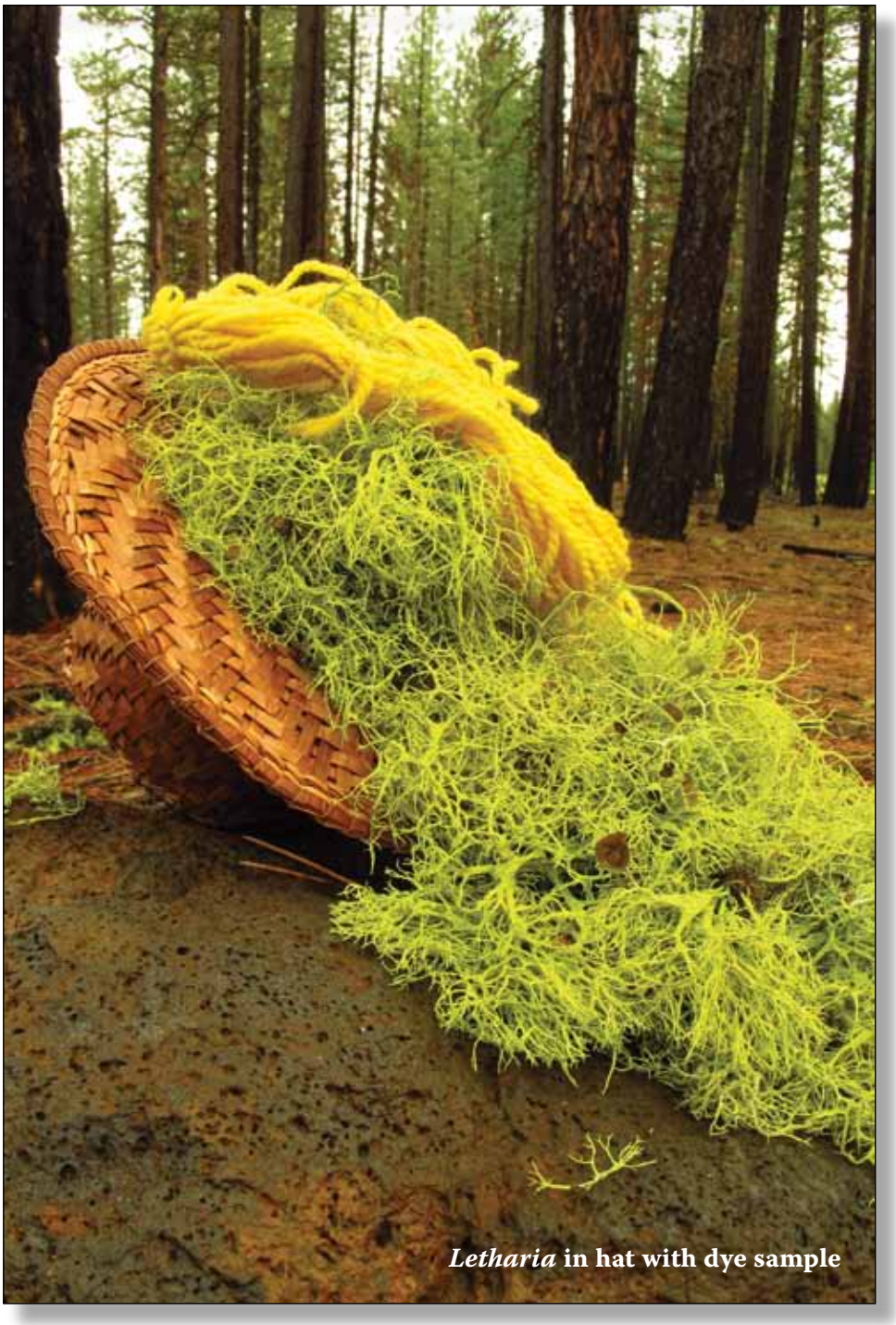
Getting Started with Lichen Dyes

by Alissa Allen



***Letharia* in hat with dye sample**

Lichens are beautiful organisms that surround us everywhere we go. Once you start looking for them you may be surprised at the diversity and quantity that otherwise blend into the landscape. Many are sensitive to air pollution and are therefore more abundant as you get some distance from the city. Lichens come in many shapes and grow on any stable surface such as rocks, trees and man-made structures. Each lichen has its own requirements for air and moisture, which is why you'll find different species growing from different parts of the same tree. Beginning to look at lichens will open your eyes to another realm of the natural world.

