harvesting color

HOW TO FIND PLANTS AND MAKE NATURAL DYES

REBECCA BURGESS

$22.95 U.S.

Beautiful natural dyes from plants found in the wild or grown in your own backyard

Harvesting Color presents the entire process of infusing your life with color—finding the right plants, harvesting them at the best time, transforming the crop into beautiful dye, and, finally, marrying pigment to fiber.

In this beautiful book, Rebecca Burgess showcases three dozen common plants that yield striking hues. Citing fascinating botanical lore, she demystifies the process of recognizing each plant in the wild. For those you can grow yourself, she details when to sow the seed and how to nurture the plant. For all the plants, you'll learn the optimal time to harvest, as well as how to extract the best dyes.

To get you started, a comprehensive section on equipment and techniques presents all you need to make your own dyes at home. A master dye recipe serves as the foundation for your work. Step-by-step instructions explain any custom-tailored variations for each of the thirty-six plants. Maps display the range of each species over the United States and Canada, helping you find out what plants grow in your part of North America.

Harvesting Color is organized seasonally, with a knitting project using wools colored with dyes from plants harvested during that time of year in each section. In addition, the book profiles the fascinating craftspeople around the country who keep the traditions of handmade natural dyes alive. Rebecca Burgess also explains the etiquette of foraging on both public and privately owned land, offering tips and emphasizing the importance of taking no more than you need—just like the Navajo do.

Whether you're a crafter or a botanist, an artist or a

(Continued on back flap)

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how to find plants and make natural dyes

rebecca burgess

photographs by paige green

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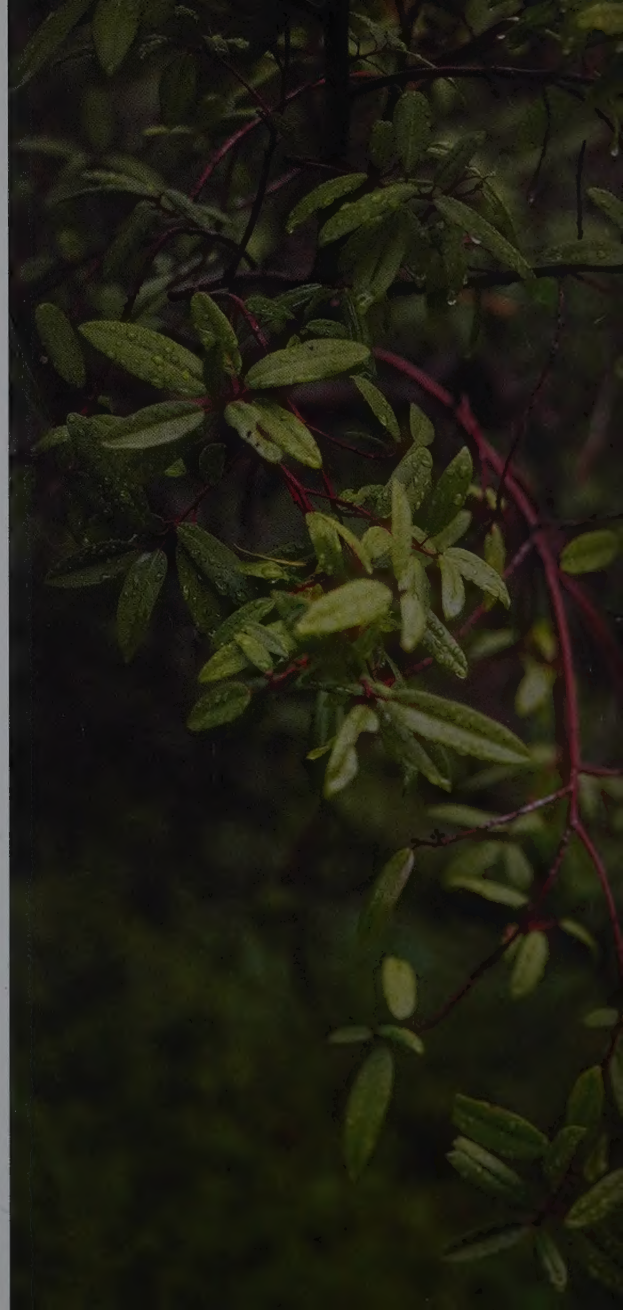

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introduction

The cave paintings of Lascaux, the red woven strands of Native American basketry, and the bright fuchsia tones of Aztec cotton robes all attest to the eternal desire to express ourselves through the use of color. In fact, it seems as if natural dye processes are as ancient as the origins of human creativity.

For thousands of years, the art and craft of natural dyeing has connected our creative urges with the inner workings of the natural world. As humans dyed fibers and then turned them into textiles and a range of other useful everyday objects, they transferred color from the plant and mineral kingdoms into human material culture. The dye processes that have evolved through the centuries are an outcome of both human error and conscious creation.

The advent of the Industrial Age resulted in chemical experiments that altered how color was created. William Perkins discovered synthetic dyes in 1856, but the process relied on heavy resource inputs. The first synthetically produced blue, for instance, required 400 pounds of coal tar to create 1 ounce of dye powder (the heavy use of refined coal tar continues to this day in synthetic dye manufacturing). Nevertheless, because of suitability and ease of application, synthetic dyes quickly became favored by the textile industry and, as the Industrial Revolution continued, more people bought mass-produced garments made with them.

In North America, the natural dye traditions were kept alive only through a scattered network of artisans and individuals. Natural dye houses disappeared from the landscape. Only vestiges of the natural dye culture can still be seen in fields that host woad, tansy, and weld—former dye crops that have naturalized even after years without cultivation.

Although the Industrial Revolution enhanced the expediency of production, it took a massive toll on our air, soil, and water resources. Rachel Carson's *Silent Spring* detailed the rampant and destructive effects of synthetic pesticide use within the ecosystem. This seminal book brought attention and scientific evidence to the impacts of synthetic chemicals upon the health of the natural world, and in the decades after it was first published in 1962, the environmental movement was not only born but began to respond to the effects and dangers of the synthetic chemical culture.

Fiber farming—and textile manufacturing as a whole—continues to this day to rely on a host of synthetic chemicals known to have effects on human health as well as the health of the greater ecosystem. A recent study of Chinese textile manufacturing revealed that the biggest source of water pollution in the entire process was not the agrichemicals used in cotton farming, but the runoff from synthetic dye manufacturing centers. According to this study, done by the research wing of China's state council, 90 percent of the synthetic dye runoff was flowing untreated directly into the environment, contributing to the larger health concern of safe drinking water (one out of every four people in China drinks water that is deemed contaminated). The magnitude of these environmental situations has inspired many individuals and organizations to seek cleaner and sometimes ancient alternatives.

The slow food movement, the reduction of one's carbon footprint, and the vegetable gardens popping up in backyards across North America are examples of the very personal response of citizens to the ecological issues that we face. Returning to natural dyes after more than 150 years of relying on synthetics is garnering increased interest from a wide audience of environmentalists, artisans, farmers, and do-it-yourself crafters.

Making and using your own natural dyes can reduce your impact on the environment (textile production as a whole is the fifth largest contributor to CO_2 in the United States), and has the added side benefit of some very pleasant time spent outdoors as you search for, gather, and/or tend to the plants that yield nonsynthetic color. Although our forebears on the North American continent did not need a handbook on where to look for dye species, or how to harvest them, this knowledge has

The wall of the workroom at Carol Leigh's Hillcreek Fiber Studio

largely been lost in the last 150 years. As a guide to natural dyes for the twenty-first century, *Harvesting Color* gives you detailed information on thirty-five plants that grow in various parts of the United States and Canada that will yield beautiful natural dyes. You can grow many of them in your own backyard; others can be gathered from the wild, and I'll show you how to do that, while respecting the balance of local ecosystems and respecting the rights of others, including landowners.

The experience of exploring your landscape for natural dye plants, whether it is a backyard or an abandoned train corridor, provides an opportunity to become more at home in your region, to connect with the world around you. I consider myself fortunate that I still live and work in the same bioregion in Northern California where I was born and raised–a landscape that has been a part of my family's history for four generations. This land provided the foundation for my childhood, one deeply rooted in a sense of place. My great-grandparents tended land containing their house and a series of manicured gardens leading into a surrounding wetland. My great-grandmother patiently taught me to crochet and sew, and I also spent long hours in the garden; my hands were trained early to work with fibers and soil.

The marsh just beyond our gate was filled with a menagerie of plant and animal life, some species indigenous to Marin County and others nonnative. I observed the effects of tides, seasons, storms, pollution, and development on this habitat. I loved to spend afternoons quietly watching statuesque blue herons and families of mallard ducks. But as I grew up, the natural serenity around me was interrupted more and more by the noise of earth-moving machinery. Levees were raised, water was diverted through concrete channels, and backhoes filled the wetlands. By the time I went off to college to study art, it was no longer the peaceful marsh that I had grown up alongside.

The art studio courses I began to take in college taught me how to interpret nature from a distance, but not how to engage with it. While painting, printing, and weaving materials that I crafted to look like my natural surroundings, I used petroleum-based paints, coal-tar dyes, nylon yarns, and a host of strong-smelling adhesives and emulsifiers. The irony was apparent: everything I washed down the sink while cleaning my brushes, all of the synthetically dyed yarns that passed through my hands, were products of a synthetic chemical culture that was destroying the very living systems that had inspired me.

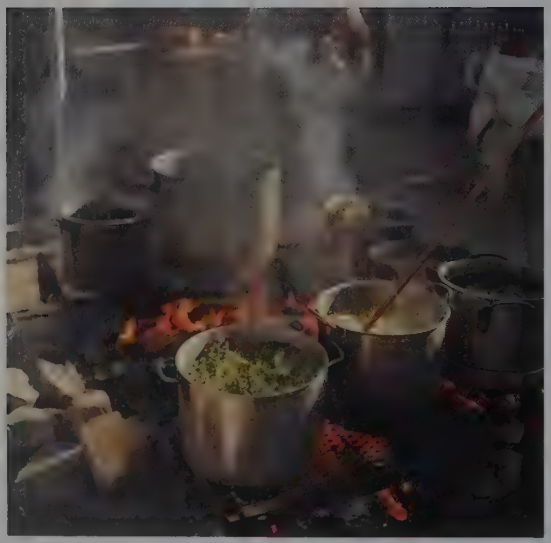
Fortunately, I also discovered the work of Native American basket weavers while in college. These artisans illuminated for me a new way of bringing art and nature together. My first basketry teacher taught me how to use local dye plants to color the plant fibers that we would weave with. During my first harvest, I was amazed to see that she had teamed up with a local ecologist to restore a former strip mine to its original environmental integrity. Our collection at the mine of materials such as willow and sedge enhanced the regenerative process of the harvested region. As gatherers, we took responsibility for removing nonnative species that we discovered along the paths; we also maintained the native species with seasonal pruning practices.

After graduation, I spent several months touring textile cooperatives in Southeast Asia that used traditional natural dye recipes. I was exposed to the ancient and well-loved species of indigo, lac, morinda root, and annatto, as well as a host of plants that appeared to have no English names. Upon returning home, I began to blend the knowledge I'd gleaned in Southeast Asia with the experiences I'd had using natural dye plants from the basketry traditions of my homeland in Northern California.

As these influences began to come together within my own practice, I started experimenting with a wider variety of native plants than I'd ever been taught to use, and began applying them to locally sourced fibers such as wool, organic cotton, angora, and cashmere.

I've enjoyed teaching both new and ancient dye recipes for ten years now. Those who come to learn natural dye making have increased in number each year. Their interest, passion, and enthusiasm stem from their love of art, ecology, design, textiles, and a general sense of looking for alternative methods that are rooted in an environmental ethic. As we collectively move into greater balance with the earth's natural processes, it is likely that we will see more natural color on our horizon.

As you explore natural color for yourself through the use of this book, you'll see that I've organized *Harvesting Color* into two parts. Part One opens with an introductory chapter that discusses the process of gathering, gardening, and dye making as a whole. Many species can be found growing throughout our communities, while others can be easily cultivated in your garden; some recipes will utilize plant material that you can order online. I also discuss the etiquette of harvesting and offer solutions for how to access the wild and sometimes weedy species that can be found throughout our communities. Many



of the plants I recommend for the garden are common species that can be found at your local nursery. In chapter 2, I discuss the materials that you will need for your dye work, and how to prepare, or "mordant," your fibers. The next chapter has many different recipes you'll be able to use for mordanting your fibers, as well as afterbaths that can be used to alter your dye colors once they've emerged from the dye pot. The Master Dye Bath Recipe, which is the centerpiece of chapter 3, will give you the foundation for how to work with the plant species discussed in detail in Part Two—and beyond, as you continue to experiment with the plants of your region.

Part Two is divided seasonally into four chapters. In each of these chapters, I present detailed profiles of plants that will yield natural dyes. Each plant listing describes its common uses, history, and folklore, as well as specific information about where and when to harvest it. The plants that have naturalized or are native to North America have highlighted maps alongside their descriptions. These maps help you easily identify if the plant is available and/or can be grown in your region. Some of the plants require special treatments and these processes are outlined within this section, although many species share the same master dye bath recipe that is outlined in chapter 3. At the end of each chapter is a knitwear pattern that has been designed to act as a showcase for that season's dye work. These knit pieces are functional everyday items that will chronicle your personal process of creating a seasonal color palette. Throughout Part Two, you'll also find descriptions of the people, traditions, and cultivation processes that are integral and interesting facets of our North American natural dye culture.

Finally, the resource guide will direct you to a sampling of sources for raw materials, from dye plants and seeds to raw and processed fibers, so that you can begin the process of researching what is regionally available for you.

Where I live in California, I am blessed to have access to many dye species that I can harvest year round. However, every region of North America has wonderful dye plants available. For instance, traveling to the Rocky Mountains, the Ozark foothills, and the high mesa plateaus of the Southwest while researching this book, I was delighted to find that dye species are abundant in all of these regions. A rich tradition of natural dye work initially attracted me to these specific locations.

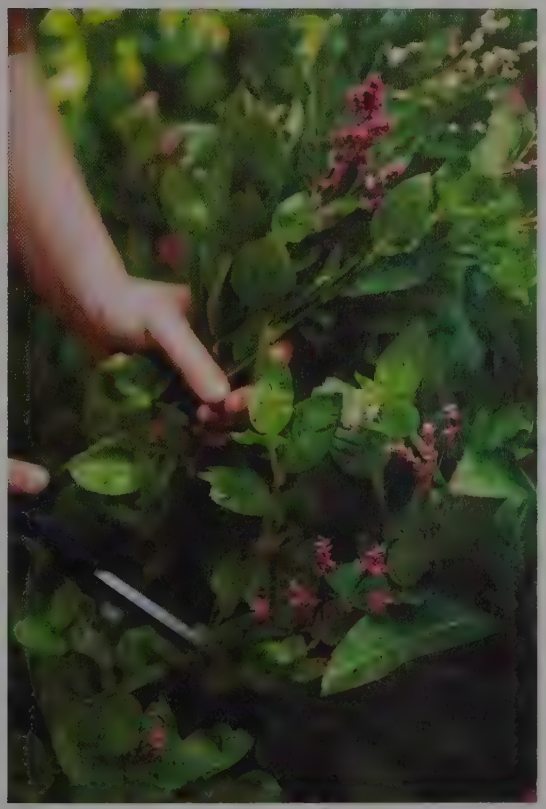
The natural dye recipes that are documented in this book are held in the minds and hearts of three remarkable women. Rose Dedman was the first of the natural dyers I visited, in the high mesas of Window Rock,

Arizona—together we worked with a number of powerfully aromatic and colorful dye plants. I then traveled to the Rocky Mountains to visit Carol Lee, who has a remarkable knack for extracting color from very tough roots (her madder root patch was an unending source of beautiful red dye). I then traveled farther east, to the Ozark foothills, where I met Carol Leigh and harvested alongside her in the expansive prairie meadows.

It was just a coincidence that two of these women share the same first name and their surnames are homonyms. But it's a small world: Carol Lee of the Rocky Mountains once lived in Missouri—where she was friendly with Carol Leigh of the Ozark foothills. These women once lived down the road from each other. While they share virtually the same name, they have since created very different dye recipes that reflect the intricate knowledge of their individual ecosystems. Having moved to the Rockies, for instance, Carol Lee has evolved a unique and bioregion-specific tradition in her new hometown of Encampment, Wyoming.

Throughout these travels, I was accompanied by the indefatigable Paige Green, whose wonderful natural-light photography captured the colors, processes, and people with an honest beauty. The journey to document this wide geography of natural dye traditions was an attempt to bring together recipes from a range of bioregions, so that all those who read through these pages would be able to gather, grow, and source natural dye plants with ease.

When you begin to make and use your own natural dyes, you'll find yourself creating a truly seasonal color palette. Like the long-awaited annual food crops that we look forward to seeing in the garden or marketplace, natural dye plants make their colors available to us only within a certain window of time. These colors reflect both your region and the time of harvest. Indigo gathered from your summer garden becomes a rich blue foundation for your textile projects—reflective of the summer skies and the watery beaches that beckon to us on those warmer days. Your aspen leaf harvest will provide you with a vibrant yellow dye—a perfect reflection of the autumnal transitioning forests. No matter what part of North America you live in, and no matter what time of year you choose to start your dye process, *Harvesting Color* provides recipes that will be of great use in your journey to create and reproduce the colors of the natural world. I hope that you will find it as satisfying, both creatively and ecologically, as I have.



part one

getting started

1

the gatherer, gardener, and dye maker

This book is organized by seasons as an aid to identifying the most opportune times for harvesting dye plants. The species were selected from a cross section of bioregions found throughout North America. These native or naturalized species can be added to your garden or harvested with the permission of local landowners or land-management agencies; maps show where each plant species can be found or cultivated with ease.

A day spent weeding nonnative and invasive plants can offer them a chance at a second life in your dye vat after their removal. There are several "garden variety" species that can be found at local nurseries—such as coreopsis, hollyhock, and zinnia—that will create beauty both in the garden and on fiber. For those who have little to no access to fresh plant life, there are several older—even ancient—recipes that I've included from such species as the cochineal insect, logwood, fermentation indigo, and madder—all of which are dyestuffs that can be easily obtained and ordered online.

This book offers the beginning natural dyer a series of simple protocols and easy recipes to follow when getting started. For the advanced natural dyer, there are recipes that may be unlike those you have seen until now; many plants' dye-yielding properties were only recently discovered. The list of recipes in this book is by no means exhaustive. There remain many bioregions within North America whose diversity of plant life has yet to be explored for its dye-yielding properties—there are likely thousands of recipes waiting to be discovered. This book offers just a taste of this feast of color.

the first dyers

The original North American dye tradition emerged on bulrush, nettle, bear grass, dogwood, and cedar bark fibers—just to name a few of the hundreds of plant species that were peeled, straightened, split, softened, dyed, and woven over thousands of years by Native Americans.

Natural dye records are scanty, but we know that paints were made from larkspur flowers and huckleberries on the West Coast, and pokeberry on the East Coast. Black dyes were made by boiling iron-rich mud and hemlock or birch bark; yellows were obtained from Oregon grape and lichens; reds were leached from chokecherry and alder bark, and browns came from the soaking of hazelnut and walnut husks. Ivan Jackson, a modern-day Native American arrow maker, uses traditional dye techniques from the Klamath region of Oregon. He soaks his tule stalks in mud to give them different colors. He writes about creating "an ochre from volcanic rock, a dark green from the wild iris, a lighter green from moss, and a black from burnt fragmented phragmite bushes."

Due to the quick decomposition of textiles, the study of Native American natural dyeing as applied to spun animal and plant fibers has presented many challenges to anthropologists. Without an extensive fossil record it is difficult

to verify how much or little dye work was done on this continent. Based on the scant information that has surfaced, it appears natural dyeing was not as significant to the ancient Native American material cultures as compared with those of other ancient civilizations such as China or Egypt. However, with the introduction of Churro sheep to the continent in the seventeenth century, the tribes of the Southwest began working with the new animal fiber, quickly creating a complex and ingenious series of natural dye recipes for their handspun yarns. Some of these recipes are included in this book, thanks to the teachings of expert Navajo natural dyer Rose Dedman.

While there are likely recipes from the Native American dye tradition that could be translated for commonly used modern-day fibers such as wool, alpaca, and cotton, I found that many of the plant species utilized historically are not available in great enough quantities to fill a dye vat easily. The recipes in this book are beholden to the Native American land-use ethic more than they are exact replicas of ancient processes. I was always taught—by Rose and other Native American teachers—to use what is abundant and to treat the plant with the utmost respect. To create an equitable relationship with the species, the harvesters must ask permission before trimming, pruning, or digging, and must say thank you upon completing their work. The use of this etiquette has endured in the Native American plant teachings; even as the landscape changes and ecosystems transform, respect is constant.

the art of gathering color

Walking through oak woodlands, prairie meadows, and desert mesas, I am immediately drawn to the composition and complementary beauty of nature's colors. The tones and shades of ancient rock formations, coastal forests, and grassland meadows are both rich and inherently subtle. Billions of years of evolution have woven the elements together in countless combinations, bringing forth dynamic schemes of color whose complexity astounds the senses. And yet these colors are rarely represented in the clothing and textiles that cover our bodies and the interiors of our homes.

Making dyes that impart nature's colors requires that the dyer move beyond inspiration and into a state of engagement with his or her surroundings. Dye making beckons us into the landscape, whether it is our own cultivated gardens or a vacant lot. The place where we harvest is the place where nature and culture merge.

The strategies I've developed for filling my dye pots have brought me into a relationship

with a wide variety of interesting human personalities and unique natural landscapes. I source my dye plants in my own garden, but also from small working farms, suburban gardens, restoration sites, and private rangelands just outside of my small town in Northern California. When the horsetail is being cut back from my neighbor's garden down the road from my home, I am there with my collection basket. When the coyote brush is being cleared from the private rangelands that are tended by my friends who graze cattle, I bring my clipping shears. Once landowners know what you wish to harvest, you can often coordinate a seasonal schedule with them.

Much of North America is in the hands of the public, and for this reason there is much opportunity for the dyer. Arrangements must be made individually with each land-management agency in your region. There are water districts, national forests, open-space districts, national and state parks, Bureau of Land Management lands, bike paths, and some abandoned train corridors—all of which host a diversity of plant life. National and state parks have very strict no-harvest rules. However, national forests allow harvesting for personal use. Water and open-space districts will often grant harvesting permits. Bike paths and abandoned train corridors are areas in which you can gather, depending on the specific guidelines within each town and/or county. The more voices requesting to prune, tend, and weed, the more we begin to push the envelope of what it means to be a human member of the ecosystem. There will inevitably be challenges to finding one's way through the complex terrain of divergent land-management paradigms; however, the more we engage with the landscape and reconnect with its cycles and processes, the greater chance we have of reclaiming our role as beneficial members of the ecosystem.

One of the most effective tools I've found for broadening the physical area of my harvesting grounds has been to plant native restoration dye gardens, either on untended vacant lots or school sites (see page 92). As a general rule, native plants establish themselves with very little additional watering. After a year of maturation, the plants will grow healthily from what they receive of rain, sun, and soil. Without the need for irrigation, these plantings work well for areas that do not receive daily attention and where water may be scarce. The native plant species offer familiar habitat and food sources for insects and animal life. Beetles, butterflies, birds, and small mammals will return to a patch of earth that hosts their preferred native plants.

There are many unmanaged landscapes, whether they be private or publically held, that

In Medicine Bow, Wyoming, sheep sorrel covers the roadsides and has moved into the forest understory.

are covered in weedy invasive species that homogenize the potential biological diversity. Dye plant harvesting is compatible with natural resource management—as there are many landowners and agencies that appreciate any assistance you can offer to help them remove these plants. In my region, the ubiquitous French broom covers large swaths of acreage in and around my home—smothering the biodiversity of the forest's understory. Yet, despite its rather frustrating presence within the landscape, the plant yields a very pleasant soft green.

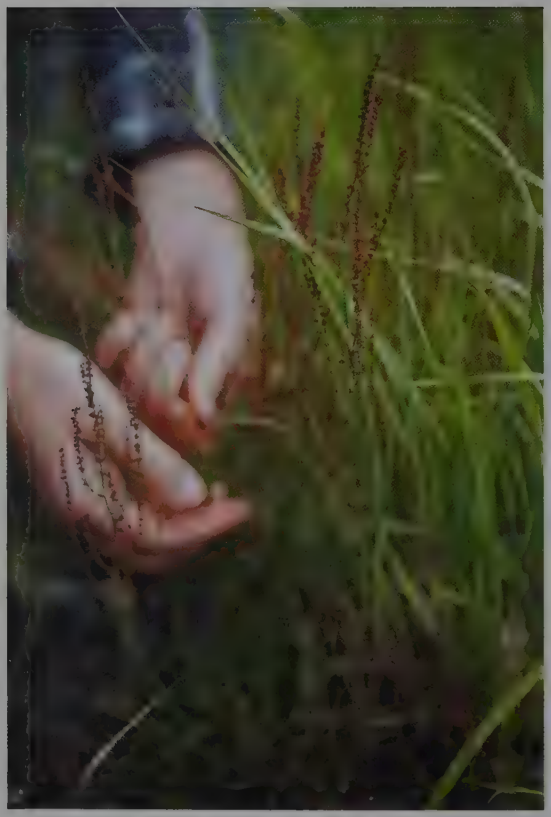
Where and how you harvest will be as unique a process as the region where you live. The challenges and opportunities will forge a story as memorable as the colors you create. While traveling and researching the dye plants of North America, I was given the opportunity to travel to the gathering grounds of three experienced natural dyers. Seeing how and where they harvested illuminated for me a thought process that has all but vanished from most modern minds. Their mental maps of the ecosystem were founded on dye plants: they knew which turn in the road would lead to the stand of staghorn sumac, and how many miles on the two-lane highway had to be crossed before pulling off for a patch of wild carrot (also known as desert rhubarb). It was mesmerizing to observe them calculate, consider, and think out loud as we approached their chosen plant species. In my travels east to the Ozark foothills, I met with expert natural dyer and weaver Carol Leigh, of Hill Creek Fiber Studio. During her dye class we traveled to her favorite empty lots, roadsides, and a conservation district that had granted her permission to harvest. In my travels north, to the Medicine Bow National Forest, I met with natural dye and fiber expert Carol Lee, of Sheep Shed Studio. We spent the morning navigating the fire roads of Medicine Bow, collecting bark from dead lodgepole pines and falling aspen leaves. Heading south to the New Mexico–Arizona border, I met with Navajo master dyer and weaver Rose Dedman, and together we harvested within the borders of the reservation. The Bureau of Land Management (BLM) technically manages these lands; however, because the Navajo operate as a sovereign nation, harvesting is permitted. Each woman I met with had found her special, secret spots; in one instance we drove for an hour down two-lane highways in search of the "dyer's landmarks."

All three of these women had well-established relationships with the places they returned to year after year. To ensure that the plant matter would regenerate before their next visit, they had taken great care in how they harvested and how much they harvested. Each of the dyers utilized a rule of thumb

of approximately 10 to 20 percent taking, leaving 80 to 90 percent of whatever they were harvesting behind. Also key to the viability of this 10 to 20 percent taking rule is that there are no repeat harvests within the same season.

When you begin this process of growing, cultivating, and harvesting color for yourself, you'll likely experience a feeling of great satisfaction when you find the perfect spot in your garden for the domesticated hollyhock or Japanese indigo. As you wander outside of your garden, the path you walk as a gatherer must be imbued with an ethic of conscientiousness and an eye for improving the health and biodiversity of the land. Studying your landscape, finding out which species are known to be invasive and which require protection, is a good first step. You can search the USDA Plants Database for information on a plant's status once you have its common or scientific name. If there is a native plant that you simply love working with, it is likely you'll begin propagating it yourself and planting it everywhere you can. My method of cultivation includes a Johnny Appleseed–like exuberance for sharing the native sagebrush, toyon, and sticky monkey flower species of my region; I plant them in every garden that I design. The vibrant sun yellows and rustic oranges that come from these plants' sweet-smelling dye vats have captivated my senses on so many occasions that I am forever an advocate and distributor of their seed.

To fully document the ecological benefit of the cultivation and harvest of natural dye species, areas will have to be set aside for study. Within most regions of the country there are untended and damaged tracts of land that would directly benefit from the stewardship practices of natural dyers. Sustained interaction with these landscapes would eventually allow the dye harvester to function as elegantly and beneficially within the landscape as any other insect, animal, or element. Given time and practice, protocols could be developed that ensure measurable outcomes for the enhancement of biodiversity. Until harvesting techniques can be proven as beneficial tools for resource management, it is unlikely that public land agencies will have the impetus to include harvesting regimes as a part of their vegetation management strategies. Until this cross-pollination of knowledge occurs, the harvesting process is most easily done in one's garden, in coordination with the private landowners in your region. However, I admonish the dyer to make requests for harvesting permits for use of public lands. Through the process of asking and engaging with these agencies, the role of humans within the landscape will become a subject of study and potential reevaluation.



beneficial disturbance—gathering in context

Most members of modern civilization have a mental construct of wilderness as a place where only animals and plants permanently reside. Somehow we—the human animal—have removed ourselves so completely from the land that we no longer recognize ourselves as part and partner in its processes.

Many of the wilderness areas we cherish and protect in North America were once regions densely inhabited and managed by native communities. People are known to have lived in my region of Northern California for eleven thousand to thirteen thousand years prior to the arrival of the first European colonists. The techniques and strategies that the native populations developed to feed, clothe, heal, and house their communities were far more complex than the stereotypical models provided by the concept of the hunter-gatherer.

Through a long process of observation and experimentation, Native Americans honed tools and seasonal tending processes that both mimicked and enhanced the effects of naturally occurring phenomena such as fire, wind, and herbivorous animal life. Their material culture so closely depended upon and adhered to natural cycles that many of the first North American settlers considered the landscape both "wild" and "parklike." For many visitors it was hard to imagine that these lands were often the product of thousands of years of tending.

In the journal entries from some of the first visitors to my region, the commentary regarding the beauty of the landscape both highlights the biological diversity and gives some clues as to its management. Horticulturalist Carl Purdy wrote this description on a stagecoach ride through the coastal hillsides in 1870: "The trip was through lovely country, at its loveliest in mid-May. Brush fires had kept the hillsides open, cultivation did not cover much of the land, and we passed through a long succession of wild flower gardens. There were masses of a single flower covering acres, or even at times, hundreds of acres."

My first Wintu weaving teacher confirmed this archival record in a lecture she gave on grasslands. She drew and shaded the squares of a checkerboard to illuminate the historical landscape of her tribe. These squares represented a shifting mosaic of patches, each one filled with a particular wildflower species. The shaded and unshaded regions were alternately burned and harvested, in a two- to five-year rotating cycle. This strategy likely created what Purdy observed as "a long succession of wild flower gardens . . . masses of a single flower covering acres."

The native populations utilized techniques closely in tune with natural disturbances for the purpose of cultivating the materials necessary for their basketry, food, medicine, dyes, tools, and to some extent their clothing, without the need for a plow or mechanized machinery. Judging from the beauty of the landscape at the time of European contact, it is fair to say that the accumulation of these selective disturbances over time had beneficial effects. People obtained the natural resources needed for their survival, while simultaneously ensuring the survival of a multitude of animal and plant life.

Biodiversity and watershed educator Brock Dolman and other ethnobiologists call these processes "beneficial disturbances." This term is one that describes the effect I aspire to create as I carry out my harvesting regimes. I am inspired by the techniques and practices of the Native Americans, yet I am well aware that the strategies I have developed and continue to explore are, and must be, attuned to a modern context. For example, I cannot employ the use of fire, but I can do my best to mimic its effects through the coppicing of shrubby chaparral species, and mulching with plant material. I am constantly seeking that fine balance, where my harvesting will mildly and temporarily disrupt the ecosystem, just enough to lead to its enhanced future.

2

materials and tools of the trade

Creating lasting color upon your fibers, yarns, and fabrics requires the use of some noteworthy tools and substances, all of which are outlined in the following pages. The essential substances responsible for lasting color are known as mordants—details of these various binding agents are outlined here. Investing in and/or upcycling an assortment of tools, such as bamboo stirring rods, old cooking pots, and kitchen bowls will be an ongoing process. I find myself constantly scouring neighborhood garage sales for old kitchen items that

Dyer Carol Lee has set up an outdoor wood-fire arrangement to heat her assortment of dye vats.

I can incorporate into my dyer's tool kit. The accoutrements of the natural dyer are easily found—and/or purchased—and, in the case of tools, will last a lifetime. With a few new pieces of hardware, a designated workspace, and a working knowledge of mordants, you'll have all you need to begin your natural dye process.

workspace

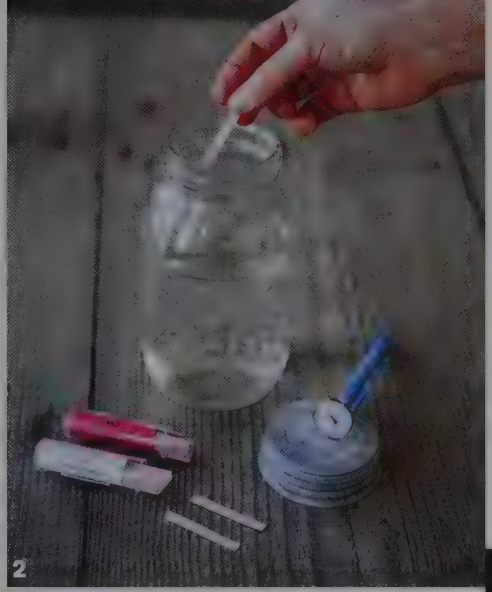
Creating a good workspace for your natural dye making is defined by a combination of what is available to you, and putting into practice a few important guidelines. Natural dye work is best done in an area you can ventilate well—this includes the ability to open windows, or turn on an overhead fan if you're indoors. It is best to have the option to take your dye work outside, or make use of an indoor-outdoor cooking space. Due to the long boiling times, the dye pots produce much steam and aroma; so it is important to be able to clear the air when needed. I use hot plates in my garage in the winter during inclement weather, and use small wood-fire rocket stoves outdoors when the weather allows.

Make sure all the pots, stirring rods, measuring equipment, and bowls used are set aside for natural dye work only. This is a guideline that is easy to follow, especially once you have a few dye recipes under your belt, and all of your equipment becomes stained with the plants' lovely pigments—there will be no confusion as to the purpose of your tools. None of these recipes is designed for medicinal or food-grade consumption, and therefore it is of the utmost importance to keep food, medicine, and dye preparation separate.

dye vats

The size of your dye vat is determined by how much material you are dyeing and how uniform you'd like your colors to be. Skeins and fabric should be able to move freely about the dye pot unless you prefer the striations and patterns created by uneven distribution of color, which can lend a rustic, handcrafted quality. A three- to five-gallon pot is a good place to start. I use five- and six-gallon pots for all of my dye work, as they are still light enough for me to lift when they are full of water and plant matter. Enamel pots tend to be the most affordable if you are purchasing new; stainless steel is more expensive, but a well-made and insulated pot will save you time due to its heat efficiency. Look to flea markets and estate sales for good used treasures. My copper pots were found at a barn sale; made at the turn of the twentieth century, their quality is evident in the hand-hammered handles and thick walls.

1



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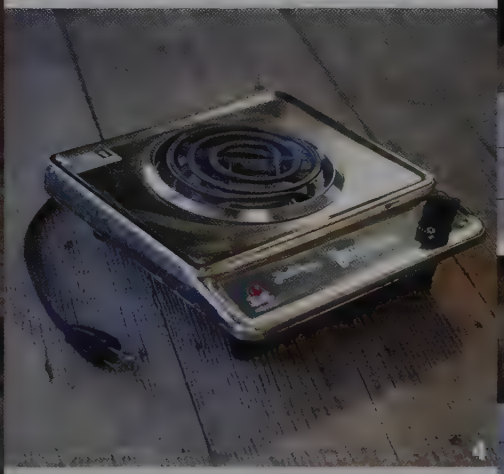

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7

tools for getting started

These are the basic tools of the trade and will function as the foundation for your dye work.

1. **Scale, measuring teaspoons, and alum**
2. **Water sample, litmus paper to test pH**
3. **Copper pots and stirring rods**
4. **Hot plate for cooking indoors or outdoors**
5. **Stainless steel pots for dye work and bowls for afterbaths**
6. **Enamel pot and slotted spoons**
7. **Gathering baskets and clippers**

leaching

When cooking a fine meal, the chef does not often think about how his or her sauté pan will or won't flavor the sauce. However, in natural dye work the way in which the metal of a pot leaches into the dye solution and bonds with the fibers will have a direct effect on the final color outcome.

Given the vast array of plant recipes and their potential to combine with a variety of metals, the color permutations could take a lifetime to explore, and learning to manipulate leaching can become an integral part of the color creation process. Copper pots, for example, tend to green, or patina, dye colors; some recipes in this book were deliberately made in copper vessels to add green tones on what might have otherwise been a yellow dye, as in the case of white sage and coffeeberry. Iron vessels tend to dull or darken the dye; tin has a tendency to brighten dye colors, and brass and aluminum have varied modifying tendencies that depend on the specific reaction they create with a plant's chemical makeup. Stainless steel and enamel tend to preserve the natural purity of the dye color, and for that reason, most of the recipes in this book call for their use.

utensils

cooking vessels

The purest colors come from dye recipes processed in stainless steel or enamel cookware. Many dyers (including me, from time to time) consciously utilize copper, iron, and brass vessels for the purpose of creating unique color effects. I do on occasion use glass Mason jars for some test swatches of yarn and fiber. I add potentially useful dye matter—such as flowers or roots—to the jar and pour boiling water over the plant material to test whether there is a change in the water color. In many cases, a color shift indicates whether the plant will be of use as a dye and worth collecting in greater quantity for my larger cooking pots. While these jars can withstand boiling water being poured into them, they cannot be directly placed upon a heat source. For these reasons, I rely upon five- to six-gallon stainless steel and enamel pots for my small-batch dye work. The recipes in this book—whether conducted by Rose, Carol Leigh, Carol Lee, or me—were, for the most part, carried out in vessels of this size and material.

hot plates

The use of hot plates is ultimately for the sake of convenience, as they allow the natural dyer to be mobile and create a "dye-studio" in a multitude of locations—including fire escapes, bathrooms, and garages. Due to the long cooking times required by many of the natural dye recipes, it is useful, particularly in the summer, to have the dye pots cooking outside. In your search for a good hot plate, you'll likely have greater success using one with a sturdy metal foundation; this will allow your pots to balance with ease, without any concern about tipping. Double-burner hot plates generally have the coils placed too close together to heat two five- or six-gallon dye pots, and for this reason I stick to the use of single-burner hot plates.

scales

I found my scale at a garage sale years ago. Weight is measured to the quarter ounce—and this level of precision works well for small-batch dyeing. If you would like the exact gram weight, you will want to use a digital scale. When you begin to work with natural dyes, and perhaps are working with very small batches, you may find a more precise, to-the-gram unit of measure most useful.

slotted spoons

The slotted spoon is a very handy tool for extracting hard-to-find fibers, yarns, and fabrics that seem to disappear in the dye vat. Slotted spoons were found at every turn of Carol Lee's

dye studio. It is useful to have more than one, primarily for the reason that they often get put down in rather random locations during the natural excitement elicited while admiring the amazing hues that emerge from the dye pot. Slotted spoons can be found in the housewares section of hardware, grocery, and kitchen-supply stores.

stirring rods

My favorite and least expensive stirring rod is a bamboo stick. Due to its smooth outer surface, it makes a perfect tool for extracting delicate and easily tangled yarns. I like to have many stirring rods available when I am working in the dye studio, with a special set put aside for use in the dark blue indigo vat. These blue-stained sticks are used exclusively for my fermentation vat, as they would stain the yellow, orange, and green fibers being extracted from my lighter-colored dye pots. Bamboo sticks can found at plant nurseries, as they are commonly used for staking vines.

thermometers

Candy thermometers, often found at hardware or kitchen-supply stores are very useful for beginning natural dye processes. As you develop experience with the vats, it is likely you'll be able to improvise, and will no longer employ the use of your thermometer; however, I still put mine to use when I'm in the midst of the one-day Japanese indigo recipe—where temperature does need to be quite exact for good color outcomes. These thermometers can be hooked to the edge of the pot and will remain there without the need to hold them in place—a very useful feature when working with hot temperatures.

modifiers

Some dyers throw rusty nails or a bit of red clay into a dye pot to enrich their dye color with the effects of iron. Modifiers can change the tone, shade, or brightness of a dye color, and can be used to create color variation in or out of the dye vat. The metals that leach from the dye pots, as well as solutions made of acetic acid or wood ash, are all examples of substances that modify color. In the case of leaching metals, it's impossible, without conducting a lab analysis, to know the concentration of the metal within your dye solution; and because it cannot be easily measured, I do not use leaching as a means to mordant my fibers, but simply as a way to modify the dye colors.

acids

Vinegar (primarily acetic acid) or citric acid can be added to your dye process in the form of an afterbath, to create strength and variation in your dyes. Warm-spectrum colors such as yellow, orange, and red can be enhanced with a vinegar afterbath. Vinegar is the preferred modifier for increasing the permanence of pokeberry's beautiful magenta dye. Cochineal reds are very sensitive to pH, and can be turned into brighter crimson hues with a vinegar dip (see photograph, page 133). Utilizing vinegar as the sole mordant in the dye process can create lovely colors—yet very few of these colors will be permanent, as most fade over time upon exposure to light and repeated washings. For more permanent results I recommend vinegar in combination with other mordants.

water

It is important to recognize that water can function as a modifier, depending on its chemical makeup. Most water, whether municipal or direct from underground sources, will have its own unique blend of minerals and a specific pH balance. When using creek water from Medicine Bow, Wyoming, trace amounts of copper in the water source had a tendency to patina the dye baths. In Missouri the municipal water had a relatively neutral pH, creating little change to the dye vats. The tap water in Northern California also tends to be relatively neutral—creating a good foundation for clear and true dye results. Hard water can

interfere with dye uptake, creating varied and sometimes "muddy" results.

