UV2 ™

"The essence of light in Nature" ™

A UV2 Confidential Draft 12 introduction from Spirit River, B Black and associates.

Spirit River, in another first, is happy to announce that we have now doubled down on our Ultra Violet or UV process.

Preface; Many of our customers, tiers and fishermen are both intrigued and perplexed about UV light and specifically our new UV enhanced process. The subject is complicated and there have been numerous books and articles written about it. Because of all the contradictory information out there we continue our own in-house UV testing. In addition we have sought out advice from many knowledgeable anglers. We are first to admit we are basing our product line on part science, on a reasonable theory and common sense. We feel results down the road will speak for themselves. Our company has contributed tremendous resources and time developing this product line. Below we will try to give you some meaningful information so you can draw your own conclusions. However we are convinced there is strong merit to using UV enhanced materials as well as multi-color spectrums. To our knowledge the combination of the 2 has never been done.

- Colors in the visible light or VS spectrum are Violet-400-450nm, Blue-450-500nm, Green-500-575, nmYellow-575-600nm, Red-600-700nm. These are the colors we humans see. The less visible UV spectrums of interest to us are run **280nm to 400nm.**
- UV**F** are what anglers/tiers know as the usual fluorescent tying materials which absorb light and will emerge back out in a stronger wave length we can view as brighter. Light colors of UVF will radiate under a black light and certain colors can be seen at very long distances both in and out of water. In addition, UVF can also be seen with a standard low strength UV light.
- UV**R** are the shorter wave lengths **the human eye does not usually perceive**. These are what we are primarily concerned with because of their prevalence in the

natural world. UVR reflects through a material or is emitted by the species and cannot readily be seen by the human eye unless very expensive equipment and filters are used. What you can sometimes see under a UV light is a bluish purple tint on honest to goodness UV enhanced materials. Many in our industry continue to claim it is UV when actually some of it is not. In addition many feathers and furs emit their own UVR signature and many common patterns used today will in fact emit some UVR.

- As an example we split a piece of standard pink rabbit and enhanced dyed each into UVR and UVF then put it to the test. Under a UV light the UVR rabbit was a Bluish Purple (admittedly some of this color emanating from the light itself) and the UVF glowed a very bright almost white. Clearly a dramatic difference.
- In explaining the difference in house, between UVR and UVF I like to say 'our UVF Fluorescent materials "scream" at you and our UVR Reflective materials "whisper" to you'.
- The UV**R** (reflective) spectrum is extremely common in the animal/insect world. Way more than you might think. This is how bees and butterflies find flowers and mayflies find mates. It is very common in bird species. While many males exhibit a natural UVR to attract mates or to feed, many females exhibit little or no UVR to camouflage themselves and their young. Hence Roosters are bright and shiny and hens are soft and muted. The more healthy the animal the brighter its UV signature which females recognize. Another way to imagine this is to think of a dog whistle humans can't hear but dogs can. UVR is the colors animals see which we don't.
- UVF (fluorescent) is far less common in nature but can still be found in plankton, algae, some baitfish, jellyfish, invertebrates & similar species. UV sensitive cones in the eyes of fish allow them to see in much greater detail in adverse water and light conditions. While visible light is lost in red at approximately 10 feet and orange at 25'…UVR and UVF light can penetrate up to 150 feet depending on the type of water and clarity. The RODS in a trout eyes do not allow them much sight in low light periods of dawn and dusk. However, UV sensitive CONES in their eyes do allow fish to see more details and at greater depths. Perhaps this is why some species prefer to feed at night. Bass anglers have known about UVF paints which are utilized on many of their baits and lures. However, not much research has been done utilizing UVR, nor to our knowledge has it ever been applied on tying materials.

- The statements above are not to say that many other factors do not enter into the science of UV and fish. They do. Consideration needs to be given to the types of water (salt or fresh), and its clarity. These are additional factors just as are the UV light reflected from the water and the UV ambient light during daylight hours. Because of these 'other' factors we do feel there is a place in flies and lures where there is NO UV needed. Basically a flat black non-UV Wooly Bugger can and will stand out better against certain water and light conditions. Ever notice how some species of fish tend to feed more in dawn and dusk situations. They are keying in on the UVR aspects of their prey.
- We have now begun to do both processes on materials. We call this our **UV2™**. Our proprietary method of dyeing or the special UV2™ dye process we hope to patent will eventually be on most UV enhanced products from Sprit River. Up till now most of our UV enhanced line has been either UVF or UVR which we refer to as simply UVenhanced. Not both. Because the UV2 feathers, hairs and furs have both UVR **and** UVF they possess an increase in electron mobility, its luminescence and overall light spectrum. The UVR we use is high in reflectivity and has diffusing properties, which the animal world identifies and exploits as mentioned above. The UVF adds higher wave lengths that also can be seen from a greater distance. With a special UV light held <u>behind</u> some materials, the lighter shades (red and above) will show an ever so slight bluish/purple hue. The UVF enhancement brightens the materials for better visibility in low light or off color water conditions and can be seen under a Black Light. We have UV2 enhanced both black and purple feathers and results do not show any discernible UV pattern. Does UV2 help on the darker colors? That is still an unanswered question we are working on.
- The UV spectrum is another KEY to fish because it optimizes feeding opportunities, as well as prey, mates, and danger. We are not claiming this will change fishing or that you WILL catch more fish. Though using it in flies, jigs and lures can arguably be said to provide anglers an advantage by arousing their curiosity, feeding, aggression, and territorial behavior. We like to think the UV enhanced and the totally unique UV2 process brings flies and anything you tie to LIFE!

