Wise Choice in Lighting

By Roch Lefebvre, Lighting Expert in Québec (Canada) For commercial, institutional and industrial uses. Companion of 2 small parrots for the past 10 years.

Definition of Terms Used in Lighting Technology

Color Rendering
Expression for the effect that the light has on the color appearance of objects.

Color Rendering Index (CRI) of a light source. A scale from 0-100 that describes how natural the color of objects will appear as compared to a standard light source (100 CRI). The standard light sources are Incandescent/Halogen bulbs (100 CRI) for warm sources and Natural Daylight (100 CRI) for cool sources.

Color Temperature A term used to describe the “whiteness” of light. It is the temperature of a piece of metal (or black body) that emits the same color light as the compared light source. Unit Kelvin, K.

Foot-candle (FC)
The amount of lumens falling on an area measured in square feet. One lumen falling on one square foot is equal to one foot-candle.

Full Spectrum Lighting
There is no official definition of the term “full spectrum” but most agree that it is a source that has a cool temperature and a high color rendering that mimics natural daylight.

Lumen
The unit of measure for the total amount of light from a light source, regardless of direction. Unit lumen, L.

Watt (W)
The unit for measuring power. W = V x A

Ultraviolet (UV)
Radiation Radiant energy in the range of about 100-380 nanometers (nm). For practical applications, the UV band is broken down further as follows:

Ozone - producing 180-220 nm
Bactericidal (germicidal) 220-300 nm
Erythermal (skin reddening) 280-320 nm
“Black” Light 320-400 nm

Reproducing Natural Light

Nowadays, there are many ways to create lighting according to everyone’s needs. Lighting manufacturers can make artificial light that reproduces sunlight as closely as possible.

In order to create a similar lighting to what a parrot might find in its natural environment, we try to reproduce the sunlight that not only gives out the colors red, orange and yellow, but also green, blue and purple, which are often non-existent in the light spectrum of commercial fluorescent lamps.

Kelvin (K) is the unit used to measure the color temperature produced by a lamp. By using lamps with 5,000 Kelvin or more, it is possible to allow a bird to detect, according to its sight, part of the color normally missing from conventional lighting.

The ability of a light source to reproduce colors on objects is called the “Color Rendering Index” (CRI). Based on a scale from 0 to 100, the higher the number, the more colors can be seen clearly. The CRI is critical when we want to reproduce a light that is as natural as possible. A CRI which is too low will produce a generally uncomfortable lighting while a high CRI allows a better definition of the lighted space and as such, becomes even more comfortable. It allows us to feel better and therefore, become more productive.

We now know that the ability that birds have to detect colors is different from our own. It seems that human beings can detect 3 main colors while birds detect 4, including UVA rays. In this case, a CRI that is high and well-adapted is of a major importance. The chosen lighting must also allow ultraviolet (UV) to pass through for the well-being of the birds. Additionally, we have learned that some types of lights block UV rays.

Proper lighting increases production. Take the example of laying hens. A certain light intensity will stimulate the hens to lay more eggs. On the other hand, a low intensity light will help calm down chickens raised for their meat so that they gain weight more rapidly by exercising less.
Choice of Lights

Note that all fluorescent lamps produce UVA and UVB rays within a safe range. UVA can be reduced in intensity according to the use of the lamp. Changing the light annually will help maintain the maximum level of UV required for breeding birds. On the other hand, replacing the light every 18 to 24 months for our pet birds will be greatly appreciated.

“Threaded compact fluorescent” bulbs will produce the proper light for our pets, at a low cost, as long as you can find a bulb with 5,000 Kelvin or more. This type of bulb can be installed in existing lighting fixtures. This means that you can simply screw them in to replace the usual bulbs. We are referring to the “Tornado” type shown on the table above. This alternative would be the most cost effective way.

Do not use the type of bulb that looks like a cartridge since it prevents UV from escaping from the lamp.

“Linear” fluorescent lamps require a lighting fixture equipped with a ballast. Thus, the costs are higher. Current government standards are strict as to the efficiency of available sources on the market. An electronic ballast will provide good energy savings and offers a longer-lasting lamp.

Types of Lighting Fixtures

In the case of lighting specifically for birds, I recommend the type of lamp that uses a linear fluorescent. It requires a specific lighting fixture that can be installed in different ways. Here are two:

I recommend the use of a fixture with a wire guard to ensure that our parrot friends do not have access to the lamps or other electrical components. A fixture with a lens would be perfectly safe but should not be used since the lens blocks most of the ultraviolets (UV) which are beneficial in the type of lighting that we are trying to achieve. Please note that to feel the benefits of UV rays, the source has to be visible, which means that the parrot must be able to see the lamp and that it should not be covered.