Rainwater collection is highly recommended for dye work because it is untreated and hasn't been sitting in the ground—thus it has little potential for being mineral-laden or having too high or low a pH. In most cases, using municipal water will be the simplest way to create dyes. If you have questions regarding the mineral content, you can contact your water supplier or perform your own pH tests to decipher alkalinity and acidity.

mordants

When I teach natural dyeing to children, the question "What does a mordant do?" always arises. This simple analogy has been my consistent response: The mordant is a translator that speaks both the language of the fiber and the language of the dye. It functions as a chemical bridge, binding to both the dye and the fabric more effectively than either can bind to the other.

Mordants were likely discovered during a fortuitous accident at some point in the dawn of history, when body and cave painting emerged as a part of human cultural activity. Mixing iron-rich soil with crushed berries would have proven to produce longer-lasting marks on the body and cave walls than if either substance had been used independently.

Most mordants are metals whose atoms attach to yarns and fabric through a process of dissolving them into water, applying heat, and "cooking" the fibers. There are also many nonmetallic substances that contain bonding constituents such as tannin and oxalic acid. Urine, blood, manure, soymilk, rhubarb leaves, and persimmons are examples of traditional nonmetallic mordants that contain high levels of these naturally occurring binders. The substances listed below are those for which I have been able to provide well-tested recipes. There are countless historical mordant processes that are the product of thousands of years of collective experimentation in civilizations across the globe, each culture arriving at its unique set of recipes based on local biology and the abundance of particular substances.

It's tempting to assume that using more mordant will yield darker colors, but this is not the case. In fact, high doses can harm the fibers of the fabric and you will greatly shorten the useful lifespan of your garment—or outright ruin it—without any change in the color. It's therefore important to pay close attention to the concentration, time, and temperature prescribed for each recipe, as these are the principle variables that control any chemical reaction.

All of the metallic mordants—including the more hazardous ones, such as copper, tin, and chrome—are naturally occurring substances. However, even in relatively small concentrations, these metals become toxic to humans. Recipes for tin-, chrome-, and copper-powdered mordants are not included in this book because as more and more people begin to use natural dyes, widespread discarding of these metallic waters into the soil could quickly lead to unhealthy concentrations. For everyone to use natural dyes in a safe way, it is in our collective best interest to use substances for which we can take full responsibility and

METALLIC MORDANTS AND THE ENVIRONMENT

The topic of mordants and their toxicity has been discussed by many natural dyers, and divergent opinions abound. What I have come to understand is that toxicity is a relative term and must be considered in the context of concentration. At very high concentrations, even common food additives can prove toxic. At the other end of the spectrum, even minute concentrations (for example, parts per billion) of certain metals are harmful, so there is no quantity of them that can be considered safe. Therefore, the toxicity of a mordant is only meaningful in the context of its concentration, which directly determines its environmental impact. By using the appropriate concentration of mordant, and in the correct ratio to the weight of the fabric to be dyed, I can minimize the risk of using a mordant that will leave residual metals in the dye effluent.

With the counsel and guidance of a chemist, I conducted several experiments to better understand the concentration of aluminum and iron that is absorbed by the fibers in my mordant baths, and what percentage of the metals are left behind. I also sampled water from dye vats that had been cooked in copper pots.

MORDANT MATH

A standard dye bath using alum as the mordant is prepared with .5 ounces of alum to 6 gallons of water, theoretically yielding a preparation of 0.065% alum, or 650 ppm (parts per million). About 10 percent of alum is aluminum and analysis by a local chemistry lab confirmed about 0.0055% aluminum was present in solution (dissolved) in the bath, equivalent to 55 ppm. Further lab tests revealed that approximately half of the mordant transfers to the fiber with each typical use of a dye bath and 5 ounces of fiber—specifically, fibers absorbed approximately 40 percent of the iron in the solution, 20 to 50 percent of the aluminum, and 65 percent of the copper—leaving a substantial percentage of the metals in the bath.

By saving and reusing the dye bath, however, one can minimize the metal mordant that remains as hazardous waste in the leftover dye water. If I reuse my alum dye bath three times, the aluminum remaining in the wastewater will be less than 8 ppm, and therefore of less concern with respect to its environmental toxicity. Note, however, that amphibious animals such as frogs and salamanders are the most sensitive organisms (routinely 100 times more sensitive than other aquatic species) because they can absorb substances directly through their skin and into their bloodstream. By thoroughly diluting any remaining wastewater before it is discarded in one's garden or down the drain, we can help to alleviate any possible environmental impacts. Better yet, by always saving your leftover mordant baths and reconstituting them with fresh water, you may never need to dispose of metal-laden wastewater (see How Metals Affect Wildlife on page 165 for more information).

that do not accumulate in soil and water in a manner detrimental to our health.

In a commitment to minimizing my footprint on the environment, I've resolved to use the least-toxic mordants wherever possible. Powdered alum, as well as a solution created from the leaching of rusty iron objects, provides a wide and satisfying variety of colors and hues. There remain years and perhaps lifetimes of research to fully explore all of the color possibilities provided by these mordants.

alum

Also known as potassium aluminum sulfate, alum is a mineral salt that was likely discovered during Roman times and later used in natural dye houses. There are naturally occurring deposits of alum, yet all alum sold for industrial use is made from the refinement of bauxite, an unprocessed form of aluminum ore. Alum is commonly used in municipal water treatment systems to remove heavy metals, as a coagulant of organic solids in wastewater treatment, and in small amounts for pickling and paper sizing, and as an ingredient in baking soda. Due to the relatively benign nature of alum and the accuracy of color it generates with plant pigments, it is the mordant I recommend for a majority of the recipes. Most alum sold for natural dyes is potassium aluminum sulfate, yet in some instances aluminum sulfate is labeled as alum. Be aware that aluminum sulfate can include trace minerals such as iron and will yield very different colors in the dye vat. Seek out pure potassium aluminum sulfate for your dye work to retrieve the clearest tones and shades from your dyes.

iron

Iron is often used as a premordant, as in several of the featured recipes, and in one case it is used as an afterbath. Iron can be purchased in crystallized form from natural dye suppliers.

Do-it-yourself dyers can obtain iron from rusty objects. I've found the concentration of the solution made from these scrap iron materials creates very satisfying results on my plant and animal fibers.

Iron has a tendency to degrade fibers over time—although it takes quite a long time. Tapestries from the Middle Ages show that yarns mordanted in iron have deteriorated faster than those mordanted in other substances. Then again, as dyer Carol Lee remarked, "I don't need my sweater to outlive the generations." If you are not planning to create an heirloom, iron is a perfectly useful mordant. Fibers left in an iron bath and then dipped and dyed in tannin baths will create lovely shades ranging from bluish to dark gray (see page 34).

wood and soda ash

Wood ash is used in traditional fermentation indigo recipes to alkalize the dye mixture. Wood ash solution can be used as a color modifier as well—alkaline afterbaths can change an elderberry-dyed fiber that is lavender in color to one that is more bluish and green in nature. Soda ash can be used in place of wood ash, and is commonly available at dye supply houses. In the Spring Dye Starter recipe (page 144), the use of either wood or soda ash is recommended to promote the lasting effects of the plant-pounding technique.

tannins

Tannins are phenolic compounds found in varying concentrations in numerous plant species. When we nibble on a persimmon or sip a young wine, the taste of tannin is most evident in the dry, sometimes bitter and puckery, flavor. There are naturally occurring tannins in many of the dye plant species described in this book—sage, wild carrot, black walnut, and staghorn sumac are several examples with high concentrations of the substance. Regenerative parts of the oak tree—such as galls and acorns—are common sources of the substance and can be harvested and extracted, and are particularly useful in the dyeing of cellulose fibers (see page 34 for recipe). Cold-water leaching of

Sequence of the process of securing your yarns for the dye vat.

blended acorns (see page 34) yields generous quantities of tannin, and the remaining acorn meat, once free of the bitter tannins, can be blended into a flour as a base for breads, cookies, or crackers. Acorn flour is rich in amino acids and has a slightly sweet and nutty flavor. If locally sourced tannins are not readily available, they can be purchased in powder form from dye supply houses.

fiber: protein v. cellulose

Protein fibers are from animal sources—silk, alpaca, angora, sheep's wool, yak, camel, llama, cashmere, and musk ox are examples. The recipes in this book will yield similar colors on all protein fibers. The Corriedale cross wool yarns pictured in the season chapters were originally white; by varying the color of the wool you choose to dye (using gray or light brown fibers) you can achieve innumerable color variations with these recipes. Each of the protein fibers absorbs dye color in its own unique way. Different breeds will take dye differently; merino yarns will come out of the dye vat with subtle differences in shade compared to Corriedale, Icelandic, or Lincoln wool yarns. The way a yarn is plied is another variable in determining how the dye will take.

If you intend to dye cellulose- or plant-based fibers such as cotton, linen, or hemp, the recipes will yield color, but in many cases the shade and depth of color will usually be lighter when applied to protein fibers. For those working with cellulose fibers, I suggest a mordant recipe that makes use of tannin as well as alum because this pretreatment will amplify and deepen your dye results (see page 34).

yarns and roving in the dye vat

Whether you are using machine- or handspun yarn you'll want to make sure that it is bundled into skeins before entering the dye pot. To avoid tangling, tie the ends of the skein around


wool
angora
cotton
alpaca
silk
hemp

WHY WOOL?

The most common animal fiber in the world is wool. It is a renewable, natural, warm, and durable resource that has been protecting human skin from the elements for millennia. It is the fiber that I can source within fifteen miles of my front door, and for that reason wool was the canvas of choice for all of the dye and knit projects in this book. The handspun skeins that are featured with every dye recipe are from a Corriedale cross sheep variety—a breed with a particularly strong fiber that is still soft enough to touch the skin. The look and feel of locally produced yarn is as stimulating to the eye and hand as a homegrown heirloom tomato is to the taste bud. Just as heirloom vegetables produce numerous varieties, there are hundreds of types of wool with varying length, strength, and softness of fiber. Each variety will absorb dye in its own unique way, creating a myriad of opportunities for the dyer to explore.

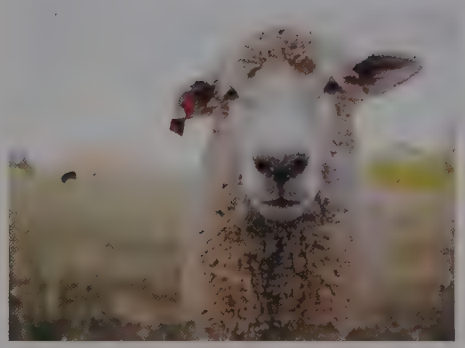
WOOL IN CONTEXT

For most of history, with the exception of the last 150 years, humans have worn natural fibers dyed in plant-based colors. The relationship between natural dyes and natural fibers has been intertwined throughout our collective textile past, with wool being the first—and to this day, the most prevalent—animal fiber used by humans.

About eight thousand years ago the relationship between humans and sheep transformed forever, and the once wild animal slowly became an integral and domesticated part of the human domain. Today, farmers and ranchers all over the planet are collectively raising one billion head of sheep; a majority of these farms are in China.

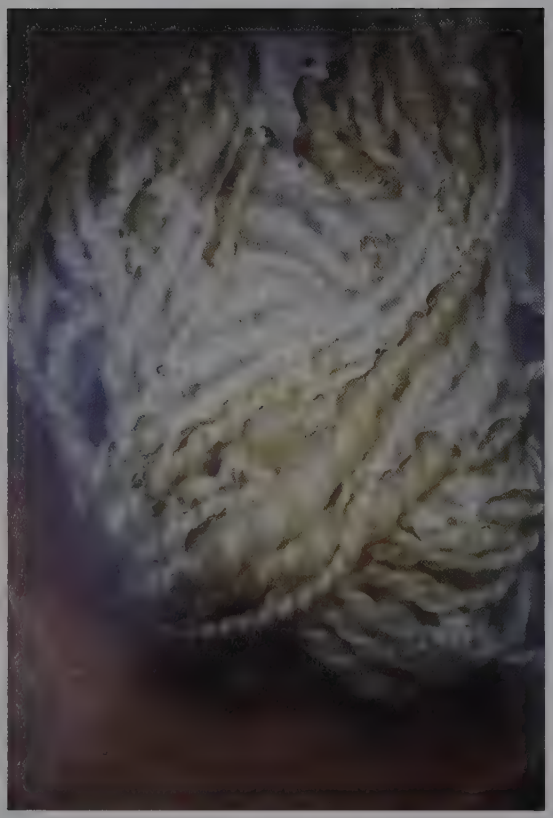
The United States has more than eighty-four thousand sheep farms, and approximately five million head of sheep, yet we remain a net importer of wool and sheep products. In Northern California, there is often more money to be made from meat sales and little incentive for the fleece to be carefully maintained for fiber production. The price and demand for domestic wool has not risen proportionally over the last four decades due in large part to the disappearance of the U.S. garment industry.

At the same time, there are small fiber producers across the country. Family farms, retirees, even a few suburban farmers have



taken interest in raising sheep, and their wool products can be found at farmers' markets and in numerous online marketplaces. Because of the direct connection between the farmer and the buyer, artisan-scale wool production has begun to carve out a niche marketplace in some regions. The Resource Guide (page 166) lists many of these small-scale wool and fiber producers.

I highly recommend sourcing the fiber that is nearest to your own community. It may or may not be sheep's wool, but regardless, your purchase will support a bourgeoning local rural economy, and your finished textile will reflect something deeply unique about where you live.



the entirety of the yarn bundle, and secure the skein in two to three more places with knots that are situated through the yarn in a figure eight. Skein winders, niddy-noddies, the back of a chair, a bent elbow and hand, or a large hardback book can be used to wind yarns.

Raw fibers and roving can be dyed using the same time frames and heat exposure as yarns—with extra attention paid to keeping the dye pot from boiling. When dyeing uncombed animal fibers, or roving, immerse them directly and very gently into the dye. The process of prewetting can be employed, but may cause unnecessary matting of the fibers due to agitation and differentiation in water temperature. Fibers and roving can easily become tangled and felt if stirred or prodded—even the bubbling of a boiling or very hot dye vat can easily agitate and felt roving.

prewetting your yarns

All yarns benefit from being prewetted before being immersed in the dye vat, but it is not essential. Prewetting is designed to saturate the fibers completely with water so that the dye will penetrate the material evenly. Wool fibers that will be used in knit projects will likely need to retain their softness—for this reason it is important not to expose them to extreme temperature changes (cold to hot and vice versa). I have found that gently immersing my handspun wool yarns in warm water before entering them into a steaming dye vat works well; the temperature change is not great enough to cause hardening, and the fibers readily absorb the warm water, preparing them well for even color uptake in the dye vat. Many rug weavers are fond of hardening their wool, as it makes for a tighter and tougher rug. Both tightly plied machine-spun wool and superwash wool yarns are able to endure greater temperature change without hardening.

If you are using plant-based yarns or fabric made from cellulose fibers, or materials made from silk, the variation in temperature between your soaking water and the dye vat will not alter the texture of your finished goods.

FIBERSHEDS

Mimi Luebberman and her sheep from Chileno Valley, California.

Fibersheds explore and define the landscapes that provide those externally nourishing materials that protect and cover our bodies. It is within the borders of these local regions that we can procure our fiber needs. Today these landscapes often consist of vast stretches of sheep-grazed land and acres of row crops covered with cotton plumes and flax blossoms. In the past, a fibershed moved through the landscape with the presence of the great herds, and was found in the gathering grounds where women sourced long plant fibers from roots, and grasses to weave their baskets, and clothing.

I have identified my fibershed as existing within 150 miles in all directions of my front door. Within this region I can source organic cotton, sheep's wool, angora, cashmere, alpaca, and llama—enough exquisite fiber for a couture wardrobe.

Identifying and locating the fiber producers that are nearest our homes and communities affords us the opportunity to connect with farmers and ranchers, and with a way of life very different from that within most suburban and urban landscapes.

If we were to open our closets and read the tags of our favorite items of clothing, we would find that in most cases less than 5 percent of our clothing is produced in the United States. This great shift away from local production has left many citizens unaware of the requirements for creating an item of clothing. Our minds do not often make the connection between the cloth we wear and the human labor or ecological system responsible for its existence. This global scale of production is not only impersonal; it has created an immense ecological footprint. Impacts include the mistreatment of countless domesticated fiber-producing animals, and the contamination and misuse of global water supplies—due to synthetic dye runoff, and pesticide contamination from fiber crop production. The exploitation of humans to fabricate massive quantities of clothing has placed many into forced labor. The textile industry has mined and extracted human, animal, and earth resources in an exacting fashion to secure maximum profits.

And yet there are small, local organic farmers and ranchers producing precious and completely unique fibers for artisan-scale clothing producers and consumers. Their animals are often named and managed with care. Their cotton fields use minimal water, and are raised without pesticides and herbicides. It is not hard to fall in love with a locally raised merino wool fleece, or a cloud-like bundle of angora. Regionally produced fibers carry site-specific textures and luster that will illuminate the beauty of your homeland in a way that no other material can. When we choose to support small local fiber producers who use the best possible practices of organic farming and animal husbandry, we are investing directly in a way of life that promotes diverse, healthy, and complex human, plant, and animal relationships.

3

master dye recipes

The following recipes are the foundation for creating the beautiful natural colors seen throughout this book. You'll likely refer to these pages often for instructions on how to prepare your fibers for the dye pot. Once the groundwork has been laid and your materials are ready for the dye vats, you'll find yourself flipping to the page that holds your plant recipe of choice. Some of the recipes in Part Two refer back to this chapter; they make use of the Master Dye Bath Recipe, a standard tool you'll be able to use with many plants in this book.

FROM LEFT: **Wool roving, handspun wool yarn, and machine-spun wool yarn.**

PREPARING THE FIBER

When purchasing yarns from a yarn shop, I generally prewash the skeins. Yarns coming from unknown sources can be treated with softeners or finishing agents—these substances can have color-altering properties. So, if you decide not to wash your yarns, your dye results may vary. When using yarns or roving from the farms in my area, I generally forgo the step of washing because I'm familiar with how the fibers were prepared before I purchased them. If washing a raw fleece, a rather in-depth cleaning process is required, depending on the quantity of grease and plant matter residing in the wool.

prewashing yarns

A stainless steel or enamel vessel is best.

Enough water to completely submerge your wool with plenty of extra to account for evaporation

pH-neutral soap (1 tbsp. for each ½ lb. of wool)

Heat the water until it reaches a temperature of 140 to 180°F. Add the soap and stir to distribute throughout the pot. Gently place the wool yarns into the wash water without agitating or stirring. Delicately prod the yarns to help submerge them, and then allow them to sit in the water for approximately 1 hour. Rinse the yarns in similar temperature water to release the residual soap, and then hang dry, or place them immediately into a similar temperature mordant bath.

prewashing raw fleece

This recipe makes use of a top-loading washing machine. This streamlines the process of washing and spinning the water out of your yarns. If you don't have access to a top loader, see the basin procedure at right.

pH-neutral soap (1 tbsp. for each ½ lb. of wool)

1. Remove debris and plant remnants from your fleece.
2. Fill the washing machine with warm water (140–180°F). Add the soap.
3. Place fleece gently in the water and submerge it. Let wool sit for 1 hour (adding hot water as necessary to keep the temperature within the 140 to 160°F range). Make sure to turn your machine off, to ensure no agitation occurs.
4. Move the washer dial to the spin setting to drain water from the machine and the wool.
5. Repeat this process until the lanolin and dirt have been removed. On your final cycle, fill the machine with water only, to rinse any remaining soap (making sure that as the water pours into the machine, it is not directly penetrating the fleece).

basin cleaning technique

If you don't have a top-loading washing machine, you can use a washbasin, plastic bucket, or any large container to wash your wool.

1. Fill your basin with hot water (160–180°F) and add the soap.
2. Gently submerge the fibers and let them sit for 20 to 30 minutes. Remove them and refill the basin.
3. Repeat the process until the water in the basin remains clear, even after the fibers are reinserted. Use an old door or window screen propped up above the ground and rest fibers upon it to drain and dry them. Avoid squeezing or overhandling the fibers.

Prewetted Churro yarns prepared for the mordant bath.

PREPARING THE MORDANT

Mordanting your fibers before they enter the dye vat is also known as premordanting—this process can be done immediately before dyeing the yarns, or mordanted fibers can be left to sit for an indefinite period of time before they enter the dye vat. I find the best color results occur from letting the fibers sit for a week after coming out of the mordant bath before being dyed.

mordant recipe for protein fibers

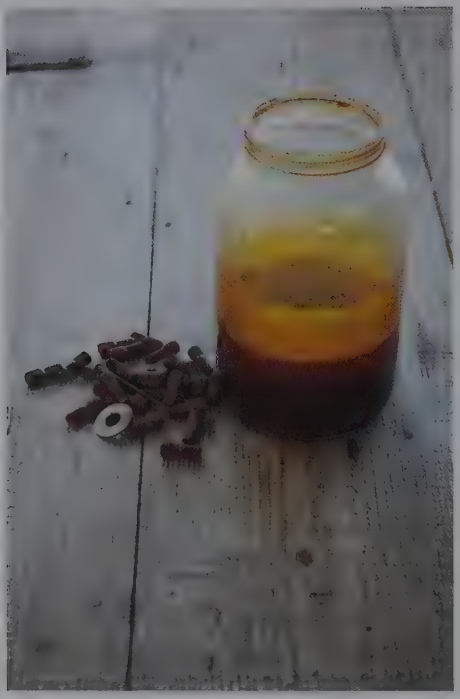
This mordant recipe is useful for incorporating both powdered alum and iron. Most recipes in this book call for alum. However, several recipes, including fennel, sheep sorrel, and French broom, recommend using iron to prepare your fibers before dyeing, because it has a tendency to create deep green colors from dye baths that might otherwise yield yellow. Powdered iron or ferrous sulfate can be purchased from dye supply stores. Another option for iron is to make a solution from rusty objects (see below).

1. Weigh the material to be dyed. Measure out your mordant by calculating 10 percent of the material weight (for instance, to dye 10 ounces of raw wool, you'll need 1 ounce of mordant).
2. Fill a stainless steel or enamel vessel with water and place over high heat. Bring to a boil. Add powdered mordant and dissolve thoroughly.
3. Reduce heat to a simmer. Add your fiber to the mordant bath and leave it in for 1 hour. Use a thermometer to monitor the water temperature—it should be within a range of 185 to 200°F.
4. Remove fiber and rinse prior to hanging to dry (see Note). In the case of wool, make sure the temperature of the rinse water is similar to the temperature of the fiber to avoid felting. The final rinsing stage removes any extra mordant that didn't bond to the fiber. Unbonded mordant can release and bond to the pigment within the dye vat—leaving less dye available for the fibers.

note: Keep in mind that fibers will absorb perhaps 50 percent of the mordant, so when rinsing the fiber, be sure to capture the wastewater and add it back into your mordant bath for reuse.

rusty-object solution

A rusty object presents a very simple way to create your own iron mordant solution at home. Although you won't know the exact ratio of iron to the weight of your fiber, with some experimentation you'll be able to create a solution that works well. Using small objects such as old nails or screws that will easily fit into your vessel is important. I use a tall one-gallon glass jar with a lid to make my solution, but any glass, ceramic, or enamel lidded vessel that can hold at least a gallon of water will work.



1 gallon container with a lid
Water
White vinegar
2 handfuls of rusty objects

Fill your container halfway to three-quarters full with water. Put 1 tbsp. of vinegar into the jar for every 1 c. of water, and add the rusty objects. Leave the mixture for a period of time so that the iron can go into solution. This will be a process you can observe by occasionally stirring your solution to see if the water has turned orange. During the summer months, the process will take from several days to a week; in the winter, due to the colder air temperature, the process will take several weeks. Once your water has turned a deep orange color, it can be poured into a bigger pot or dye vessel. Add extra fresh water to the vat, so that your fibers will be able to move about freely. Heat the iron water to 180 to 200°F. Add your fibers to the water and let sit on the heat for 60 to 90 minutes. Rinse in warm water, and then hang to dry.

vinegar mordant

Most dyes will not hold color over time with a vinegar mordant; the exception to that rule is pokeberry, which requires a vinegar mordant. Carol Leigh of Columbia, Missouri, discovered this unique relationship between vinegar and pokeberry. The result is an extremely beautiful color, one of the best produced with a native North American species.

1. Fill a stainless steel or enamel pot with water. Add ½ cup of white vinegar for every 4 ounces of fiber.
2. Gently heat your pot over medium heat (160–180°F) for 60 to 90 minutes.
3. Remove the fiber and place it immediately into your pokeberry dye vat (see page 91).

In the top row (from left to right) are French broom, toyon, and fennel. The first row of yarns were all premordanted in alum and then dyed in each of the dye plants. The second row of yarns were dyed in copper pots with each of the three dye plants. The bottom row of yarns were premordanted in iron and then dyed using these same species.

tannin solution

If you live among oak trees, it's easy to make your own tannin solution—the base ingredient is acorns, and they're plentiful in the early fall.

Tannins can also be purchased in powdered form. To make a solution, dissolve 1 tbsp. for every ½ gal. of water.

1. Collect about 1 lb. of acorns. Shell them by pounding and cracking their exterior with a rock. Once the shell has been cracked, you can generally peel it off.
2. Place your peeled acorns into a food processor and blend them into a fine meal. Place the acorn meal into a cloth bag and hang the bag over a large glass jar or a plastic bucket (I use a gallon jar). Using your faucet or a hose, turn the water on gently and let it drain through the cloth bag and into your container.
3. Squeeze the outside of the bag, and you should see a thick cloudy substance release into your container—these are tannins. The first five minutes tend to release the most potent tannins, so this is the solution to save for later use for the fall dye starter (page 86), and for mordanting cotton.
4. If you wish to make acorn flour, you'll want to release all the tannin from the acorn meal. The process of releasing the tannins can take many hours, so I recommend securing the bag to the faucet or hose and letting the water gently rinse the meal, and overflow from your bucket or jar for as long as it takes for the water to run clear.
5. To make your own acorn flour, spread the meal out to dry, and then blend it in a high-powered blender until it is a powdery consistency.

Tannin solution

mordant recipe for cellulose fibers

Preparing cotton, hemp, linen, or ramie for dyeing requires an extra step after the fabric is mordanted in alum. Cellulose- or plant-based fibers will typically dye lighter than protein fibers like wool will. A second mordanting, this time in tannin solution, will amplify and deepen your dye results.

1. Complete the Mordant Recipe for Protein Fibers (page 31), using the 10:1 fiber to alum ratio. You can either hang the fibers to dry overnight or continue immediately with the application of tannin.
2. In a large pot, dilute your tannin solution with water. Heat the solution on medium heat until it reaches between 180 and 200°F. Add the cellulose fibers and let sit on the heat for 1 hour.
3. Rinse well and hang to dry.

master dye bath recipe

This recipe is a classic—useful for many plants in this book, and many more that have not yet been discovered for use in the dye vat. I have found that woody perennial shrubs, barks, and roots yield stronger colors if repeatedly heated. The dyer can experiment with this recipe and use it as a framework for continued experimentation, both with new species and also by adjusting the recipe as feels appropriate to extract the best color. This recipe should be started in the evening and finished the following morning—resting the dye vat overnight is important for color extraction.

1. Fill your dye vat with water and the appropriate quantity of plant matter based on the recipe you are using.
2. Boil the plant matter from 60 to 90 minutes, based on what you see in the dye pot. By the end of the evening boiling period, the water should have begun to change color.
3. Let the bath sit overnight.
4. Reboil the dye pot for another 60 to 90 minutes; at this point, the dye should be fully extracted.
5. The plant matter can be fully or partially extracted at this point, to make room for your yarns or fabric. If you are dyeing unspun fibers, fully strain the dye pot of plant matter to avoid tangling.
6. Place fiber to be dyed—e.g., raw wool, roving, yarns, or fabric—into the dye vat and heat to a simmer (185–200°F) for 60 to 90 minutes. You can experiment with leaving material in overnight (with the heat off) to see if stronger colors can be obtained.
7. Remove fibers and let them cool to room temperature before rinsing them gently in warm water.
8. Hang to dry out of direct sunlight.

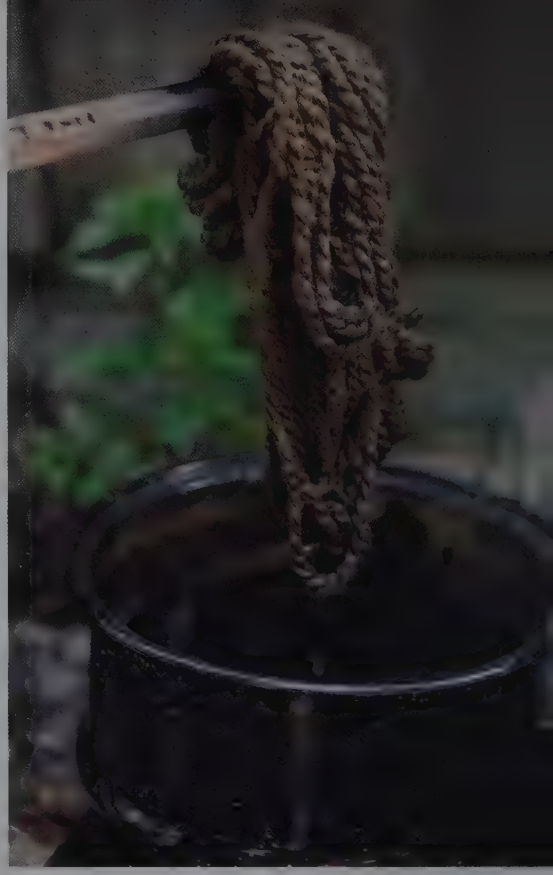
AFTERBATHS

Afterbaths are useful for expanding the range of color from one dye vat. Yarns can be immersed in afterbaths directly, or soon after they are removed from the dye pot. Preparing the baths is simple, and the results are immediate.

iron

Iron afterbaths are known to deepen or "dull" the dye color. In the case of staghorn sumac (see page 100), the color shifts altogether, from chestnut brown to a deep charcoal.

Choose a bowl or pot large enough for your fibers to move freely around the vat. Fill your vessel with the iron solution (add extra water if needed so the fibers can move about freely). Heat the solution until it's just beginning to steam a little (140–160°F). Add the dyed fibers and let sit in the afterbath for approximately 10 minutes. Remove and gently rinse your fibers in warm water after letting them cool for several minutes. Hang fibers to dry after rinsing.



Staghorn sumac being pulled out after ten minutes in an iron afterbath.

vinegar

A vinegar afterbath will brighten orange, yellow, and red dyes.

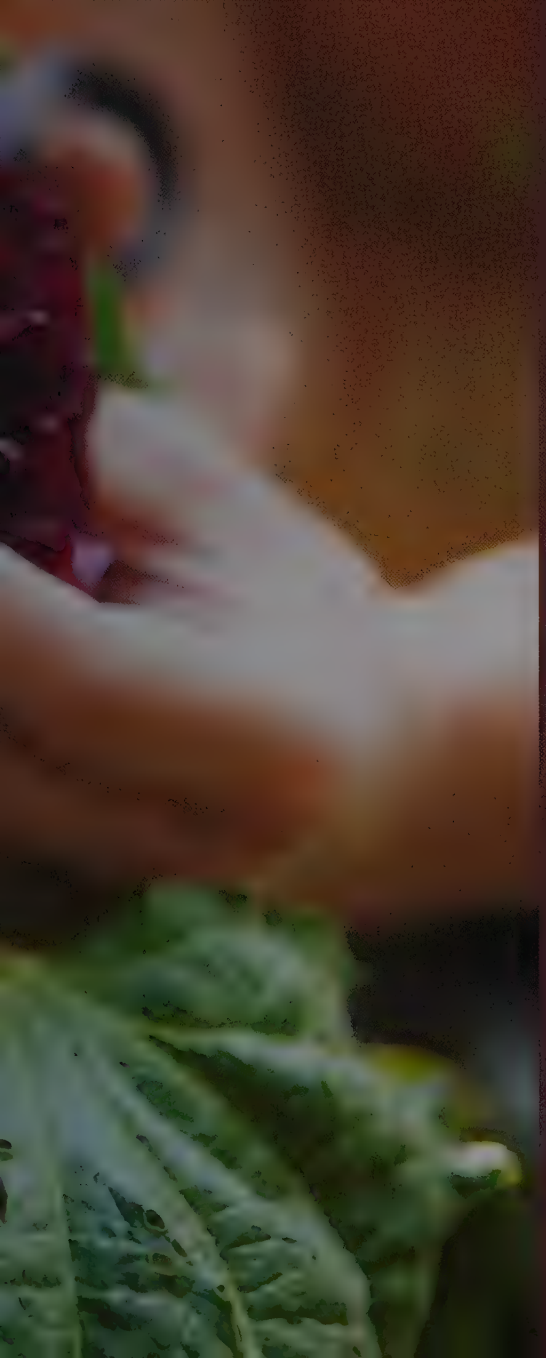
Fill a glass, stainless steel, or enamel vessel with enough hot tap water for your fibers to move freely. Add approximately ½ c. of vinegar for every 4 oz. of fiber you are dipping. As an alternative, you can begin with cold water and heat your vessel on the stove until it is hot to the touch. Add vinegar once the water is hot. Transfer fibers to your vinegar solution immediately after removing them from the dye vat. Stir gently and continuously in the solution for up to 10 minutes.

wood ash

Wood ash and soda ash can be used interchangeably to create an alkali afterbath. You can simply dissolve 1 tsp. of soda ash for every 4 oz. of fiber into your afterbath dye vessel. Taking wood ash from your fireplace or outdoor fire-pit is a way to make use of an available by-product that does not need to be synthetically produced, as is the case with soda ash.

1. To make the solution, put wood ash into a woven cloth (or fine cheesecloth) bag and hang the bag over a plastic bucket or other available vessel.
2. Fill your container with enough water so that the bag of wood ash is completely immersed. Squeeze the bag for 4 to 5 minutes, and then let it soak for several days, squeezing the wood ash bag twice a day.
3. This wood ash solution can be poured into your afterbath vessel and gently heated until it is hot to the touch. Once your fibers have been removed from the dye vat, they can be placed in the alkali afterbath for approximately 10 minutes.

Wood ash from your fireplace or wood-burning stove can be used in your afterbath solution.



PART TWO

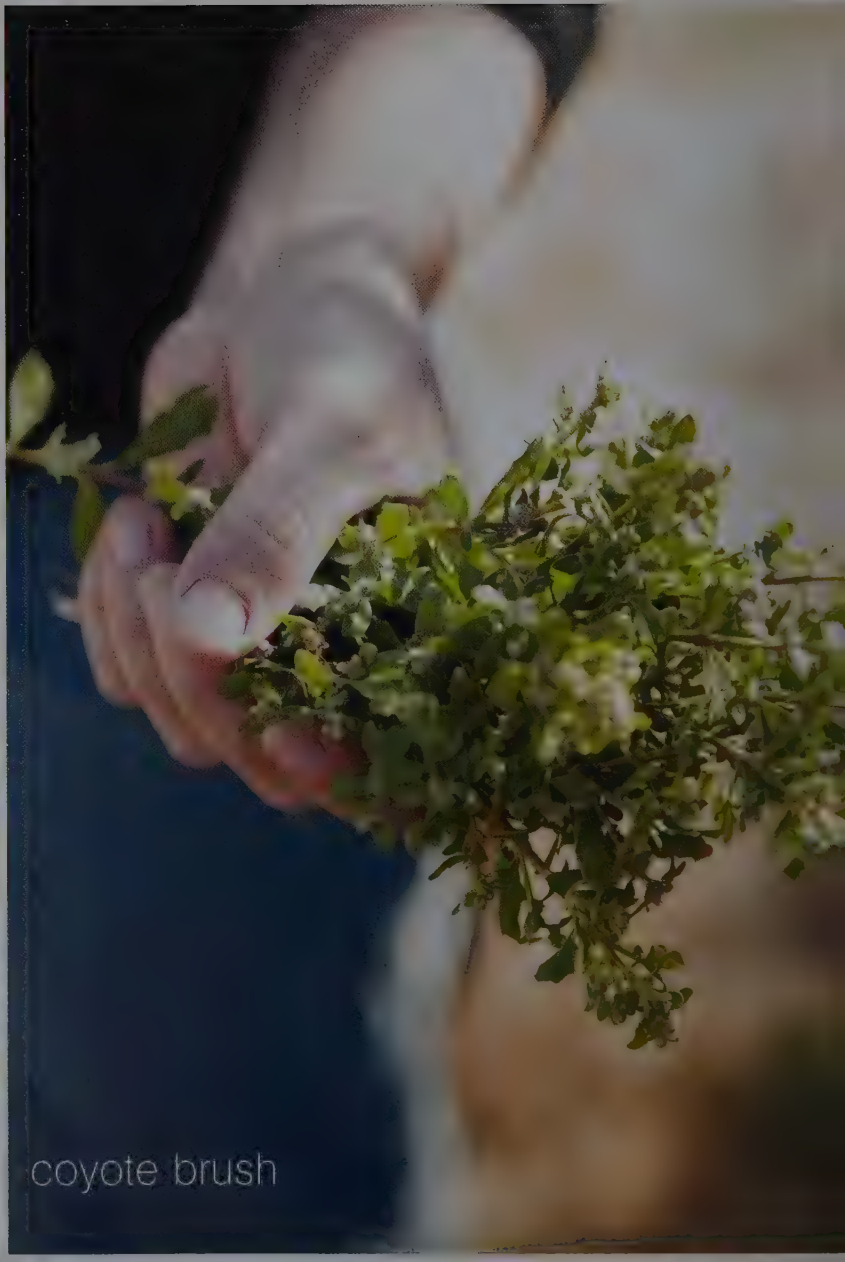
the seasons

4

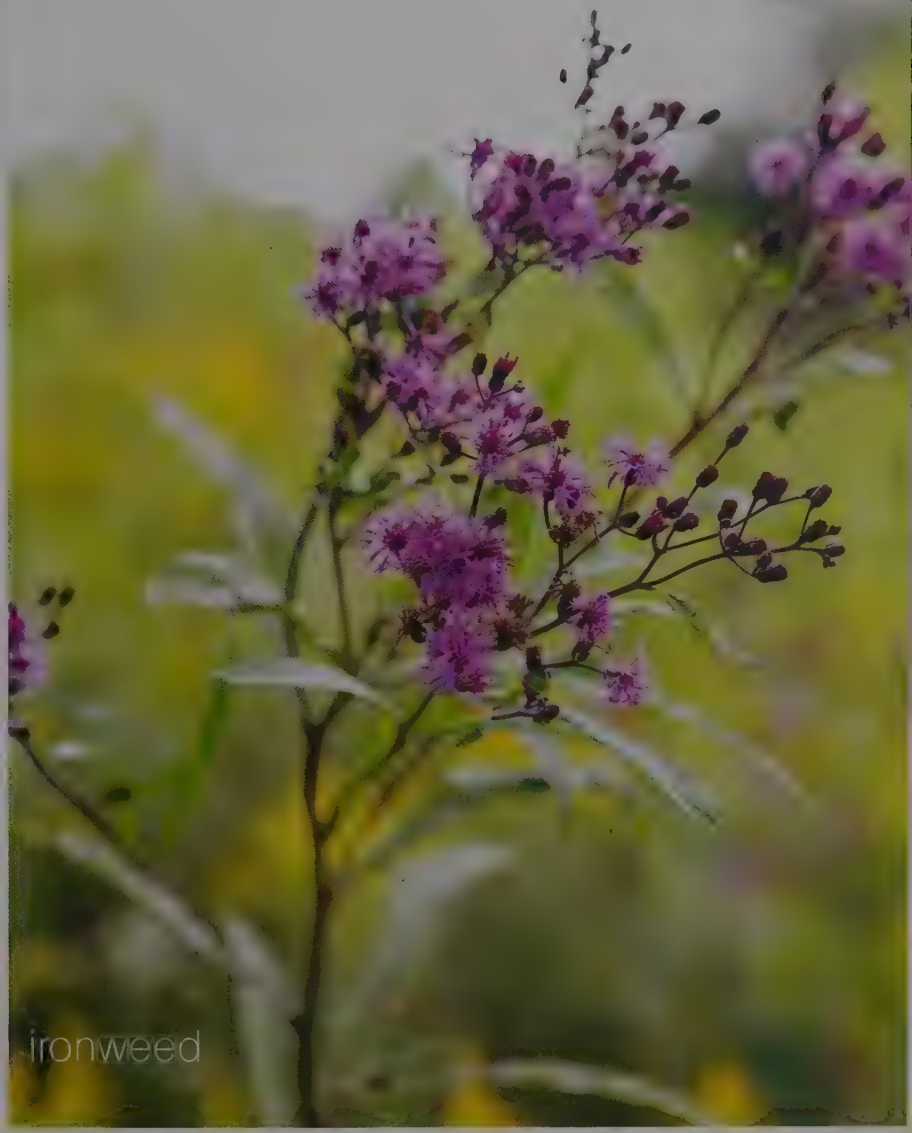
summer

As the warmth returns, the sun remains overhead for hours of the day, giving flowers the impetus to open, inviting us outside, and generating enough solar power to easily cook a natural dye vat.


zinnia


coyote brush


nap mat


ironweed

summer dye starter

This is a wonderful activity for children and parents to do together—a blend of art, science, and the garden. However, if you do not have a garden, bouquets of coreopsis can often be purchased at a farmers' market and enjoyed for several days in the home before being used for dye. Just before the foliage wilts, the flowers can be cut and placed in your dye jar.