Not only are lichens fascinating to look at, but many contain substances that can be converted to brilliant permanent dyes. Their historical use in textiles originated thousands of years ago and came to rise in several isolated regions. The early recipes were often vague or guarded and most have been destroyed or lost. We are left with relatively modern accounts and archeological remnants.

The intensity of the colors they produce rival both natural and synthetic dyes. Some of the most incredible colors lichens produce are: neon yellow, electric magenta, blue-violet, and a pink that changes to blue in the presence of sunlight. Many of these colors may not be visible in the fresh lichen, but are converted through the extraction process. An exception to this is the wolf lichen, *Letharia* spp., which dyes fiber exactly the color of the lichen itself.

In addition to their intense colors, there are several advantages lichens have over other natural dyes. Lichen dyes can be made using simple household ingredients like water and ammonia. Mineral salts (also called mordants) are not needed to get strong colors, and in fact will often diminish the lichen dye's natural luster. Also, there is a simple chemical test that will reveal the presence of particular dye substances, helping you to determine the best route for extraction.

Before you start extracting dyes from lichens, there are a few things you should know. I recommend picking up an introductory book on lichens so that you can familiarize yourself with some basic concepts and terminology. Learning the terms for the stature type and anatomical

Letharia vulpina with dye sample

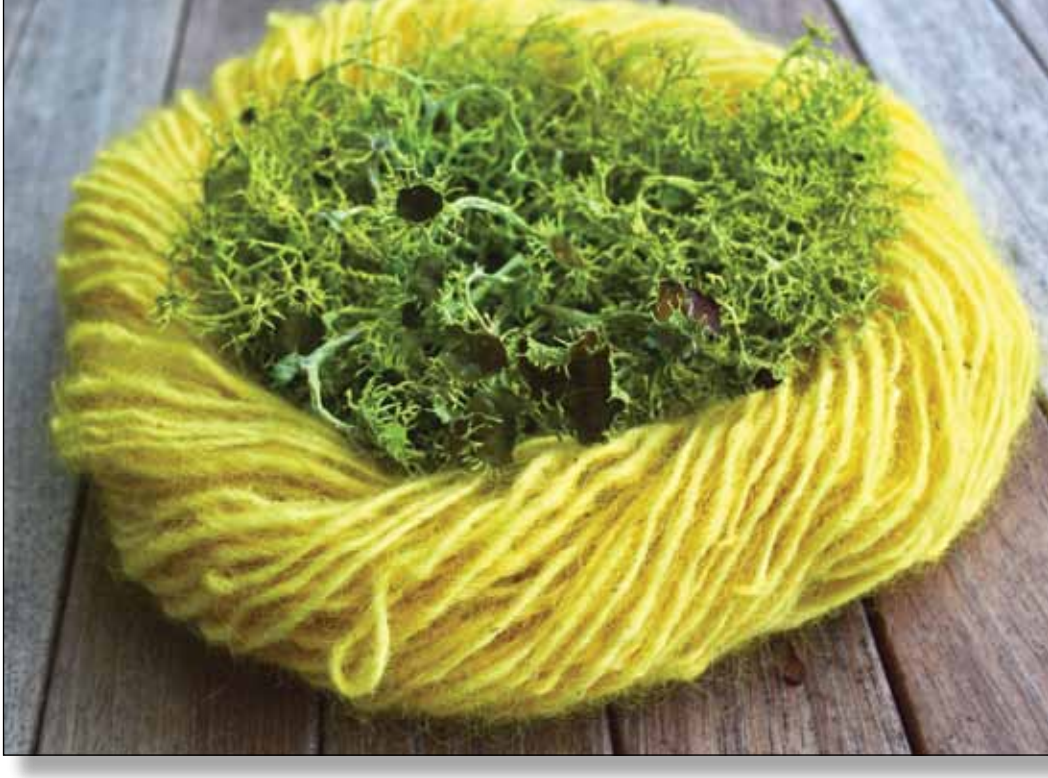
layers will allow you to take note of what you are collecting. For example, it helps to know the terms in order to describe whether your lichens are branchy (foliose) or flat (fruticose), or if the top (upper cortex) is a different color from the bottom (lower cortex). Once you know the basic terms, lichen dye books will make more sense. You can also learn a lot by signing up for a lichen walk led by a member of your local lichen guild.

