

# ENDANGERED

THE RACE TO SAVE LANDRACE CHILES



BY CARMELLA PADILLA

**It was an unusual family heirloom: a large, clear jar with a white screw top, the kind you set on the back porch in summer to make sun tea. Grace Medina retrieved it from deep inside the closet where it had sat, like hidden treasure, for decades in the dark. The jar was half full.**

Medina poured out half of that and, with pride and generosity, entrusted hundreds of heirloom chile seeds to Mary Campbell's care.

Campbell was not family; her Tennessee roots were a world apart from the secluded Embudo Valley where she came to live in 1992. Still, in 2000 when Campbell and her husband purchased the Cañoncito house and farmlands owned by Medina and her husband, Ismael, the families achieved a particular kind of kinship—a relation forged not by birthright but through the rights of land, water, and consecutive ownership of the property.

Handed down over 150 years through the Medinas' extended family, the chile seeds were as much a part of the property as the rooftop or the windows or the dim interior closet from which they came.

"[Grace] was the custodian of the seed, and I was surprised at how much she would part with," recalled Campbell, a retired Los Alamos National Laboratory chemist and owner of Embudo's thirteen-acre Rancho Arco Iris farm. "Besides the jar of seed, we were given instructions of how to plant the seeds, right down to using a special hoe."

The seed transfer was bigger than the Medinas or Campbells alone. As stewards of centuries-old northern New Mexico farmlands, they were connected links in a cultural—and agricultural—chain dating back 400 years. In this sense,

the seeds belonged to the greater community and culture that had nurtured them through time. In passing them on to Mary Campbell, Grace Medina did her part to encourage the survival of the beloved local chile crop. It was now left to Campbell to determine whether the small Cañoncito chile field would thrive or die.

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**On a sunny mid-August morning nine years later,** the jar of chile seed sits in still life on a square farm table in the old Medina house, the words "Cañoncito Field #7" printed across the white screw top. A narrow shaft of light illuminates the glass and the golden seeds, which remain remarkably untarnished by age and time.

"This seed has got some serious energy," said Loretta Sandoval, a chemist and owner of the two-acre Zulu's Petals farm, who now lives in the home. "It's been out-selected through generations for the best size, color, and shape."

Sandoval and Campbell are standing before the seed jar with native Embudo Valley author and historian Juan Estevan Arellano, whose father, Carlos, built the house, where Arellano lived until he was seven. In 1954 the family moved from Cañoncito to Embudo to avoid water shortages in the upper valley. Arellano fondly recalls a valley of extended family members with big fields of corn



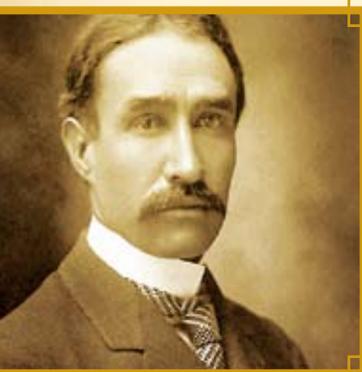
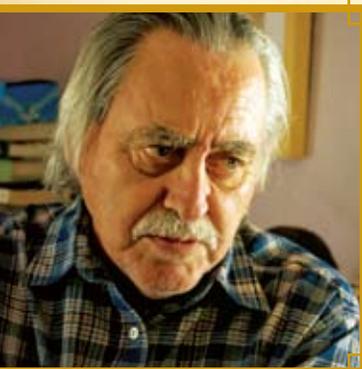
Above **Mary Campbell** moved to Cañoncito in 1992 with her now late-husband and today owns the thirteen-acre Rancho Arco Iris farm. She is working with Loretta Sandoval to preserve northern New Mexico's endangered landrace chiles. Photo by Blair Clark.

Left **Ripe red Cañoncito chile pods** from Loretta Sandoval's 2009 harvest are set on racks to dry, along with Cañoncito green chile grown by Juan Estevan Arellano. Seeds from these pods will be saved to plant next season. Photo by Loretta Sandoval.

**Juan Estevan Arellano**

is an author and historian whose family has been in the Embudo Valley since at least 1725. Like others in the valley, family members have farmed native chile varieties for generations.

Photo by Blair Clark.



Pioneering New Mexico State University chile breeder **Fabian Garcia** developed the first hybrid chile with a dependable pod size and heat level, laying the foundation for the state's multimillion dollar chile industry. Courtesy of New Mexico State University/Rio Grande Historical Collections.

and “waist-high chile” that his mother, Lucia, used to grow. She spoke of bumper chile crops in the 1930s that produced 500 *ristras* (strings of chile) per harvest and sold for fifty cents apiece, important income during the Depression years.