I recommend the use of tickseed coreopsis because varieties of this plant are native to most regions of the United States, and while you may not find the variety that is endemic to your region, the commonly sold cultivar that you purchase at your local nursery will make a perfect dye. If you would like to plant a native variety, I recommend you seek out a seed purveyor in your area. Growing the local seed variety has its benefits—these plants thrive in the garden without the need for extensive attention.

recipe

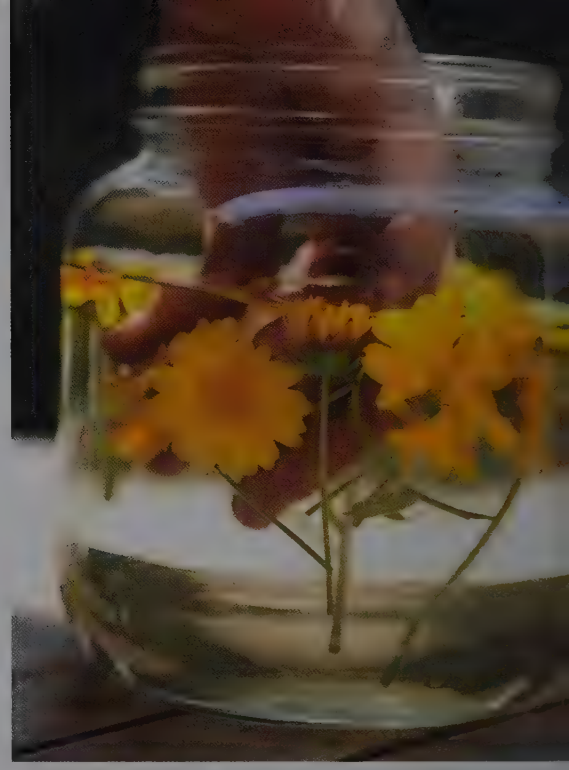
I use a solar oven for all coreopsis dye making; the process of using the sun's energy, and negating the carbon footprint produced with a traditional heat source, is a gratifying one. The solar dye-vat method can be used as a strategy to experiment with other species; flowers tend to yield the fastest results, compared with barks, twigs, and leaves. The sun-oven always cooks the flowers and fiber within one day; it is a reliable, simple, and efficient tool.

Ratio of 1:1, fresh flower weight to fiber weight
Fibers premordanted in alum

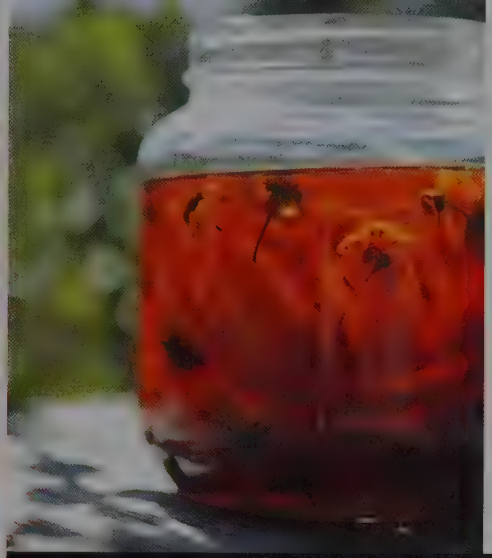
Start the dye making early, before 10:00 A.M., to ensure that the strongest sunlight of the day will be captured. Add flowers to a glass jar and cover them generously with hot tap water. You will begin to see the clear water change to yellow in the first five minutes. Place your jar in direct sunlight in an outdoor environment. As the light changes throughout the day, make sure to move the jar accordingly. Fiber, yarn, or bits of fabric can be added to the dye bath once the color of the solution has turned orange (this can take anywhere from 2 to 4 hours in direct sunlight).

Keep your fibers in the jar, with the lid on, for the rest of the day. The outdoor temperature determines the speed at which the dye will set—the warmer the air, the faster the processing time. Check the color periodically throughout the afternoon and remove the fibers when you observe a strong orange or yellow/orange color, based on your preference.

Once removed, hang the yarns until they are room temperature. Then, gently rinse them in warm or cool water and hang them to dry completely. Leaving the fibers in overnight or over a period of two days will strengthen the color.



Coreopsis flowers are placed in jars for these small dye baths.



Expediting the process can be done with the use of a solar oven. The dyes will set in less than half the time. Children especially love to observe solar energy at work.

hollyhock

latin name | ALCEA ROSEA 'NIGRA'

Hollyhocks are grown in gardens across the country. Their stature, range of color, and overall hardiness make them an easy and accessible choice for the garden. In the town of Mt. Shasta, California, hollyhocks have naturalized (this is when a plant reintroduces itself into the wild, surviving without the assistance of human intervention). The plant could be seen growing in every pocket of available soil, and even up through cracks in the pavement of parking lots and alleyways. I was intrigued by its height and long stalk of multipetal blossoms.

In *A Dyer's Garden,* master weaver and dyer Rita Buchanan provides a very useful recipe for hollyhock blossoms. Rita wrote that black hollyhock would yield a unique and colorfast yellow dye. After some experimentation, making subtle changes in timing and temperature, I discovered the blossoms could also yield a soft mint green—a unique color within the summer palette. I concur with Rita's analysis that hollyhock should be a prime choice in the dyer's garden.

Once in bloom, the plant's prolific nature proves a perfect match for the dye process. I harvested nineteen blossoms over a two-week period from a single blooming stalk. Initially I used a combination of dried and fresh blooms for this recipe, but I later realized that using all fresh or all dried blossoms worked equally well for dye-making purposes.

where to find it

Other than zones where it has naturalized, if you wish to find hollyhock, it must be planted in your garden. Rootstock of the 'Nigra' variety can be found through nurseries online. Hollyhocks are biennial; that is, if you plant them from seed it will take a full two years before blossoms are available.

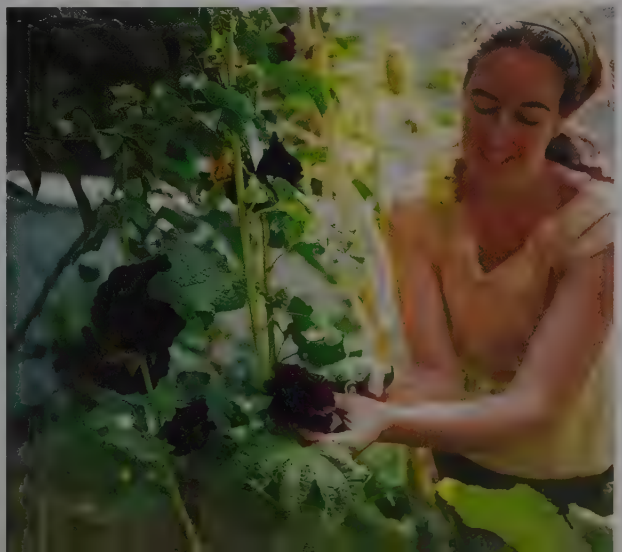
harvesting

Late spring through summer is blooming time. To gather usable dye material, collect the blossoms from the plant directly or wait for them to fall to the ground—both methods work well. Only the blossoms are needed; no stem or leaf is used in this recipe.

recipe

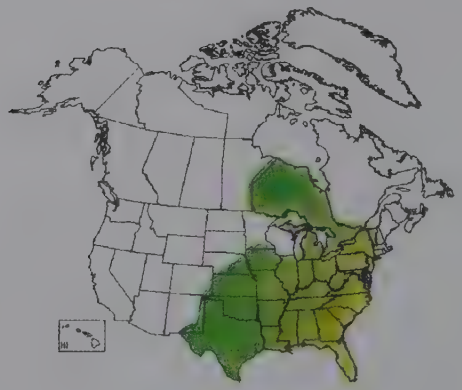
For fresh blossoms, ratio of 2:1 hollyhock blossom weight to fiber weight; for dried blossoms, ratio of 20 dried blossoms to 2½ oz. of fiber
Fibers premordanted in alum

Harvest the blossoms and put them in a jar of water; cover with a lid and let sit overnight. In the morning pour the mixture into your dye pot, adding water to the pot so that the fibers will be able to move about freely. Put the mixture on low heat; prewet the fibers in warm water, and add them to the pot. Heat the mixture for 2 hours, keeping it around 160 to 180°F, and then turn off the heat and allow the mixture to cool on the heat source. If using an open flame, remove the mixture from the heat source completely. Let the fibers sit in the dye pot for another 2 hours so that the color can set properly, and then transfer the fibers to a bowl or onto a drying line. Allow the fiber to sit out of the dye vat for approximately 20 minutes before gently rinsing in lukewarm water.



ironweed

latin name | VERNONIA GIGANTEA



A tall and prominent perennial species that enjoys damp meadows and wetland areas, *Vernonia gigantea* is native to twenty-five states, spanning from Texas to New York. It provokes a wide assortment of reactions in this vast range: it's listed as a noxious weed in Kentucky yet considered a threatened species in New York. So where you live will determine your relationship with ironweed. If you find it in an area where it is threatened, it would be beneficial to cultivate it in your garden, as opposed to harvesting it from the wild. If you live where it is considered to be invasive, local landowners will likely allow you to harvest it freely.

I traveled to Columbia, Missouri, to study with Carol Leigh, a master natural dyer, weaver, and spinner. We harvested at the edge of Buffalo Ridge Road, around the corner from Carol's home studio. Columbia sits in the foothills of the Ozarks, a lush ecosystem that is full of year-round greenery, wildflower blooms, and branches dripping with berries. *Vernonia*'s distinct purple blossoms live in perfect contrast to the native yellow and orange prairie companion plants such as goldenrod and biden. All of these species are known for their dye properties.

Vernonia has deep green stalks. Its small, numerous purple blossoms last about three to four weeks. The plant grows May through September, at times reaching heights of nine feet. It was the only species of this color I saw during our walk through the meadow, making it easy to identify. It attracts numerous native butterflies and birds and would make an inviting addition to the garden, especially if you live within the plant's native habitat.

where to find it

Vernonia gigantea's territory is vast, as seen in the map. It grows commonly at low elevations in damp soils. I saw it along roadsides where landowners had left the grasses and wildflowers to grow undisturbed. If you live within its native habitat, one strategy for cultivating ironweed is to simply leave a portion of your garden unmowed, as it may appear naturally. Otherwise, seed and rootstock can be found through many native prairie plant supply houses.

Vernonia is self-seeding, and can become prolific in the right soil and water conditions. I recommend raising the plant in your garden so that you can observe the blooms; this will allow you to easily track the best time for

harvest. Because the flower is so attractive to pollinators, planting *Vernonia* will enhance the fruiting and seeding of other crops. Its height makes it a wonderful choice as a backdrop to flowerbeds. Purchasing rootstock, which can be ordered online, gives the gardener a head start in the growing cycle, as you are likely to see flowers in the same year the root is planted.

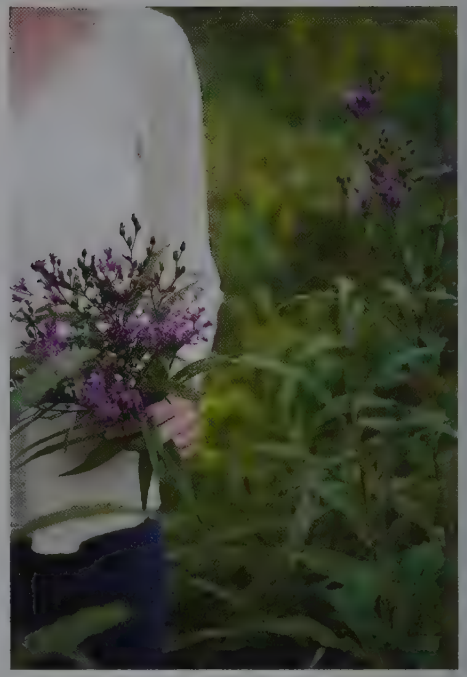
harvesting

Vernonia can be harvested throughout the summer months; if harvested during the three- to four-week blooming cycle, when the purple blossoms are most spectacular, the dye will yield soft green tones. Collect the blooms as if you were cutting them for a bouquet; some leaf and stem matter can be included in the dye vat. If harvested after blooming and seeding, in the late summer or early fall, the plant will produce a range of soft, luminous yellows. At this latter part of the season, collect the leaf and stem—8- to 10-inch stalks work well.

recipe

Ratio of 6:1, ironweed stem and blossom weight to fiber weight
Fibers premordanted in alum

Add your flowering ironweed stalks to the dye pot and cover with enough water so the fibers will be able to move about freely. Heat the vat to a simmer (185–200°F) for 90 minutes and then turn off the heat, leaving the pot on the burner. If using an open flame, move the pot away from the heat source. Let the bath sit for 2 hours in this state. Remove or strain the plant matter, and add your prewetted fibers to the bath. You may reconstitute the vat with fresh water if needed. Let them sit overnight, off of the heat source. The next morning, heat the vat to a simmer (185–200°F) for 1 hour. The fibers will have soaked up the dye overnight, and the heat will set the color properly. Remove the fibers, and hang to dry in the shade. Wait approximately 20 minutes before gently rinsing the fibers in warm or cool water.



NAVAJO DYE TRADITION

The first naturally dyed wools in the United States emerged when the Navajo and Hopi tribes began to work with the sheep imported by the Spanish more than four hundred years ago. Over time, the people's intimate relationship with the plant community merged with the processing of the sheep's wool, and natural dye recipes were born. Navaho dyer Rose Ann Dedman is one of the keepers of this tradition. Each year, Rose and her friend Mary Walker, a fiber artist, organize a class on harvesting and dyeing high mesa plants in the Navajo tradition (see the Weaving in Beauty entry, page 167).

Traditionally all of the Navajo people's needs were met by the land, and it is important to Rose, and the Navajo culture as a whole, to continue making use of the land's offerings with respect and gratitude; to do so is to engage with the spirit that created it all. When Rose harvests plants to use in making natural dyes, she focuses on those species for which natural disturbances—for example, fire, wind, flooding, and grazing—were or, to some extent, are a part of the regenerative cycle (see Beneficial Disturbance, page 10). Historically, these natural disturbances were unimpeded by the presence of humans. Today, fire has been suppressed and the great herds have all but disappeared. However, Rose's harvesting regimes continue, as they have for centuries, in the Navajo tradition. Her gathering practice remains an integral part of the natural processes of the high mesa landscape.

Rose's passion is to pass on the ways of the wool and dye plants that she learned from her mother and grandmother to her own children and grandchildren. Rose's daughter-in-law is an accomplished weaver and dyer, and the home that they share is filled with naturally colored yarns and partially woven tapestry looms. It seems only a matter of time before the young grandchildren begin to learn the craft—and a new generation of Navajo dyers and weavers is brought forth.

Rose Dedman stands in the doorway of her home, surrounded by her many grandchildren, who remained present during the entirety of our workshop.

mexican cliffrose

latin name | PURSHIA MEXICANA

navajo | AWEETS'AAH

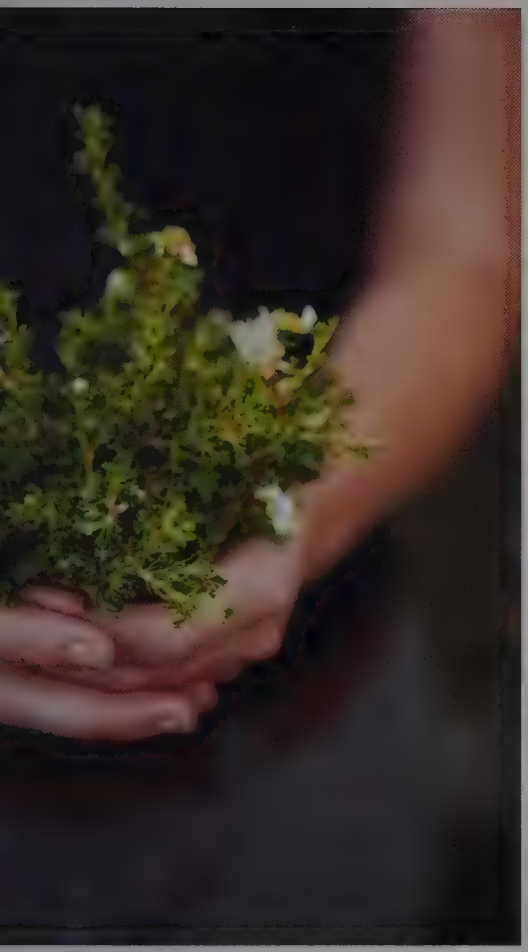
Cliffrose is easy to recognize among the many plant species on the high mesas of Arizona and New Mexico: its small, white, rose-shaped blossoms and strong aroma are an unforgettable combination. Navajo natural dyer Rose Dedman and her friend Mary Walker, a fiber artist, drove me to its habitat at the edge of the road just outside Window Rock, Arizona (see page 51). Mary and Rose told me about cliffrose's many uses, some of which were clearly medicinal–for example, Navajo mothers lined their baby's cradleboards with its soft, sticky branches. The plant's antibacterial resin protected children from rashes and infections.

While picking cliffrose, my hands became covered with the slightly sticky resin and strong aroma. Even though it was recommended that I wear gloves, I preferred the full sensory experience of the harvest. Since strong scents and resinous texture are generally good indicators that a plant will yield dye, touching and smelling the plants you work with is an integral part of the process.

Rose remembered being handed a gunny sack as a young child, with instructions to return it filled with the plant's young branches. She would climb steep hillsides to find it clinging to rocky outcroppings. "I didn't mind going up, but it was hard to get down," she remarked. During our visit we collected the plant along the road's edge, among the red and pink quartz-tinted soils. I admire that Rose continues the tradition of the harvest and is willing to share this wisdom passed down from her mother and grandmother. While collecting cliffrose was viewed as a chore during Rose's childhood, the harvest and the dye-making processes are now second nature to her. Her hands move swiftly and with the utmost efficiency as she gently prunes and gathers the branches, quickly collecting the perfect quantity of plant matter for her dye vat.

where to find it

Cliffrose grows at elevations between 3,500 and 8,000 feet, and can be found throughout New Mexico and parts of the Southwest, and into northern Mexico. Its lovely white blossoms emerge in the late spring and last well into the summer. This hardy yet beautiful deciduous shrub is a perfect plant for gardens in an arid region.



ABOVE (FROM LEFT): **Handspun Churro yarn, unmordanted; harvested cliffrose stems; and Corriedale cross yarn mordanted in alum. Both skeins spent one hour in the dye vat.**

Gathering cliffrose in early August.

harvesting

Harvest time is suggested between May and August. Harvest the small, leafy green twigs from the surface of the shrub, gently giving the plant a bit of a pruning. I observed the plant growing in clusters, which allowed me to take just a bit from one bush, and then move on to the next, so as not to cut back any one plant too much. If you harvest at seeding time, avoid disturbing the seeds; let them fall where they may. If you are committed to propagating the plant, midsummer is a good time to collect the wispy, white seed heads.

recipe

Ratio of 3:1, cliffrose stem weight to weight of fiber

Fibers can be premordanted in alum, or left unmordanted, depending on the color you desire (see photograph, page 53)

Add cliffrose to your dye pot and cover the plant matter with enough water so that your fibers will be able to float freely. Bring the pot to a boil. Allow the plant matter to boil for at least 1 hour, until the color of the water changes to yellow-brown. Add your prewetted yarns to the vat and reduce the heat to a simmer (185–200°F). Leave your fiber in the vat on a simmer for at least 1 hour, or until it reaches the shade you desire. To achieve a deeper shade, leave the fibers in the dye pot overnight off of the heat source.

note: Rose recommends a 1:1 ratio of plant matter weight to fiber weight. But upon experimentation, I realized a 3:1 ratio was needed to achieve the darker ochre color of the skein pictured.

NAVAJO-CHURRO

The canvas for Navajo natural dyes was traditionally provided by the fibers of the Churro, the first sheep ever brought to North America. The introduction of this domesticated animal brought revolutionary change to the Navajo; the tribe's traditional reliance on gathering shifted to a pastoral, farm-based life. The herds were loved and well cared for by the Navajo—the flocks flourished, so that fiber and meat became readily available. The sheep became a living symbol for health, balance, and a good life.

In the story of a nineteenth-century Navajo shepherd, as compiled by Harvey Leake and Louisa Wade Wetherill in *Wolfkiller,* the young boy recounts his grandfather's chastising him for complaining about his responsibility to the flocks. Before the Churro arrived, he said, "We [often] had nothing for clothing but cedar bark and sticky mud to keep our bodies from freezing."

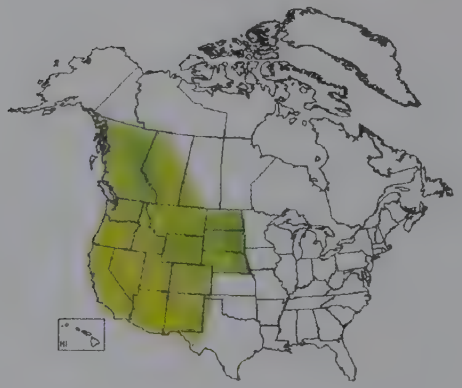
The Churro's wool is well suited to a land with little water: the fleece is low in lanolin, and thus requires little washing or manipulation before it can be spun. The low lanolin content means less "grease," and for this reason less water is needed to remove the lanolin. Tapestries and rugs made from Churro wools were traditionally traded for necessary goods. Churro were important in the Navajo economy and flocks flourished until the Livestock Reduction Act was enacted in the 1930s to combat what the federal government claimed was severe overgrazing. More than 80 percent of the sheep were exterminated. As a result, very few purebred Navajo-Churro remain today; however, we did find a growing herd at the historic Hubbell Trading Post in Ganado, Arizona. In fact, I was encouraged to include the yarns of the Churro in my wool samples so that I could touch, smell, and see the living history of the Navajo dye tradition. Supporting the rebuilding of this heritage breed can be done through purchase of Churro yarns (see Resource Guide).

Churro in the fields at the Hubbell Trading Post.

big basin sagebrush

latin | ARTEMISIA TRIDENTATA

navajo | TS'AH



Sagebrush is a critically important species to the West, both ecologically and ethnobotanically. Over time people have found many uses for the plant far beyond the dye vat—both medicinal and practical. It was commonly used as a hair rinse to remedy dandruff and hair loss. An infusion of the gray-green foliage is still used to repel insects. The foliage left in its raw state is used to line the inside of shoes, both to warm the feet and to keep odor to a minimum. The plant was brewed into a solution to keep the walls and floors clean and fresh-smelling.

Big basin sagebrush lives in what is called the sagebrush steppe ecosystem, a land of surprising biodiversity, where prairie dog, grouse, horned toad, and a vast abundance of seasonal wildflowers are interspersed with the predominant soft gray foliage of sagebrush.

As we stared out upon the immense landscape, Rose Dedman smiled while her friend Mary Walker (see page 51) commented, "It's important to make use of what is abundant." Rose, like all the Navajo, prefers to use local resources that are plentiful, avoiding those that are rare or weakened. As we harvested, I took some time to remove dead wood from the sagebrush; it is also good practice to remove cheatgrass (a vigorous invasive) from the harvest area. These tending practices are important acts that establish reciprocity with the plant community: they reduce the area's fuel load (that is, the amount of easily combustible plant material) and support the vigorous growth of the plant.

Many dyers use sagebrush to obtain a range of greens and yellows. The recipe below is the one Rose learned from her mother; it yields a strong yellow in fibers premordanted with alum, and a soft, buttery yellow in unmordanted fiber. To enhance the green tones in her Churro weaving yarns, Rose's mother used to add coffee grounds and sometimes juniper branches to the dye pot. But she never used mordants. Instead, she relied on the natural tannin and oxalic acid present in the plant materials to adhere the color to the wool. She sometimes left her yarns in the dye pot for a week to achieve the color she was seeking.

where to find it

Sagebrush country includes the entire Southwest, from coastal California to the easternmost part of Colorado, and it can be found as far north as the Canadian border. But as large as this ecosystem is, sagebrush is

LEFT (FROM LEFT): Handspun Corriedale cross wool mordanted in alum, sagebrush stems. Handspun Churro unmordanted.

under threat in many areas due to development and the increase in wildfire intensity. For this reason, it is recommended that you plant this species in your garden. The native plant nursery near my home carries a sagebrush variety that is local to my region. I have found its gray foliage to be of great beauty and contrast to the darker green foliage of the rest of the garden. It has been a very easy species to grow, and creates prolific foliage for the dye pot.

harvesting

Sagebrush grows in large communities, so you can trim, prune, and take a nice long walk all at once. You can harvest from late May until the end of summer; variations in temperature and the amount of water in the soil will affect the blooming cycle. In a typical year, the best harvesting time might be mid-July. This harvest took place on the Navajo reservation on the New Mexico–Arizona border. If you live in this region, the best time to harvest is when the sage is beginning to send up its small, discreet yellow flowers. We harvested during what had been a cool summer, so the plants were blossoming quite late. If you choose to propagate the plant for use in your home garden, seed harvesting should take place in early-to-mid fall.

recipe

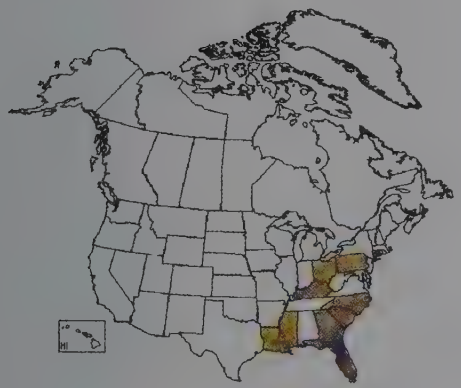
Ratio of 3:1, sagebrush stem weight to fiber weight

Fiber can be premordanted in alum or left unmordanted, depending on your desired outcome (see photograph, page 57)

Add sagebrush to your dye pot and cover the plant matter with enough water so that your fibers will be able to move freely. Bring the mixture to a boil for up to 1 hour, until the liquid is a strong yellow—or the pot begins to boil over. Add your prewetted fiber and reduce the heat to a simmer (185–200°F). Leave the fiber in the pot for at least 1 hour, or until you see the color you like—but keep in mind that the yarn will dry several shades lighter than what you see in the pot, whether mordanted or unmordanted. The skeins pictured were left in the dye vat for just over an hour.

zinnia

latin name | ZINNIA ELEGANS



The colorful garden-variety zinnia used for this recipe was originally native to Central America. Hybrid seed varieties were developed to produce long, thick stems with brightly colored, doubled-layered petals. The color and height of these easy-to-harvest plants have made them a popular addition to annual summer gardens across North America. In some areas of the South, these hybrid seed varieties have naturalized, and the plant can be seen growing wild.

An organic farm just down the road from one of my harvesting sites planted a large patch of zinnias among the summer vegetable plantings. After receiving permission to gather a bouquet, I wound my way through the vibrant rows of orange, yellow, red, and pink blooms, which attract pollinators to the small roadside farm and help ensure a good harvest of the food crops. The flower's broad, flat base makes a good landing pad for larger butterflies.

Gardeners across the country have documented the popularity of the zinnia for species such as the Eastern and Western Tiger Swallowtail, American Painted Ladies, and Red Admirals. There are many seed varieties of zinnia, all of which can be used to make natural dyes. The largest flower heads tend to

be 'Oklahoma' and the 'Splendor' hybrid series, 'Cut and Come Again', 'Sunbow Mix', 'Candy Stripe', and 'Envy'.

where to find it

Zinnia starts and seed can be found at most nurseries. It is best to plant seeds directly in the ground if possible, after your last frost date. Once they have matured, thin the starts approximately 18 inches apart. This will

ensure that the plants get enough air between their foliage to prevent mildew. Some hybrid varieties have naturalized to southern states—Florida, Louisiana, Mississippi, Georgia, South Carolina, and North Carolina. The USDA plant database has also charted its appearance in more northern states, such as Ohio and Pennsylvania.

harvesting

Zinnias can be harvested when they are in bloom. Depending on where you live, that means from June through October. The flower regenerates quickly from being pruned back—the 'Cut and Come Again' seed variety describes the zinnia growth cycle well. After bouquets are harvested, the plant will reproduce many more blooms.

recipe

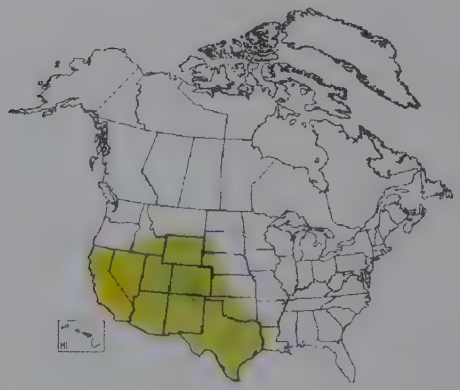
Ratio of 2:1, zinnia bloom weight to fiber weight

Gently heat your blooms (I use the darkest reds, pinks, yellows, and oranges I can find) on low to medium heat (120–160°F) for 2½ hours. Make sure not to boil your dye, as it will diminish the color potential. You can use the dye after this initial heating—strain out the flowers, and add your fibers on low heat for 1½ to 2 hours. Remove your fibers, and after letting them cool to room temperature in a bowl, rinse them gently in warm water, then hang to dry. This recipe produces a range of buttery yellows.

desert rhubarb (wild carrot)

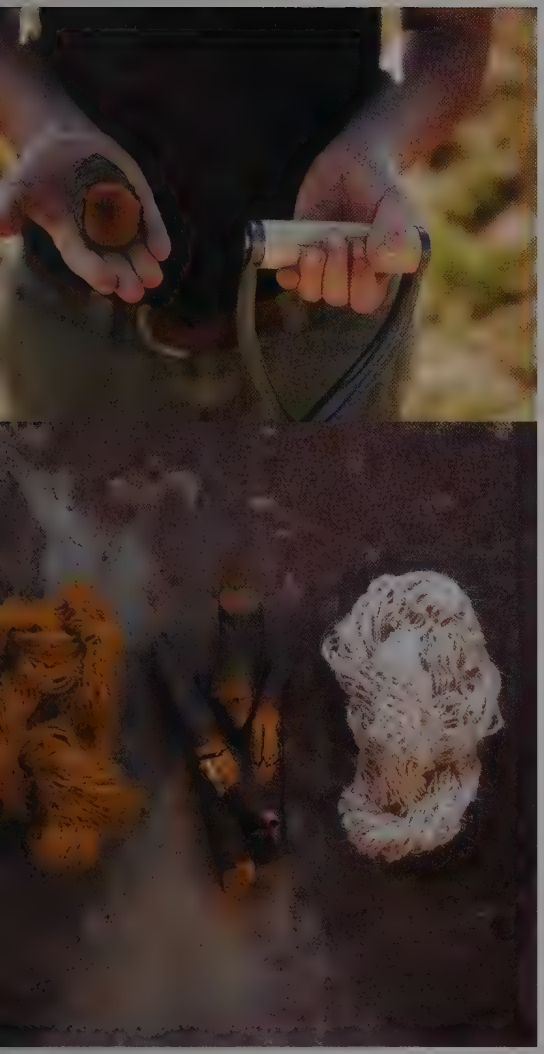
latin name | RUMEX HYMENOSEPALUS

navajo | CHAAD'INIIH



The ochre-colored lands outside Crownpoint, New Mexico, were soft after an evening rain. We passed few people or houses as we traveled through the vast stretches of high mesa on the Navajo reservation, but after driving fifty miles, we started to see the dried leaves and stems of wild carrots dotting the landscape into the horizon. The Navajo say that desert rhubarb (aka wild carrot by Rose Dedman) populations slowly migrate to new terrain over time. Rose's mother would harvest in one region for years and then find that the population had crept into unfamiliar territory. Similarly, Rose has found her own harvesting grounds far from where her mother originally gathered the plant.

The Navajo avoid food-source plants for use in the dye pot, as this is viewed as wasteful. But wild carrots are inedible because of the plant's high oxalic acid content. This acid functions as a natural mordant; dyers of old obtained strong orange brown colors with relative ease. When harvested, wild carrots yield fresh and dried roots, and both can be used for dyeing. The variation in the colors they produce are of great interest to rug and tapestry weavers, who bring together the pale and vibrant tones to increase the perception of depth in their finished pieces.



ABOVE are (left) unmordanted handspun Churro yarn dyed with fresh wild carrot root and (right) unmordanted handspun Churro yarn dyed with dried wild carrot root.

where to find it

Wild carrot has been located in nine Western states: Arizona, California, Colorado, New Mexico, Nevada, Oklahoma, Texas, Utah, and Wyoming. It thrives in sandy soils. We looked for washes, areas where water moved quickly through the landscape. Just beside these washes, the land leveled out; and it was there, in this flat, sandy zone, where wild carrot lives in great abundance.

harvesting

Wild carrot should be harvested after the leaves and stems die. Depending on rainfall, this begins to happen in early to midsummer. Harvesting time lasts well into October. Once you've located a stand of wild carrot, look for a plant with multiple stems, as this means several roots lie beneath the surface. Begin digging your hole at least 6 inches from the base of the plant's stem, digging toward the base of the plant. Make a hole between 12 and 18 inches deep; be ready to sift through the sand a bit in order to find the roots, which are twice the thickness of a domestic carrot. The fresh root is plump, with a vibrant, orange interior; older roots are brown and shriveled. Make sure to separate the old roots from the new as you work. The process of fully removing some of the roots aerates the soil and breaks apart the dense rootstock, giving the plant room to spread and increase its colony.

recipe

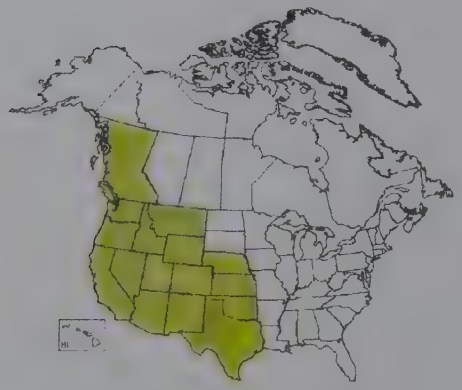
Ratio of 3:1, wild carrot weight to fiber weight (both for dried or fresh root)
Fiber does not require a mordant
2 tbsp baking soda (for dried roots only)

Chop the root into ¼-inch pieces and put into your dye pot; fresh and dried roots should go into separate dye vats. Add enough water to the pot that your fibers will be able to move about freely. Boil the dye mixture for 90 minutes. Add your prewetted fiber and reduce the heat to a simmer (185–200°F). The fiber can sit in the pot anywhere from 60 to 90 minutes for the absorption of good, strong color. Rose recommends leaving the fiber in overnight or longer to obtain stronger colors. The skeins pictured here were left in the dye vat for 1 hour.

rabbitbrush

latin name | CHRYSOTHAMNUS VISCIDIFLORUS

navajo | G'IIŁTSOIDIDJOOLIH G'IIŁTSOIH



As you travel through high-elevation mesas in the summer, it can seem as if you're in the middle of a sea of yellow blossoms. Much of this radiance emerges from the blooms of rabbitbrush, a common species that cannot be missed on a trip down the long two-lane highways. Growing generally no higher than the hip bone, rabbitbrush is a part of the sagebrush steppe ecosystem, which is home to almost one hundred species of birds and about eighty-five species of mammals. With little else as cover, rabbitbrush—along with its common companion, sagebrush—provides crucial homes to pygmy rabbit, as well as to a host of small birds and raptors.

Rabbitbrush holds a key place in the Navajo dye tradition, because it yields some of the most intense colors of local species. While cleaning skeins of Churro yarn, Rose Dedman (see page 51) picked out plant matter, smiled fondly, and recalled that her mother had loved the strong, clear yellow that rabbitbrush produces. Rose, like her mother before her, is used to putting her Churro skeins into the dye vat without a mordant, so she was surprised to see what happened with an alum-mordanted skein that I had brought from home: it came out a deep gold-mustard color. The recipe here is from Rose, carried on from her mother's tradition, and can be used with premordanted or unmordanted wool.

where to find it

Rabbitbrush is commonly found in the sagebrush steppe, as far west as California, from the Mexican to the Canadian borders, and as far to the east as Nebraska. If you live in an area where rabbitbrush grows naturally, it is highly recommended for a drought-tolerant garden. The gardener looking to create a native perennial bed will enjoy the brightly colored blossoms of this hardy, indigenous species. It enjoys being cut back drastically in the late winter; this will ensure it grows healthfully in the spring and summer, producing enough fresh flowering sprigs to fill your dye vat once again.

harvesting

I harvested this species in Arizona and Wyoming. In both locations I was told that mid- to late summer is a good time to pick the yellow blooms. Harvest gently, and prune back any dead or dying stems as well; this will benefit the plant's overall ability to

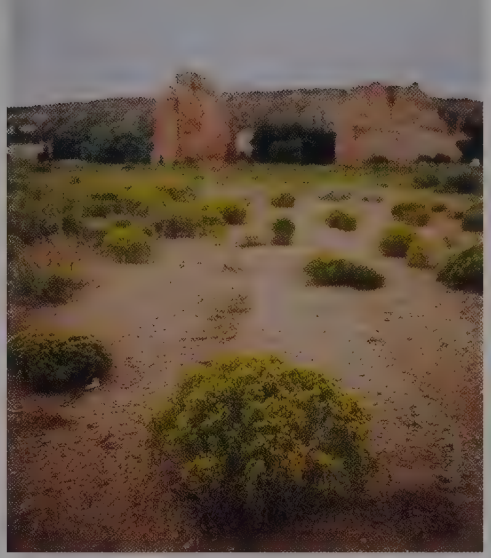
regenerate. The dye color is produced solely by the blooming sprigs; dead wood that you remove can be left at the base of the plant or composted.

recipe

Ratio of 3:1, rabbitbrush stem weight to fiber weight

Fibers can be premordanted in alum, or left unmordanted

Add freshly harvested rabbitbrush to your dye pot, and fill it with enough water that your fibers will be able to move freely. Bring the pot to a boil for 1 hour or longer. If the pot begins to boil over and you see that the liquid has become a vibrant yellow, it is time to add your prewetted fiber. Reduce the heat, and let it simmer (185–200°F) for 60 to 90 minutes. Fibers will dye almost instantaneously with rabbitbrush; you will see results within an hour.