In the case of “threaded compact fluorescent” lamps, they can simply be used in our existing fixture to replace the usual bulbs. You can also install fixtures such as these top right.

Fluorescent Lamps

The table below shows how to choose a lamp according to the information provided by the number found on a linear lamp (in relation to the number written on your lamp). Each number or letter means something. For example, “F” means fluorescent lamp, “32” means 32 watt capacity. Thus, a lamp indicating F32 would be a 32 watt fluorescent which is automatically 48” long. F17 would indicate a 17 watt fluorescent which automatically measures 24”.

At present, lamps marked T8 and T10 meet the current standards on the market. They represent the best choice. Here are some choices for linear lamps, made by known manufacturers and easily available from electrical distributors around the world and pet supply retailers.

<table>
<thead>
<tr>
<th>Product</th>
<th>Kelvin</th>
<th>Color Rendering Index</th>
<th>Hours</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vita-lite</td>
<td>5500</td>
<td>91%</td>
<td>28,000</td>
<td>$$$</td>
</tr>
<tr>
<td>Philips F32T8/TL950</td>
<td>5000</td>
<td>98%</td>
<td>20,000</td>
<td>$$$</td>
</tr>
<tr>
<td>Osram FO32/850XP/ ECO</td>
<td>5000</td>
<td>80%+</td>
<td>18,000</td>
<td>$</td>
</tr>
<tr>
<td>GE F32T8/SPX50/ECO</td>
<td>5000</td>
<td>86%</td>
<td>20,000</td>
<td>$</td>
</tr>
<tr>
<td>Glo Life-Glo- 48”- 40 Watt (Rolf C. Hagen Inc.)</td>
<td>6700</td>
<td>88%</td>
<td>20,000</td>
<td>$</td>
</tr>
</tbody>
</table>
Technical file cont.:

KELVIN VERSUS COLOR RENDERING INDEX (CRI)

It is important to note here that a good choice in a lamp lies with a high Kelvin, but it must be combined with the highest Color Rendering Index (CRI) possible. It is a must to combine both.

Remember that to reproduce sunlight, we need 5,000 Kelvin or more. It is possible to find lamps on the market with higher Kelvin such as for example, a light previously called Daylight with 6,500 K and with a CRI normally between 60 and 75% (less acceptable) which will create a blue effect instead of white. A low CRI is not adequate to reproduce a comfortable natural light.

Lamps available on the market with the proper CRI are those that have between 5,000 K and 5,500 K. Therefore, if you find lamps with a higher Kelvin rating than 5,500 K, you must make sure that the CRI is high enough.

Unless the information regarding the Kelvin and the Color Rendering Index is listed on the lamps then our choice would be left to chance. A lamp that gives out a purple light or too much blue can indicate that the Color Rendering Index is not satisfactory.

To my knowledge and until now, most fluorescent lamps found in pet shops had been developed to meet the needs of aquariums or reptiles and are usually low in CRI. Therefore, a parrot with bright yellow feathers such as the sun parakeet would loose the nice yellow coloration under a light with too much blue. This could result in the bird looking green.

The human brain can always compensate in the presence of an uncomfortable color. But the environment is still uncomfortable. Thus, CRI and K (Kelvin) go together.

People often ask me: “How many watts do I need to light my room?” So let’s start at the beginning.

In human beings, our metabolism reacts not only to color temperature but also to the intensity. Simply said: more light = more activity; less light = less activity. We are more productive under high intensity lighting.

A fluorescent lamp has this particular feature: the longer a lamp is, the more power is being produced. The unit used in lighting to measure the power of a light is called “footcandle”. It indicates the results or the amount of light produced. This result mostly relies on the power used (in watts) and the length of the tube. This measure unit is very complex because it also depends on the room being lighted, the size of the room and many other aspects.

A lamp is equipped with a reflector, 2 tubes of 48” (32 watt T8), and located at about 4 feet from the bird cage, we could get about 60 footcandles which would light a 7 to 8 ft diameter around the fixture.

The number of watts chosen really will depend on the intensity level required. To replace your 60 watt bulb, you need to choose a threaded compact fluorescent lamp of 15 watts.