<u>Our NEW UV2™ DUBBING</u>

Our UV journey the past couple years has also lead us to what we are now developing as a whole new **UV2 full color spectrum line of dubbing**. Unlike feathers we have the ability with dubbing to blend many types and colors of fibers. We all know that every color emits it own unique wave length. Over the last 20+ years many scientist have found the obvious, that insects emit a variety of colors as well as UVR. So we have enhanced core colors of dubbings that have been separately enhanced with UVR and UVF. These are then painstakingly blended with select dubbings so that whether you are fishing dries or nymphs, we have a dubbing blend perfect for the task. This can add up to 10 more steps in the manufacturing process. We think the results are worth the effort. In doing so, we achieve an overall base color while still gaining the multi spectrum of reflective colors that are so vital to replicating the true insects or prey.

Once used, the dubbing will emit many color wave lengths as well as both UVR and UVF properties. The theory has proven itself quite effective on dry flies…far more so that standard single color dubbings. Fish will see and key in on certain color wave lengths and our dubbings emit many **UV** and **COLOR** wavelengths.

Another key we believe in is to dress the base of the pattern with either white thread or better yet…pearl or silver Mylar. This has the ability to bounce any light back out in UVR. Many of our new UV-2 patterns will be tied using this technique. Most of our new UV2 patterns will incorporate this additional feature.

Hold any of these new dubbings directly in the sunlight and even thought you do not see the effects of the UV enhancement, you do see reds-blues-orange pinks and so on. Now pop these under a UV or Black Light and BAM….there is the difference. Note that the UV2 additive does alter the hue of the dubbings ever so slightly, so on many you will notice a slight pink flavor.

Please try our UV2 materials and fly patterns. Keep an open mind. We believe you will see and experience a significant difference.

Spirit River is dedicated to leading the industry in materials that make a difference.

Side Notes

Randall Kaufmann's famous Kaufmann's Stone dubbing mix has always been a collection of many colors and materials. As I worked on Spirit River's UV2 project I asked Randall about the effectiveness of his patterns in relation to his dubbing mixtures.
He related that...*"from what little we know it would seem plausible that fly recognition by fish consists of five "keys": size, shape, color, animation and presentation. The more "keys" you offer, the higher your success rate. It is with all these thoughts in mind that I devise or select an imitation to fish. The Kaufmann Stone, in assorted colors and sizes, illustrates this strategy. The desired color of dubbing is achieved through a blend of many colors, thereby allowing fish to perhaps perceive a natural mottling "pattern", realistic shade or to "see" a specific color. It is also a blend of multiple materials, which are chosen for their reflective, translucent and animation properties." Hold a Kaufmann Stone up to the light. You can "see" any color that you look for. Such multi-color/material dubbing mixtures "come alive" in the water and, depending on light and water conditions, and other angling variables, can dramatically increase the "acceptance rate" of fish."*
The difference now is our ability to UV enhance blends with not only various colors but also with UVF and UVR. Our exciting and ground breaking UV2-enhanced product line takes Randall's and others 'blending' concept to the next level. Use your imagination, refine your flies, stock a new fly box and enjoy more fish-to-the-fly!

I happened upon a short NPR segment written by John Cooney. He has allowed me to use it. In it he speaks of a simple Chickadee and their outstanding eyesight. Their retinas are lined with receptors that are 2 times more packed then a human. This gives them much higher sight acuity and lets them see far more details. This also gives them the ability to perceive colors beyond what humans ever will. Because they have an extra color receptor that deflects UV light, Chickadees see 4 primary colors and 11 main combinations which far exceed anything humans can even imagine. Mr. Cooney says that these small birds "live in a world of hyper-reality of color that then allows them to coax sustenance from a seemingly barren forest." Just another example of how limited we are in what we can see and the potential that UV2 materials can have when viewed from a fish perspective.