BELOW **are (left) handspun premordanted Corriedale cross yarn and (right) handspun unmordanted Churro yarn.**

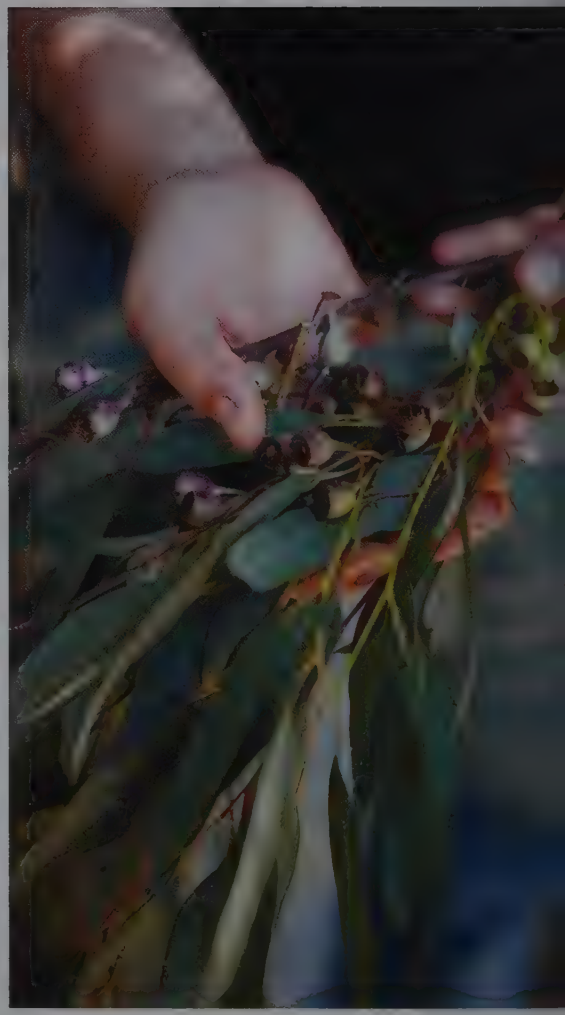
red ironbark, or rosea

latin name | EUCALYPTUS SIDEROXYLON

Originally from Australia, the eucalyptus red ironbark was planted as a windbreak throughout California and other hot and dry regions of the West. Its fragrant, elongated, gray green leaves and stems are veined with a deep red substance, thus giving the natural dyer a clue to what colors can be unlocked from its biomass. Every child who lays eyes on the blooms calls them "fairy hats": the bell-shaped head is densely adorned with pink stamens, giving the tree a unique visual trait.

Because there are more than two hundred species of eucalyptus in the United States, it can be a challenge to tell them apart—in fact, I had to send samples of my eucalyptus to the University of California, Davis, to receive the correct identification for this entry. If you are having trouble identifying your tree, there are herbariums in many universities that can assist in your search for the correct species. This particular tree has a nonshedding bark that is deeply furrowed, setting it apart from other eucalyptus varieties.

I have found red ironbark to vary considerably in its dye bath results. If I harvest from the southern, exposed part of the tree during the hottest and driest parts of the summer, I am likely to get a brick red or deep



orange color. If there has been a considerable amount of fog, or if I am harvesting from the part of the tree that receives shade, my dye results are yellow. I have found no exact science for how to extract the deep reds consistently at all times of the season. For this reason, I can say with confidence that this recipe will be a wonderful experiment, especially if you appreciate the potential for unknown outcomes.

where to find it

Red ironbark can be found only in areas where it was planted—it is not native or naturally occurring on this continent. It is commonly seen in rural areas, where it was used along roadsides and as a windbreak on open hillsides. I have also seen it used for landscaping purposes along busy roads and freeways in cities looking for drought-tolerant species. This particular species is not invasive—unlike the red river gum, which has a tendency to spread and dominate in certain areas. The red ironbark prefers very dry soils and does not like to be planted in clay or with its roots exposed to standing water.

harvesting

Red ironbark leaves and twigs produce the strongest colors if harvested during the summer dry season. I prune back eight- to ten-inch-long branches, primarily from the south-facing part of the tree (this is the where the most sun-drenched foliage resides) and cut them into smaller pieces so they will fit into the dye pot.

recipe

Ratio of 20:1, red ironbark branch and leaf weight to fiber weight

Follows the Master Dye Bath Recipe (page 35). For the strongest colors, red ironbark requires a longer preparation time than the suggested 60- to 90-minute time frame in the master dye bath recipe. I heat my dye for 2½ to 3 hours on medium to high heat (between a simmer and a full boil) once in the evening and once the next day. To provide enough room for the fibers to move freely in the pot, remove some of the plant material. Add the fibers, and keep the dye bath at a simmer (185–200°F) for 2 to 3 hours. Depending on the time of year and the tree you harvest from, the colors will range from bright yellow to brick red.

coyote brush

latin name | BACCHARIS PILULARIS

Whether it's on the edge of cliffs overlooking the sea, trailing inland on rolling hillsides, or dotting the road's edge, coyote brush is a common sight on much of the West Coast. This evergreen shrub provides habitat year-round for quail and other bird species. Coyote brush is a popular choice in native gardens throughout the West; not only is it a hardy, pioneering plant, but it also creates conditions for other species, such as sticky monkey flower and California sagebrush, to take root more easily.

Coyote brush has a gentle aroma and small, dark green leaves. It usually grows about waist-high, but can grow as tall as a small tree, There are male and female plants, which can be a challenge to tell apart; only when seeds begin to develop on the female in the late summer or early fall is it easy to distinguish the two. Seeding takes place in the fall, and over the next few months, each female produces hundreds of white, wispy seed heads, which are an important winter snack for local bird species.

where to find it

Coyote brush can be found in the coastal scrub and inland chaparral ecosystems of California and Oregon. If you live within its naturally occurring zone, it is a wonderful species for the garden, as it provides an evergreen foundation that requires little to no water, once established.

harvesting

Coyote brush can actually be harvested for much of the year, except during the winter months, when it is producing seed. I enjoy harvesting it in the summer when my plants have already sent up vigorous new growth. Outside of the tended garden, coyote brush can become quite woody. If you find a stand of coyote brush where you have access to harvest, and would like to tend it, heavily pruning in the late winter after the seeds are gone will ensure a healthy comeback of fresh green growth within the same year.

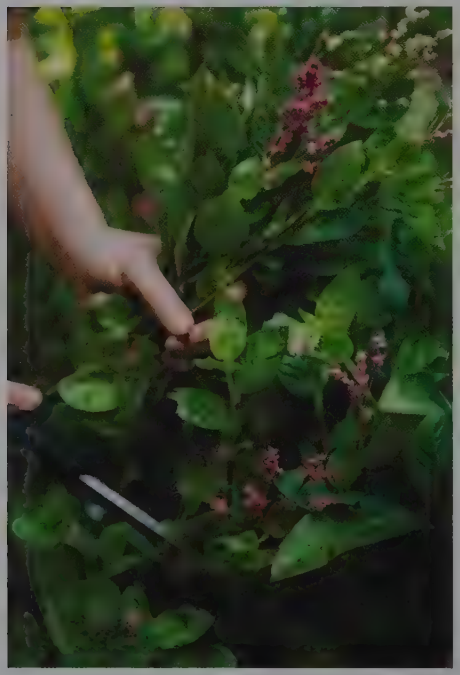
recipe

Ratio of 5:1, coyote brush leaf and stem weight to fiber weight
Fibers premordanted in alum

Follow the Master Dye Bath Recipe (page 35).

japanese indigo

latin name | POLYGONUM TINCTORIUM



No plant indigenous to North America will yield blue from the natural dye process. To achieve the color of the sky and sea directly from a plant, you need to use a species that originated elsewhere, and the one that grows successfully in most regions of the country is Japanese indigo. Anecdotal evidence suggests it does not like the dry heat of the Southwest, but perhaps grown in a greenhouse, this could be overcome.

The plant enjoys being well watered and growing in recently amended soil. When I grew it in my backyard, I started the seeds indoors in the early spring, and planted them after the last risk of frost had passed. The starts were planted in a ten-foot-long mound that was fifteen inches at its highest. I spaced the starts ten inches apart, all along the mound, side to side, and back to front. For a species that you'll be abundantly harvesting from, this is a useful planting strategy. The starts grew healthfully to just over two feet tall, and I was able to harvest enough indigo to easily dye several pounds of yarn. I was inspired by Rita Buchanan's recipe, which can be made within three to four hours, and lasts for one day's dye work.

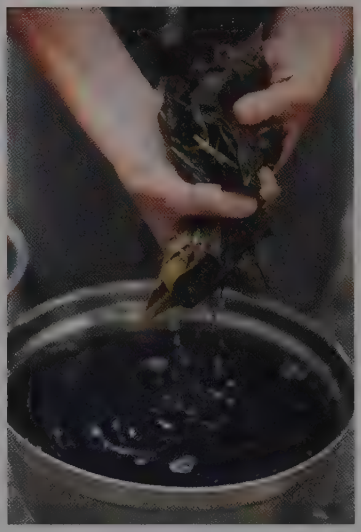
where to find it

Japanese indigo seed comes onto the marketplace from time to time, but it's rare. If you grow it, make sure to harvest and save your seed as your growing season is coming to a close. This is a simple process of letting the pink and white blossoms mature in the early-to-mid fall. As they begin to dry, you'll likely notice little black seeds wrapped up in a brown husk. These seeds can be saved for the following spring's planting.

harvesting

The first harvest should be around midsummer, or when the plant has gained some height and the leaves turn blue when bruised. Prune back the stems, just above a leaf node, and harvest about 1½ pounds of the leafy stems, removing the leaves for the dye vat. Depending on regrowth, you'll be able to harvest several more times within one season. You'll need a pound of leaves for the recipe.



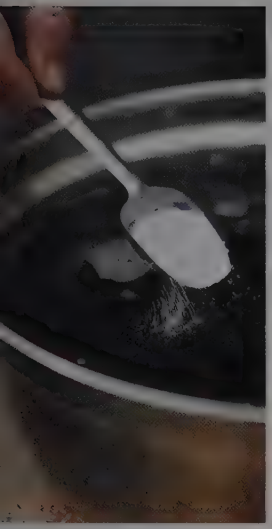
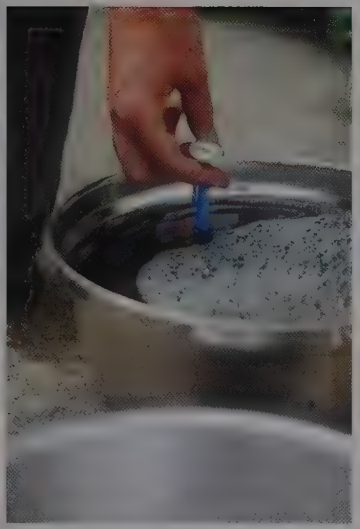


recipe

This one-day recipe can be used for up to five ounces of yarn. No mordant is necessary. The process must be done all at once and requires a solid three- to four-hour time slot. This recipe does not require your constant attention in the beginning, but it is important to take a temperature reading from time to time. Toward the end, you'll be fairly involved, until the dye vat is complete.

1 lb. Japanese Indigo leaves
1 tbsp. baking soda
1 tbsp. Spectralite (also known as color-run remover)

1. Remove the leaves and place them into a 2- to 4-quart glass jar. Cover the leaves with warm water, secure the lid, and place the entire jar in a 2- to 3-gallon pot, then fill the pot with enough water to partially cover the jar of leaves, without causing it to float. Heat up the pot of water to a steam, making sure the temperature hovers not much higher than 170°F. I did find that at one point, my leaf solution briefly reached 180°F, and still retained its dye properties. A thermometer is an essential tool to monitor this process. When the water in the jar begins to turn a burgundy brown (about three hours into the process), you are ready to remove the jar from the pot. Strain the liquid off into a bowl, and squeeze out your leaves into the solution. The leaves can be composted once this is done, or reused for a pale pink or beige dye bath. Prewet your yarn by adding it to the pot of hot water from which you just pulled the indigo-leaf jar. You can turn the heat off, and simply put a lid on the pot to keep the water warm.
2. Add the baking soda to the bowl of indigo water to alkalize the bath. The next stage is to add oxygen to the dye bath. Place a second bowl next to the bowl of indigo water, and pour the solution from one bowl to the other, back and forth. As oxygen is added, the solution will turn a bluish green color. Depending on how quickly you pour, this will take 6 to 10 minutes.
3. Once the color has turned, add the Spectralite, and very gently stir it into the


solution; this will remove oxygen from the indigio solution. After 8 to 10 minutes, the liquid should turn yellow, indicating that the solution has been deoxygenated. The bath should remain at a temperature of 100 to 120°F. If it is necessary to heat the solution, just place the bowl over the pot of steaming-hot water and cover it with the lid.

4. Gently place your prewetted, warm skeins into the dye, avoiding drips of water, which can draw oxygen into the bowl. Allow the skein to sit in the solution for approximately 10 minutes. You can gently move the skein through the liquid, but be careful not to add oxygen. After 10 minutes, remove the skein and enjoy watching it transform from yellow to blue as it touches the air.

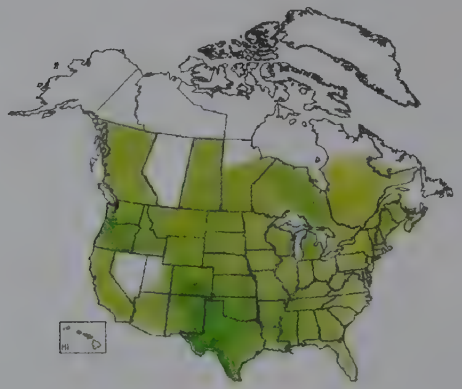
slow-acting recipe

This great recipe for a bacterial vat uses simple kitchen-ready materials. The indigo vat will require 3 days before it is ready for use.

Follow steps 1 and 2 of the above recipe. Then, instead of adding Spectralite, as outlined in step 3, add 3 tbsp. of corn syrup and ½ c. of wheat bran to your alkalized indigo solution. Keep the solution in a dark place, like a plastic bucket with a lid, and keep the temperature at approximately 85°F—although indigo can most certainly ferment at a higher outdoor temperature. The vat will ferment and be ready for use in about three days. When you notice that the below-surface water has turned yellow, the vat is ready. Prewet your yarns, and follow the procedure outlined in step 4 above.

blue elderberry

latin names | SAMBUCUS CAERULEA; SAMBUCUS NIGRA



Elderberry is a tall, deciduous shrub with large and plentiful white spring blossoms that are well known for their use in elderflower tea. As time passes and the summer sun is directly overhead, these blossoms transition into clusters of dark blue berries, which are incredibly sweet when eaten after being dried. The berry is commonly used to make healing tinctures and cordials to boost the immune system and clear respiratory passages.

Elderberries are harvested in my community for seed propagation by biologists and volunteers for use in riparian (creekside) restoration projects. The plant plays a critical role in the ecology of creeks: its berries are food for many bird species, including black phoebes and Phainopeplas; its hollow stalks provide shelter for longhorn beetle larvae—to the exclusion of all other possible habitats; and its broad leaves create shade for young fish and amphibians. Elderberry can also be a wonderful addition to the garden—with its spring blossoms, large and tropically shaped leaves, and edible deep blue summer berries.

where to find it

This well-known medicinal is native to North America and Europe; both varieties can be found in the United States, and both are of use in the dye vat. Elderberry grows alongside creeks, known as riparian corridors, and in openings of moist forest habitat. It can also live in damp soils in what are known to be much drier regions—along roadsides and in chaparral plant communities.

harvesting

The berries will begin to droop in thick bunches in mid- to late summer. The best time to collect elderberry and the duration of the harvest period is determined by the temperateness of your particular climate. On the West Coast, blue elderberry can be harvested from midsummer through the late fall. In the foothills of the Ozarks, where I harvested elderberry for this recipe, the berries had ripened in midsummer and were almost past their prime when I collected them in early September. As you observe its annual cycle, you'll discover the window of opportunity for gathering specific to your bioregion.

While growing and harvesting the berry from your own garden stock is recommended, working in collaboration with seed harvesters, such as biologists and native seed purveyors in your area, may be an option. The restoration

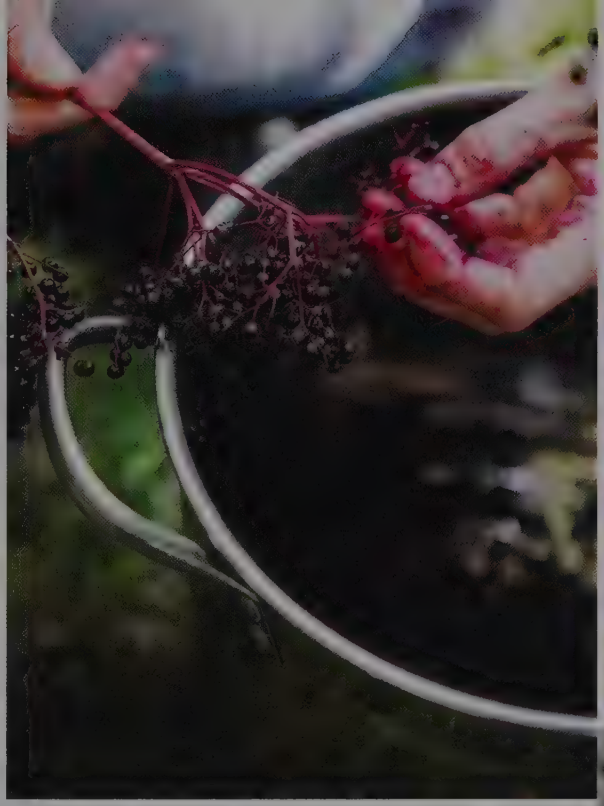
ecologist in my community is quite happy to part with the pulpy residue from her seed-harvesting process. Collecting along the roadsides with permission from landowners is also quite doable. Roadside stands of the berry are not recommended for food or medicine, but they are quite suitable for the dye vat.

recipe

Ratio of 9:1, elderberry weight to fiber weight
Fibers premordanted in alum

If you've harvested fresh berries, remove the stems and then place the berries in your dye pot. If you are working with seeded pulp, it can be added directly to the dye pot.

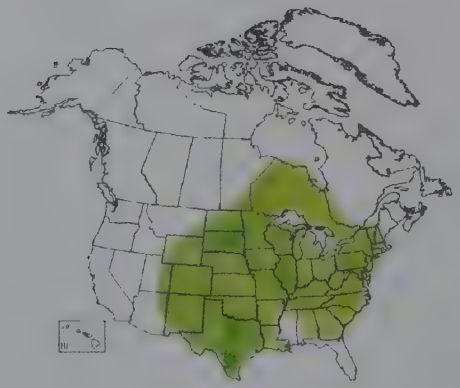
Add enough water to the pot so your fibers will be able to move freely. Heat the mixture over low to medium heat (160–200°F) for 1½ to 2 hours. The brew should steam but not boil during this time frame. Strain the dye vat and return the liquid to low to medium heat (160–180°F); you can either compost or discard the pulp. Add your prewetted yarn, and leave the fiber in the heated dye vat for 1 hour. Turn the heat off, cover the pot with a lid, and leave the fiber in the pot overnight. The next day, remove the fibers and hang them to dry for 30 minutes; then rinse them in cool water and return them to the drying line.



RIGHT: **Handspun Corriedale cross yarn (left) and machine-spun merino yarn (right).**

showy goldenrod

latin name | SOLIDAGO SPECIOSA

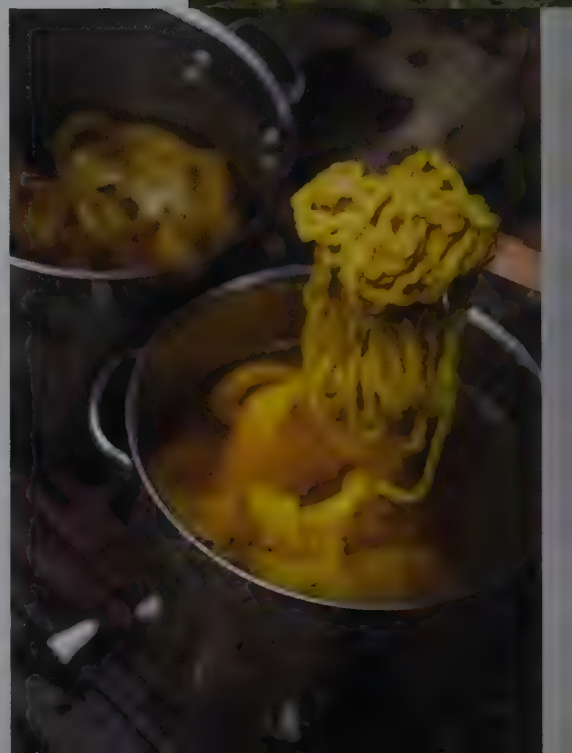


Goldenrod can be found, in one of its many varieties, in every state of the country. Its vigor and adaptable growing strategies have made it an integral part of America's perennial landscape. Growing goldenrod in the garden is a joy, as it attracts butterflies and moths. Weaver Susanne Grosjean of Hog Bay, Maine, cultivates her goldenrod by leaving her fields unmowed; the plant self-sows and grows all on its own. "I harvest goldenrod in the summer," she says, "and toward the end of the season I make sure I leave the last remaining flower heads for the bees."

I gathered goldenrod in the foothills of the Ozarks, where it is commonly known as showy goldenrod because of its almost six-foot-tall stalks and long, bright yellow flowering heads. Approximately 100 species of the plant have been identified–all of them with bright yellow flowering heads. Each one of these species will likely yield color in your dye vat, typically a bright, sunny yellow.

where to find it

Because goldenrod reproduces through underground rhizomes, it spreads very easily. It's usually found in large patches in open meadows, in prairies, and along roadsides.



It was cultivated for gardens in Europe before it was given much appreciation here in the United States. Tall species like showy goldenrod make a nice background to any garden bed; smaller species, like the California goldenrod, are useful as border plantings. To find the goldenrod species best suited to your area, look to your native plant nursery or seed company for a recommendation (see the Resource Guide).

harvesting

Goldenrod is at its peak bloom in the late summer and early fall. I cut back the flowering heads and leafy stalks, as if I was collecting flowers for a bouquet (approximately 8- to 10-inch lengths). Preferred harvesting sites would be your own garden, or areas that are soon to be mowed. There are many county-managed roadside mowers that cut plants like goldenrod down to ground level throughout the summer months. Collecting these plants just before they're chopped down is a good way to obtain goldenrod for the dye pot without removing additional plants from the overall population.

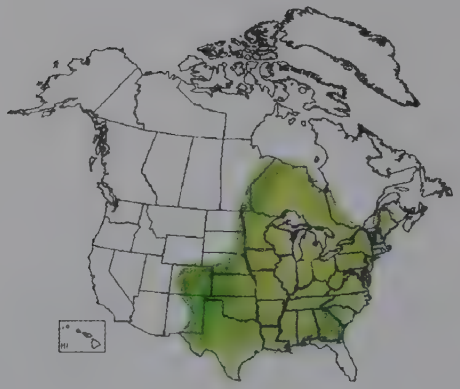
recipe

Ratio of 10:1, goldenrod stem and blossom weight to fiber weight
Fiber premordanted in alum

Add the stems and blossoms to the dye pot, and cover them generously with water so your fibers will be able to move about freely. Put the vat on medium to high heat and let the vat come to a simmer (185–200°F) for 1 to 2 hours, or until the water begins to turn a deep shade of yellow. Once the color has released from the plants, strain the vat and add your prewetted fiber to the dye bath. Keep the heat on medium to low (160–180°F), and let the fibers sit in the bath for 1 hour, or until you are satisfied with the depth of color. Hang your fibers in the shade for approximately 20 minutes, then rinse the fibers in warm or cool water and hang to dry again, in the shade.

biden (tickseed sunflower)

latin name | BIDENS POLYLEPIS



Biden seed easily attaches to clothing and animal fur. In fact its needlelike awns have led to its being mistaken as a tick so many times that the plant is now commonly known as tickseed sunflower. This perennial wildflower has a tall stalk that grows up to 6 feet high, and the bright yellow blossoms on its multiple flowering stems are approximately 1½ inches in diameter. In the Ozark foothills, meadows are full of biden, goldenrod, and ironweed. When I harvested flowers in the Ozark foothills with weaver Carol Leigh and her workshop students, we were barely visible in the meadows adjacent to Carol's dye studio—we were dwarfed by the yellows, oranges, and purples of biden, goldenrod, and ironweed.

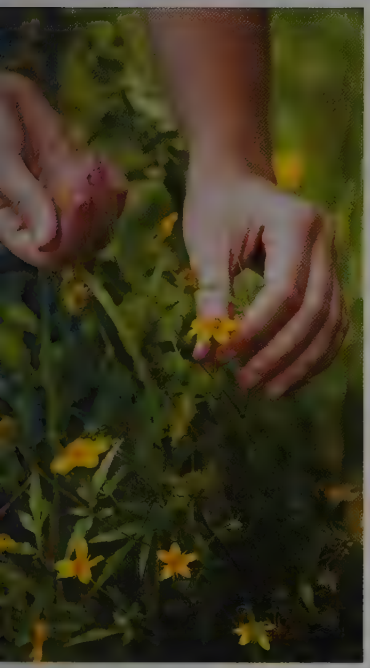
The color produced by biden flowers is one of the strongest shades of orange seen from any natural dye. It yields a good color from a relatively low plant-to-fiber ratio. This is a species that you can grow in the garden and easily raise enough material for your dye vat. It is also a species that works well for solar dye making (see page 44).

where to find it

Biden can be found as far north as Maine, and as far south as Texas. The plant grows primarily east of the Rocky Mountains, in open fields, along roadsides, and in ditches. It was found often in drainage areas where we harvested in Missouri. This is another species that can be cultivated simply by not mowing. For instance, Carol Leigh had an area of her garden marked off that was not to be mowed—wildflowers, grasses, and forbs grew tall there.

harvesting

The flowers can be harvested with or without their stem, taking only 10 percent of the flowers from any one stalk, so that enough flowers remain for the pollinators. This can be easily monitored if you are harvesting from your own garden or other private land. However, if you are harvesting in public areas, following the 10 percent rule is a challenge, since you don't know who else might be harvesting there. For that reason, I recommend growing biden in the garden, where the flowers will provide you with weeks of beautiful blooms, with no need for additional irrigation—and pollinators will appreciate your offering. See the Resource Guide for seed and start availability.



recipe

Ratio of 1:1, biden flower weight to fiber weight
Fiber premordanted in alum

Remove the biden flowers from the stems and add them to your dye pot, then fill the pot with enough water that your fibers will be able to move freely. Bring the mixture to a steaming temperature on medium heat (160–180°F) for approximately 1 hour (avoid simmering or boiling). When the water has changed to an orange yellow, strain the plant matter from the vat and return the pot to low heat (120–160°F). Add your prewetted fiber and let it sit in the dye bath for 30 to 60 minutes, removing it when the dye color is clearly absorbed. Hang your fiber in the shade for approximately 20 minutes, then rinse in warm or cool water, and return to the shade to hang dry.

SUMMER KNIT | nap mat

This mat is a wonderfully useful size. It also makes a great small rug.

finished measurements | 38 inches wide, 39 inches long

yarn | Chunky thick-n-thin 2-ply wool in eucalyptus, coyote bush, cliff rose, biden, hollyhock, sagebrush, indigo, ironweed, rabbitbrush, elderberry, and goldenrod; use 4 oz. (114 g) each of your favorite 3 colors and 2 oz. (57 g) each of the rest, for a total of 28 oz. (794 g). This pattern was written to use 4 oz. of eucalyptus, indigo, and coyote bush.

needles | U.S. size 19 (15.5 mm) 24-inch circular needle, or size needed to obtain gauge

notions | Scissors, wool needle, small spray bottle of water

gauge | 1½ sts per inch

With eucalyptus, cast on 60 sts using a long-tail cast-on. Knitted or cable cast-on works well also.

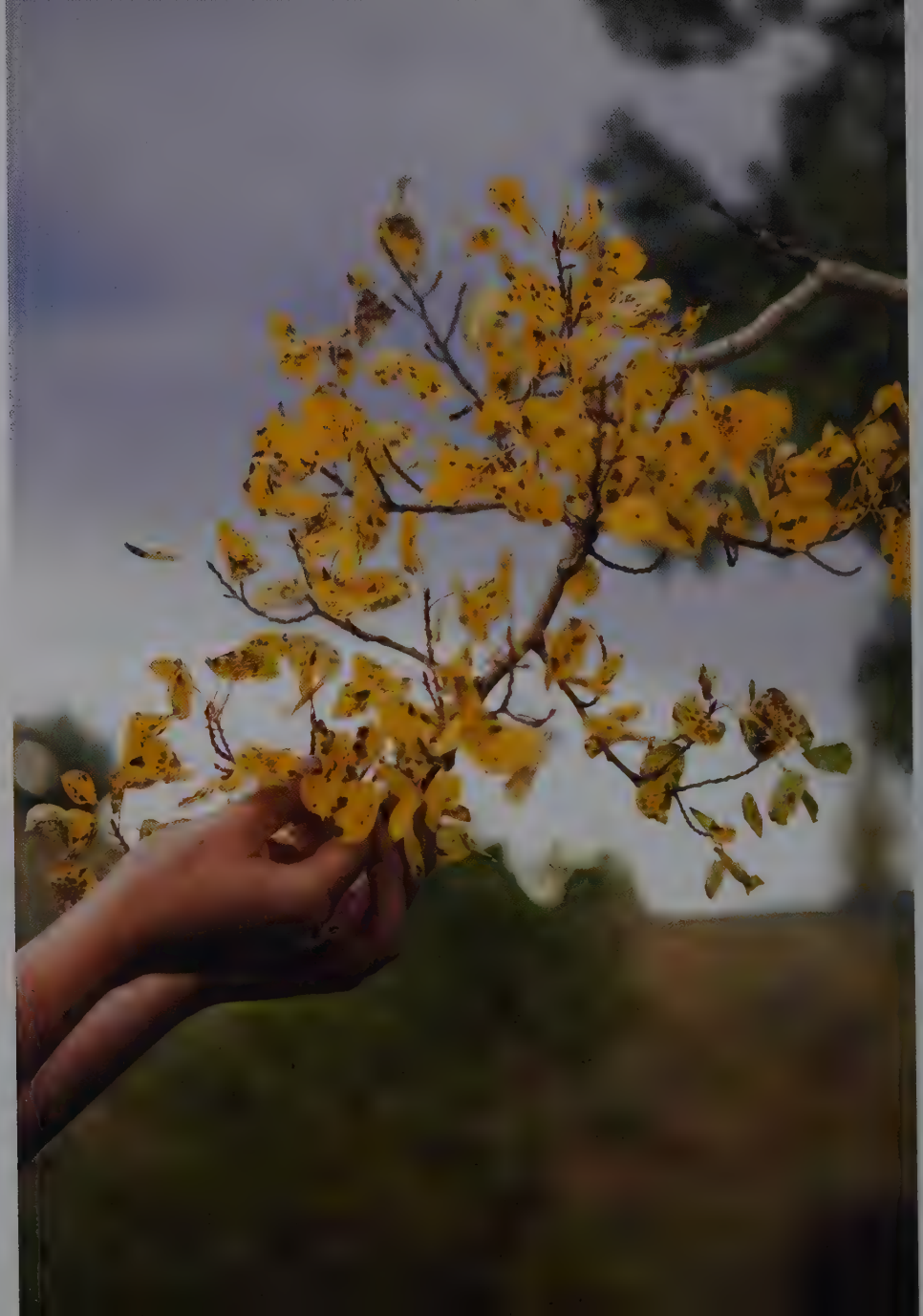
Work in garter st (knit every row) until you have about 12 inches of yarn left. Spit-splice this tail to the beginning of the skein of coyote bush and continue in garter st., changing colors in this order: cliff rose, biden, hollyhock, sagebrush, indigo, ironweed, rabbitbrush, elderberry, goldenrod, eucalyptus, indigo, and coyote bush. When knitting the last skein of coyote bush, remember to save enough yarn to bind off. The knitted piece should measure roughly 24 by 41 inches.

Weave in ends with the wool needle. To finish the mat, steam block the fabric to measure 38 x 39 inches.

Spit Splicing

Spit splicing is a rustic technique to join yarn, one that complements the already slubbed texture of the yarn. It requires a spray bottle of water, not necessarily saliva. Take the working yarn and fray 2 to 3 inches of the tail. Take the next color and do the same. Overlap the two colors in a way to create a continuous strand across the palm of one hand. Spray a small amount of water in that palm and rub both palms together rapidly. The friction created by your hands and the yarn, combined with the water, will cause the yarn to felt onto itself. Repeat until the yarn is firmly fused.

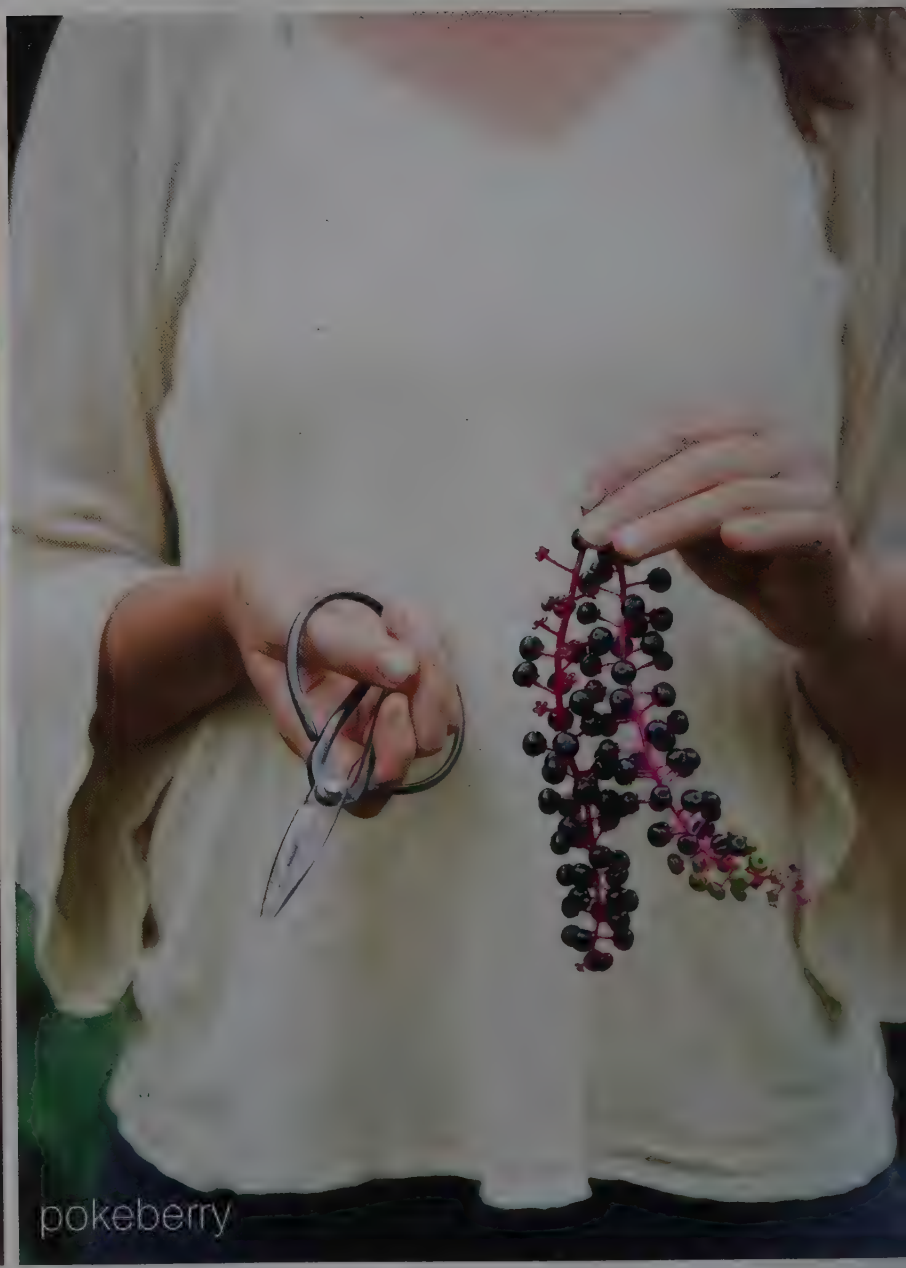
5



fall

A golden light filters through falling leaves and the earth begins to cool. In my neighborhood the oak tree sends its acorns down onto roofs throughout the night, and the old Japanese maple attempts to hold on to its greenery well into November.


black walnut


pokeberry


sumac


sheep sorrel

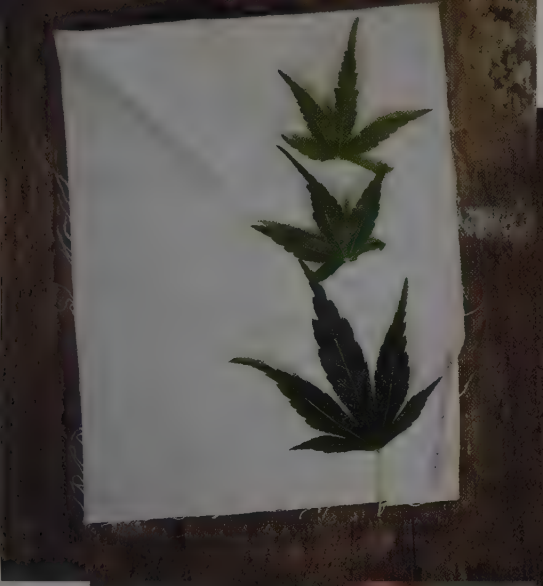
fall dye starter

To capture the spirit and colors of fall, this recipe makes use of maple leaves prior to their transition into full-blown yellow, scarlet, and orange colors. This process creates a permanent textile leaf print that can be used to lend an autumnal aesthetic to quilts, clothing, and all manner of fabric-based housewares.

This simple recipe is a perfect candidate for a seasonally appropriate school project, or a fun weekend family craft event. Old T-shirts or any recycled natural fiber fabric can easily be refashioned and given new life with this technique. The print will take two to three days of soaking time, depending on the heat and sun exposure that it receives—patience creates the best outcomes.

Handful of rusty iron objects
White vinegar
Maple leaves (flat oak leaves can be substituted)
Tightly woven or knit 100% natural fiber fabric (approximately T-shirt weight)

1. Fill a large (I use a one gallon) glass jar three-quarters full with water, and add 1 tbsp. of vinegar for each cup of water. Add approximately 1 lb. (a handful) of rusty objects to the water and vinegar mixture. Cover the jar with the lid and allow it to sit for one to two days, or until the water has turned the color of iron rust.
2. Prepare your leaves, making sure to pick the smoothest. The flatter the surface of the leaf, the better the contact it will make with the fabric. Place leaves on one side of your selected fabric, and fold the other half of the fabric over them, pressing the layers firmly together. Roll the fabric tightly, making sure there are no air pockets between the layers, then secure it with rubber bands or other ties.
3. Place the rolled fabric into the jar, replace the lid, and set the jar in a sunny, warm location. Allow the fabric to sit for two days if the sun is shining, and three days if there are clouds (during inclement weather, bring the jar inside to keep it warm).
4. Remove fabric from the iron solution and take off the rubber bands, gently removing the leaves from between the layers. Allow the fabric to sit for a day before rinsing it in cool water; the print is wash-fast in cold water.

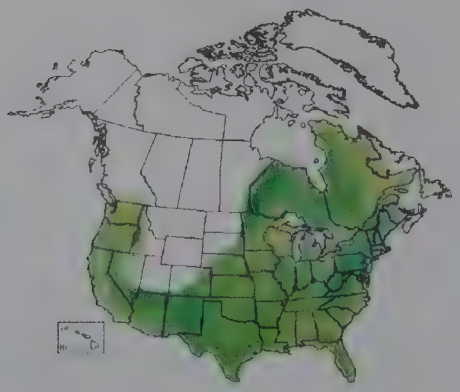


tannin variation

To create a bluish-gray-toned fabric with a light green leaf print, premordant your fabric in tannins (see page 34). Once the fabric is removed, it can be rolled with the maple leaves while damp–follow steps 2 through 4 as you would to make a simple rust print.

pokeberry, or pokeweed

latin name | PHYTOLACCA AMERICANA



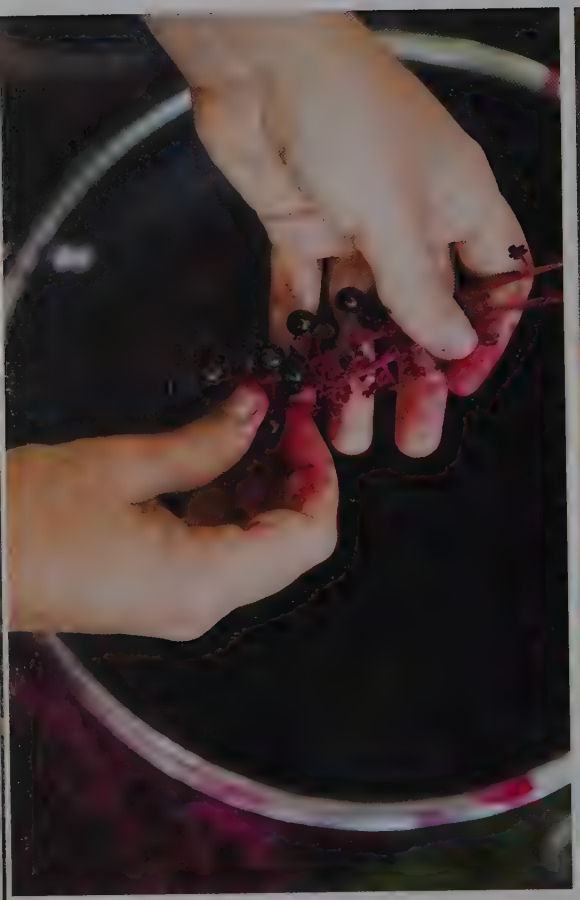
Pokeberry's many uses are woven into the stories of American life. In the nineteenth century, pokeberry was fermented to make ink. Letters written with it survive from the time of the Civil War; the soldiers' words, originally bright fuchsia, are now brown with age. The cooked spring greens of pokeberry afforded needed nourishment to many Southerners and Appalachian residents, from the colonial era all the way through the Great Depression. Until as late as 1989, cans of "poke sallet" could be found in some California markets, where it remained a favorite food among those who'd left the Dust Bowl and emigrated west in search of a better life. Even though the penchant for poke sallet has passed and the greens are no longer processed commercially, I did meet one elderly woman in my travels who continues to cook and enjoy her poke greens each spring. (She cautioned that once the leaves mature, they are no longer edible—poisoning those attempting to eat them.)