Extraction overview

Lichen dyes are extracted in one of two ways, depending on the presence of certain dye substances. For most lichens, the dyes are extracted by simmering in water for about an hour. But some require an extended soak in an ammonia-water solution for a minimum of 3 months prior to dyeing. This may sound cumbersome, but the results are worth every minute of the wait. A subset of the ammonia-extracted dyes are those with pigments that change from pink to blue when exposed to sunlight during drying. These are extracted in ammonia using the same process as the others, but will change color right before your eyes if exposed to sunlight at the end.

The easiest way to determine the method of extraction is to do a simple test, referred to as the C test (C for chlorine). Use your fingernail or a knife to gently scrape away a small section of the cortex, the thin layer of skin on the lichen, thus revealing a layer of white inner flesh called the medulla. Once exposed, drop a tiny bit of bleach onto the medulla. If the color flashes red, you have a C+ reaction; this indicates the presence of certain acids that will, after an extended soak in ammonia, transform into some shade of purple dye. Of course, there are exceptions to the C test, but this is a very good place to start.

If there is no color change, or a non-reddening reaction to the drop of bleach, your lichen is C- response, indicating that



Letharia columbiana - Boiling water extraction Alissa Allen

Xanthoria perientina with color changing dye sample

your lichen may work best with a boiling water extraction. Not all lichens produce dyes, but a boiling water test is easy enough to do, and is essential for getting started with lichen dyes.

Collecting

There are a couple of important considerations to make when collecting lichens. A lichen is an entire organism, so when you remove it from its substrate, the organism dies. Lichens grow very slowly and may never recover in areas that are over-harvested.

For these reasons there is a code of ethics for harvesting lichens for dyes:

1. Focus on collecting abundant lichens. Rather than targeting dye lichens, I suggest starting with lichens that are most plentiful. Seeking out rare lichens for their dye potential, or harvesting from protected areas, is

Xanthoria, *Evernia*, *Umbilicaria* sun dry

generally frowned upon. There are plenty of abundant dye lichens out there, but you may have to travel outside of your neighborhood to find them.

2. Collect lichens that have become detached from their substrate, or perch. Because lichens take so long to grow and may not regenerate, scraping trees and stones is highly discouraged. Luckily, nature has a way of producing more than enough for individuals to collect and use for small-scale projects.

Wind and ice are the two forces that

***Umbilicaria mammulata* - Ammonia extraction started May 28, 2013 Alissa Allen**

***Flavopunctelia flavantior* - Ammonia extraction started February 1, 2014 Alissa Allen**

bring down much of what is available to the observant dyer. Because each species has its own requirements for air flow and moisture regulation, once the lichen becomes detached from its ideal perch on tree or stone, it will eventually be reduced to compost. Check the base of rock faces for chips of lichens after the spring thaw, and under trees after a storm.

Once you begin to notice the abundance of lichens around you, you will begin to spot them, naturally dislodged under the places they grow. Some of the most spectacular dyes come from commonly found lichens such as *Letharia* spp., known for its neon yellow dye; *Umbilicaria* spp., *Lasallia* spp., *Ochroleccia* spp., and *Flavopunctelia flavantior* known for their stunning purple dyes; *Evernia prunastri* known for its lilac dye, and *Xanthoria* spp., and *Teloshistes* spp., for their solar induced color-changing dyes. There are a large number of lichens that produce bold reddish-brown dyes in boiling water.

