

Back to the ranch!



Shortly after the Ranch Trek, Prairie Plains Director Bill Whitney accompanied a group of five botanists from the University of Kansas Native Medicinal Plant Research Program back to Sioux County. The article here explains the work of the program and is excerpted from an article written for the fall bulletin of the United Plant Savers (UpS), an organization dedicated to protecting native medicinal plants of the United States and Canada (learn more at unitedplantsavers.org). Our thanks to Kirsten Bosnak and UpS for allowing us to print it as a supplement to *Prairie Plains Link*. Pictured: Botanist Hillary Loring with a load of silver-leaf scurf-pea (*Pediomelum argophyllum*) collected on the Prairie Plains Guadalupe Memorial Prairie.

Medicinal plants from the prairie: What is here that can heal?

by Kirsten Bosnak

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In late June, in a great, white barn on a ranch outside Harrison, Nebraska, three miles from the Wyoming border, wild licorice root, prairie sagewort, silver-leaf scurf-pea and other plants lay drying in neat sections on a tarp. Over the previous two days, our field team had clipped, pulled and dug each plant and recorded its exact location. Back at the University of Kansas in Lawrence, after drying, grinding and bagging, the plant material would be tested in the medicinal chemistry lab for compounds that might have the capacity to heal.

Our project, the Native Medicinal Plant Research Program, which is aimed at verifying traditional knowledge through research and reviving the medicinal use of some Great Plains plants, is entering its second year.

Our staff is small, fewer than a dozen people. Some of us are from right here, where the eastern deciduous forest meets the prairie. Some of us come from halfway across the world. We bring various academic backgrounds to our project, but we share an interest in sustainability and natural healing, and a curiosity about how the plants right beneath our feet might help.

At various times of year, you'll find some of us in the field gathering echinacea or milkweed or other plants from our list of hundreds to collect. Others will be in the medicinal chemistry lab testing plant material — or maintaining and developing our new medicinal plant research garden. Some of us will build on our ethnobotanical database or write articles sharing our findings. We also will meet with our funders and explore opportunities for bringing new herbal products to the public.

There are two parts to our program: botany and medicinal chemistry. Our project is truly interdisciplinary. It's headed by Kelly

Kindscher, a recent United Plant Savers (UpS) board member, one of our region's leading ethnobotanists and a senior scientist at the Kansas Biological Survey, and Barbara Timmermann, chair of the KU Department of Medicinal Chemistry and a leading researcher on turmeric and ginger. We also have staff members with backgrounds in field botany, medical anthropology, and journalism. The medicinal testing involves chemists as well as laboratory biologists and staff at the KU Medical Center in Kansas City, Kansas.

While those of us in botany and outreach are all from the North American prairie, our medicinal chemists are all internationals — Barbara is from Argentina; others are from India, China, Ireland and Costa Rica. Hank Zhang, of China, and Gollapudi Rao, of India, bring a special perspective, having grown up in a part of the world where the tradition of herbal healing continues today (most U.S. herbalists feel that their herbalism is derived from European or Native American traditions).

The five-year, \$5 million grant that is our main funding source comes from Heartland Plant Innovations, a private company that received startup funding from the Kansas Bioscience Authority. Heartland's goal is to identify medicinal compounds that can be marketed in natural remedies and other products, bringing business benefits to Kansas and creating new jobs here. For our work, this means in part that the funding cannot be taken elsewhere; the project will remain at KU.



Collected plants — including *Cyclachaena xanthifolia*, *Artemisia frigida*, *Glycyrrhiza lepidota*, *Pediomelum argophyllum* and *Atriplex canescens* — are spread out to dry on tarps in the barn. The botanists are, from top and clockwise, Quinn Long, Kirsten Bosnak, Kelly Kindscher and Maria Pontes Ferreira.

We begin our work by choosing which plants to collect for testing. The basis for our decisions comes ultimately from the herbal traditions of this region — through the work done by various ethnobotanists over the past century. Much of this information was collected in two books on medicinal and edible prairie plants by Kelly, but we also draw on other databases and sources, including the Native American Ethnobotany Database created by Daniel Moerman at the University of Michigan.



One long root: Native Medicinal Plant Research Program botanists took some time collecting this licorice root (*Glycyrrhiza lepidota*). On the left, Quinn Long still in the process; right, Hillary Loring, Quinn Long, Kirsten Bosnak and Kelly Kindscher. Kelly, Ethnobotanist and Senior Scientist for the Kansas Biological Survey, heads the botany division of the program, and is also serving on the Prairie Plains Resource Institute Board of Directors.

The knowledge base for this herbal tradition was developed over thousands of years by people native to this place. We are deeply aware of this and would like to see some of the business ventures related to our project benefit Native American communities directly. We are beginning to explore such opportunities and welcome information and ideas related to this.

Kelly and other staff members on our project have worked closely with Native Americans on a professional level, and we seek their involvement in this work. A number of Native Americans of various nations follow our activities through our Facebook page — which was created in late January this year and now has more than 1,500 members.

For the laboratory tests, Barbara needs a kilo of dried material for each plant. This means we must gather quite a large sack full of fresh material. When you're talking about roots, that means a lot of digging. When you're talking about flower heads, it means a lot of clipping.

We collect primarily from public lands and often must make a series of phone calls to obtain the proper permits. For each species, we want to collect from a large stand of plants in one location because of the likelihood that the genetic material in that stand is fairly uniform, whereas if we were collecting a bagful of material from patches of plants at some distance apart, that would be less likely. We want genetic uniformity because each stand of plants could offer something different chemically. If we find in the medicinal chemistry lab that a plant from a particular stand tests out with highly effective medicinal compounds, we could return to that very stand of plants to collect more plant material or seed for propagation.

Two notes about collecting: Our general rule is that we take no more than half from any particular stand of plants. And if a plant is endangered, we will not collect it; it's simply off limits. Also, Kelly, who has worked on the UpS Plants-at-Risk Assessment Tool (<http://www.unitedplantsavers.org/At-Risk-Assessment-Tool.html>), keeps us aware of potential overharvesting risks for the plants we work with.

Our project is in the very early stages, and testing of plant material is a multistage process that takes time. We don't expect to have definitive information on what any particular plant might offer until sometime next year. We have state-of-the-art medicinal chemistry and biological testing labs here at KU. All the plants are run through several specific biological assays, testing for antioxidant capacity, wound healing, and anti-inflammatory capacity. Testing for a specific type of anticancer activity is done in collaboration with the KU Medical Center.

In the meantime, we continue collecting, researching and reaching out. Education is an important part of our work, and if the rapid growth of the Facebook page is any indication, people are very interested in learning about the healing properties of native plants. More than a dozen newspaper and radio reporters have come to us in the past six months for interviews, and more than 100 people came to the dedication of our medicinal garden on the same May afternoon as all the local high school graduations.

The garden itself, which is north of Lawrence on prime river bottom soil, is our primary public meeting ground, and several volunteers have helped plant and tend it. We've had several tours there already and plan to develop a demonstration garden and a butterfly garden in the coming year.

We're excited about our project and where it might lead. To learn more about it, please visit our website, www.nativeplants.ku.edu, and join our Facebook page www.facebook.com/nativeplants.