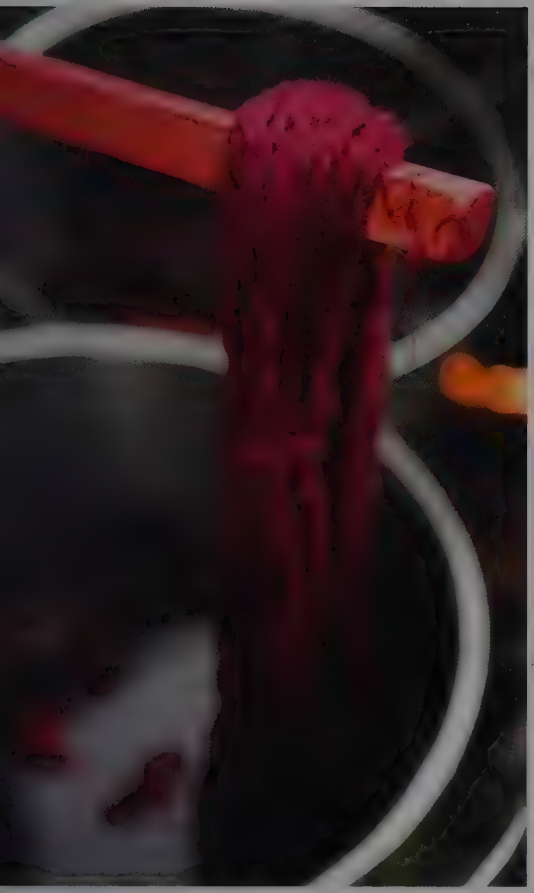
Dyers have long wondered whether it was possible to transfer pokeberry's strong magenta color into fiber in a lasting way. When pokeweed dye was applied to fiber, it quickly faded with exposure to light. However, Missouri weaver Carol Leigh experimented with levels of acidity to devise a method that creates lasting color: she creates a low-pH dye vat and premordants her fibers in vinegar.

"It was a class given here at the studio, and our group was so efficient, we'd run out of dyes to work with," Carol reminisced. "So I suggested we try pokeweed." The teacher said it wouldn't work, but Carol and another student went out that night and harvested pokeweed in the moonlight. The next day, through various iterations, the recipe on page 91 was created. Over time it proved to do something no pokeberry recipe had done before: when you visit Carol's studio, she will happily show you her pokeberry-dyed yarns, which have retained color for more than ten years without fading!

where to find it

Native to more states than not, pokeberry is relatively easy to find. It is a perennial shrub that can grow as tall as a small tree, and is found along roadsides and at the edges of forests. I found the plant growing not far from my home and harvested seed from inside the berry in the early fall. To germinate, each seed must be poked with a needle before sowing, a process known as scarification. I began growing the plant in the early spring in my





garden, and by late summer it was more than six feet tall, with numerous strands of hanging berries.

harvesting

For your dye vat, you will likely find most of your berries in late summer through fall. Harvest the berry-filled stems from several plants, leaving some for the birds to feast on. It's important to note that the pokeberries are toxic to humans.

recipe

Pokeberries are quite heavy, so do not be dissuaded by how much is necessary for a good dye bath. Your gathering basket will fill quickly with the needed quantity.

Ratio of 25:1, pokeberry weight to fiber weight
Yarns mordanted in vinegar (see page 32)
White vinegar (amount depends on amount of water in your dye pot)
pH test paper

1. Remove the berries from the stems and place them in your dye pot (you can compost the stems). With a potato masher or your fingers, squish the berries until they have all been crushed. Fill your pot with enough water to cover the berries and still allow enough room for your yarns to move about freely. Add ½ c. of vinegar for each gallon of water in your dye pot, or enough vinegar to create a pH of 3.5.
2. Once the proper pH has been attained, gently heat the dye pot on low to medium heat (160–180°F)—any bubbling or boiling will destroy the red color. Let the vat steep for about an hour and then strain. It's best to make sure the pokeberry seeds have been removed, so they do not get into your fiber.
3. Prewet your yarn. If the yarns are not going directly from their mordant bath to the dye pot, it is best to have them in an acid bath while they are waiting; this can be done by adding ¼ c. of vinegar to the soak water.
4. Add the prewetted yarns to the dye pot and let them soak on medium heat (160–180°F) for approximately two hours. If you have the time, I recommend that you leave the yarn in the vat overnight. To soak the yarn overnight, turn the heat off after two hours and cover the pot with a lid.
5. After removing your yarns, let them hang in a shady location for at least 20 minutes and up to half a day; then rinse them gently in cool water until all the excess color is released.

RESTORATION DYE GARDEN

Students from the Lagunitas School harvesting from a restoration garden they planted and continue to maintain.

A restoration dye garden is a place where native flora and fauna are enhanced through planting schemes that mimic healthy local ecosystems. Once designed and in the ground, the maintenance of the garden is performed by the natural dye makers. The pruning and coppicing by-products of tending the garden provide the primary ingredients for the dye pot.

Restoration dye gardens can take many forms. They can be as small as potted plants on the deck of an urban apartment or fill up an ample plot of depleted soils in an overgrazed rural field. A dye garden can also be a perennial border in a suburban food garden or a once-untended corner of a school garden.

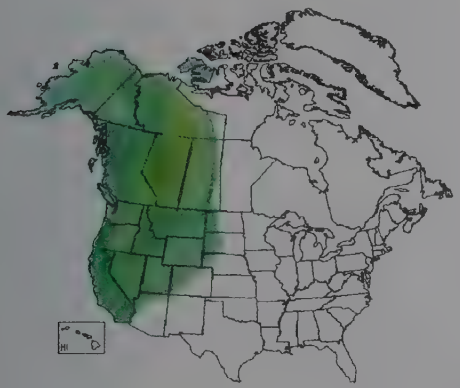
The key to their creation and successful perpetuation is to plant what is local. Find species that once grew where there is now concrete or can still be seen in untrammeled parts of the neighborhood. Many recipes in this book highlight plants that are native to large parts of the country (however, the maps often show a broader area, including regions where a nonnative plant has naturalized). Choosing plants and recipes from these pages is a good place to start in the planning of your garden, but make sure you also refer to a field guide, local native plant nursery, or seed purveyor before making your final planting decisions. You want the species you cultivate to grow harmoniously within your ecosystem, and not become invasive.

A restoration dye garden has many benefits. Native plants require little or no irrigation after the first year. They naturally deter pests while attracting and supporting beneficial insects in the garden. Many of the dye plants in these pages are perennial and will become mainstays of the garden. Some of these species coevolved with fire and herbivorous animal life and are accustomed to the beneficial disturbances of being heavily "pruned" back by natural forces (see Beneficial Disturbance, page 10). The natural dyer can mimic the role of these forces with a good set of shears and a little pruning knowledge, preventing the plants from becoming woody and overgrown.

The restoration dye garden inspires us to return species to their place of origin after the leveling, building, and other disruption characteristic of human activity. Simultaneously, these plants supply us with useful natural resources that supplant the need for store-bought dyes, which come with a much greater price tag and environmental impact than represented solely by the out-of-pocket monetary expense.

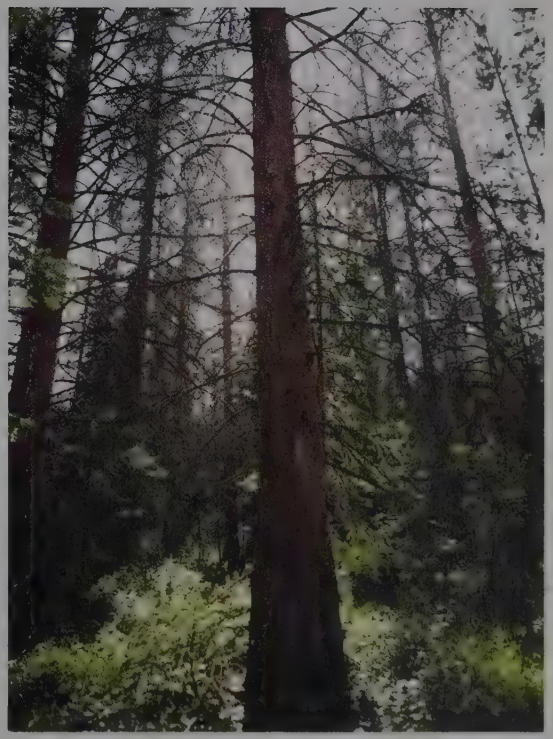
lodgepole pine

latin name | PINUS CONTORTA



The lodgepole pine forests are located between 6,000 and 9,800 feet above sea level. As their name suggests, the trees grow in a polelike fashion, rising 70 to 80 feet high with proportionally narrow diameters. American Indians both in and around the region utilized these trees to create their tepee poles. Due to the lodgepole's natural growth pattern, forests are densely packed, with trees growing within several feet of one another. Their seed-filled pinecones require the heat of fire to open and spark the germination process—the result of evolutionary pressures over hundreds of thousands of years.

I harvested the bark of lodgepole pines from dead trees that currently cover much of the landscape in the Medicine Bow National Forest. Throughout southern Wyoming and northern Colorado, the western pine beetle has decimated more than 1.5 million acres of pine forest. Due to climatic changes causing warmer winters, the trees have become weakened and susceptible to the effects of the insect. This shift in forest ecology has left a mass of dead and dying trees, and so far little has been done to remedy the situation. Carol Lee observed, "The trees were beautiful before the beetle. It's a shame to see this loss, and we need to help these forests."



Utilizing the bark of these trees for dye makes use of an abundant and untapped resource. The process of gathering the bark is simple; and the dye—a soft, walnut shade of brown—can be made within one day.

where to find it

Lodgepole pines grow throughout the high-elevation mountain ranges of the West. The trees can be found in mixed forests of

spruce, cedar, and aspen, as well as more homogenous communities that consist only of pine. The forests are remarkable, even in their death. A bird's-eye view shows a sea of red and orange trees that stand in sharp contrast to the small remaining stands of green. The dead trees are both easy to find and abundant. Harvesting in the national forest is legal, as long as you are harvesting only for your personal use.

harvesting

The tree bark can be gathered at any time of the year. It can be either peeled directly off of the dying trees or collected from the forest floor. If the bark is to be harvested from living trees, be sure not to take it from the full circumference of the trunk, as this will sever the flow of nutrients and kill the tree, a procedure known as "ringing."

I chose to harvest this species in the early autumn when it yields a soft walnut brown in the dye vat that's perfect for a fall color scheme. The early autumn is also a wonderful time to visit the mountains—the trembling aspen leaves are turning yellow, berries remain on many of the bushes—and after a busy summer of visitors the forest has become quiet again.

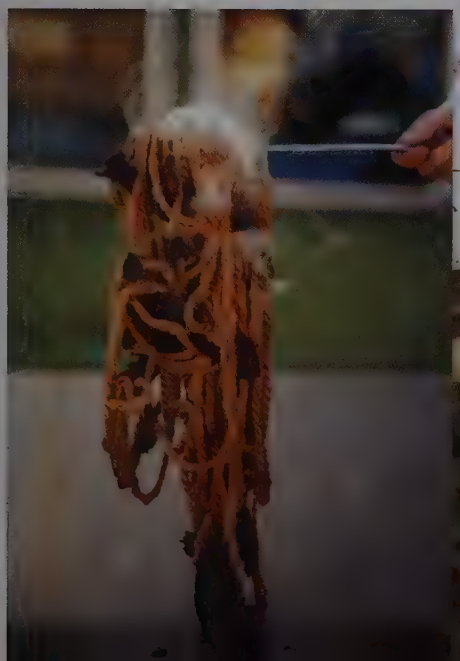
recipe

Ratio of 4:1, pine bark weight to fiber weight
Fibers mordanted in alum

If the pieces of bark are large (anything greater than 8 inches square), break them up into smaller pieces (about half the size), add them to the dye pot, and fill the vat with enough water that your fibers will be able to move about freely. Bring the dye to a gentle simmer or low boil (185–212°F) for 1½ to 2 hours. Add the fiber and then lower the heat so the dye cools to a steam (160–180°F)—it is important that the dye bath come to a boil before the fiber has been added, as this will darken and strengthen the color. Leave the fiber in the dye bath for 1 hour (at 160–180°F, or steam). It is fine if the dye reaches a boil. This will not alter the color. After approximately 1 hour, remove and hang dry. After it has cooled to room temperature, rinse the fiber in lukewarm water.

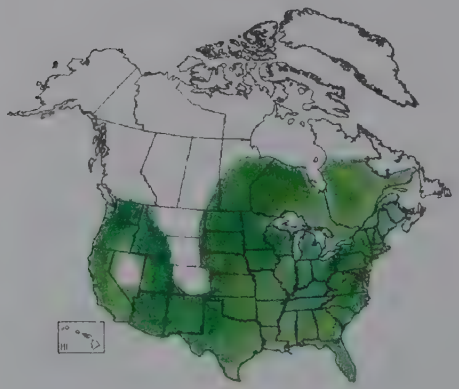
Red and gray trees have succumbed to the western pine beetle infestation.

OPPOSITE, FAR RIGHT **(from left): Handspun Corriedale cross wool and machine-spun merino yarn.**



black walnut

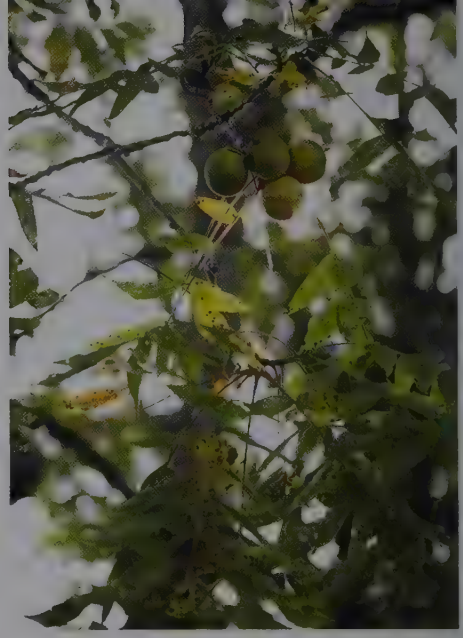
latin name | JUGLANS SPP.



Black walnut yields a rich brown dye that carries a hint of brassy yellow. The outer husk is the source of the color, which was once used to dye the uniforms of Confederate soldiers and is now used to create inks for temporary tattoos.

Native Americans used the black walnut as both a food source and a medicine. The meat of the nut contains a nutritionally balanced mixture of omega oils; the inner bark was and still is harvested for the creation of an anti-inflammatory tonic. The outer husk is initially green and has a fragrant aroma reminiscent of lemon rind and cedar bark. Once the husk has been cut and exposed to oxygen, it begins to oxidize and turn brown.

The walnut can be harvested from the tree or simply picked up off the ground at either the green or brown stage of maturity. There are two options for harvesting the black walnut husk for dye: The first is to use the whole walnut, including the husk; the second is to scrape the husk from the walnut shell. Either way, the dye color will be the same. If you plan on removing the husk to preserve the walnut for later eating, you'll want to use a paring knife and wear gloves (the husk is filled with tannin



that can be very drying and yellowing to the skin). After trimming, leave your walnuts in the sun for several weeks, which will allow any remaining husk to shrivel and fall off. Walnuts can be left in their shells and cracked open for eating as desired.

where to find it

There are fifteen species of black walnut trees in the United States, all of which are useful for dye making. The external husk is green in each of these species, and is easily identified among the leaf litter that begins to drop in the late summer and early fall. The trees are popular in many suburban and rural communities because of their seasonal beauty;

the deciduous leaf turns yellow in the fall and during the winter a few walnuts still dangle from the bare branches. The easiest way to identify the tree is to scan the ground in the autumn. Once the walnuts are found, you can look up and take visual stock of the bark and leaf shape of the source. This is a good way to hone your black walnut identification skills.

harvesting

Walnuts can be harvested beginning in the late summer and throughout the fall, but try to harvest early so you don't miss your chance. The trees are well loved by squirrels and crows, and for that reason walnuts can disappear quite quickly. In suburban areas I have to harvest early in the autumn to ensure I can gather enough for my vats. In rural regions, where animals have a greater choice of food, there is a greater window of opportunity, and I can harvest well into the fall, always with more than enough to gather.

FROM LEFT: **handspun Corriedale cross yarn, walnut, and machine-spun merino yarn.**

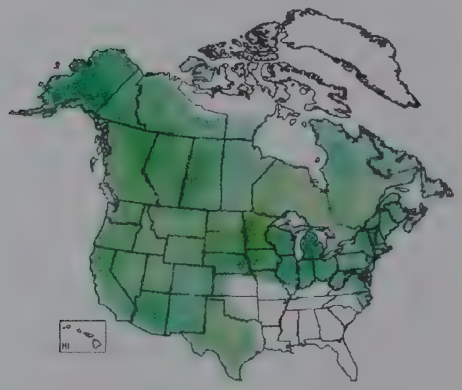
recipe

Ratio of 6 lbs. of walnuts to 5 oz. of fiber
Fiber must be washed but can be left unmordanted

Put the husks or whole walnuts into a 5-gallon plastic bucket filled generously with water so that they float. This mixture should be covered with a lid, and allowed to ferment for a minimum of three weeks (or until the water is dark brown and somewhat sludgy). When the mixture is ready, pour the entire contents of the bucket into the dye vat and boil for one hour; then strain out the husks or walnuts and return the strained liquid to the heat. When the dye is steaming and just about to boil, add your fiber and leave it to soak on low to medium heat (160–180°F) for 60 to 90 minutes. The heat can be turned off after this time and the fiber can be removed, or it can be left in the dye vat overnight to obtain a deeper brown. The strained husks can be returned to the used dye liquid, and returned to the bucket for further soaking. The process of heating, straining, and dyeing can be done repeatedly until you've exhausted the color.

trembling aspen

latin name | POPULUS TREMULOIDES



FROM TOP: **Machine-spun merino yarn and handspun Corriedale cross yarn.**

Aspens are the predominant tree species in North America. They're the first trees to recover after a forest fire. Their success is in large part due to their ever-expanding underground root system. In fact, about 80,000 years ago, a male tree started growing in what is now the Fishlake National Forest, Utah, and its root system has expanded and sent up shoots over the centuries, creating a colony of aspen trees that is one of the largest living organisms in the world today.

Despite the longevity and endurance of such trees, recent disruptions of soils and climate have made the aspen susceptible to what is known as "sudden aspen decline" (SAD). Almost 140,000 acres of its range in northern Colorado and southern Wyoming have been affected.

I harvested the yellowing leaves from trembling aspen trees just outside of Encampment, Wyoming, in mid-August. Even though that was a month before the autumnal equinox, fall arrives early in the Rocky Mountains. I traveled into the forest with Carol Lee of Sheep Shed Studio at the tail end of a cool, unusually wet summer. Normally, Carol told me, the aspen were ready to drop their leaves after months of dry, almost

droughtlike summer weather, but the trees were still fairly green, so we were barely able to harvest enough yellow leaves in the cool mountain air to fill our dye vat.

The recipe is Carol's creation and takes one day, start to finish. Carol recommends leaving your dye vat out for several days of use; in her experience the leaves will emit more color if left in the vat with periodic reheating. If you do add a second or even a third round of fiber, the shade of yellow achieved will be increasingly lighter in tone.

where to find it

Trembling aspen can be found throughout the United States, with the exception of particularly hot, damp climates and open prairies. Aspen quickly recovered from the heavy logging of pine forests and clearing of farmlands during the Great Depression, and to this day can be found in regions once covered in pine. It prefers loamy soils (well-balanced mixtures of clay, sand, and organic matter) and full sun.

harvesting

The leaves can be harvested in the northern states beginning in the very late summer and early fall. In most regions the yellowing begins around the time of the fall equinox. The brightest yellow leaves will yield the strongest color for the dye vat. Leaves are the primary ingredient in this recipe, so avoid the collection and use of larger stems and twigs, as they will alter your weight ratio.

recipe

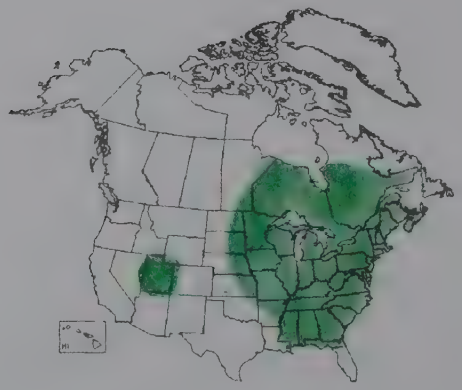
Ratio of 4:1, aspen leaf weight to fiber weight
Fibers premordanted in alum

Add the fresh yellow leaves to a full pot of water and heat the mixture to a boil. Once the bright yellow pigment has released into the vat—60 to 90 minutes—the dye is ready. Add the prewetted fiber to the vat and reduce the heat, allowing the fibers to simmer (185–200°F) for 1 hour; then remove the fiber and let it hang dry. The leaves will continue to release color well into the evening if the heat is turned off and the lid left on the pot.

If you desire to add more fiber to the dye vat, treat it in the same way as your original solution, simmering the leaves and fiber for another 60 to 90 minutes.

staghorn sumac

latin name | RHUS TYPHINA



Staghorn sumac is closely related to both poison oak and poison ivy, yet its distinctive red berries and dense thickets set it apart from its poisonous relatives. Traditionally, the brightly colored berries of staghorn sumac were used for the creation of a refreshingly tart drink. This lemonadelike tonic is made by soaking a stalk of the berries in cool water overnight, then straining the liquid through cheesecloth, and adding a bit of sweetener before drinking. Staghorn sumac has a long list of medicinal uses, among them an Appalachian folk remedy that uses a poultice made from the berries to stop bleeding and a pounded mixture of berries and roots that can be applied to canker sores, warts, and fever blisters.

Staghorn sumac is filled with tannin, a naturally occurring mordant, so it can be used on unmordanted fiber. However, when combined with an iron mordant afterbath (see page 36), the brown dye turns to a deep charcoal color. Without the iron afterbath, the fibers turn a soft chestnut brown.

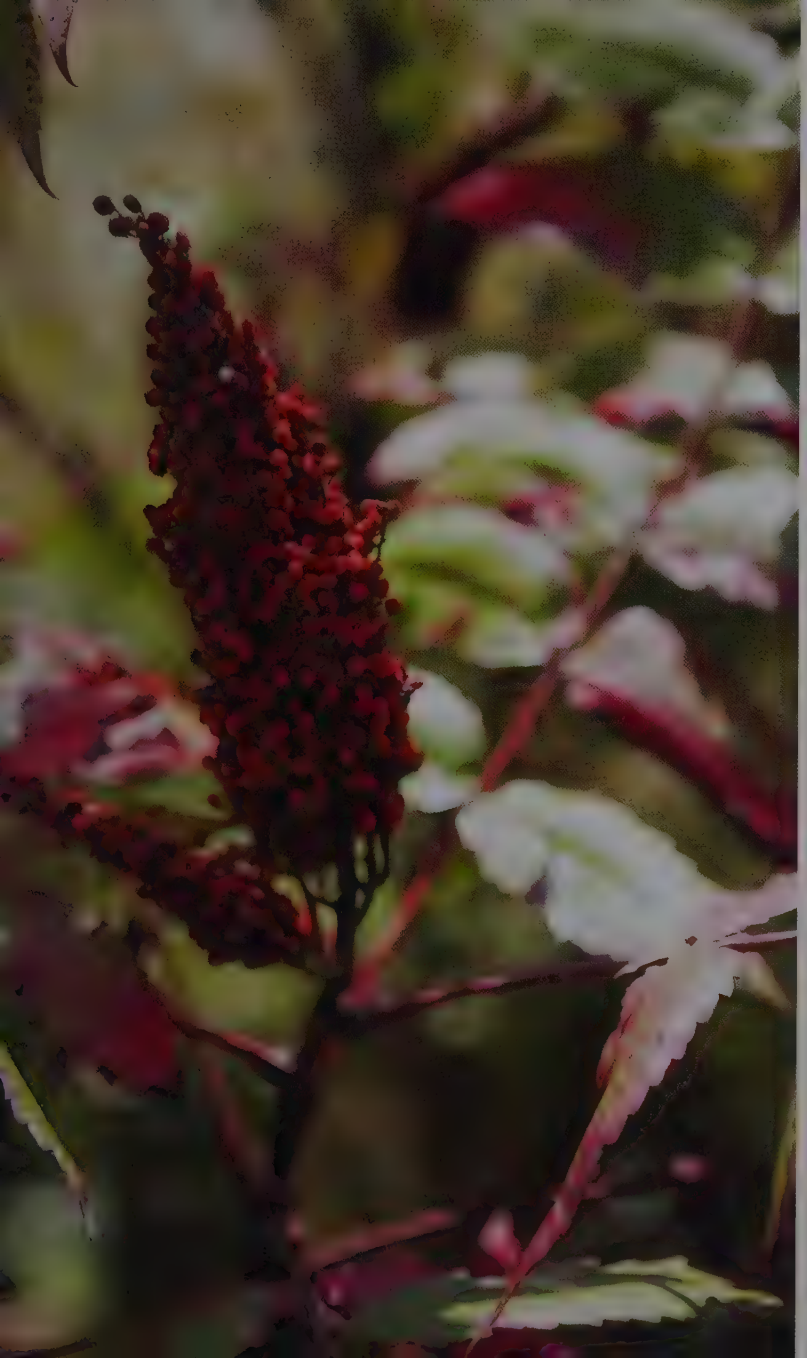
This recipe, from Carol Leigh of Hill Creek Fiber Studio in Missouri, calls for using the pinnacle-shaped berry heads only. These can be harvested in the late summer through fall. Staghorn sumac is deciduous and will begin to lose its leaves in mid- to late fall; the berries linger and in more temperate latitudes will remain well into the winter. This unique species with its beautifully shaped winterberry heads brings a vibrant color to the garden during a typically quiet and dormant period.

where to find it

Staghorn sumac is native to the Northeast and Midwest. It grows in disrupted soils, particularly along roadsides. It is also found at the edge of forests and on the outskirts of the prairies. It is commonly seen growing in thickets due to its rhizomatous root structure, which consistently sends up shoots throughout the spring and summer months.

harvesting

I gathered the berry heads in mid-September in the foothills of the Ozark Mountains. Carol recommends harvesting throughout the late summer and fall. If you are harvesting for the first time, it is easiest to learn to identify the plant when the leaves are still present. Birds rely on the berries as a winter food source, so gather only what you need, leaving behind 80 to 90 percent for animal life.



FROM LEFT: Unmordanted machine-spun merino wool, sumac berry, and unmordanted handspun Corriedale cross wool.

recipe

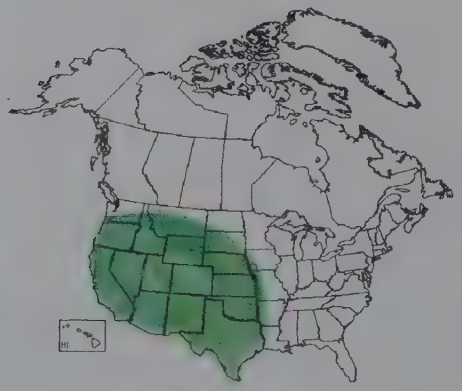
Ratio of 10:1, sumac berry weight to fiber weight

Add berries to the dye pot and add enough water so that the fibers will be able to move freely in the vat. Boil the mixture for 1½ to 2 hours until the liquid is a rich brown. To create more space in the dye vat, strain the sumac from the pot. Add your prewetted fibers and simmer (185–200°F) for 1 to 1½ hours, then turn off the heat. To obtain a deeper color, leave the fiber in the cooling dye vat overnight. If you wish to darken the color you can do so by adding the still hot or warm fiber to a steaming iron afterbath (see page 36) for 20 to 30 minutes. After removing the fiber from the dye vat or afterbath, let the fiber cool in a bowl or on a dry line until it has come to room temperature and then rinse with lukewarm water and hang dry.

Handspun Corriedale cross wool with an iron afterbath (left) and machine-spun merino wool with iron afterbath (right).

mountain mahogany

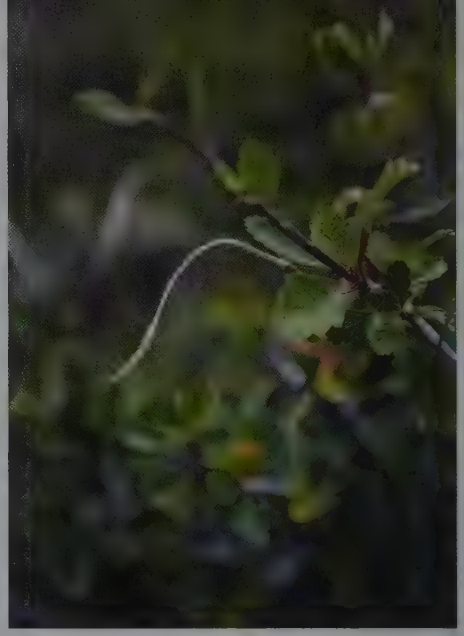
latin name | CERCOCARPUS MONTANUS



This extraordinary hardwood was traditionally used for tools. The Navajo sculpted it into prayer sticks. The Coast Miwok and Wintu, among many other tribes, fashioned it into digging tools that helped them unearth edible and nutritionally rich bulbs and tubers.

I harvested mountain mahogany root in Medicine Bow National Forest with dyer Carol Lee. We scaled a steep, rocky slope where the plant's roots were exposed and clinging to the hillside. These deciduous shrubs grow no more than three or four feet tall in this dry environment.

Among various Native American tribes, the area around Medicine Bow was well known for its mountain mahogany, even with the low-growing stands. Native American tribes from many areas would come to the forest to make their hunting bows from this famed wood. The local hot springs were also an attraction, an intertribal place of healing and personal restoration, where disagreements over territory would be left behind so that all could relax in the mineral-rich waters. The name Medicine Bow reflects the thousands of years of repeated and ritualized mountain mahogany tool-making and healing activities that took place in this region.



Mountain mahogany's root will create a soft, pinkish tan color. Very little of it is required for a good dye vat, yet the processing time is greater than for many other species. To extract the pinkish tones, the roots must be soaked in water over several days, with periodic heating.

where to find it

Mountain mahogany can be found throughout the West in chaparral plant communities. It thrives in well-drained soil and is common to steep slopes. The lateral roots grow out from a large root crown. It is the roots alone that are harvested and used for dye. On steep slopes they are often found protruding from the soil. On level ground they can be found between

two and four feet beneath the soil. The root crown is the life source of the plant, and should be left untouched. After harvesting just what is needed for your dye vat, it is important to cover any holes you've created so that the plant can healthfully regenerate. This plant is commonly used in drought-tolerant garden design throughout the West and, because of its generally slow and shrublike growth, is recommended for border plantings.

harvesting

Harvesting the root must be done when the soil is soft for digging. In regions where the ground freezes, sourcing the root is best done in early-to-mid fall. Be prepared to scale a slope or dig a rather deep hole. Since harvesting mountain mahogany is a more physically demanding process than pruning a perennial or picking a flower, I recommend putting it into the garden, where the soil can remain loose with irrigation and tending.

recipe

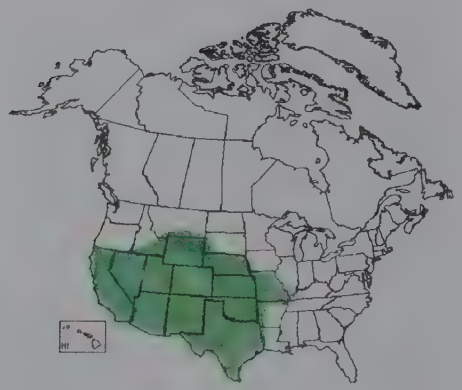
Ratio of 1:1, mountain mahogany root weight to fiber weight
Fibers premordanted in alum

Chop the root into 1-inch pieces, put them into a pot, and cover with water. The smaller the root pieces, the greater the surface area that is created for the water to penetrate. The mixture will take two days to prepare. Heat the mixture to a boil for 1 hour, on both the first and second days, leaving it to cool in between. After two days of heating and cooling, the dye will be ready. You can leave the bark in the dye or strain it out. If necessary (to give your fibers enough room to move freely), pour the entire mixture into a larger dye pot. If you strain the bark, save it for the making of another round of dye—this can be done as described above. Often it takes many repeat boilings to extract all that the root has to offer. If the dye solution has reduced too much after repeated boilings, water can be added to the mixture. Heat the vat up to a low simmer (180–200°F), and add the fiber for approximately one hour. Remove the fiber after the dye has set, let it cool to room temperature in a bowl or on a drying rack, and then rinse in lukewarm water.

FROM LEFT: **Handspun Corriedale cross wool and machine-spun merino yarn.**

white sage

latin name | ARTEMISIA LUDOVICIANA

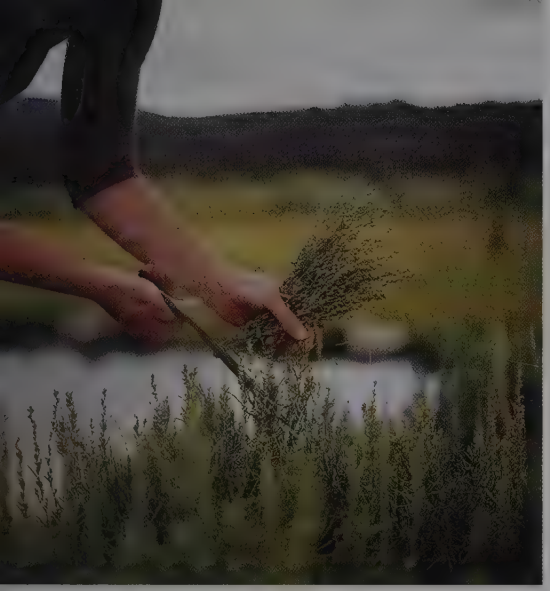


Partly because of its wide range, white sage has many common names, including sagewort, silver wormwood, and western mugwort. In the Rocky Mountains, it's known as white sagebrush. This abundance of names reflects a wide variety of uses, variations in habitat, and shape. The genus *Artemisia* is shared with Big Basin sagebrush (see page 56) and California sagebrush (see page 156).

Artemisia is derived from Artemis, Greek goddess of the Moon, who was associated with the great wild animals—and she herself was a shape-shifter, often appearing as a deer and as a protective force for all wild places. The plants within the *Artemisia* genus are widespread around the globe, functioning as habitat for hundreds of animal and insect species even in the driest and most remote locations, where other species do not survive. White sage is commonly used in Native American ceremonies to clear the minds and hearts of those entering into sacred and spiritual activities. Due to the plant's unique uses, it is crucial that we protect the species from overharvest. Cultivating it in your own garden is recommended so that you can safely harvest, while increasing the overall population.

White sagebrush found in the northern Rocky Mountains yields a strong yellow dye that can be altered with the effects of time and the type of metal pot you cook it in. Carol Lee cooks her sagebrush clippings in a large copper pot to enhance the dye's green tones. All of the sage dye I made with her was completely prepared within one day. For an even stronger green tone, Carol recommends a longer dye-making process: sagebrush dye cooks on the first day, sits overnight, and is reheated the second day (or even on the third day) before adding the fiber. Whether you dye your fiber on the first, second, or third day is a matter of inspecting the dye as you go, and deciding what intensity of color you desire.

This recipe can be cooked in a copper, stainless steel, or enamel pot. The choice of the pot will determine the color outcome: copper lends green, stainless steel lends gray overtones, and enamel provides the plant's unadulterated colors. The color of the pictured skein is due to a slight greening effect created from the leaching copper (see page 16).



where to find it

Varieties of white sage can be found throughout North America. Keep in mind that the white sage pictured is one variety of many; there are variations in the leaf structure and flower head. Consult a native plant guide specific to your locale to identify the species of your bioregion. Native plant nurseries and seed companies are also very helpful in researching local varieties.

harvesting

White sage is best harvested in the early fall. The plant's yellow flowers emerge in the late summer and early autumn. In the West, white sage experiences drought conditions for much of the summer. Harvesting the sprigs of the plant prior to the late autumn and winter rains assures that the plant is potent with natural oils and pigment. The brightest yellow can be obtained in the fall season.

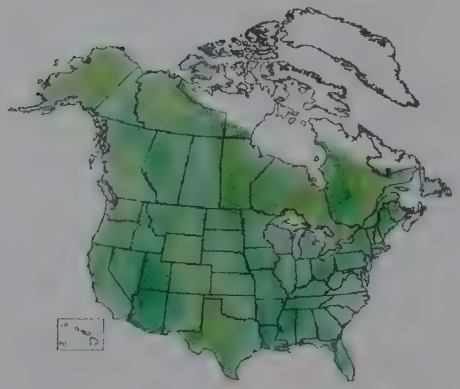
recipe

Ratio of 8:1, white sage weight to fiber weight

Add the sprigs of sage to the dye pot of your choice, and cover them generously with water so that your fibers will be able to move freely. Heat the mixture to a rolling boil for 1 hour. At this time, check to see if the water has turned yellow; if it hasn't, then leave the dye vat on the heat until the yellow is extracted. Lower the heat to a simmer (185–200°F) and add your fiber for 45 to 60 minutes, keeping the heat consistent. Remove the fibers and let them cool to room temperature, rinse them in lukewarm water, and return them to the drying line. The sage vat will keep releasing color for as long as one week. The mixture can be reheated to a simmer periodically, for an hour at a time. After this reheating, more fibers can be added and left to cook for a minimum of 45 minutes. For greater experimentation, fibers can be left in the cooling dye pot overnight, or over a period of two days.

curly dock

latin name | RUMEX CRISPUS



Curly dock is most visible to the natural dye gatherer in the fall, when its seed head has dried and all that remains is a reddish brown stalk. These tall vestiges of the blooming plant are common in open fields and damp soils. Dock is a native of Eurasia; in most parts of North America, partly because of its aggressive self-seeding ability, it's considered a weed. However, it is a wonderful dye plant with many other uses. The dried and powdered root can be made into a poultice for burns, skin irritations, and boils. The young spring leaves, which are edible, were used as a tobacco substitute by Native Americans.

I harvested curly dock root in the Medicine Bow Mountain range in a low-lying meadow fed by an underground spring. I identified several curly dock seed heads in the lush field, and began to dig out one of the roots that lay beneath the rocky soil. My objective was to harvest the whole root in order to avoid breaking the plant into small, hard-to-retrieve pieces. At first the soil proved too dense to penetrate. Once I focused on a spot with loose, damp soil, I was able to remove the entire root.

When used with an alum mordant, dock root creates a soft pink color that is almost

Carol Leigh with a bouquet of dock seed heads.

identical to the color created by mountain mahogany root. Dock is accessible in suburban and even urban areas, and is recommended for those who want to create the fall color palette, but cannot access the high-elevation areas where mountain mahogany is found.

where to find it

Dock root is common to every state in the country, including Hawaii, and every province in Canada. It favors moist soils, open grasslands, and sloughs. It can often be found in disturbed soils or popping up in unmaintained lawns. Due to its prolific nature, dock is common to rural, suburban, and urban regions. Where soil is turned, curly dock is likely to germinate. Like many common species, dock can be cultivated easily, by simply refraining from mowing or weeding the garden.