***Flavopunctelia flavantior* and me, Alissa Allen**

Dye instructions

As with most natural dyes, lichen dyes work best on wool or silk that has been washed to remove oils. Cotton and other plant fibers may take the dye, but without additional treatments, the colors will be less intense and more likely to fade.

Boiling water extraction: Start with a small amount or lichen and fiber for a test. In a stainless steel or glass pot, chop and soak a cup of lichen (for half an ounce of fiber) in water overnight. The amount of water is not precise; just use enough to amply cover the fiber and lichens. You can then either simmer the lichens for an hour and strain them before simmering an hour with fiber alone, or you can simply simmer the lichens and fiber together for a single hour; both options work well. Aim to keep the dye temperature around 160-180°F. After the hour has passed, check for color. You may or may not get a good dye, but this is the first step in screening your lichens for color.

If your tests are a success, proceed by increasing the recipe above (**2 cups of lichen to 1 oz of fiber**) to match the amount of available lichens or the quantity of fiber you'd like to dye. You can add more or less lichen to achieve desired results.

Leaving the fiber in the dye pot to cool overnight will intensify colors. So will reheating the dye bath for a second extraction and redyeing the same fiber the next day.

Ammonia extraction: Lichens that have a C+ response are best for purple and violet dyes. While orange lichens work in a similar way, their dye will change to blue if exposed to sunlight during the drying process.

Loosely fill a jar with lichen, cover with a 50/50 mixture of clear household

ammonia and water, leaving an inch of air at the top of the jar for oxygenation. Close the lid tightly and shake the jar. Ideally, you should shake the jar multiple times a day, but I have had some beautiful batches of dye arise from severely neglected jars. However, oxygenation is an essential component to converting the lichen acids to dye, so do try to give the jar attention. Once a week or so take the jar outside and carefully remove the lid. Give the lichen solution several vigorous stirs and replace the lid. Shake daily for at least 3 more weeks.

You will notice a slow transformation in the color, from reddish brown to deep, grape-juice purple. This process takes anywhere from 3 weeks to 6 months depending on the species of lichen, the amount of oxygen, and the concentration of the lichen. Do not be tempted to use the dye if it is not the color of grape juice. The conversion must be complete or the dye will look muddy and wash out.

Once grape juice color is achieved, **pour off a cup of the liquid into approximately 4 cups of water, and simmer with an ounce of fiber at 165-180°F for one hour**. Adjust future dye baths with more fiber for lighter results or less fiber for darker results. The stock dye solution will maintain its viability for quite some time. For best results, try to use it up within a year of its conversion to purple.

Exploring lichens for dyes provides a practical backbone for learning more about lichens in general. Successful extraction of their dye is gratifying, and facilitates a connection between the lichen found and a useful outcome. This makes species recognition and learning their names easier. Observing their growth habits and selective distribution leads one to question air quality and microclimates. There are so many questions and so few answers when it comes to understanding these complex organisms, I hope you will be inspired to take a deeper look into their mysterious world.

Recommended reading

Casselman, K.D. 2011. *Lichen Dyes: The New Source Book*. Cheverie Nova Scotia: Studio Vista Publications.

To learn more about mushroom and lichen dyes, or to sign up for classes, visit mycopigments.com.

Lichen dye expert Dorothy Smullen offered a few additional looks at the vibrant colors obtained from lichens. The hat is all lichen dyed and was displayed at the 2005 International Fungi Fiber Symposium in Denmark. The blues are from *Xanthoria* in the Photooxidation process; the purples and pinks are the Ammonia method; the oranges and yellows are the Boiling Water method. One photo shows the *Ochrolecchia* that the Danes use for purple (in USA we use *Umbilicaria*).