed to control the pineal and pituitary glands in the brain, which are the sections of the brain that tell birds when to molt, breed, and put on a few extra pounds for the winter.

Harnessing The Sun - Artificial Lighting for Bird Cages

Because the earth's own circadian rhythm means the sun that rose in the morning must also set at night, humankind invented its own way to harness light for both convenience and necessity. Though there are now many types of lightbulbs in varying degrees of shape, color, and output (known as luminescence), bird owners should be concerned with only one type of artificial light - full spectrum lighting.

Birds need [ultraviolet light](#). As emitted from the sun, ultraviolet light can be basically broken down into three components - ultraviolet-A (UVA), ultraviolet-B (UVB), and ultraviolet-C (UVC). The UVC component of ultraviolet light never

reaches the earth's surface, as it is filtered out by our atmosphere. Which is a good thing, because UVC light is closest in the electromagnetic spectrum to X-rays, and there is a reason the X-ray technician at your local hospital uses lead shields on a daily basis. UVA and UVB light are also both harmful in concentrated amounts over prolonged exposure. However, it is UVB light, specifically, that synthesizes Vitamin D, and that birds need exposure to, either through natural sunlight or full spectrum lighting.

Full spectrum lights are bulbs that emit light across the entire range of the possible lightbulb spectrum. Because humankind has not - or cannot - compete with nature, we are still unable to exactly mimic the light of the sun with manufactured materials. As such, no lightbulb can emit light that spans the full ultraviolet, visible, and infrared light spectrum the way that natural sunlight can. However, by using various bulb filaments, glass coatings, and gaseous and inert materials, lightbulbs are available that better mimic the sun, thus being better suited for avian care.

In fact, anything less than full spectrum lighting does nothing to physiologically benefit a bird, other than allowing her to see her surroundings. Common incandescent lightbulbs do not emit light equal to even the full visible light spectrum the sun provides, let alone emit the ultraviolet light birds need. Natural sunlight is robust across the entire visible light spectrum of colors (red, orange, yellow, green, blue, violet), while incandescent lightbulbs are heavy on the red end of the scale and progressively lighter as it moves towards the violet end of the scales.

Normal fluorescent lights aren't much better in concerns to avian care. Though it is true that the gases that fill a fluorescent lightbulb do produce ultraviolet light when turned on, the special coating inside of the bulb absorbs the ultraviolet light produced and changes it into visible light we can see. Without the coating, a fluorescent light wouldn't produce light we could see, though its ultraviolet light would still be very damaging to our skin. By the same token, a normal fluorescent bulb doesn't emit satisfactory amounts of ultraviolet light for birds.

Additional problems can also occur with normal fluorescent lightbulbs. Especially in older fixtures and/or homes, the fluorescent lightbulb could be working with the help of a magnetic ballast. Magnetic ballasts basically work slower than newer, more efficient electronic ballasts. Because of this, fluorescent lightbulbs running with a magnetic ballast flicker - oftentimes imperceptible to the human eye, but always very irritating to birds. Though most older fixtures can be updated to an electric ballast by a qualified electrician, doing so still does not provide the beneficial UVB light birds need.

As mentioned before, the popular black lights that cause white shirts and specially made paints and posters to glow does emit ultraviolet light. However, using a black light to light your bird will not benefit her health either; in fact, a black light could

seriously affect your bird's health or eyesight. The reason for this is because black lights produce UVA light, not the needed UVB light. Just as lengthy, concentrated exposure to harmful UVA and UVB light in the sun can cause serious health problems, similar detrimental problems could affect your bird. In essence, placing your bird under a black-lighted cage would be like your falling asleep outside in the unprotected sun. A general rule is to place black lights away from birds.

In fact, other than to light the room in which you keep your bird's cage, keep all types of light other than full spectrum lighting directly away from your bird. In the wild, when a bird doesn't like her surroundings, she takes flight. In the cage in your house, she does not have this option.

What Is Light?

Light is one of those natural elements everyone takes for granted. When most of us wake up in the morning, light lets us see the world. When we head off to sleep, light is perceptibly absent. When darkness surrounds us, we simply flip on a switch and, thanks to Thomas Edison and his lightbulb, light appears with little effort and even less thought.

But light is, really, one of the three natural elements (including air and water) that has driven life as we know it since time began. The light we see - known as visible light - is just a small component of the larger electromagnetic spectrum. This spectrum includes all of the magnetic energy contained in the universe - magnetic energy that controls everything from X-ray machines to natural light to radios to the electricity on which our human lives depend.

In basic terms, the electromagnetic spectrum looks like this:

Cosmic Rays	Gamma Rays	X Rays	Ultraviolet Rays	Infrared Rays	Radio Waves	Electric Waves
Visible Light						

Visible light - which is the light we see - falls between ultraviolet light and infrared light. As its most basic, ultraviolet light is what tans (or burns) our skin and is also what is emitted from the black lights used on amusement park thrill rides the world over. Infrared light, on the other hand, is what motion sensors detect to activate the floodlights you may use for security around your home.

Within the small sliver of visible light that makes life on earth possible, however, the spectrum can be further broken down. Visible light is really perceived as color. But of the seven colors that make up the visible light spectrum, humans can only detect three - red, green, and blue.

This is why you can closely stare at the screen of any older television and see only tiny dots of red, green, and blue color. But, when you step back, you see an image colored like a rainbow. Your eyes have physically and chemically combined these

small dots into an image and mixed the varying degrees of red, green, and blue colors being broadcast by your favorite television station into vibrant oranges, yellows, pinks, purples, etc.

Further broken down, the visible light spectrum looks like this:

Ultraviolet Rays Violet **Blue Green** Yellow Orange Pink **Red** Infrared Rays

Visible Light

(humans can only detect light in three colors)

Because of the way we perceive light in the three primary colors of red, green, and blue, human sight is known as trichromatic vision. But birds see in tetrachromatic vision - adding a fourth dimension of light to their sight capabilities. Birds see not only the red, green, and blue colors of visible light that humans see; they also see well into the ultraviolet range of the electromagnetic spectrum.

In fact, birds - and all other animals - use light in ways both similar and far different than how we humans use light. Light in the animal kingdom is more than just a tool for sight. It is also the key to existence.

See The Light

As in any choice you make as a consumer, one general rule always applies - there is no fix-all, end-all solution to anything. In fact, even the best avian light, lit under the strictest schedule will not change or fix the health of a bird living on a bad diet or in undesirable conditions. Providing adequate light is only one component of good bird husbandry. In fact, in some regards, how and when you light your bird may be the simplest decision you have to make. Simply research available information for your species of bird and learn where that species originates in the world, and how much light it would be subject to if it were living there instead of in your living room.



But truthfully, the best thing you can do for your bird - as with any domesticated animal - is to keep her, not just as a pet you occasionally admire, but as a companion with whom you daily associate. Spend quality time with your bird. Bond with her. Build a relationship of trust and friendship. In this way, you'll be able to eventually perceive the minutest of changes in her behavior, attitude, and health. For in these types of animal-human relationships, it doesn't matter that our lines of communication differ; what matters is that it is through our senses that we speak, listen, and learn from each other, year after year.