Despite the Embudo Valley's temperamental climate and hilly terrain at 6,000 feet, Arellano's family was self-sustaining, thanks in large part to chile and other homegrown crops. Today, however, many of Arellano's family members have died or sold their farmland, and while he and a few cousins remain in the area, less and less chile is grown there each year. What brings Arellano back to his childhood home is not simply a nostalgic story of the past but a promise for the valley's future—dual narratives that converge and resonate in the contents of the sun-tea jar.

“For me, being able to preserve these chile seeds and grow local chile means being able to retain something that has been part of this community for a long time,” he said. “The people here know the native chiles, they know how to grow them. This chile is an important part of being able to maintain a culture and history that goes way back.”

For his part, Arellano has joined Sandoval and Campbell in their efforts to preserve, protect, and perpetuate endangered heirloom chile seed lines—technically known as “landrace” chiles—from Cañoncito and other small communities throughout northern New Mexico. In 2007 Sandoval and Campbell first collaborated to research and grow Grace and Ismael Medina's hand-me-down chile seeds in Cañoncito Field #7—the same field in which the Medina and Arellano ancestors had grown the family chile since 1850, selecting seeds from each harvest to plant in subsequent years. They have since expanded their research to include landraces from Dixon, Velarde, Embudo, Alcalde, and Chimayó.

Though the women are still in the early stages of field research, their ultimate purpose is to document the nutritional qualities, growth characteristics, and disease resistance of the landrace varieties and compare them to those of modern hybrid varieties. The latter are a cross between two different chile varieties that have been scientifi-

cally merged to produce uniformity in size, shape, taste, and other traits, largely to meet the needs of New Mexico's multimillion dollar chile industry, which produces the majority of the US chile crop. The economic success of the hybrid chile industry, however, has come at the expense of small-scale chile farmers in northern New Mexico, who have slowly abandoned the tradition of farming landrace chiles in favor of easier-to-grow chile hybrids, or in many cases, no chile at all.

The result, says Sandoval, is the slow death of landrace chiles—and the social, cultural, and culinary history they embody. But if she, Campbell, Arellano, and other supporters can scientifically build a case for the nutritional, social, and economic benefits of protecting landraces, Sandoval believes the impact will be felt not only in northern New Mexico but also statewide.

“The landraces are not dead yet, but they're highly endangered,” Sandoval said. “If they die out, hundreds of years of New Mexico agriculture and stewardship go with them. There's no turning back the clock.”

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**The clock recording the history of New Mexico chile was set around 1580**, when Spanish chronicler Baltasar Obregón wrote, “They have no chile, but the natives were given some seeds to plant.” Obregón was referring to the Pueblo Indians, who, according to current archaeological evidence (though this is still a subject of debate), were not growing chile in New Mexico until the Spaniards arrived. Though chile was grown and eaten in South America as early as 5200 BC, the first Spanish encounter with the New World crop was during Spain's 1519 invasion of Mexico's Aztec empire. By then, sophisticated Aztec chefs cultivated and cooked dozens of varieties of chile—called *chilli* in the Aztec Nahuatl tongue. The Spaniards quickly adopted the tasty crop, which they called *chile*, and carried it into the northern frontier.

The Juan de Oñate expedition arrived in northern New Mexico in late 1598, and by the following spring, chile seeds were planted throughout the area and irrigated with newly established *acequias*

(ditches). Neighboring Pueblo Indians now also grew chile alongside their traditional crops of corn, beans, and squash. Though chile was originally a perennial, Spanish farmers cultivated the crop as an annual because of frost, which killed northern New Mexico crops each fall. The local climate—warm days, cool nights, and steady breezes—proved perfect for chile growing. The landraces quickly adapted to the unique geographic locales in which they were raised, each crop becoming stronger, more weather-resilient, and more resistant to disease.