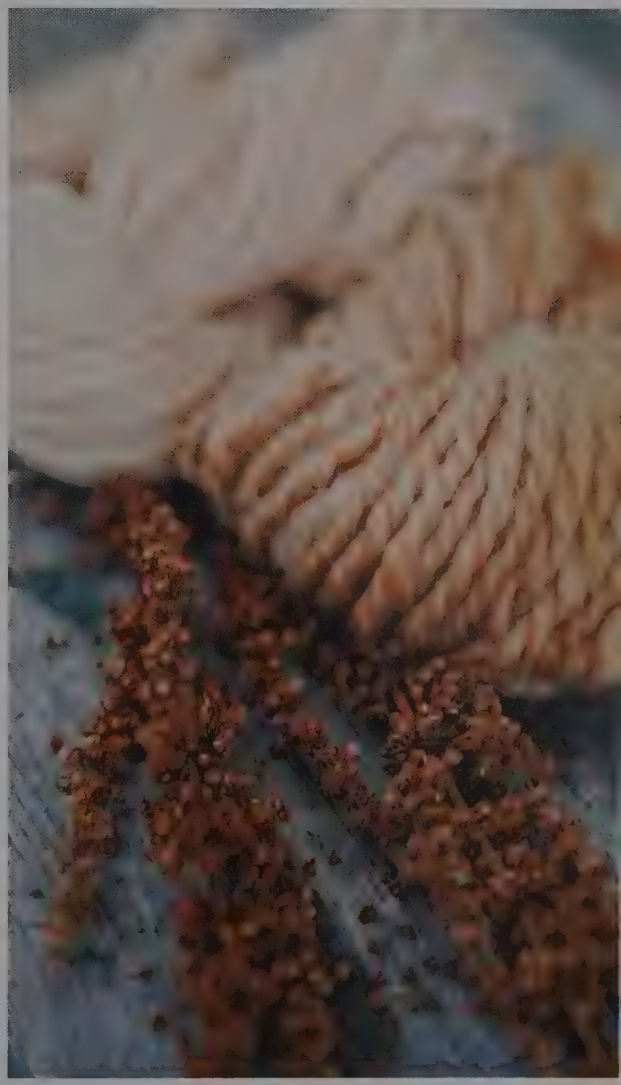
harvesting

Harvesting in the fall will yield the strongest color in the dye vat. However, the root can be collected at any time of the year. The plant is easily identified in the fall. The tall drying stalk stands out among its neighboring plant species. To dig out the root, you'll need a shovel and, as I discovered, a bit of patience. Begin digging around the base of the plant; once you're about 18 inches below the surface, the root should begin to loosen. Gently pull on the stalk until you feel it easily emerge from the soil. This may require some work with the hands.

recipe

Ratio of 3:1, dock root weight to fiber weight

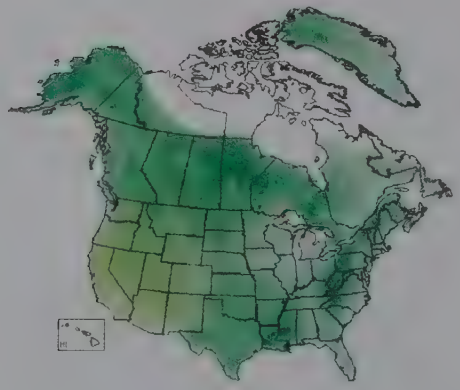
Cut the dock root up into small pieces and soak in water overnight. The next day, bring the mixture to a boil for one hour to release more color. After one hour, strain the roots through cheesecloth and tie them securely. This bag of root pieces is then returned to the dye pot. Keep the dye hot and steamy (180–200°F) and add your fiber for 60 to 90 minutes. After this time, remove your fiber and hang. When the fiber has cooled, rinse in lukewarm water and return to the drying line.



FROM LEFT: **Machine-spun merino yarn and handspun Corriedale cross yarn.**

sheep sorrel

latin name | RUMEX ACETOSELLA



Sheep sorrel is a well-known perennial herb that makes up a substantial component of the herbal "Essiac" tea blend, which is widely used in the treatment of cancer because of its apparent ability to destroy mutating tumor cells. The plant also is a powerful antioxidant, making it a favorite in many medicinal herb gardens, and its leaves are full of vitamin C, supporting the suppression and healing of viral infections.

Despite all this, the plant is considered noxious and has been banned from planting in Iowa and Connecticut. If you are able to plant sheep sorrel, consider doing so within the confines of a container, to limit its spread within the garden.

Sheep sorrel reproduces both by seed and through underground rhizomatous roots. It is a pioneer species, often one of the first plants found growing after soil-disrupting activity such as a forest fire has taken place.

I harvested sheep sorrel along the roadside in Wyoming with natural dyer Carol Lee. Carol had discovered that premordanting fibers in iron created a rich forest green in the sorrel dye vat. Harvesting and dyeing can be done in one day. We added fresh plant matter to the wood-fire dye vat in the morning and by the early afternoon the deep green skein had emerged.

where to find it

Originally from Eurasia, sheep sorrel has naturalized in the United States and can now be found across the country in a range of elevations and soil types. Because sheep sorrel is regarded as a noxious weed, harvesting the species will likely be easy and even appreciated by landowners. It does prefer sun and open areas—on the edge of the forests, in meadows, and along the road's edge, thriving particularly well in acid soils.

harvesting

The dried stalks and seed heads are harvested and used for the dye vat. The harvest begins when the stalks turn reddish brown in early fall. Harvesting the dried stalks before they drop their seeds is a method for reducing the rate of reproduction.

RIGHT: Handspun Corriedale cross yarn (left) and machine-spun merino yarn (right).

recipe

Ratio of 2:1, sheep sorrel weight to fiber weight
Fibers premordanted in iron

Add the sheep sorrel stalks to the dye pot and cover with enough water for the fibers to move freely about the mixture. Boil the sorrel for 60 to 90 minutes, until there is a color change in the water. Premordant your fiber in iron, then add it directly to the dye bath, keeping the temperature at a low simmer (160–185°F) for approximately 90 minutes. Sheep sorrel is generally good for only one dye bath, unlike sage or some of the barks and roots, where color can be successfully extracted more than once. Your yarn is done when you see that it has turned a deep shade of green. Once this has occurred, remove the yarn and hang it to cool, then rinse it in lukewarm water and return it to the drying line.

ROCKY MOUNTAIN DYER

Carol Lee holds a recently harvested bouquet of dock seed heads, extra material from our root-harvesting process.

On the outskirts of the Medicine Bow National Forest in the southeastern corner of Wyoming is the small former copper mining town of Encampment. Just outside of the town's center, in a renovated early-twentieth-century schoolhouse, is where you'll find expert natural dyer Carol Lee and her Sheep Shed Wool and Dye Studio. The large mountain goat on her front door, which Lee herself carved, is a welcoming image, and a reminder of the greater biological community that defines this remote and beautiful mountain community.

Although Carol is kept very busy with her Sheep Shed Studio wool business, she makes a point to travel into the mountains often with her husband, Carl, accompanied by their well-loved llamas. The animals have been known to carry her spinning wheel and even a dye pot up the slopes and ridges, deep into the Medicine Bow Range. During these mountain sojourns the couple will make camp and Carol will sit and spin wool, while a pot of stew cooks over the fire. "That is the good life. . . . Carl and I have raised children and worked hard. Getting to go into those mountains . . . it's just what we love to do," Lee reflected.

Carol and Carl began on a dairy farm in Missouri in the 1970s, an era when family farms were disappearing. "We were working eighteen to twenty hours a day, trying to stay afloat. We worked those long hours, and still we were going into debt." At that time the couple were forced to give up the farm, and began driving semitrailers, hauling everything from hogs to Coca-Cola. "I'd see Carl in passing, and we managed to raise our children while taking turns at the house. It was in 1979 that I thought to myself, I'm just not going to do this any longer." By 1991, Carol and Carl had moved to Encampment and created what she calls "the ultimate studio playhouse."

Carol's home is designed to accommodate the large groups of fiber artists who arrive annually for an event called "the Gathering." Women come from all around the country to spend the weekend with Carol and her dye pots, spinning wheels, and seemingly unending bags of wool yarns and roving. For many past

Gatherings, Carol and Carl provided thirty-six dye pots for their guests, an event of almost unimaginable size for just two people to carry out. Recently, however, a hip replacement has compelled Carol to shift her focus from hosting students to healing her own body. "I haven't done that kind of teaching since the hip replacement, but we'll see; I'm sure the Gatherings will return," she said.

While Carol is feeling her way back into teaching large groups, she was as accommodating and generous as could be during my visit. It was hard to tell she was recovering from any type of surgery, as I watched her scale steep slopes and hike into the woods with a sense of vigor and agility. Although she hasn't spent her whole life in these mountains, it is clear that she has found her home. Her work with dye plants has given her the means to explore the landscape. Her practice of gathering has brought her into a relationship with the forest that I feel quite honored to have witnessed.

ABOVE: **Carol Lee's wild kitten takes a nap on a pile of naturally dyed wool yarns.**

LEFT: **Carl Lee cuts firewood in the early morning for our all-day open-fire dye process.**

FALL KNIT | hand warmers

These hand warmers feature simple color work. Fifty-five to sixty grams of DK weight yarn is more than enough for one pair of hand warmers. Remember, it is better to dye too much yarn and have a bit left over.

yarn | For color block version: ½ oz. (14 g) of DK weight yarn in color A (sheep sorrel), ⅞ oz. (25 g) in color B (aspen leaves), ⅞ oz. (25 g) in color C (black walnut)

For striped version | 1 oz. (28 g) of DK weight yarn in color A (aspen leaves), ⅞ oz. (25 g) in color B (black walnut), ½ oz. (14 g) in color C (dock root)

For solid version (not shown) | 2 oz. (57 g) of DK weight yarn

needles | U.S. size 5 (3.75 mm) double-pointed needles (set of 4), or size needed to obtain gauge; U.S. size 4 (3.5 mm) double-pointed needles (set of 4) for ribbing (optional)

notions | Scissors, 3 stitch markers, waste yarn or small stitch holder, yarn needle

gauge | 5½ sts per inch

Cast on 38 stitches with color A. Distribute stitches evenly over 3 needles. Join to work in the round, being careful not to twist stitches. Place a marker to denote beginning of round.

Rnds 1–5: Knit all stitches. Cut the yarn and change to color B.

Rnd 6: (K1, p1) to end of rnd. This forms a 1 x 1 rib pattern.

Rnds 7–12: Repeat 1 x 1 rib; piece should measure 2 inches.

Rnd 13: Knit all stitches. If you used the smaller dpns to cast on and create the ribbing, change to the larger dpns on this round. Cut the yarn and change to color C.

Rnd 14: Knit 10 rnds or until stripe measures 1½ inches.

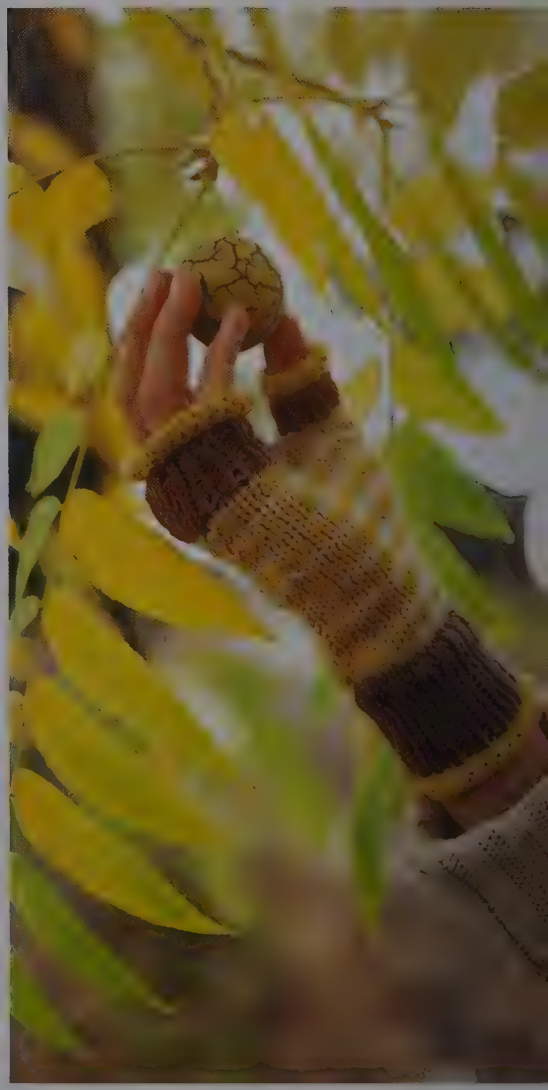
increase for thumb gusset

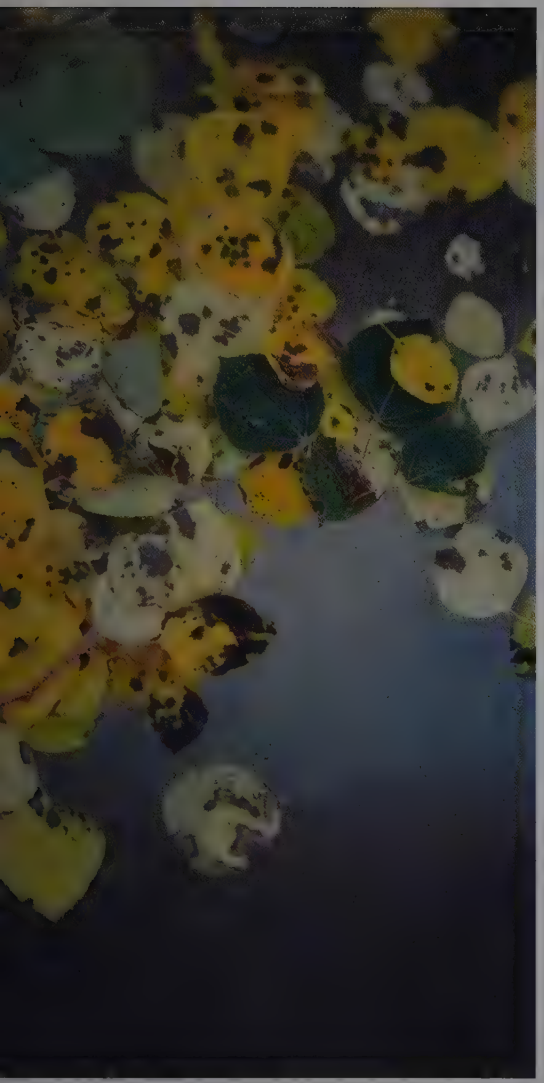
Rnd 1: K18, place marker (pm), make 1 st (m1), k2, m1, pm, k18.

Rnds 2 and 3: Knit.

Repeat these 3 rounds until there are 14 sts between the markers (50 sts total), ending on rnd 3. Cut yarn and change to color B.

Rnd 19: (K1, p1) across 18 sts, remove stitch marker, and slip the next 14 sts onto a piece of waste yarn or a small stitch holder. Remove the second stitch marker; (k1, p1) across the last 18 sts.





Rnd 20: Continue in a 1 x 1 rib pattern for 6 rnds or until piece measures 1 inch.
Next rnd: Knit all sts. Cut yarn and change to color A.
Next rnd: Knit 5 rnds. Bind off all stitches loosely. Cut yarn.

thumb

Slip the 14 sts off the waste yarn or stitch holder and divide them evenly onto 3 dpns.
Rnd 1: With color B, (k1, p1) to end of rnd. Continue in pattern for 6 rnds or until thumb measures 1 inch.
Next rnd: Knit all stitches. Cut yarn and change to color A.

Continue in pattern for 5 more rnds. Bind off stitches loosely and weave in all ends.

STRIPE VERSION

Follow the above pattern for all measurements. After completing the 1 x 1 ribbed section (rnds 1–13 above), change to color C and knit 2 rnds. Do not break yarn.

Change to color A and knit 2 rnds, carrying color C along the side. Alternate between color C and A every 2 rnds, twisting the yarn as you change colors to prevent holes.

increase for thumb gusset

Maintain stripe pattern throughout rnds 1–18 of the increase rnds for the thumb gusset, ending with color C. Continue with the above pattern from rnd 19.

6

winter

The winter inspires time spent within the warmth and light of our homes. Spinning tales and wool were common winter activities throughout colonial America and old Europe, and remain an important part of the winter cultural tapestry of many South American and Central Asian communities.


prickly pear cactus


oyon


dried tansy


coffeeberry

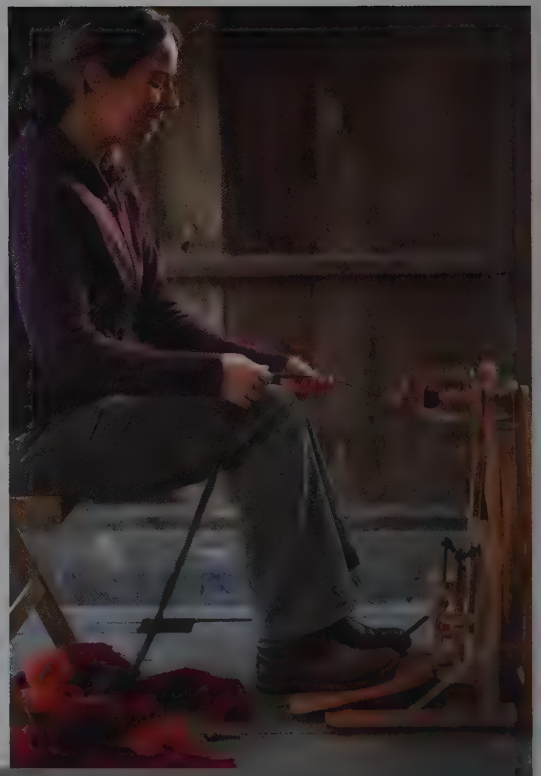
cold winter day spin

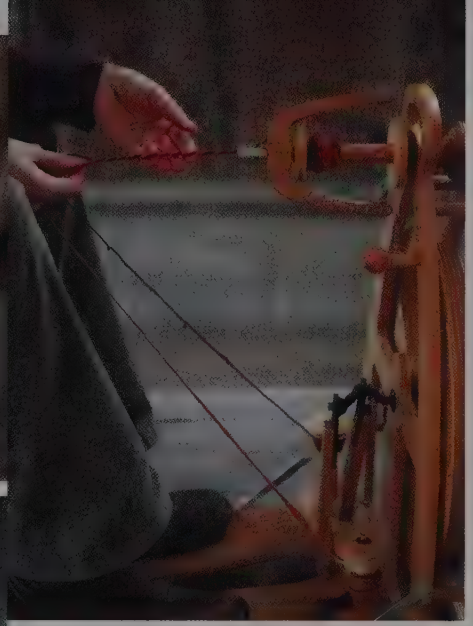
This activity makes use of roving samples from your winter dye processes. I often throw a bit of extra roving into my dye vats for the purpose of creating a random and eclectic assortment of samples to use in my winter spinning work. You'll need an assortment of roving colors (three is a minimum, but there is no maximum); 4 oz. of roving is a good place to start, but you can work with as much or as little raw fiber as you choose (it's your experiment)!

This is a free-form process, like knitting without counting your stitches—you can use as much of each color as you'd like. I take a mental estimate of how long I've been using one color, and then make an attempt to spin the other colors into the yarn for approximately the same amount of time; one minute spinning red, one minute spinning gray, etc. Fill your spindles with enough multicolor single-ply yarn so that you can ply them together.

Once both spindles are filled with yarn, place them at the base of your wheel and prepare to ply them together, taking a strand of yarn from each spindle and placing them on top of one another; begin spinning your wheel in the opposite direction you used to spin your original strands of yarn. I spin my single-ply yarns clockwise and I spin the wheel counterclockwise to ply them together.

Your finished two-ply yarn will have a shifting, two-tone color pattern. The stripes and contrasts of these mixed-color yarns are reminiscent of holiday confections—they carry the appeal of an edible treat, as well as being the basis for very charismatic knitting projects.





A three-color combination emerges on the wheel.

When adding a new color to your yarn, overlay the two colors–new and old–and begin to spin.

toyon

latin name | HETEROMELES ARBUTIFOLIA

The boiling leaves and branches of toyon send marzipan-scented steam wafting into the air as the dye vat is prepared. The plant creates one of the most unique and sweet-smelling dyes of any that I have made. Toyon is an evergreen shrub that can grow to 15 feet in height in the right conditions. Its vibrant red winter berries and white summer blossoms are unique characteristics that make it a favorite backdrop within the perennial garden.

The berries were a traditional favorite of the native Californian tribes, who prepared them by boiling or roasting them in tightly woven baskets. Birds rely on toyon as a winter food source; the berries attract songbirds, including northern red-breasted sapsuckers, thrashers, and wren-tits.

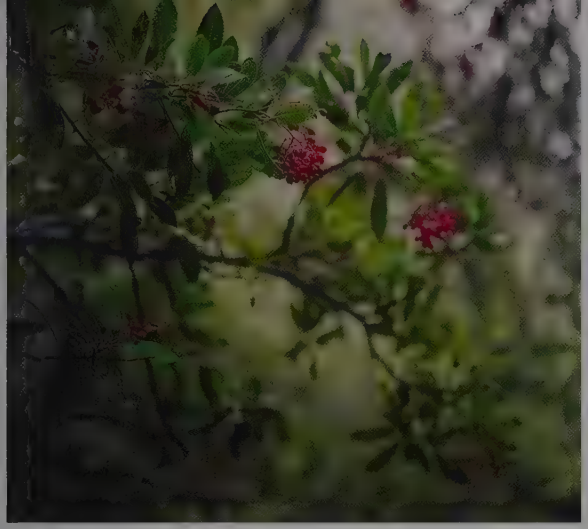
A variety of colors ranging from yellow to rust orange can be obtained from toyon, depending on the soil the plant was grown in and how long the vat is aged after its initial cooking. To deepen the color, I cook the vat and then pour the liquid and the plant matter into a bucket for at least a week (and up to a month) before reheating and immersing the fibers. Upon reheating the dye and plant matter, the color tends to deepen. If mold forms on the top during the aging process, I simply skim it off the surface and proceed with the dyeing process.

where to find it

In the wild, toyon is found within oak woodland, coastal sage scrub, and mixed evergreen forest ecosystems. Its evergreen leaves have a serrated edge and grow from stems and branches whose bark is a deep reddish brown. It is also known as Christmas Berry or California Holly, and in the winter it is easy to identify. The plant is sold at many nurseries within its native habitat and is highly recommended for the garden due to its unique red winter berries.

harvesting

I harvest toyon in the winter. I prune the suckers away from the base or trunk of the plant, but leave the berries for bird food and to ensure the plant's ability to reproduce. Leaves and fresh stems are the preferred material for the dye pot. Toyon should be put into water and cooked soon after it is harvested; if the plant dries beforehand, the dye created will be weaker in color.



FAR LEFT: Toyon berries in winter bloom.

LEFT: Harvesting the suckers from the base of the toyon tree.

BELOW: Corriedale cross handspun yarns dyed in toyon.

recipe

Ratio of 5:1, toyon branch to fiber weight
Fibers premordanted in alum

Follow the Master Dye Bath Recipe (page 35).

variation

For deeper colors, follow the Master Dye Bath Recipe and then pour the mixture into a bucket and let it sit for a week or longer (even up to a month). Reheat the mixture to a simmer (185–200°F) for 90 minutes, then reduce the heat and place your fiber in the vat, removing all or some of the plant matter so that the fiber can move about freely. Let the fiber sit in the dye bath (180–200°F) for 1 to 1½ hours, then remove and hang it for 10 or 15 minutes before rinsing.

coffeeberry

latin name | RHAMNUS CALIFORNICA

Coffeeberry bark was once peeled and cooked for the making of a coffeelike drink. The deep red berries transition to black upon maturity, and are known to have a strong laxative effect upon humans. A decoction of coffeeberry is a favorite medicinal employed to treat rheumatic conditions and muscular pain. Birds and small mammals rely on its small fruit as a food source throughout the winter.

I avoid harvesting the berries, as they are of no use in the dye vat and are better left for the birds to ensure the plant's ability to reproduce. Coffeeberry is one of those wonderful species that can go green. If cooked in a copper pot, the leaves and stems create shades of deep yellow, yellow green, and—given enough time curing the dye—a range of khaki shades. Like toyon, coffeeberry creates a lovely color after the first two boils but can provide a different range of color if the dye and plant matter are left to sit for a week to a month before being reheated and used as a dye.

The foliage of evergreen species such as coffeeberry must be quite hardy to endure freezing conditions and remain on the plant throughout the winter months. The strength of these leaves and stems does not easily diminish in the dye pot, and for this reason, curing and repeat boilings beyond the suggested evening and morning boils of the Master Dye Bath Recipe are useful to achieve a greater range of color. I call this "working the color."

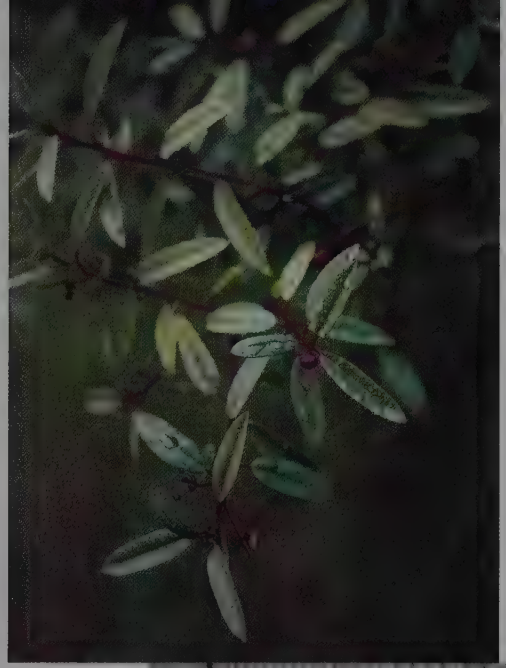
I rarely pour out an exhausted bath after dyeing a batch of fibers—instead, I replenish it with more fresh leaves and stems and repeat the boiling cycle all over again. This technique can be applied to the hardy species listed in this book—the barks, the stiff stems, and evergreen foliage will generally provide a greater range of color if worked in this way.

where to find it

Coffeeberry is found in mixed forest regions and grows taller in less-wind-exposed areas. The plant is evergreen, often occurring in a small shrublike state, and can grow as tall as 15 to 20 feet. Its leaves are oblong and gently curl under at the edges. It lives predominantly in California, but can be found in parts of western Arizona.

harvesting

Coffeeberry is best harvested in the winter, when the plant is not blooming and often just a few berries remain. I harvest only the leaves



and twigs, gently pruning the plant back. This pruning process supports healthy and shrublike growth and mimics the relationship between the plant and the herbivores that traditionally feast upon it.

recipe

Ratio of 7:1, coffeeberry stem and twig weight to fiber weight
Fibers premordanted in alum

Follow the Master Dye Bath Recipe (page 35).

variation

Cooking coffeeberry in a copper pot enhances the green tone of the fibers. Follow the Master Dye Bath Recipe for strong yellow green tones. For deeper shades of green, allow the dye and plant matter to remain in your copper pot for at least a week and up to a month. Reheating the dye occasionally during this time will draw out more color. Observe the changing color over time and add your fiber when you like what you see. Before adding your material to be dyed, it might be necessary to remove some or all of the plant matter.

madder root

latin name | RUBIA TINCTORUM

Madder root has been in use as a dye for four thousand years. Native to the eastern Mediterranean and central Asia, its brilliant red was—and to some extent still is—a trademark of Persian rugs. Demand for madder was what drove traders from the Middle East into central and northern Europe. Eventually dyers in Europe realized how adaptable and hardy the plant was and began to grow it for themselves. Charlemagne insisted the plant be included in his own garden, and church records show that madder was raised for dye in France as early as AD 600. Today textile artists across the globe have adopted the plant for use as a dye, growing and harvesting it far from madder's original habitat.

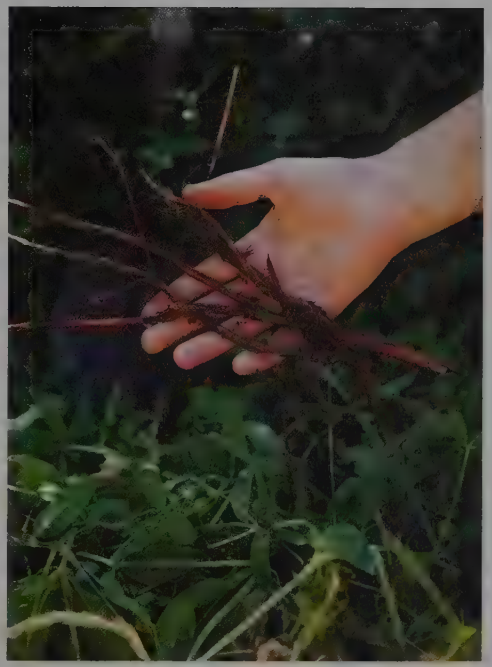
I found madder growing in abundance in the garden of dyer Carol Lee in Encampment, Wyoming—a region with long and very cold winters. In Lee's region of the country madder is best harvested in the spring, summer, or fall; the roots can be dried and saved for winter use. In regions where the soil remains permeable year-round, madder can be harvested at any time.

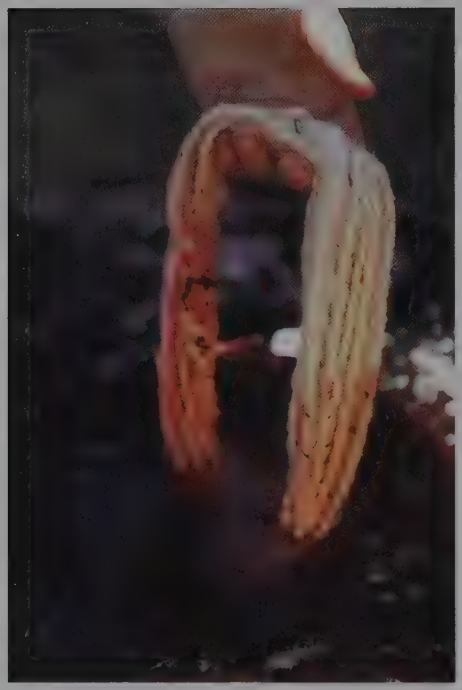
where to find it

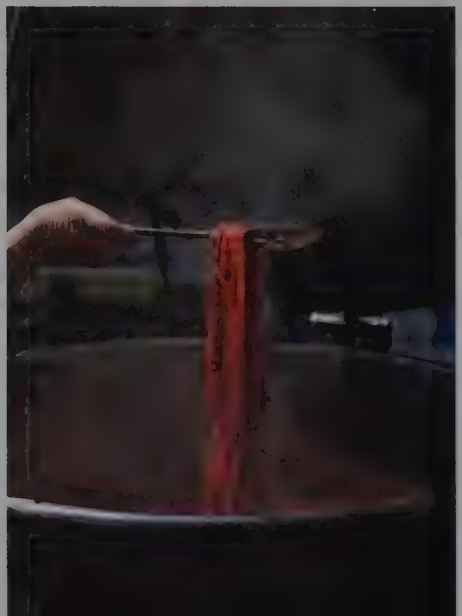
Madder seed and the fresh plant can be ordered from specialty nurseries around the country. Dried madder root can be purchased via mail order from Aurora Silk in Portland, Oregon (see Resource Guide). There are many plants within the same family as madder *(Rubiaceae)* that you may find growing in your area; *Galium mollugo* and *Galium aparine* are examples of closely related species with roots that will yield a red dye. Many of these are noxious weeds and can be harvested in abundance in certain fields and roadside areas. Madder root yields the strongest reds with a relatively minimal weight ratio between fiber and plant matter.

harvesting

If harvesting fresh madder, the root must be three years old to produce strong reds. With some tending the plant will grow well in most climates of North America. Many prefer to keep it in a raised bed, where its prolific nature can be contained. However, if you are harvesting it often, you'll naturally be maintaining and managing the plant's tendency to sprawl. If your garden soil is too frozen to dig into during the winter months, dried madder can be purchased from a dye supplier and sent straight to your door.







recipe

Ratio of 1:1, madder root weight (dry or fresh) to fiber weight
Fibers premordanted in alum

I used fresh root harvested from Carol Lee's garden. Her technique is to clean and soak the roots until they are soft and then break them into smaller pieces and put them in a blender to macerate them. If using dried roots, soak them overnight to thoroughly soften them. This process increases the available surface area for maximum color yields and releases the yellow and orange dye properties of the root. If you want deep reds, it is good to discard the water the roots have been soaking in, and pour fresh water into the blender. Pour the blended mixture into your dye pot, adding extra water to fill the vat so your fibers can swim freely.

Gently heat your dye vat on low to medium heat (160–180°F). The slower the heating, the better; never boil madder root, the dye will successfully fix to the fiber when the dye vat is steaming. Boiling can alter the color toward the orange spectrum.

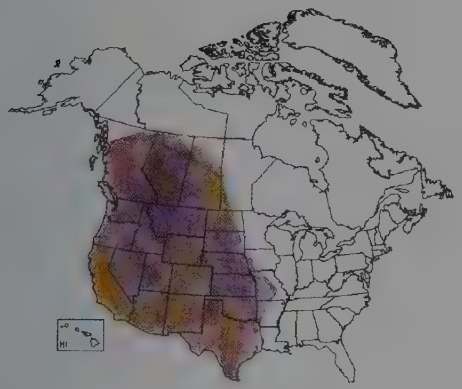
I have noticed on several occasions with certain batches of dried madder root that the first dye bath has yielded an orangelike red; if this is the case, discard the orange water, refill the vat with fresh water, and slowly reheat the mixture. In most cases the red color will release on the second try. Add your fiber once your dye vat is hot and the color has released from the root; this can take anywhere from 1½ to 3 hours, depending on the heat. Often madder root dye takes time to fully develop a strong color on the fibers.

ABOVE: In its first moments in the madder root dye vat; the color emerges slowly—the yarn is pink for some time before turning deep red.

LEFT: Handspun yarns after 90 minutes in the madder root dye vat, ready to be removed.

prickly pear cactus

latin name | OPUNTIA SP.



Prickly pear fruit is a sweet and abundant food source found throughout Mexico and Western North America. At certain times of the year, it was relied upon as a staple. Archeological digs have unearthed human remains that are dense with prickly pear seeds. The wild prickly pear fruit has spread far from its habitat and origin in the Southwest to cover a large expanse of the Western United States. In some areas it is considered quite invasive. With its spiny cactus pads and prickly fruit it can be a challenge to manage.

Prickly pear fruit and juice can be used for conserves, blended drinks, and salad dressings. It can also be fermented for alcoholic beverages. Historically the spines were used as needles, and the pads were eaten and used for treating burns and wounds.

The cochineal insect uses the fruit as food and habitat—the red pigment in the juice and meat is the source of the insect's brightly colored shell. The color produced by the prickly pear fruit on its own creates a range of rose and orange colors. This recipe makes use of a Hopi dye formulation that utilizes the fermented juice and a cold-water process to adhere the dye to the fibers.

where to find it

Prickly pear can be found throughout the West and prefers dry, well-drained soils. It is the most cold-tolerant of all cacti, and can be seen growing in areas with winter freezing temperatures. In my region of Northern California the plant grows in thickets, covering the quick-draining soils of hillsides with a southern exposure.

harvesting

Prickly pear fruit, also known as tuna or Indian Fig, is harvested in the winter months, when the fruit is ripe, and red or pink. Once it is

ready for harvest, it will easily separate from the cactus pad. If you are harvesting for dye and food purposes, use fallen fruit for your dye vat and pick that which you would like to eat. Wear thick gloves if you want to pick without fear of getting pricked. If you are very careful, you can grasp the fruit between the areas where the spines are growing.

recipe

2 lbs. prickly pears
½ lb. yarn premordanted in alum

Wearing gloves, crush the prickly pears with your hands into a plastic bucket, or an enamel or stainless steel vessel. Let the prickly pear juice and plant matter ferment (this can take a week). The top layer of the solution will have yeasts and some molds growing on the surface—this is how you know it's ready. Add your fibers and let them sit in the solution between one week and ten days, or until the color has turned pinkish tan. Massage the solution into the yarns at least twice during the soaking period. After you've removed the yarns, rinse well in cool water.

cochineal

latin name | DACTYLOPIUS COCCUS

The bright scarlet reds of cochineal were harvested during Aztec times through the *Opuntia* (prickly pear) cactus growing regions of Central America. Europeans discovered the dye in the sixteenth century and quickly became infatuated with the strength of color the insect produced in the dye vat. Governments, explorers, pirates, and tradesman continued to lucratively profit from the importation and exploitation of the insect for three centuries until synthetic red was invented and brought to the marketplace. Yet many who wore the new synthetic color complained of the harmful effects of arsenic that leached from the dye onto their skin; others complained of the impacts of synthetic dye production on groundwater sources. For this reason, cochineal production has never fully faded away, despite the collapse of the large colonial projects in Mexico, Guatemala, and the Canary Islands.

The cochineal insects eat from the pinkish red fruits of the cactus and the pigment of the plant lodges in their colorful shells. The female lays her eggs and then dies, and the scarlet red color is extracted from her dried body using a hot-water dye-extraction process. The color is consistent and strong on all animal fibers.

Unlike madder root, whose reds can veer toward shades of orange and pink, cochineal produces a strong scarlet red. The dye is very sensitive to pH, such that acidic waters below a pH of 4.5 will yield orange, a pH of 4.5 to 6.5 will enhance the red tones, and a neutral or basic (high pH) water will bring out the purple and blue tones of the dye. Afterbaths can be used to create a variety of color from a single cochineal dye vat. Soaking a skein in a soda or wood ash solution immediately after it exits the vat ensures a high pH and will yield a deep plum color. I often add a bit of vinegar to my cochineal vat to make sure I achieve the deepest reds possible. The Central American recipes often include lime juice to create the same effect.

where to find it

Cochineal can be purchased through dye supply houses across the country. It is imported mainly from Central and South America. Even though the host plant—the prickly pear cactus—can be found in North America, the cochineal insect is not adapted to our climate. The dried insect can be ordered in whole or powdered form. If you purchase the whole insect, you'll need to make a powder before preparing your dye vat. An old coffee grinder will work well for this process.

Cochineal-dyed Corriedale cross yarn dipped in a wood ash afterbath (left) and cochineal-dyed Corriedale cross yarn dyed in an acidic bath (right).

recipe

Ratio of 1:2, cochineal weight to fiber weight
3 tbsp. white vinegar
Fibers premordanted in alum

Grind the whole insects into a powder and place the powder into an old nylon stocking or fine-mesh cloth. Fill the pot with water, and add the "tea-bag" of cochineal. To ensure scarlet red, add 3 tbsp of vinegar to the dye pot.

To extract the dye properly, heat the vat to a simmer (185–200°F) for 30 minutes, and then let it cool for 15 minutes. Repeat this process another three times. While the bath is steaming after the last cool-down (120–160°F), add your prewetted fibers. Keep the vat at a hot steam, just below boiling (160–180°F), for 1 hour. Remove your fibers and allow them to cool to room temperature before rinsing them in warm water and hanging them to dry.

option

For purple color, transfer the hot steamy yarns directly from the dye vat into a wood ash afterbath (see page 37) for several minutes or until you can see a significant color shift. Remove the fibers, let them sit in a bowl for approximately 10 minutes, rinse gently in warm water, and then hang them to dry.

FERMENTATION INDIGO VAT

Walking into a traditional colonial American home, one might expect to see the tools of skilled textile artisans lying about—spinning wheels, looms, and perhaps a fermentation indigo vat. If maintained properly, the vats could produce dye color on an ongoing basis for small cottage industries. It was only the introduction of synthetic blues in the late 1800s that forced fermentation indigo vats to disappear from use. In my own recent travels to Asia, I found indigo vats more than seventy-five years old. (There are likely much older ones in existence.)

Most indigo powders used in Europe and the American colonies were made from the tropical Asian *Indigofera tinctoria* plant species. Woad *(Isatis tinctoria)* was also used for its ability to create natural blues and was more easily cultivated by Europeans and the colonists alike. However, to make a readily available dye from woad, large quantities of plant material were needed.

There remained a reliance on imported indigo powder, even with successful attempts to grow the tropical *Indigofera tinctoria* in the southern colonies. The traditional fermentation indigo vat relied on several ingredients, one of which was stale urine. This ingredient was too odiferous for the likes of most home-based dyers, who typically kept their vats near the cooking hearth. The following recipe emerged and was widely used by the artisans of early America. With a less pungent aroma, a blend of madder root, wheat bran, and wood ash created powerful blues and could be kept near the hearth without offending the senses.

RECIPE

A stainless steel or enamel pot works best. The thicker the pot, the better insulation the dye vat will have to retain the warmth it needs to properly ferment, preferably 100 to 120°F. Most dyers living in North America—particularly in the cold winter months—will need to insulate their dye pot. Aurora Silk's Cheryl Kolander recommends placing your dye vat within a cardboard box lined with aluminum foil. To create the proper 100 to 120°F water temperature, place a clip-on lamp with a heat-generating lightbulb above the vat and foil-lined box. I have found this to be an essential setup for the fermentation process to function properly.