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Watts</th>
<th>Replaces an incandescent of</th>
<th>Kelvin</th>
<th>Color Rendering</th>
</tr>
</thead>
<tbody>
<tr>
<td>CF15/50K/Spiral/E26/STD</td>
<td>15</td>
<td>60 watts</td>
<td>5000</td>
<td>82%</td>
</tr>
<tr>
<td>Standard product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF20/50K/Spiral/E26/STD</td>
<td>20</td>
<td>75 watts</td>
<td>5000</td>
<td>82%</td>
</tr>
<tr>
<td>Standard product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF23/50K/Spiral/E26/STD</td>
<td>23</td>
<td>100 watts</td>
<td>5000</td>
<td>82%</td>
</tr>
<tr>
<td>Standard product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CF26/50K/Spiral/E26/STD</td>
<td>26</td>
<td>125 watts</td>
<td>5000</td>
<td>82%</td>
</tr>
<tr>
<td>Standard product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glo Life-Glo (Rolf C. Hagen Inc.)</td>
<td>15</td>
<td>75 watts</td>
<td>6500</td>
<td>80%</td>
</tr>
</tbody>
</table>

Technical file cont.:
outside but a small incident allowed to bird to escape. We were in a panic to have lost this beloved pet. But our friend, with his great intelligence, stayed near our house. We could tell where he was by his call alone. However, time was flying by without any sign of being able to catch him. At sunset, our Coco also got ready for the night; he settled down and moved slowly to the top of the tree where he had been. The same thing happened at the first light: at daybreak he quietly ate the stems of some leaves (beginning of activity) then once the sun was up, he began to call (gradual increase in his activity) which attracted many wild birds curious to find out where that mysterious call was coming from. Crows, among others, came for a visit. The bird activity was then at its peak, in full sun. Fortunately, this adventure ended when Coco returned safely home after 24 hours spent in the wild.

So, the gradual increase of light seen in the natural brightness of day and the reduction seen at nightfall has an effect on the behavior of birds. This is referred to as “dimming”.

It is possible to find some dimmers on the market that can reduce the light from 100% to 0% (called “fade out”) in a variable preset time, preferably over a 1 hour period, to simulate the sunset. This allows us to get our pet birds ready for sleep without rushing them.

However, a dimmer with a “fade out” can cost around $250 (CAN). A dimmer can work with regular bulbs only and not with threaded fluorescents.

You can also use a timer and the costs will be a lot lower. It all depends on the intended use. A timer automatically shuts off the light at the preset time, with an on/off switch but it doesn’t have the capacity to gradually lower the light. Only a system with a dimmer can do that.

A dimmer can also work with a linear fluorescent which makes it possible to have the dimmer as well as the Kelvin and the CRI. Then, the cost can climb to between $400 and $600 (CAN) because of the dimmer and special ballast required. An electrical appliances distributor can help you design such a sophisticated system.

To continue with the explanation about the dimmer lamps shown on the previous table: halogen lamps or PAR halogen lamps provide a really white light, around 3,200 K. This light is whiter and more concentrated than a standard incandescent lamp (a regular bulb provides 2,700 K). Halogen lamps with 3,200 K produce a lot of heat. About 80% to 90% of the energy produced by the lamp is infrared heat, the remaining 10% is used for lighting. This can be useful when you want to provide a bit of heat to your sick birds, temporarily, but not at night.

For a prolonged use in the case of a sick bird, there are special heating lamps with infrareds. Infrareds allow for a deeper, more beneficial sleep to help our pets heal better and get back to health. Infrareds are better suited, when needed, for both daytime and nighttime applications.

Summary
Below is a summary of lighting choices (many possibilities available) listed from the least expensive to the most expensive.

- Install a dimmer with a “fade out” on an existing fixture. It has the advantage of simulating the sunset. However, it does not reproduce daylight.
- Use a threaded fluorescent lamp of 5,000 K or more (with high CRI), such as the “Tornado” threaded compact fluorescent as a replacement for regular bulbs. The only cost involved is the cost of the lamp. However, it is not possible to install a dimmer.
- Use a threaded fluorescent lamp but keep the regular light as well. Add a dimmer equipped with a “fade out” on the regular light. Then at night, shut off the fluorescent lamp and activate the “fade out” to simulate the sunset over a 1 hour period.
- Install a linear fluorescent lamp. These require a ballast and fixture. The costs are much higher. It is even possible to install a dimmer on these types of fixtures. These fluorescents can simply be added to the room or replace existing fixtures.
- Keep the existing lighting but add a dimmer with the “fade out” option on the existing bulb. Then add another fixture to the room such as a linear fluorescent. Thus at the end of the day, it is possible to shut off the fluorescent and at the same time reduce the intensity of the light in the room. First, the effect will be to calm down our pet birds and then, by using the dimmer with the “fade out” option, it will gradually reduce the brightness over a 1 hour period, just like the sunset. While this option is the most expensive, it provides the most adequate lighting for our companions on a day to day basis.