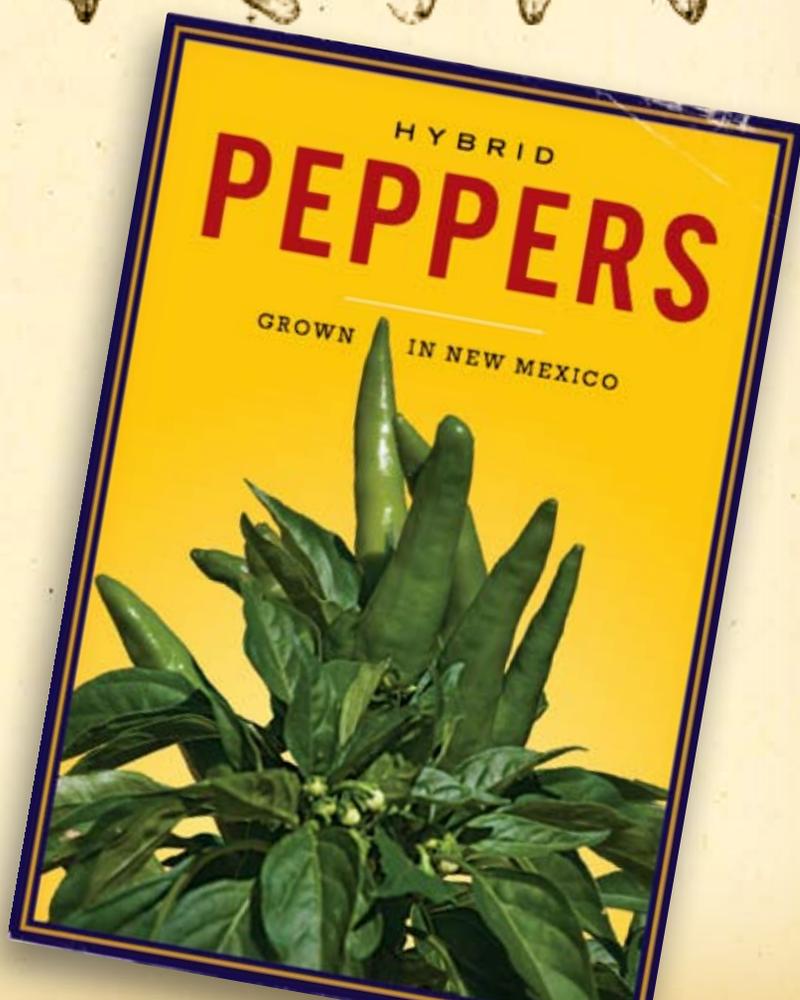
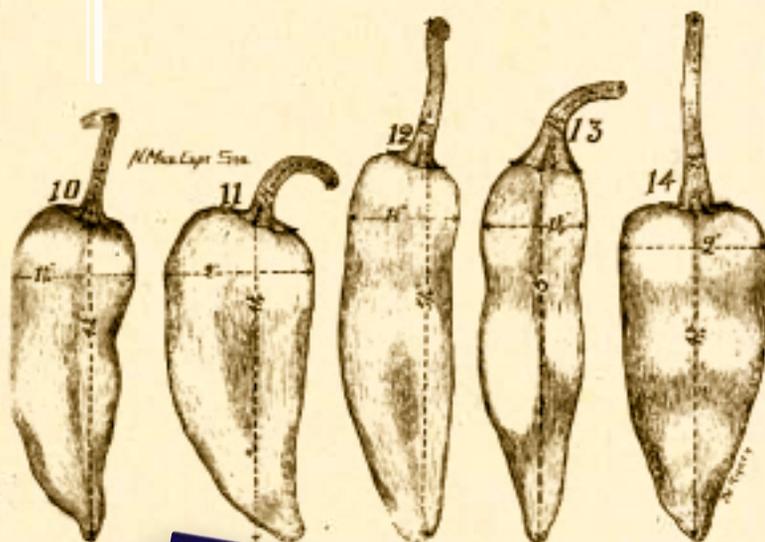
Physically, the landrace pods grew small and crooked with thin skin and irregular shape, a reflection of the region's shorter growing season and temperature extremes. Yet locals cherished their unique traits of pungency, sweetness, and taste. With every harvest, as farmers selected seed from the heartiest, tastiest plants to save for subsequent years, chile became central to community life—so valuable that it was accepted for trade at the local mercantile. By the late nineteenth century, chile was being shipped east on the railway, while state tourism boosters promoted it alongside native culture and adobe architecture as an example of the state's "foreign" appeal.

It wasn't until 1908 that the state's chile industry broke wide open. That year, Fabian Garcia, a researcher at the Agricultural Experiment Station of the New Mexico College of Agriculture and Mechanic Arts in Las Cruces (now New Mexico State University), published plans to breed a contemporary New Mexican chile that at once satisfied mainstream American tastes and local farmers' demands for more uniform, higher-yield crops. In 1921 his New Mexico No. 9, the first scientifically developed chile cultivar, was released to the acclaim of chile farmers and chile eaters alike. Garcia's breakthrough not only revealed the economic potential of chile breeding, it demonstrated its scientific potential, inspiring generations of other chile researchers to follow his lead.

Today, New Mexico State University remains at the forefront of chile science through research and breeding initiatives that have developed a wealth of new chile varieties, making chile the

Top Fabian Garcia made **drawings of various chiles** during his experimentation to produce the first commercially viable chiles in the Mesilla Valley. Courtesy of New Mexico State University/Rio Grande Historical Collections.