The basic ingredients listed (opposite) are used in the stated proportion when you first make your fermentation vat. They should

be added in these same ratios each time you "feed" or reconstitute it. Because the vat is alive, it must always have the right balance of ingredients to function properly.

2 oz. ground madder root
2 oz. wheat bran
12 oz. soda ash (substitute for wood ash)
4 oz. ground indigo powder (see Note)

1. Fill your vat with warm water and mix in the basic ingredients in their correct proportions. Stir continuously until the indigo powder and soda ash are dissolved. Cover your vat with a lid.
2. Stir your vat once a day, being careful not to splash or allow drips to fall into it. The fermentation process must remain oxygen-free for the vat to properly reduce. Each time you stir the vat you are dissolving more indigo and soda ash, and helping to redistribute the madder and wheat bran, but it's important to avoid introducing air.
3. After approximately one week, the dye will be ready (temperature-dependent). A fully reduced dye vat will have a coppery film on its surface, and the water will be a yellow green color.
4. Prewet your fibers and then gently submerge them in the dye vat. It is important to wear gloves—the dye is very strong and will color your hands blue! Move the fibers around gently under the surface of the dye solution.
5. Remove the fibers after 4 to 5 minutes, carefully but quickly separating them without dripping the solution back into the dye vat. Hang them to dry, and allow the fibers to oxidize—during this time, they will turn blue.
6. For darker blues, redip the fibers in the vat after drying them, repeating the process as many times as needed to procure the color you are seeking to achieve.

optional step

To create a deep green color in your indigo-dyed fibers you can overdye your material in a tansy dye bath. To do this, complete the indigo dyeing process, and then enter your well-rinsed yarns into the tansy dye bath (see page 136). You can store the indigo dyed yarns indefinitely prior to overdyeing them.

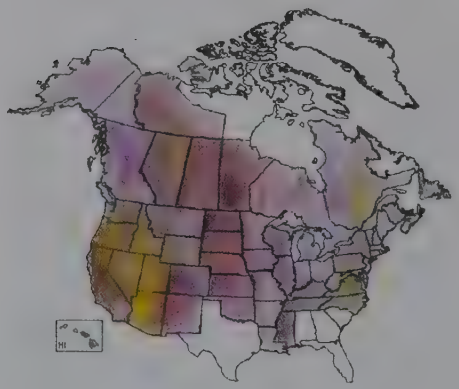
tips

- You'll know that your dye vat needs to be reconstituted with more ingredients when the blues become faded and dull.
- If your vat won't ferment, the chemical makeup of your water may be preventing the process. Try using rain or spring water instead of tap water.
- A pH of 10 is necessary for dissolving the indigo powder, hence the addition of soda ash; if the pH is too low, the vat may not reduce properly.

note: Indigo powder can be bought from natural dye supply houses around the country. There are many different grades and qualities of indigo available. My favorite supplier is Aurora Silk in Portland, Oregon—its El Salvadorian variety is the strongest and most concentrated I have worked with. A fermentation indigo dye kit can also be purchased from Aurora Silk; it contains all of the necessary ingredients to make your own vat.

tansy

latin name | TANACETUM VULGARE



It might be surprising to see tansy listed in the winter color collection; its bright yellow blossoms are regularly seen in early to midsummer along the shores of lakes, in open fields, and in dye crop rows at New Mexican herb farms.

If harvested in the summer and dried properly, tansy can be used at any time of the year. In the colder months when the garden is quiet, the stored bags of dried summer blooms can be pulled out to make a vibrant yellow dye bath. The color is a reminder of warmer days to come, and if used to overdye your fermentation indigo yarns, a seasonally appropriate shade of green can be created.

Tansy is native to the temperate regions of Europe and Central Asia. It was used in the Middle Ages (with unknown efficacy) to help women conceive and to prevent miscarriages. In modern medicine it is useful for treating jaundice and to bring down fevers. In colonial New England, tansy's preservative qualities and ability to deter pests were put to use in the making of funerary wreaths for the dead; the blossoms were used to pack the inside of coffins.

where to find it

Dried tansy is often available through dye farms. It is preferable to make a purchase of tansy from a location where you know the plant has been raised organically, as is the case with Urban Eagle Herb Farm in Youngsville, New Mexico. The dried blossoms of the plant are also available from dye supply houses online. Tansy is easy to grow—so much so that it can become invasive. Check to see the status of tansy in your area through a search of the USDA Plants database, or by calling a local conservation or open space district office.

recipe

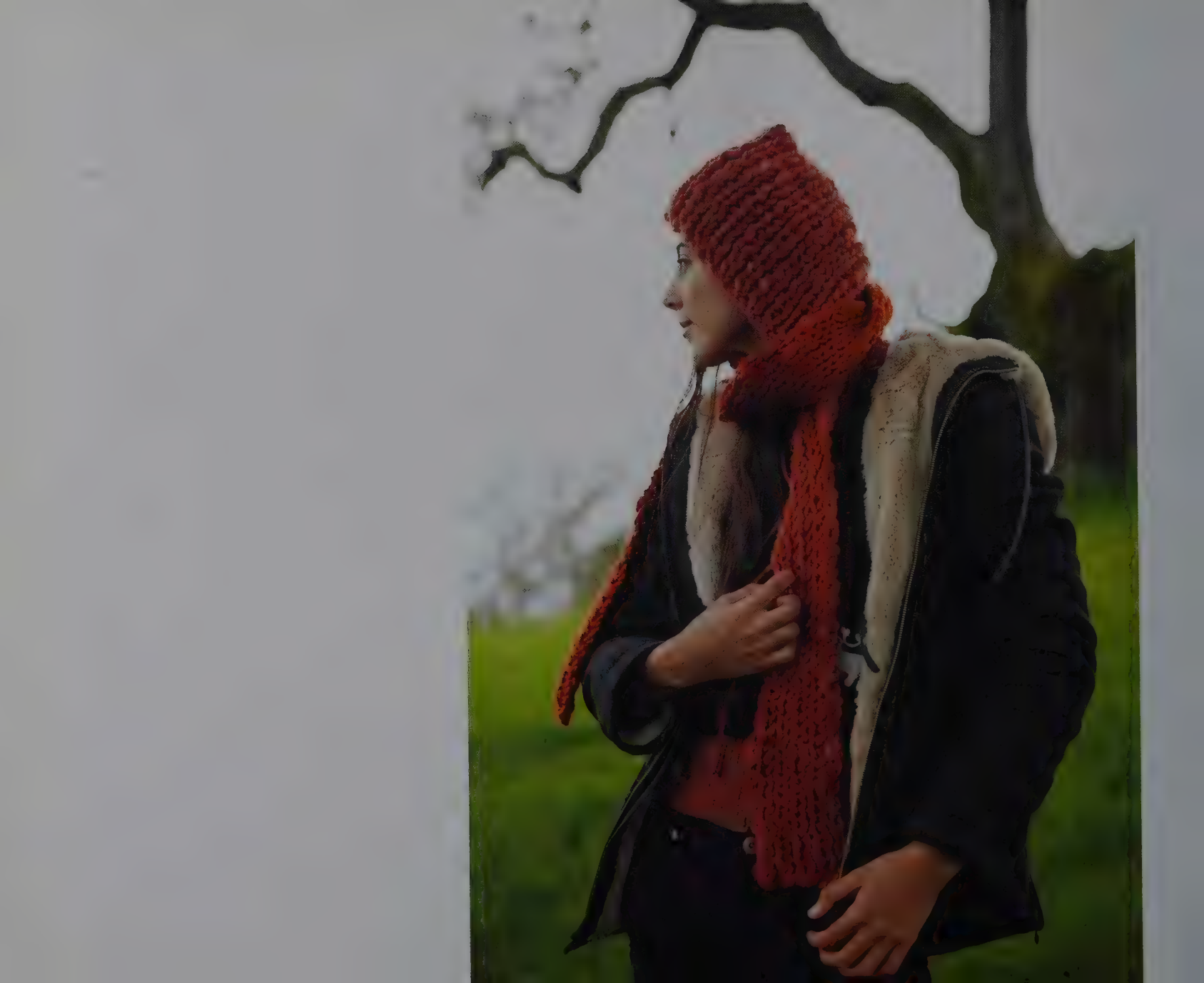
You can use either fresh or dried tansy blossoms in this recipe.

Ratio of 1:1, dried tansy weight to fiber weight;
1:1, fresh tansy weight to fiber weight
Fibers premordanted in alum

Place tansy blossoms in your dye pot and cover them generously with water so that your fiber will be able to move about freely, then let the vat sit overnight at room temperature. The next

morning, slowly bring the dye bath to a simmer (185–200°F) and heat for 1 to 1½ hours. If necessary, strain out some or all of the flowers to make room for your fibers. Add the prewetted fibers and then heat them gently, no higher than a simmer (160–180°F), for 1 hour. Remove the fibers and let them cool slightly; then rinse them gently in warm water. The vat will produce lighter shades of yellow if you repeat the process again with more raw wool.

ABOVE: Corriedale cross skein dyed in tansy.
LEFT: This emerald green skein was created by following the full fermentation indigo recipe, followed by the tansy dye recipe.



WINTER KNIT | hooded scarf

This hood is snug and covers just over the ears. I have included notes on how to make a deeper hood if desired. The scarf can be made longer or shorter depending on the desired effect–just keep in mind that one piece needs to be long enough to wrap around the neck.

yarn | 8 oz. (227 g) of 2-ply chunky handspun in madder root

needles | U.S. size 17 (12.5 mm) 24-inch circular needle, or size needed to obtain gauge

notions | Scissors, spray bottle of water, yarn needle

gauge | 2 sts per inch in stockinette stitch

notes | I joined skeins by spit-splicing the ends together. This technique is described on page 81.

Cast on 10 sts using the long-tail method.

Row 1: (K1, p1) to end of row. Mark as right side.

Row 2: (K1, p1) to end of row; this forms a 1 x 1 rib.

Continue in pattern until piece measures 18 inches from the cast-on edge, ending on a wrong side row. Do not turn work. Cast on 26 sts using the cable cast-on method (36 sts total).

Next Row: (K1, p1) to end of row.

Continue in pattern until piece measures 16 inches from the cast-on edge of the hood. For a deeper hood, knit 20 inches from the cast-on edge of the hood.

Next Row: Starting on the wrong side row, bind off 26 sts in pattern; 10 sts rem. Work these 10 sts in pattern until piece measures 34 inches from the bound-off edge of the hood. Bind off.

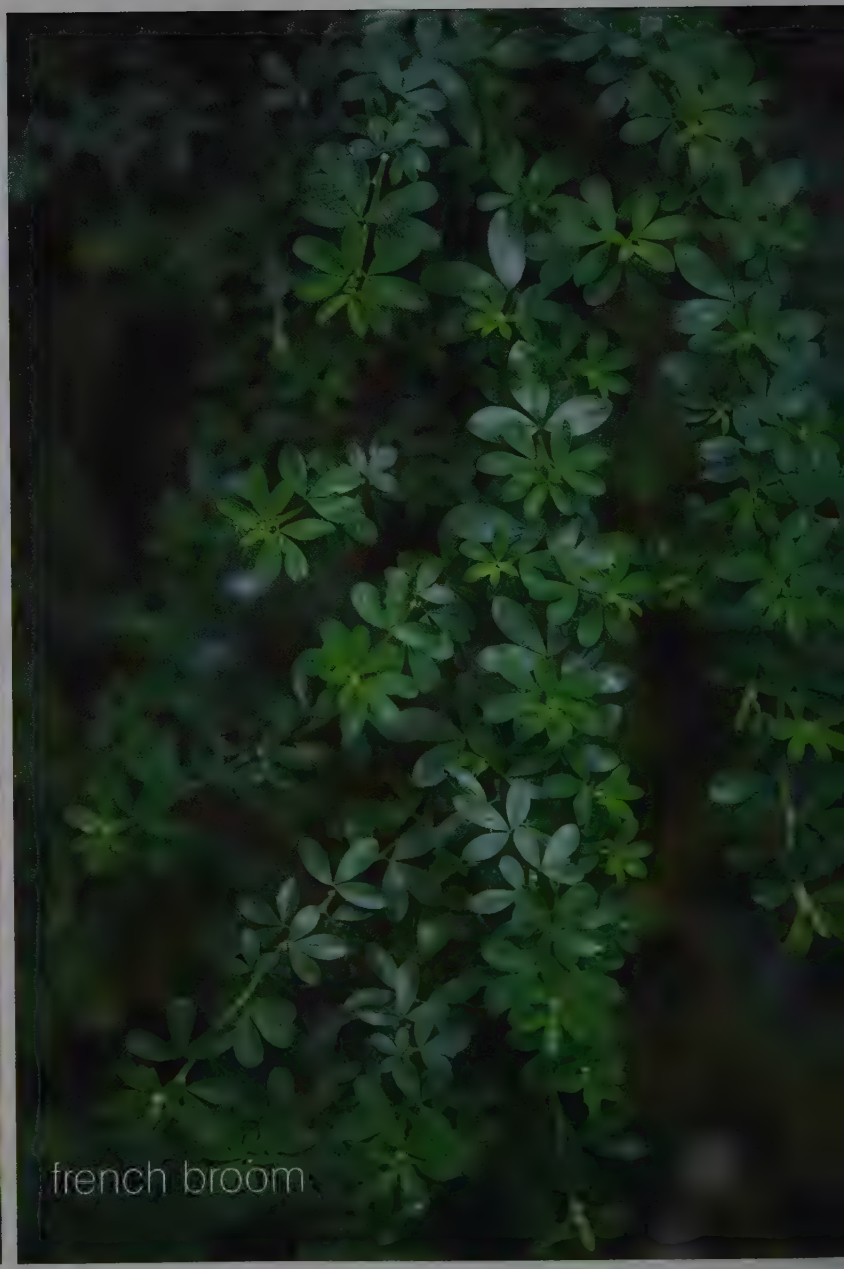
Fold the hood in half and sew the back seam using the mattress stitch; this creates a clean, sturdy seam. Weave in ends.

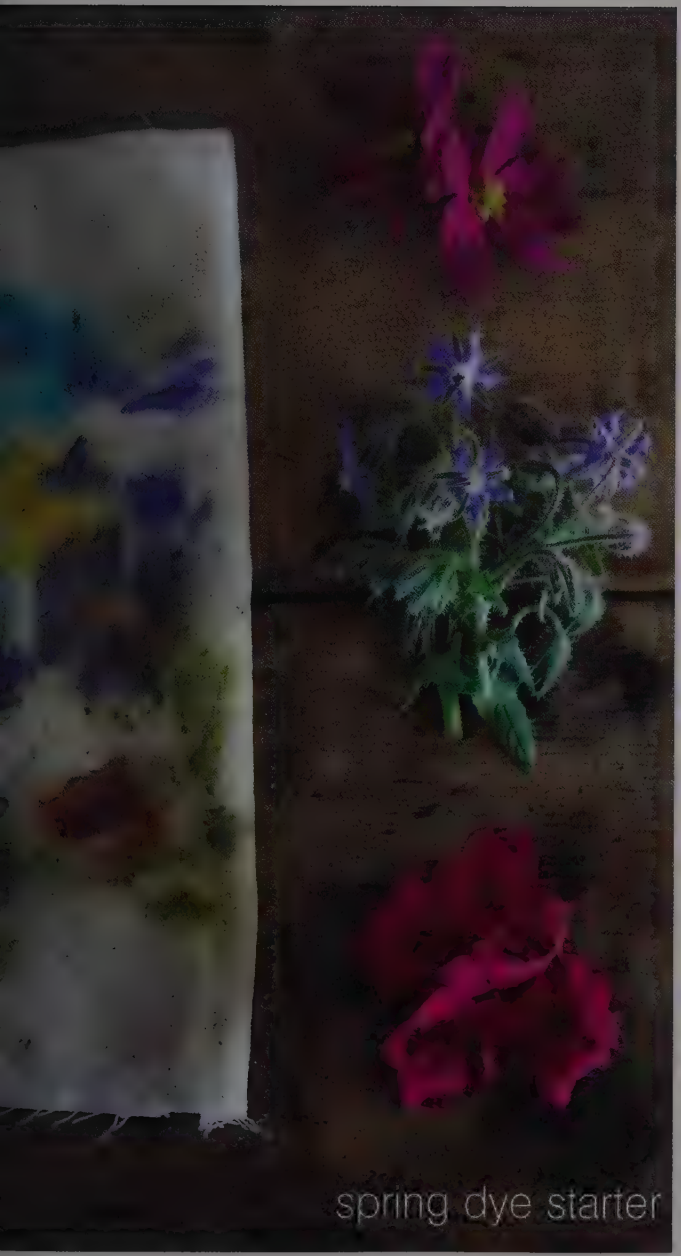
7

spring

The longer, light-filled days of spring promote new growth. Color emerges from latent fields, gardens, and cracks in the sidewalk. Water-saturated soils are fertile foundations for lush blooms that provide the starting materials for spring colors that can be crafted into indelible imagery.


slouchy hat


french broom



spring dye starter

horsetail

spring dye starter

This spring dye starter captures an impressionistic image of the season. The method can be used with many different plant species. This is just a small sampling of what is available to those interested in employing the plant-pounding technique.

Wood ash or soda ash solution (page 37)
Spray bottle
Towel (one that can be sacrificed and stained)
Tightly woven or knit fabric (T-shirt weight)
A sampling of blossoms: possibilities include pansies, violets, and borage (leaves and stems). Later in the spring and early summer, plant possibilities include cosmos, cota, coreopsis, and indigo leaves
Mallet

1. Dissolve ½ tsp. of soda or wood ash solution in a 16-ounce spray bottle filled with water.
2. Place the towel on a firm work surface and put your fabric swatch on top of it. Put plant matter on one side of the fabric and fold the other half of the fabric over the blossoms and stems, covering them completely.
3. Spray the fabric with your soda or wood ash solution until it is saturated to the point where the plant material can be seen through the fabric
4. Hold your fabric down with one hand and with your other hand pound the blossoms and stems with the mallet.
5. Unfold your fabric and remove the plant matter. Let the fabric dry and then iron it for heat setting. This will ensure that the image lasts.

Exhausting the dye bath (from left): Logwood skein of Corriedale cross wool, first dip in the bath; Logwood skein of Corriedale cross wool, second dip in the dye bath.

logwood

latin name | HAEMATOXYLON CAMPECHIANUM

The blacks, deep purples, and lavender shades of logwood can be obtained year-round; however, I chose to place the species within the spring plant collection because the yields are especially complementary when placed in combination with the orange of cota, the vibrant yellow of sagebrush, and the deep green of fennel. There are very few sources of naturally obtained purple in North America; to extract this unique color from a local source, a dyer must become familiar with members of the Fungi kingdom, because some mushrooms and lichen will yield these shades. However, it bears mentioning that sustainably harvesting enough material for a strong dye vat can present a significant challenge.

Logwood shavings are from the heartwood of a tree that is primarily found on the east coast of Central America, especially in the landscapes surrounding Mexico's Bay of Campeche. It was discovered by Spaniards in the early sixteenth century and was shipped to Europe as logs, to be rasped and aged before being used as a dye. Prior to logwood, European royalty relied on what was known as Tyrian purple for their regal robes, a dye sourced from *Murex brandaris*, a species of sea snail native to the eastern Mediterranean. Twelve thousand snails were required for just 1.4 grams of pure dye, which added to its status, but for this reason the snail faced near extinction toward the end of the Roman era. Because of the scarcity of natural purple-yielding materials, the discovery of logwood was widely celebrated throughout Europe, and the species was used extensively until the invention of synthetic colorants in the mid-1800s.

where to find it

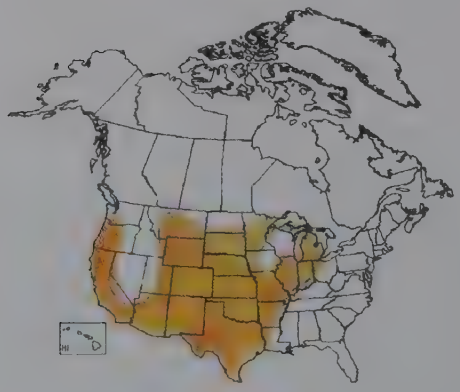
Logwood is found in warm climates and in swampy soils. Belize, Jamaica, and the Dominican Republic are countries where the tree has been traditionally sourced. Expert dyer Cheryl Kolander has created a fair trade project with the Quesqueya peoples in the Dominican Republic that has evolved into a nonprofit organization called Mama D.O.C. The project currently ensures the production of high-quality and fairly traded logwood, fustic (a yellow dye), organic "peace-silk," and a host of natural medicines.

Logwood from the Quesqueya project produces the strongest and most intense blacks and purples, and is sold through Kolander's Portland-based business, Aurora Silk, as well as through Carol Leigh's Hill Creek Fiber Studio in Columbia, Missouri (see Resource Guide).

cota

latin name | THELESPERMA MEGAPOTAMICUM

navajo | CH'IL AHWÉHÉ



Harvested for tisane (any herbal infusion) a thousand years ago by the Anasazi people of the Southwest, cota has been a staple medicinal herbal remedy for centuries. Soon after sheep were introduced to the region, it was discovered to have exquisite and strong dye-yielding properties, ranging from bright yellow to deep orange. Cota-dyed yarns can be seen today, woven through intricate Navajo and Hopi wool rugs.

Also known as Indian Tea, Hopi Tea, Greenthread, Navajo Tea, *kyanaidu* (Zuni), or *ho hoysi* (Hopi), cota's multitude of common names illuminates its status as a widely used and appreciated plant among the tribes in the region. During our class with expert Navajo natural dyer and weaver Rose Dedman, a delivery of dried cota bundles was brought to us by several of Rose's friends. I asked the women who had harvested the flowers how they used the plant; they responded by telling me how wonderful it was for relieving their children's stomachaches, and was especially helpful for fighting off colds, primarily at the early stages.

The plant sends up shoots from its root base in the early spring and will grow up to three or four feet in height by the midsummer. I observed cota growing along roadsides throughout the reservation in early August. It was in full bloom with an abundance of soft, green leaves and small, dense, yellow blossoms.

where to find it

Cota likes well-drained, sandy soils and is commonly found growing at elevations between 5,000 and 8,000 feet. It can survive drought conditions and light frosts in the spring and fall, but it dies back completely in the winter. It can be found throughout the West and as far to the east as Indiana and Michigan.

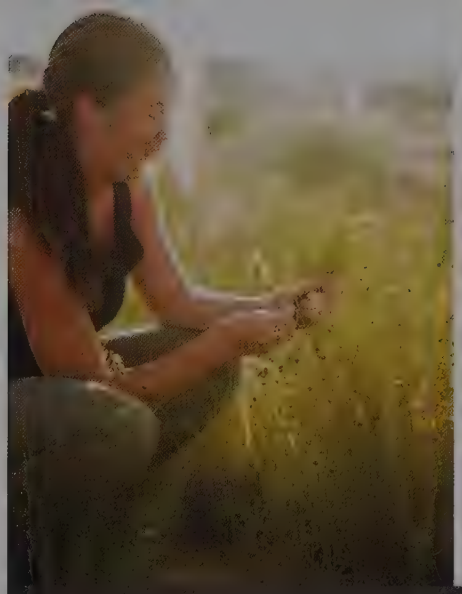
harvesting

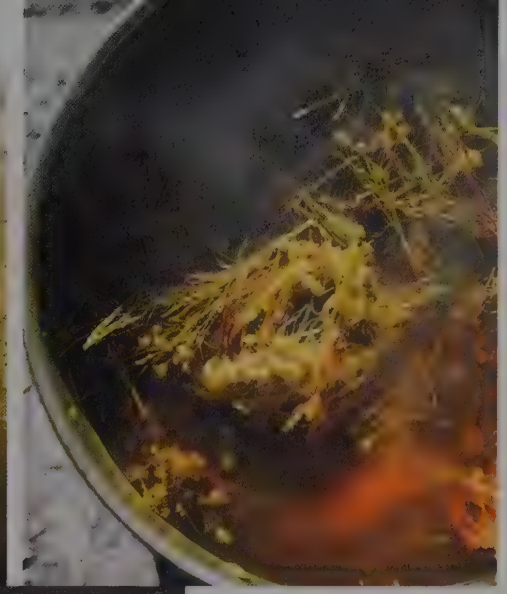
Cota can be harvested as soon as the small yellow blossoms emerge in the late spring and well into the summer months. Cota flowers can be deadheaded and will regenerate within the same season. The blooms are the foundation of the dye-making process, but stems and leaves are typically thrown into the dye vat, too. If you do not have the appropriate environment to grow cota, the dried plant can be ordered for dye use from Urban Eagle Herb Co. in New Mexico, or from High Desert Farmers; details are found in the Resource Guide.

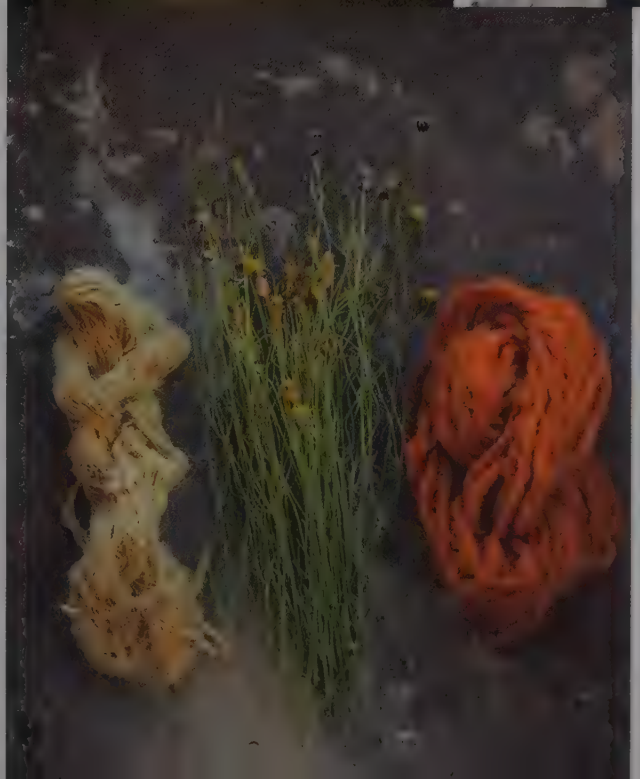
recipe

Ratio of 4:1, fresh cota stem and flower weight to fiber weight; ratio of 1:1, dried flower and stem weight to fiber weight
Fibers premordanted in alum

Put the cota blossoms into your dye pot and add enough water so that your fibers will be able to move about freely. Heat the dye bath and let it boil vigorously for 30 to 60 minutes, until the water in the vat has become a deep yellow shade. Once this color change has occurred, add your prewetted fibers, making room for them if necessary by removing some plant matter. Lower the temperature and keep the dye bath at a simmer (185–200°F) until your desired shade has been achieved; this should take 20 to 60 minutes. The dye color is dependent on where the plant was harvested–the drier the region, the more potent the color: orange, yellow, and shades in between can be expected from your dye pot.



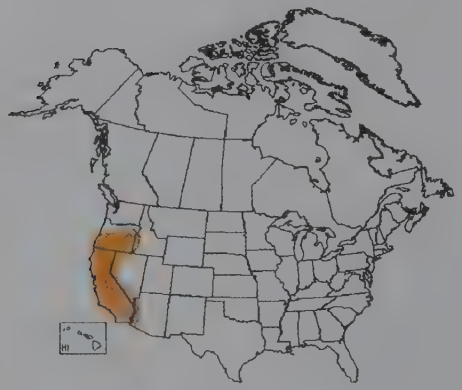




TOP RIGHT: **Cota plants in the dye pot with a skein of Churro yarn.** BOTTOM: **Handspun unmordanted Churro skein (left), cota stems (center), handspun Corriedale cross skein (right).**

sticky monkey flower

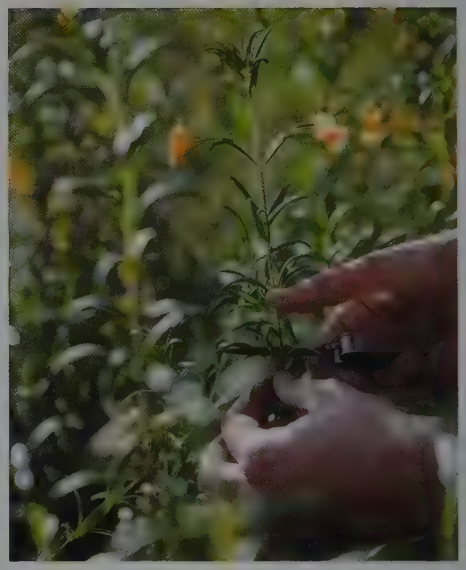
latin name | DIPLACUS AURANTIACUS
(AKA MIMULUS AURANTIACUS)



Sticky monkey flower's delicate orange flowers and sticky leaves make a memorable impression on the senses. Native to California and Oregon, sticky monkey flower thrives in regions with long dry seasons. Frequently visited by hummingbirds and bees, it is well designed to host the needs of its pollinators, having a long, tubular blossom whose petals move inward to embrace the insects that land upon it. It makes a good candidate for the perennial garden; even without water the blooms can last from the early spring through the early summer. With periodic watering, flowering will continue throughout the summer. There are many varieties of sticky monkey flower, and their blossoms range in the warm color spectrum of yellow, orange, and orange-red.

Sticky monkey flower was traditionally used as an antiseptic for sores and cuts, as well as a remedy for dysentery and fever. The indigenous communities living in the plant's native habitat were said to have used it aesthetically as well as medicinally, using it to make wreaths to place in children's hair as an adornment.

I have found that the plant is quite resistant to deer, as long as they are not terribly hungry. It is often seen covering hillsides, along with California sagebrush and coyote brush. Planting



all three of these species in the garden creates a perennial zone that is wonderfully pleasing to the eye, with their contrasting leaf structures, varied shades of green, and alternating bloom and seeding cycles. These plants are the perfect habitat for a multitude of bird species and serve great use in the dye pot.

where to find it

Sticky monkey flower is found in abundance on coastal hillsides throughout California and Oregon. The plant has a versatile growth habit and can be found in rocky serpentine outcroppings as well as in damp and sandy soils. It will grow leggy and long in shady zones, and can be found in dense, shrubby outcroppings on hillsides with a southern

exposure. It can handle a variety of soil types, and both open and forested terrain.

harvesting

In most cases, given normal rainfall and seasonal temperature fluctuations, sticky monkey flower branches (including leaves, stems, and blossoms) are best harvested in the early spring. After a harvest, the spring rains generally promote another burst of growth, just in time for the plant to go to seed. If the plant is grown in a garden where it receives irrigation year-round, it can be harvested well into the late spring. Additional water supplied by the gardener will provide enough energy for the plant to rebloom and produce seed in the late summer.

recipe

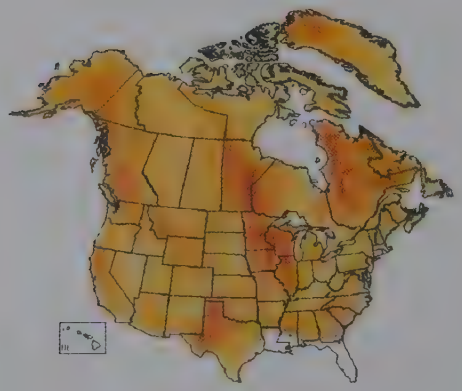
Ratio of 2:1, sticky monkey flower branch weight to fiber weight
Fibers premordanted in alum

Follow the Master Dye Bath Recipe (page 35).

RIGHT (FROM LEFT): **Handspun Corriedale cross skein, sticky monkey flower, and machine-spun merino skein.**

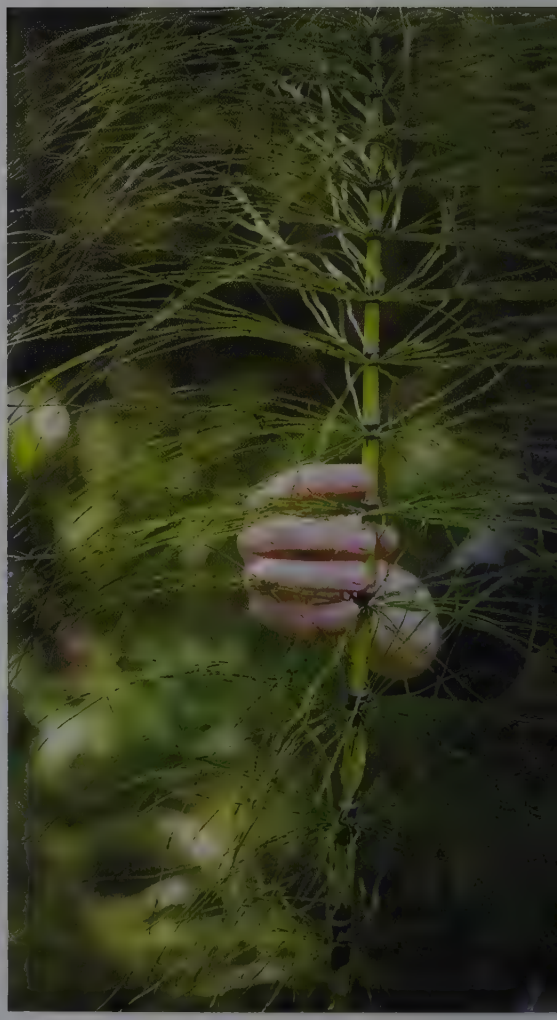
horsetail

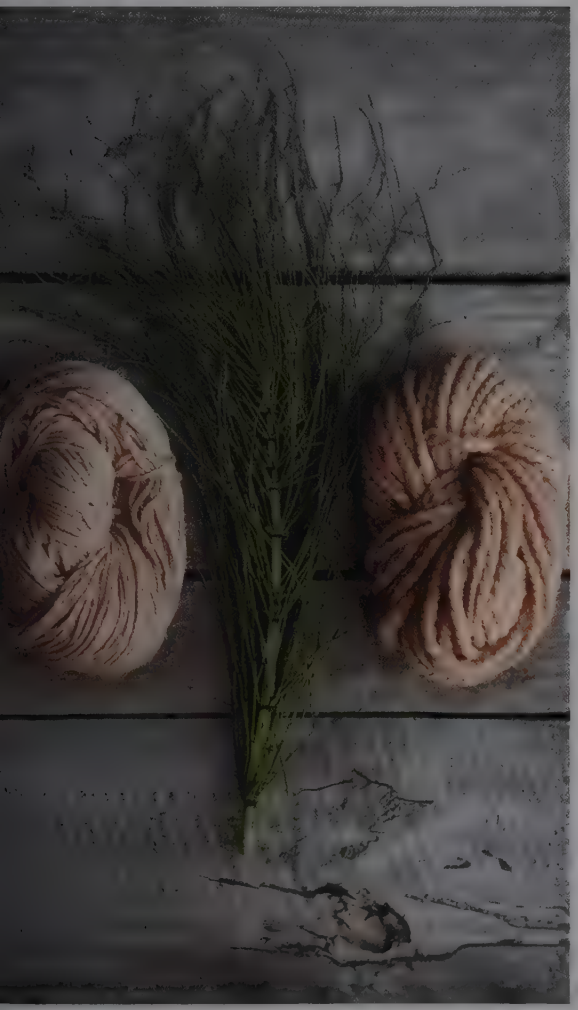
latin name | EQUISETUM ARVENSE



Horsetail predates the appearance of humans on Earth by a good 295 million years; it is the only surviving genus from a class of plants that dominated the Paleozoic forests for 100 million years. The ancient variety of the plant grew taller than its modern counterpart, towering like a tree at a time when dinosaurs roamed and the continents were not yet positioned the way we see them today. Horsetail thrives on every continent of the planet with the exception of Antarctica, its success in large part due to underground rhizomes that continuously spread and send up shoots. Its spore-based reproduction process predates the advent of seeding plant species; horsetail relies on the dispersal of spores that are generated from the inside of fertile shoots.

The lush greenery of horsetail, when touched, has a curiously abrasive quality due to high silica levels. Its rough surface was made into sandpaper and used for smoothing young oak shoots incorporated into weaving shuttles by California Indians. Its rich mineral content has been noted to be of great medicinal value. Today, it is given to preosteoporotic and osteoporotic women to help restore bone density. It is used by herbalists to treat urinary tract, bladder, and





kidney infections. Greek and Roman healers used the plant to stop bleeding and heal ulcers.

Although it is native to most of North America, its incredible biologic abundance has caused some landowners to regard it as a weed and a plant that must be eradicated. It is toxic to sheep, cattle, and horses, so it is removed from many pastures. In some regions around Seattle, horsetail shoots cover the roadsides like a dense carpet. At the Berkeley Botanical Garden in California, horsetail is routinely removed to encourage the biological diversity of the grounds. I view horsetail as a perfect species for dye making—its abundant growth allows the dyer to harvest the vegetation with the reassurance that its rhizomatous roots will continuously spread and send shoots up the following year. Its beautiful rose dye emerges from shoots that have grown in mineral-laden soils; softer pinks and tans can be obtained from the plant when it is harvested in less rich soils.

where to find it

Horsetail can be found in damp, open fields. It prefers wet soils, but it also has a tendency to pioneer along the road's edge, where water drains quickly. It grows approximately 12 to 36 inches high in dense pockets. Its characteristic "horse's tail" foliage makes it easy to identify. From afar, a horsetail colony looks soft and featherlike, swaying easily in the wind due to its hollow stems.

harvesting

Horsetail's soft, spindly foliage and stems are the best material for the dye vat; these can be harvested throughout the spring and into the summer. The fertile, spore-bearing shoots should be avoided, however. These shoots, which play an important role in the reproduction cycle, are identifiable by the conical shape of the top of the spear and the absence of the characteristic horsetail vegetation.

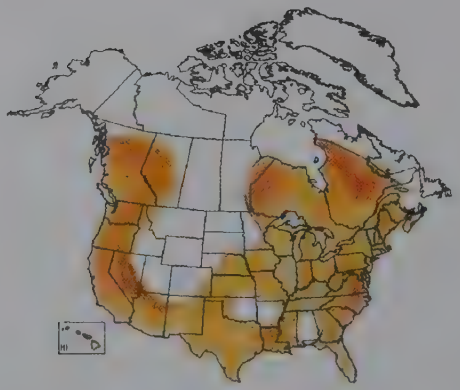
recipe

Ratio of 5:1, horsetail weight to fiber weight
Fibers premordanted in alum

Follow the Master Dye Bath Recipe (page 35).

fennel

latin name | FOENICULUM VULGARE



Fennel is native to southern Europe and has a long culinary and medicinal relationship with the people of these regions. It was used as a folk remedy for improving the quality and supply of mother's milk, and its licorice-flavored foliage is eaten both raw and cooked in many Mediterranean recipes.

In North America, the pollen and nectar of its yellow flower provide food for a myriad of insects. The delicate foliage hosts adult and immature ladybird beetles, and several butterfly species. Stands of fennel provide habitat for white and golden crown sparrows, which can both nest and feast on the tasty seed heads. It also supports the life of various rodents and the garter snakes that prey upon them.

Fennel's adaptability has allowed it to naturalize with great success—so much so that it is listed as an invasive species in Virginia, Oregon, Washington, California, and Hawaii. Because I live in a zone where fennel has become successful and dominant, I harvest the plant in a manner that slows and inhibits its ability to reproduce. This allows other species to take hold, ones that rarely have an opportunity to establish themselves in fennel-dominated landscapes.

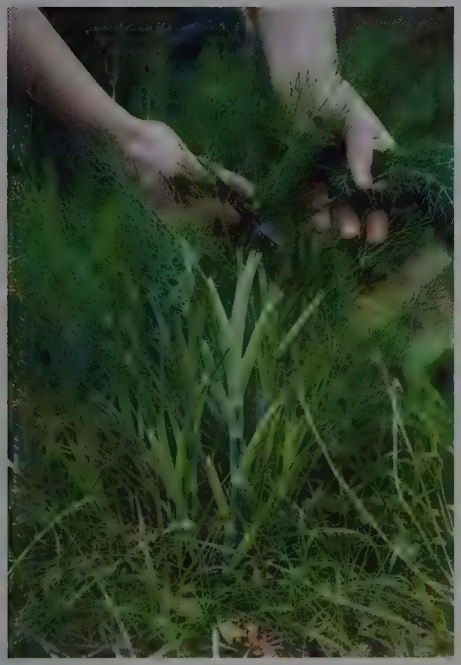
The leaf and stalk are the most useful parts of the plant for the dye vat, producing a range of strong greens. I use an iron mordant for fennel, and find that upon initially dipping my yarns into the vat, I see only a muddy orange-brown color taking shape. It takes more than an hour for the greens to emerge. As they are pulled from the dye vat, I am always stunned by the quality of the color. Depending on the soil the fennel is grown in, the color can range from soft sage to deep forest green.