I must add that most fixtures are not necessarily designed for birds and they will require some work to protect the electrical components (light and electrical cords) from the birds. If the birds are loose, they will find it pleasant to sit on top of the fixture, especially if it produces some heat. The fixture can represent all the comfort of a new toy and should be avoided.

You can find the items mentioned at electrical distributors listed in the yellow pages. The items mentioned above are now the best on the market based on the quality/cost ratio. Other products are also

<table>
<thead>
<tr>
<th>Incandescent</th>
<th>Incandescent BR or R</th>
<th>Halogen PAR</th>
<th>Halogen MR16</th>
<th>Halogen T3</th>
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<td></td>
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</table>

These bulbs do not have the 5,000 K or the CRI but can be used with a dimmer.

Continued on page 60
Everybirdie’s a critic!
We watch, listen, read, try and taste anything new and old on the bird market!

Then we critique and praise.

**DVD REVIEW**

• Dr Lupu has achieved to transmit concise, pertinent information that is undisputable. The DVD is well orchestrated & structured. Her fundamental respect for these creatures promotes a positive approach that is universal to all parrot guardians.
• Dr Lupu’s professional and experienced recommendations concerning behavioral analysis is clearly founded and reflects 25 yrs of experience, consulting parrot owners. The DVD features an overview of instinctive behavior- learnt behavior to step- by- step behavior modification. The importance of providing an enriching, safe, and healthy stimulating environments is absolutely crucial to promote a lasting relationship.
• Our lifestyles are in constant change, and long lived parrot companions will inevitably react to unforeseen events, lifestyle and environment changes to their captive universe. These will trigger undesirable, misunderstood behavior such as (screaming, biting, territoriality ect.). Practical keynotes are emphasized to help them to adapt to changes in their routine, environment and relationships.
• Behavioral modification requires a realistic approach, log entries of behavioral concerns, objectives have to be clear and small steps must be endeavored, participation from all members of the flock are essential in the process of behavior modification (individuals that are part of the birds environments and interactions)
• The parrot companions themselves will also go through stages of adolescence, and reach sexual maturity. These stages will be the blue print of their intellectual development. Dr. Lupu explains the dangers of allowing your companion to bond with one person & understanding the hierarchy of the individuals of the flock
• It features responsible parrot owner’s relationship demonstrating that it is possible to develop and maintain a healthy relationship with your feathered companion I especially liked the African Grey scene, an African Grey playing the potato, with his guardians. The couple are passing the parrot back and forth (hot potato game) and there is an obvious complicity and complete trustworthy relationship between these flock members. Peanut the Umbrella cockatoo is stimulated by skill enrichment games with his caregiver. His participation is motivated by positive reinforcement. His cognitive ability to recognize objects, interpret commands and retrieve specific objects has been positively reinforced with drama reward , mutual respect and interactive gameplay.
• A bilingual resource such as this was long overdue in the avian community. I recommend this DVD for guardians of a newly acquired feathered companion and established feathered flocks.

Josee Bermingham

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**Species PROFILE**

LOVE BIRDS

Alexandrine parakeet, in spacious mixed flight with lutino and pied lovebirds
Photo Michèle Aubin, Zoo D’oiseaux Exotique Icare

Lovebird chicks parent raised with brotogeris celestial blue parrotlet.
Photo Michèle Aubin, Zoo D’oiseaux Exotique Icare

Connor MacKay ,10 years old,( Parrot Life magazine’s youngest reader!) with his companion lovebird, “Peaches”. Connor has had peaches since Sept. 2005 and has done extremely well at handling and training his wonderful feathered companion. Peaches, loves to ride around on Connor’s shoulder or inside his shirt with her head peeking out. She makes kissing noises and growls like a dog so far and he hopes that she will someday learn to say word or two or maybe her name. Belleville, Ontario, Canada

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Available on the market. It is important to choose a color temperature of at least 5,000 K combined with the highest possible CRI, preferably above 90%, to provide the maximum ultraviolet light allowed and offer the proper help our cherished companions need.

You have to remember one thing, our companions are not machines intended to produce, they are above all else our friends. It is important not to continuously subject them to a lighting that is too intense. The proper lighting, good activity periods combined with rest time, a healthy nutrition and time spent with them will contribute to the happiness and well-being of our friends.

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