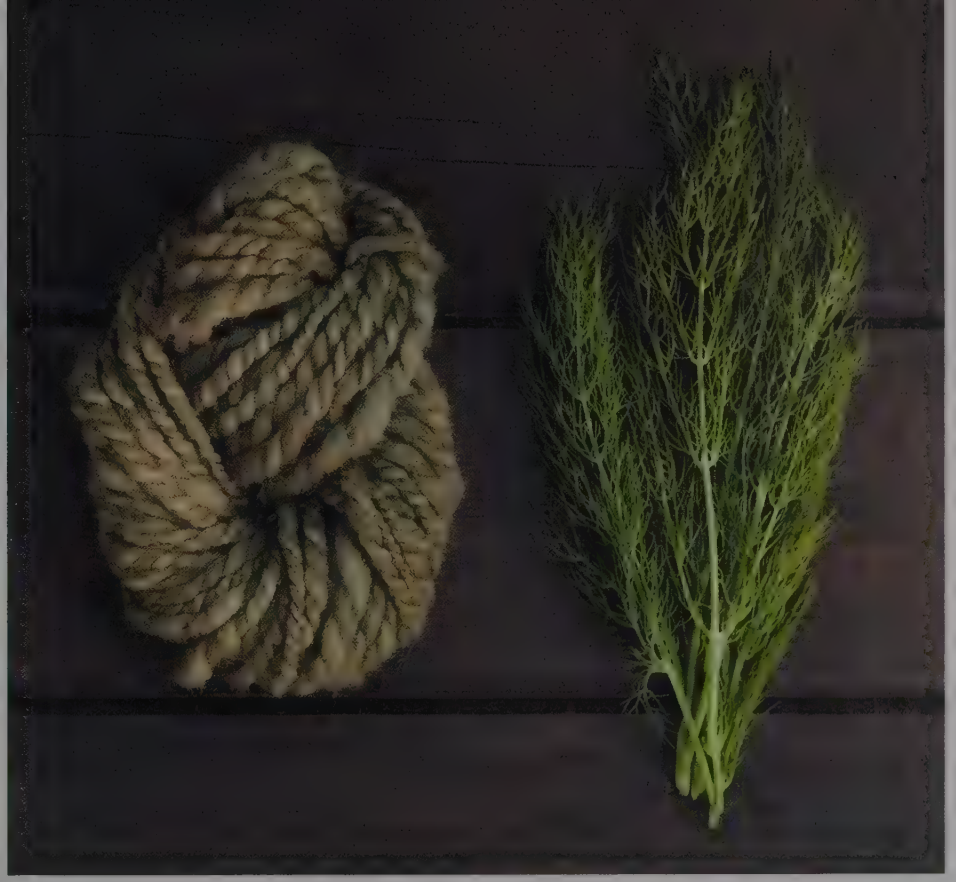
where to find it

Within regions where fennel has naturalized it can be found growing near riverbanks and in disrupted areas such as roadsides and construction zones. Once an area has been disturbed, fennel has a proclivity for taking hold and pioneering in soils where other plants struggle to survive. It can be found growing from sea level to 2,000 feet.

harvesting

I gather fennel along the roadside near my home during the spring and early summer, prior to seeding. When I harvest, I select the fresh stalks of recently sprouted young plants





because this prevents at least a small portion of the fennel population from blooming and leaves the rest of the plant for food and habitat. My thinning process reduces the amount of viable seed that will become available and allows sunlight to reach the ground, where other diverse species may be growing.

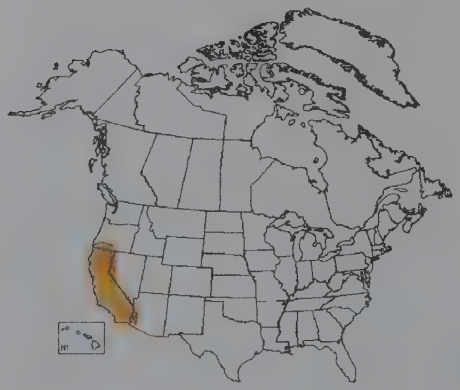
recipe

Ratio of 5:1, fennel weight to fiber weight
Fibers premordanted in iron

Follow the Master Dye Bath Recipe (page 35).

california sagebrush

latin name | ARTEMESIA CALIFORNICA



Sagebrush produces a dye that varies between a deep, penetrating yellow and a soft, goldlike mustard, depending on what time of year the plant is harvested. As is the case for most species in the coastal sage scrub ecosystem, California sagebrush has a high oil content, which not only protects the plant from foragers during the long dry seasons, but also gives the plant its unmistakable, strong aroma. While its soft, wispy gray foliage and shallow branching roots tolerate long dry periods and rocky soils, sagebrush also thrives in the well-tended soils of a garden landscape.

California sagebrush was eaten by native Californians to alleviate colds, and a concoction was made for women in labor to hasten the birthing process. The smoke produced by burning dried bundles was used in sweat lodges, and a poultice was made from its leaves for the treatment of asthma. The plant's ubiquitous presence on the hills of California meant that many different tribes experimented with its healing properties.

Sagebrush's place in the ecosystem also benefits numerous mammal and insect species. It is known as the sole host plant for *Trirhabda sericotrachyla,* an herbivorous beetle, and as the favored habitat for the rare California gnatcatcher, a bird that feeds on the plentiful and diverse insect life that makes sagebrush its home.

where to find it

California sagebrush is found throughout the California coastal hillsides and as far south as Baja California. It grows up to altitudes of 2,200 feet above sea level. It can be seen on rocky outcroppings and in all soil types. It is the "sage" of the coastal sage scrub ecosystem, and is often found growing in shrubby plant communities alongside sticky monkey flower and coyote brush. It grows to approximately 5 feet in height, with thin and pliable branches that sprawl from the plant's base. It is a perfect plant for the garden because after it establishes itself it requires no water. Its gray green foliage offers both aromatic and visual pleasures and remains vibrant from the winter through early to midsummer, replenishing itself each year with the first rains.

harvesting

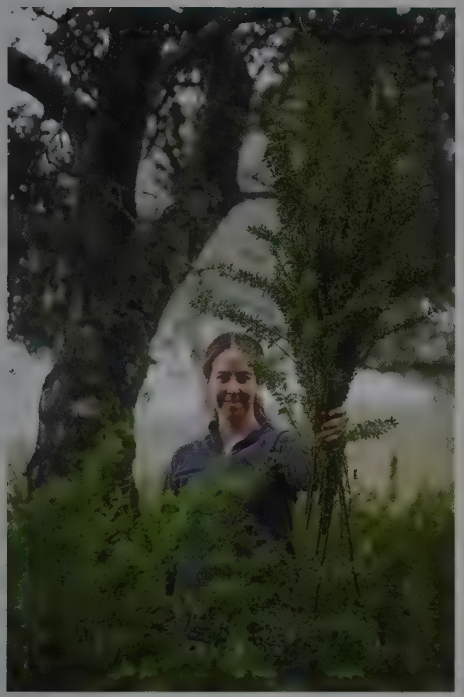
Sagebrush is most potent for dye use in the mid- to late spring through the beginning of summer, when the rains have subsided. I harvest sprigs from the plant, gently pruning back the long, leggy branches to keep the plant confined to a dense and bushy state. If there are late rains the plant will often stay green well into the early-to-mid summer. It is important to let the plant successfully seed, so all harvesting should be completed prior to the seed head's emergence in the midsummer.

recipe

Ratio of 2:1, sagebrush sprig weight to fiber weight
Fibers premordanted in alum

Follow the Master Dye Bath Recipe (page 35).

INVASIVE SPECIES



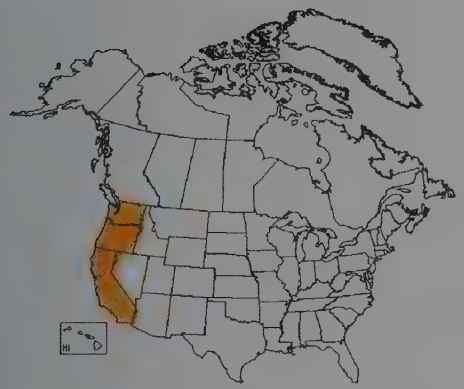
What sets a species apart to the point that it is deemed invasive? Where do we draw the line between a foreign plant that has naturalized and a more invasive one that has taken over an ecosystem? The answers depend on whom you speak to. Many individuals and agencies responsible for cultivating a particular landscape, whether they are farmers, gardeners, or an open space district, generally categorize plants and offer unequivocal distinctions between invasive and noninvasive species. There is often not a second thought in regard to removing a patch of French broom or sheep sorrel from the land. However, there are some land managers who view these invasive species as symptomatic of a greater imbalance within the soil and water cycles. They seek to heal those imbalances gradually with subtle adjustments, rather than removing what they see as essentially a symptom manifested as a plant. And there are also those who see these invasive species not as invasive at all, but as beneficial pioneers, playing their role in the greater evolutionary story of the earth's cycles. There are of course many people who are harder to categorize, sharing aspects of one or more of these philosophies.

Whatever your opinion or approach, it is commonly understood that these are readily available plants and thus very easy to source for the natural dye vat. These species often return, even after well-intentioned and diligent attempts at eradication. East Coast expert natural dyer Susanne Grosjean of Hog Bay, Maine, prefers using the invasive species of her region for dyes; she teaches the use of gallium, ragweed, and purple loosestrife for natural color. She stated, "It is best to use invasive plant species for dye; they are abundant, and removing them is of great benefit to the ecosystem."

Whether you are a new or experienced natural dyer, the invasive species are a wonderful place to begin your journey as a gatherer, and you'll likely become a well-appreciated member of your community for your gracious acts of weeding.

french broom

latin name | GENISTA MONSPESSULANA



French broom was originally brought from Europe as an ornamental species, and for use as erosion control in areas recently graded for railroad development. It soon became naturalized on much of the West Coast and pervasively colonized the understory of many forested hillsides and grassy open meadows. In my region of California, French broom is routinely removed from private lands, open space, and water districts. Its nitrogen-fixing properties enrich the soil to the point that native species no longer thrive, so it is often seen growing in a monoculture, with little biodiversity left in its wake.

Its success as a pioneer species makes French broom a wonderfully abundant species for the dye vat. When used with an iron mordant, it creates a beautiful shade of soft grassy green; with an alum mordant, it yields a basic yellow.

where to find it

French broom is easy to find if you live in the habitat into which it has naturalized. It grows densely in areas where the soil has been disrupted, and can be found in untended suburban landscapes, along the roadsides, and throughout public lands. Most land management agencies are very supportive of any action to remove broom.

harvesting

I prefer harvesting in the spring when the ground is loose enough for the root to be easily removed with a little tug; however, it is usually beneficial to remove the plant whenever possible. If taken out in this way over several seasons, the plant's numbers begin to dwindle. If the area of removal is tended consistently throughout the year, and native species are planted to replace the French broom, its rate of return reduces even more. I remove large stalks, and then cut them into smaller pieces for the dye vat.

recipe

Ratio of 5:1, French broom stalk weight to fiber weight
Fibers premordanted in iron

Follow the Master Dye Bath Recipe (page 35).

SPRING KNIT | slouchy hat

This hat is knit inside out. I love the texture of reverse stockinette on the chunky yarn, but I can knit much faster than I purl. So I just turn it inside out. The following directions are for the two-color striped hat; see the notes for the stripe pattern of the multicolored hat.

yarn | Two-color hat: 1⅝ oz. (45 g) of DK-weight yarn in California sagebrush; 1⅜ oz. (38 g) of 2-ply chunky-weight handspun in California sagebrush and fennel

Multicolored hat: 1⅝ oz. (45 g) of DK-weight yarn in logwood; ⅝ oz. (15 g) each of 2-ply chunky-weight handspun in sticky monkey flower, logwood, California sagebrush, coreopsis, and fennel

needles | U.S. size 10.5 (6.5 mm) 16-inch circular needle; U.S. size 17 (12.5 mm) 16-inch circular needle; U.S. size 17 (12.5 mm) double-pointed needles (set of 5), or size needed to obtain gauge

notions | Scissors, yarn needle

gauge | DK-weight yarn, doubled: 3 sts to the inch in stockinette stitch

2-ply chunky-weight handspun | 1 st to the inch in stockinette stitch

special notes | When working two-color stripe pattern, you will be carrying the yarn on the knit side. All color changing will be visible throughout the knitting process. When working color changes for the multicolored hat, I cut the yarn after each color change.

stripe pattern for multicolored hat

The 2-ply stripes in the multicolored hat follow this pattern: sticky monkey flower, logwood, California sagebrush, coreopsis, fennel, logwood, sticky monkey flower, coreopsis, California sagebrush.

Using the smaller needle and two strands held together of the DK-weight yarn in California sagebrush, cast on 70 sts. Join to work in the round, being careful not to twist the stitches. Place a marker to denote the beginning of the round.

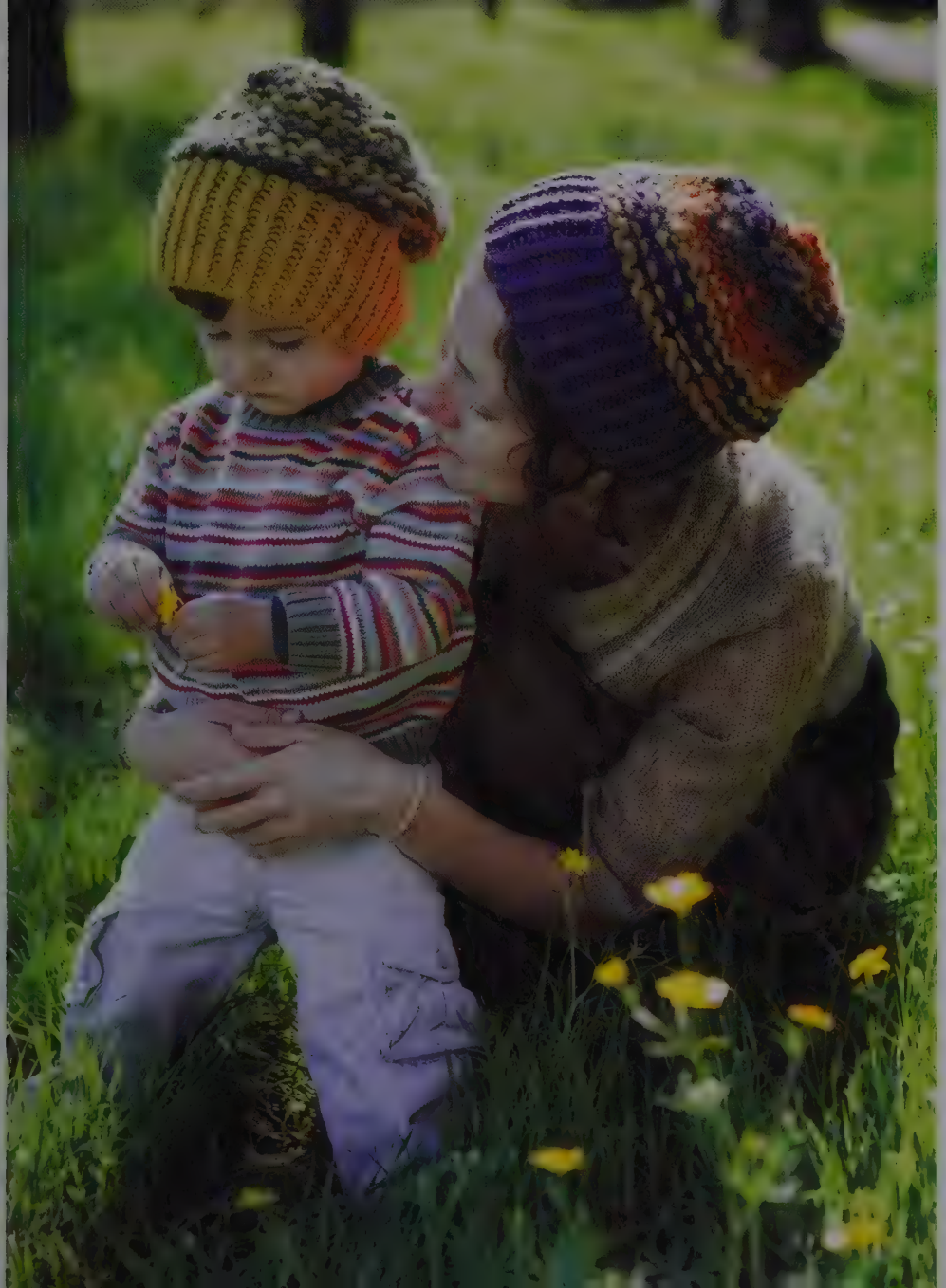
Rnd 1: K1, p1; repeat to end of round. This forms a 1 x 1 rib pattern. Continue in pattern for a total of 17 rounds or until the piece is 4 inches long. Cut yarn.

Change to the larger needle and chunky 2-ply in fennel.

Next rnd: P2tog; repeat to the end of round; 35 sts rem. Go slowly; it takes a bit of negotiation to go from smaller needles and yarn to larger needles and larger yarn while decreasing. If you prefer, a k2tog decrease can be used instead of the p2tog.

Next rnd: Knit.

Change to chunky 2-ply in California sagebrush.



Next 2 rnds: Knit.

Continue changing colors every 2 rounds; this forms your pattern. Work pattern for 6 more rounds. Then start to decrease; stay in pattern throughout your decreases.

decrease rounds

Rnd 1: K3, k2tog; repeat to the end of the round—28 sts rem.

Rnd 2: Knit all stitches. This is a good round to switch to the dpns.

Rnd 3: K2, k2tog; repeat to the end of the round—21 sts rem.

Rnd 4: Knit all stitches.

Rnd 5: K1, k2tog; repeat to the end of the round—14 sts rem.

Rnd 6: Knit all stitches.

Rnd 7: K2tog; repeat to the end of the round—7 sts rem. Cut yarn, leaving a 6-inch tail. Thread tail on a yarn needle, pull it through the remaining stitches, and secure.

Weave in all ends. Turn hat right-side out.

appendix

how metals affect wildlife

LC50 (lethal concentration to 50 percent of the population) of various metals, expressed as parts per million (ppm, which is equivalent to milligrams per liter).[a]

TEST ORGANISM	IRON SULFATE	ALUMINUM SULFATE	COPPER	CHROMIUM
Frog *Rana spp.*	24.9	0.06	0.067	54[c]
Fairy shrimp *Streptocephalus proboscideus*	215	no data	0.20[b]	1.2[c]
Aquatic sowbug *Asellus aquaticus*	419[d]	6.6[g]	0.5	5.3[c,e]
Western Mosquitofish *Gambusia affinis*	27[e]	48	0.056[e]	64[e]
Goldfish *Carassius auratus*	100[e]	250	1.15	0.66[f]
Salamander *Ambystoma spp.*	no data	0.06[f]	0.06	no data
Rainbow trout *Oncorhynchus mykiss*	no data	0.41	0.14	100
Fathead minnow *Pimephales promelas*	no data	23.8	0.9	49
Threespine stickleback *Gasterosteus aculeatus*	no data	10[h]	2.8	71[c]

[a] Data reported are from diverse publications and studies and may represent averages. Unless otherwise noted, data refer to the concentration at which twenty-four-hour exposure results in 50 percent mortality.

[b] As copper sulfate

[c] As potassium dichromate

[d] Forty-eight hours' exposure

[e] Ninety-six hours' exposure

[f] Seven days exposure

[g] Immobilization of 50 percent of population at forty-eight hours rather than mortality

[h] Aluminum nitrate

Source: US EPA's ACQUIRE database. Perform your own searches at www.pesticideinfo.org/Search_Ecotoxicity.jsp

resource guide

Whether you are planning your dye garden, ordering dyestuffs, or looking to purchase your fibers from local sources—the following Resource Guide is a good place to start. This list is far from comprehensive, only a sampling of the thousands of farms, nurseries, and dyestuff providers that exist in North America. The Resource Guide is a starting point and hopefully will inspire your continued investigation into the raw materials provided within your own community. Farmers' markets, local native plant nurseries, fiber festivals, and county fairs are important events for the budding dye and fiber enthusiast to begin searching for local botanic and fiber materials.

united states

NATIONWIDE RESOURCES

Alpaca Nation
www.alpacanation.com

U.S. Department of Agriculture Plants Database
www.plants.usda.gov

ALABAMA

Cozy Cove Llamas
Gurley, AL 35748
www.cozycovellamas.com
Llama and alpaca fibers

ARIZONA

Black Mesa Weavers for Life & Land
www.blackmesaweavers.org
Handspun Churro yarn

Canyon Wren Ranch
Cathy Gorman
Winkelman, AZ 85292
520-357-7501
cgorman@wildblue.net
Churro roving and yarn

Flagstaff Native Plant & Seed
400 E. Butler Avenue
Flagstaff, AZ 86001
928-773-9406
www.nativeplantandseed.com
Native plants and restoration services

Weaving in Beauty
Tempe, AZ 85283
www.weavinginbeauty.com
Natural dye and weaving classes

CALIFORNIA

Cormo Sheep & Wool Farm
Orland, CA 95963
www.cormo.us
Cormo fleece, roving, and yarn

Larner Seeds
235 Grove Road
Bolinas, CA 94924
www.larnerseeds.com
Native plant seeds

Nebo Rock Ranch
Janet Heppler
Covelo, CA 95428
707-983-9147
nebo-rock@saber.net
Merino fleece

Open Sky Alpacas
Sandra Jorgensen
Corning, CA 96021
530-824-9394
sjorgensen@dm-tech.com
Fleece

Renaissance Ridge Alpacas
Mount Aukum, CA 95656
www.renaissanceridgealpacas.com
Alpaca yarn and roving

Retiredice Alpacas
6899 Mt. Aukum Road
Fair Play, CA 95684
www.retiredicealpacas.com
Alpaca fiber

Windrush Farm
Petaluma, CA 94952
windrushfarm.wordpress.com
Corriedale cross and Shetland roving, natural color yarns, and naturally dyed yarns

COLORADO

Desert Weyr LLC
Paonia, CO 81428
www.desertweyr.com
Raw fleece, roving, and yarn

Dry West Nursery
Hotchkiss, CO 81419
www.drywest.com
Native, drought-tolerant plants

La Plata Farms
Hesperus, CO 81326
www.laplatafarms.com
Churro, merino, mohair, alpaca, and blends

Switzer-Land Alpacas
Estes Park, CO 80517
www.alpacaland.com
Alpaca fiber and yarn

Table Rock Llamas Fiber Arts Studios, Inc.
6520 Shoup Road
Black Forest, CO 80908
www.tablerockllamas.com
Fibers, roving, and yarn

Western Native Seed
Coaldale, CO 81222
www.westernnativeseed.com
Native plant seed

CONNECTICUT

Connecticut Sheep Breeders Association, Inc.
www.ctsheep.org

Earth Tones Native Plant Nursery & Landscapes
212 Grassy Hill Road
Woodbury, CT 06798
www.earthtonesnatives.com
Native plants

Palmer Family Farm
Tolland, CT 06084
www.palmerfamilyfarm.com
Romeldale and Cotswold yarns and roving

Windborne Farm
North Stonington, CT 06359
www.windbornefarm.com
Icelandic raw fleece and roving

GEORGIA

Georgia Sheep and Wool Grower's Association
www.gasheepandwool.org

Georgian Oaks Farm
Sharon and Raymond Bogenschutz
Powder Springs, GA 30127
678-427-2770
georgianoaks@bellsouth.net
Raw alpaca fiber

Nearly Native Nursery
776 McBride Road
Fayetteville, GA 30215
www.nearlynativenursery.com
Native plants

IDAHO

Draggin' Wing Farm
Boise, ID 83717
www.waterthriftyplants.com
Native, drought-tolerant, and ornamental plants

Fine Fleece Alpacas
Sandpoint, ID 83864
www.finefleecealpacas.com/fleece.htm
Alpaca fleece and yarn

ILLINOIS

Genesis Nursery Inc.
23200 Hurd Road
Tampico, IL 61283
Native plant seed

Green Pastures Fiber Cooperative
Waterman, IL 60556
www.illinoisgreenpastures.org

Three Fates Farm
Crete, IL 60475
www.threefatesjacobs.com
Jacob and Leicester fleeces

INDIANA

Earth Source, Inc.
Fort Wayne, IN 46818
www.earthsourceinc.net
Native plant seed

Ewenique Icelandic Sheep Farm
Seymour, IN 47274
www.eweniqueicelandicsheep.com
Icelandic fleece, handspun yarn, and pelts

IOWA

C&M Acres Alpaca
Maxwell, IA 50161
www.cmacres.com
Alpaca raw fleece, roving, and handspun yarn

Ion Exchange, Inc.
Harper's Ferry, IA 52146
www.ionxchange.com
Native plants and seed

KANSAS

Kansas Native Plants
Topeka, KS 66614
www.kansasnativeplants.com
Native seeds, plants, and books

Maggie's Farm
Lawrence, KS 66044
www.maggiesfarm-ks.com
Lincoln and Lincoln cross fleece, roving, and handspun yarns

Willowbrook Farm
Louisburg, KS 66053
www.alpacasatwillowbrook.com
Alpaca yarns and clothing

KENTUCKY

Dropseed Native Plant Nursery
Goshen, KY 40026
www.dropseednursery.com
Native seeds and plants, habitat restoration

Houndscroft Farm
Glendale, KY 42740
www.houndscroftfarm.com
Shetland, Icelandic, Jacob, and Wensleydale yarns, roving, and fiber

Windsor Wool Farm
Windsor, KY 42565
www.windsorwoolfarm.com
Border Leicester/Coopworth cross and Bluefaced Leicester/Merino cross fleece

LOUISIANA

Ecolage
Lake Charles, LA 70605
www.ecolage.com
Native plants, trees, and shrubs

Running Moon Farm
Dry Creek, LA 70637
www.runningmoonfarm.com
Gulf Coast sheep fleece, roving, and yarns

MAINE

Blackberry Lane Alpacas
Harrington, ME 04643
www.blackberrylanealpacas.com
Alpaca yarns

Longwoods Alpacas
Cumberland, ME 04021
www.longwoodsalpacas.com
Alpaca yarns and fibers

Sunshine Daydream Gardens
377 Center Conway Road
Brownfield, ME 04010
www.sunshinedaydreamgardens.com
Merino, Lincoln, Corriedale, and Columbia Finn wool, roving, handspun, and naturally dyed yarns

MARYLAND

Angel Crossing Farm
www.angelcrossingfarm.com
Cormo sheep fleece, roving, and yarns

Maryland Sheep & Wool Festival
Howard County Fairgrounds
West Friendship, MD 21794
www.sheepandwool.org
Annual fiber festival, held in May

MASSACHUSETTS

Cranberry Moon Farm
Cummington, MA 01026
www.goodwool.com
Leicester Longwool and Border Leicester fleece and fiber

River Valley Farm
Lenox, MA 01240
www.raresheepwool.com
Sheep, llama, and alpaca roving, batts, and yarn

West Elm Farm
Pembroke, MA 02359
www.westelmfarm.com
Icelandic and mohair fleece

MICHIGAN

The Native Plant Nursery LLC
Ann Arbor, MI 48107
www.nativeplant.com
Wildflowers, native grasses, trees, and shrubs

Sheep Stuff at Mt. Bruce
Romeo, MI 48065
www.sheepstuff.com
Corriedale, spotted Jacob, and Moorit yarns and patterns

Willow Farm Wool
Lennon, MI 48449
www.willowwoolfarm.com
Bluefaced Leicester and Romney fleeces

MINNESOTA

Outback Nursery
15280 110th Street South
Hastings, MN 55033
www.outbacknursery.com
Native shrubs, trees, grasses, and wildflowers

Roundabout Acres Fiber Farm
Center City, MN 55012
roundaboutacres.wordpress.com
Finnsheep, Shetland, BFL cross and llama roving and batts

Sun Rise Sheep
North Branch, MN 55056
www.sunrisesheep.com
Icelandic fleece and roving

Winterwind Farm
Battle Lake, MN 56515
www.winterwindfarm.com
Romeldale yarn, roving, and fleece

MISSOURI

Carol Leigh's Hillcreek Fiber Studio
7001 South Hill Creek Road
Columbia, MO 65203
www.hillcreekfiberstudio.com
Natural dye supplies and classes

Easywildflowers Plant Nursery
Willow Springs, MO 65793
www.easywildflowers.com
Native seeds and potted plants

Whiskey Creek Sheep Farm
Washington, MO 63090
www.whiskeycreeksheepfarm.com
Border Leicester fleece and roving and wildflowers

MONTANA

Black Foot Native Plants Nursery
Bonner, MT 59823
www.blackfootnativeplants.com
Native grasses, shrubs, and wildflowers

NEBRASKA

Kreutzer Farms Jacobs
Kearney, NE 68847
www.blackandwhitesheep.com
Jacob fleece, roving, and yarn

Myrrhwood Farm
Clarkson, NE 68629
www.myrrhwood.net
Border Leicester and Icelandic yarns and roving

NEVADA

Native Plant Farm and Tree Movers
Washoe Valley, NV 89704
www.nativeplantfarm.com
Trees, shrubs, and perennials

NEW HAMPSHIRE

Painted Knoll Farm
New Hampton, NH 03256
www.paintedknollfarm.net
Shetland fleece and roving

Riverslea Farm
Epping, NH 03042
www.riversleafarm.com
Border Leicester/Dorset cross batts, roving, and yarns

NEW JERSEY

Dancing Waters Farm
Hampton, NJ 08827
www.mohaïr-fiber.com
Mostly mohair batts, roving, top, and yarn

NEW MEXICO

Española Valley Fiber Arts Center
325 Paseo de Oñate
Española, NM 87532
www.evfac.org
Weaving and natural dye classes

High Desert Farmers
Gallup, NM 87301
www.highdesertfarmers.com
Dried bundles of organic cota for tea and dye

Tierra Wools
91 Main Street
Los Ojos, NM 87551
www.handweavers.com
Dye studio and retail store

Urban Eagle Herb Co.
Youngsville, NM 87064
urbaneagle.com/herbco/Urban_Eagle_Herb_Co/Welcome.html
Natural dyes

NEW YORK

Catskill Merino Sheep Farm
Goshen, NY 10924
www.catskill-merino.com
Merino fleece and natural-dyed and undyed yarns

HeartsEase Farm
Dansville, NY 14437
www.icelandicsheepworld.com
Icelandic fleeces and fiber

Morehouse Farm
Red Hook, NY 12571
www.morehousefarm.com
Merino yarns, knitting patterns, and kits

Nistock Farms
Prattsburgh, NY 14873
www.nistockfarms.com
Cotswald, Border Leicester/Rambouillet/Corriedale cross fleece, batts, yarns, and roving

NYS Sheep & Wool Festival
Dutchess County Fairgrounds
Rhinebeck, NY 12572
www.sheepandwool.com
Annual fiber festival, held in October

The Plantsmen Nursery
482 Peruville Road
Groton, NY 13073
www.plantsmen.com
Native plants and restoration

NORTH CAROLINA

Cill Ide Farm
Angier, NC 27501
www.wetlandplantnursery.com
Native plants, trees, and shrubs

Earthguild
33 Haywood Street
Asheville, NC 28801
www.earthguild.com
Natural dyestuffs and fiber arts materials

The Stoney Mountain Farm
Burlington, NC 27217
www.stoneymountainfarm.com
Churro fleece, roving, and yarn

Wellspring Farm
Burnsville, NC 28714
www.wellspringfarm.com
Llama, Corriedale, and Jacob roving, batts, and fibers for needle felting

OHIO

Jorgensen Farms
Westerville, OH 43081
www.jorgensen-farms.com
Romney undyed yarn

Mulberry Grove Farm
Napoleon, OH 43545
www.mulberrygrovefarm.com
Icelandic fleece, roving, and handspun yarn

Ohio Prairie Nursery
Hiram, OH 44234
www.ohioprairienursery.com
Native plant seeds and seed mixes

Spring Hill Nursery
www.springhillnursery.com
Black hollyhock root stock

OREGON

Anchor Ranch Alpacas, LLC
Eagle Point, OR 97524
www.anchorranchalpacas.com
Alpaca yarn

Aurora Silk
Portland, OR 97211
www.aurorasilk.com
Fair trade natural dyes, fibers, and yarns; classes in natural dyes

Black Sheep Gathering
Lane County Fairgrounds
Eugene, OR 97402
www.blacksheepgathering.org
Annual fiber festival, held in June

Dream Land Alpaca Farm
Sweet Home, OR 97386
www.dreamlandalpacafarm.com
Alpaca fleece, roving, and handspun yarn

PENNSYLVANIA

Dundee Farm
Sewickley Heights, PA 15143
www.dundeefarm.net
Jacob, Merino, and Corriedale fleeces, roving, and yarn

Edge of the Woods Native Plants
2415 Route 100
Orefield, PA 18069
www.edgeofthewoodsnursery.com
Shrubs, perennials, trees, and grasses

Tamarack Farm
Spring Mills, PA 16875
www.tamarackfarmsheep.com
Icelandic fleece, roving, and yarn

RHODE ISLAND

Bally Duff Farm
Harmony, RI 02829
www.ballydufffarm.com
Lincoln fleece, raw, washed, and dyed

SOUTH DAKOTA

South Dakota Natural Colored Wool Studio
Groton, SD 57445
members.nvc.net/mariemcc/
Lincoln-Finn cross, Icelandic cross, and Border Leicester cross roving, batts, and yarn

Seeds of the Plains
Amy Lehman
Belvidere, SD 57521
605-344-2265
lehman@gwtc.net
North Great Plains native seed

TENNESSEE

Three Creeks Farm
Charlotte, TN 37036
www.3creeksfarm.com
Shetland and Icelandic fleeces and roving

GroWild, Inc.
Fairview, TN 37062
615-799-1910
www.growildinc.com
Native plants; retail on an appointment basis

TEXAS

Diane Cabiness' Bird & Butterfly Gardening
Montgomery, TX 77316
www.gardenstops.com/diane.htm
Native plants

Hill Shepherd Farm
Stephenville, TX 76401
www.hillshepherd.com
Mohair fleece and roving

VERMONT

Bear Mountain Farm
West Rupert, VT 05776
www.bearmountainfarm.com
Romney fleece, yarn, and blankets

Black Sheep and Zucchini Farm
Suzanne Wallis
Norwich, VT 05055
802-649-1789
suzannewallis@valley.net
Jacob fleece and hand-dyed yarn

Boreas Farm & Cashmere Goats
Norma Bromley
Newark, VT 05871
802-467-3222
boreas25@localnet.com
Cashmere roving and yarn

Brigid's Farm
Jane Woodhouse
Peacham, VT 05862
802-592-3062
brigidsfarm@fairpoint.net
Leicester and angora fiber, natural dyes, and classes

Contented Butterfly Farm
Windsor, VT 05089
www.contentedbutterflyfarm.com
Shetland roving and yarn

Kind Horn Farm
South Duxbury, VT 05660
www.kindhornfarm.com
Icelandic fleece, roving, batts, and yarn

Kirby's Happy Hoofers
Brandon, VT 05733
www.kirbyshappyhoofers.com
Mohair yarn

Maple Ridge Sheep Farm
Randolph, VT 05060
www.mrsf.com
Shetland sheep and wool products

Vermont Sheep and Wool Festival
Tunbridge Fairgrounds
Tunbridge, VT 05077
www.vermontsheepandgoat.org/festival
Annual fiber festival, held in October

VIRGINIA

Juniper Moon Farm
Palmyra, VA 22963
www.fiberfarm.com
Angora goat, Cormo, and Cotswold yarns and fiber

Saville Hill Farm & Studio
Lexington, VA 24450
www.savillehillfarm.com
Corriedale fleece, batts, and roving

Willow Hawk Farm
Lovettsville, VA 20180
www.willowhawkfarm.com
Fleece, roving, and yarn

WASHINGTON

Botanical Colors
http://botanicalcolors.com
Natural dyestuffs and extracts

Earthues
5129 Ballard Ave NW
Seattle, WA 98107
206-789-1065
www.earthues.com
Fair-trade natural dyes, extracts, and yarns; classes in natural dyes; natural dye and color consultants

Gretchen's Wool Mill
Monroe, WA 98272
www.gretchenswoolmill.com
Small selection of Friesian fleece

Honey Lane Farms
Friday Harbor, WA 98250
www.honeylanefarms.com
Alpaca yarns

WEST VIRGINIA

Deer Run Sheep Farm
Franklin, WV 26807
www.deerrunsheepfarm.com
Coopworth fleece, roving, and locks

Good Time Ridge Alpacas
Augusta, WV 26704
www.westvirginiaalpacas.net
Natural colored yarns

WISCONSIN

Hidden Valley Farm and Woolen Mill
14804 Newton Road
Valders, WI 54245
www.hiddenvalleyfarmwoolenmill.com
Coopworth roving, yarns, and quilts

Prairie Nursery
W5875 Dyke Avenue
Westfield, WI 53964
www.prairienursery.com
Native plants and seeds

WYOMING

Sheep Shed Studio
Encampment, WY 82325
www.thesheepshedstudio.com
Yarn, roving, and fiber

Wyoming Prairie Alpacas
Cheyenne, WY 82009
www.wyprairiealpacas.com
Natural colored yarn

canada

NATIONWIDE RESOURCES

Canadian Sheep Breeders Association
www.sheepbreeders.ca

Canadian Sheep Federation
www.cansheep.ca

Alpaca Canada
www.alpacainfo.ca

BRITISH COLUMBIA

Bella Cria Canadian Alpacas
Duncan, BC V9L 6S6
www.bellacria.com
Raw fiber and yarns

British Columbia Sheep Association
www.bcsheepfed.com

Fraser's Thimble Farms
Salt Spring Island, BC V8K 1A3
www.thimblefarms.com
Native plants

Maiwa Handprints
6-1666 Johnston Street
Granville Island, Vancouver, BC V6H 3S2
www.maiwa.com
Natural dyestuffs

Sagebrush Nursery
Oliver, BC V0H 1T0
250-498-8898
www.sagebrushnursery.com
Grasses, perennials, shrubs, and trees

MANITOBA

Manitoba Sheep Association
www.mbsheep.ca

NOVA SCOTIA

Lismore Sheep Farm
River John, NS B0K 1N0
www.lismoresheepfarmwoolshop.com
Wool batting and yarn

ONTARIO

Brier Run Alpacas
Oil Springs, ON N0N 1P0
www.alpacascanada.com/
Fibers, batts, and yarn

Grow Wild
Claremont, ON L1Y 1A3
www.grow-wild.com
Native plants

Acorus Restoration Native Plant Nursery
722 6th Concession Road
RR#1
Walsingham, ON N0E 1X0
www.ecologyart.com
Native plants restoration

Gamiing Nature Center
1884 Pigeon Lake Road
Lindsay, ON K9V 4R5
www.gamiing.org
Native plants

Old Field Garden and Wild-Flower Nursery
2935 Porter Road
Oxford Station, ON K0G 1T0
www.oldfieldgarden.on.ca
Native plants

SASKATCHEWAN

Saskatchewan Sheep Breeder's Association
www.ssba.org

Saskatchewan Sheep Development Board
www.sksheep.com/links.htm

Wool Growers Cooperative Canada
www.seregonmap.com/SCM/index.htm

acknowledgments

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DIYer eager for a new challenge, a gardener or a textile designer, *Harvesting Color* will inspire you. The plants and the colors around you will never look the same again.

REBECCA BURGESS is a teacher and natural dye artisan who has worked for more than ten years creating recipes from local flora. She teaches natural dye workshops throughout the country, to crafters, ecologists, and art students. Rebecca has been a guest lecturer at Harvard University and has consulted with apparel companies on how to incorporate natural dyes into their clothing. She is also the founder of Ecological Arts, an organization dedicated to creating, revitalizing, and teaching functional art forms that utilize natural raw materials. Rebecca lives in San Geronimo, California.

Photographer **PAIGE GREEN** applies a storytelling approach in her work, frequently addressing issues involving agriculture, land use, and food. She uses natural light and funky old cameras, as well as the latest digital ones, in order to tell the stories she photographs. Paige lives in Petaluma, California.

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Dyeing your own fabric can produce gorgeous colors,

as more and more crafters are discovering. Master dyer Rebecca Burgess spotlights thirty-six plants that will yield beautiful natural shades, and she shows just how easy the dyes are to make. Pokeberry creates a vibrant magenta while a range of soft lavender shades is derived from elderberries; indigo yields a bright blue, and coyote brush produces stunning sunny yellows.

With breathtaking color photographs, maps that show the range of each plant throughout North America, and seasonally based knitting projects, *Harvesting Color* is an essential guide for this burgeoning field.

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