Bottom **A Mirasol Improved chile**. Spanish for "looking at the sun," Mirasol-type chiles grow in erect clusters of four to six cone-shaped pods that point toward the sun. These hybrid chiles are grown by Loretta Sandoval and Mary Campbell to compare with local landrace varieties. Photo by Blair Clark.





**Loretta Sandoval** thumbs through a journal in which she records plant varieties and plant growth data for chiles grown in her greenhouse each season. Photo by Blair Clark.

state's largest crop. The university's Chile Breeding and Genetics Program focuses on pushing the major New Mexico chile types—the New Mexican, jalapeño, and cayenne—to their fullest potential, breeding for such qualities as pungency, flavor, color, size, shape, and resistance to disease. Chile hybrids have been developed to achieve everything from a milder green to a hotter red to a deep purple “ornamental” hue. Among the hybrids most familiar to New Mexicans are the long, fleshy Big Jim and the fiery Sandia. The down-home Joe E. Parker, a pod developed to be meaty, of medium heat, and easy to peel, is among the most widespread varieties grown in the state.

Loretta Sandoval, who was raised on a farm in Blende, Colorado, and earned degrees in chemistry, biology, and applied science from Colorado State University, understands the gains that chile hybridization has brought to large-scale chile growers, processors, and producers, whose livelihoods are invested in the crop. But she says that ongoing manipulation of the chiles' genetic material through breeding has led to a loss in qualities of taste, as well as in the crop's ability to withstand disease or other environmental pressures. In the long run, she believes, the losses outweigh the benefits.

“Hybrids require more energy and plant food to raise, they are potentially more susceptible to disease, and they degrade over time,” she said. “Unlike hybrids, which are homogenous, landraces are heterogeneous, meaning that many genes control their processes and make them stronger structurally and environmentally. The fact that they have been out-selected over generations has given them more strength and stability in the field. That's why the same chiles that have been grown in Cañoncito for 150 years can still grow strong there.”

The superior strength and purity of traditional landraces has not been lost on chile breeders, who use them not only as parent material for conventional breeding but also in transgenic crop development, extracting genes for specific traits to insert into other varieties and create new patented cultivars. According to Charles Martin, an agricultural specialist at the Sustainable Agriculture Science Center in Alcalde, one of ten statewide experiment

stations of New Mexico State University, fair consideration and compensation to the small farmers who have maintained the landraces over time is rarely addressed in the issue of patenting genes extracted from traditional landraces. A researcher of sustainable small-scale agriculture in north-central New Mexico, Martin emphasizes that his comments are solely based on his professional opinions and do not express any official position of New Mexico State University.

“The traditional landraces are an undervalued resource, and the small-scale farmers are really being deprived in a number of different ways,” Martin said. “A big concern of mine is the biopiracy issue. These genetic engineers need the raw materials in the form of genes, and often they’re acquired from traditional landraces. But when modern varieties are sold back to growers, they often have traits geared for the large-scale commercial growers, not for the small-scale growers. The seeds are also patented and cost more.”

Particularly threatening, Martin, Sandoval, Campbell, and Arellano agree, are the behemoth seed corporations that seek to patent chile genes and control their growth, distribution, and development into new chile varieties for their own production—and profit. “It’s important to raise the awareness of the growers to understand that the traits of their traditional lines are being acquired and used by research institutions and biotech corporations for patenting chile lines,” Martin said. “Theoretically, the small-scale grower could be prohibited from saving their own seed as a result of the patenting of the genes.”

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**“We have to put small farmers on the same playing field with the big companies,”** said Sandoval. “We have to get back to basics.”

Sandoval’s “playing field” is a short drive across the road from her house and down a narrow dirt path. There, on the edge of the Acequia del Medio, sits Cañoncito Field #7, a modest two-and-a-half-acre plot bordered by giant sunflowers and knee deep in four rows of ripe green Cañoncito chiles. It’s a small space for the big task of

preserving centuries of chile history, but at this nascent stage in Sandoval and Campbell’s studies, it’s the quality, not the quantity, of the crop the field produces that counts.

“Our work represents a systems approach, which is similar to an ethnobotanical approach, which does not try to change farming practices,” Sandoval said. “We grow as the old-time farmers grew, and only make improvements to traditional methods if it will benefit the landraces.”

Sandoval and Campbell have focused goals for the crop. In this case, three rows of chile were direct-seeded on the first of May, according to the Medinas’ detailed planting instructions, while one row was seeded in Sandoval’s greenhouse, then transplanted to the field. Noting the smaller size of the greenhouse row, Sandoval said, “In this case, the traditional method of direct-seeding is clearly stronger.” Furthermore, she notes that hybrid varieties cannot be direct-seeded in high-elevation fields. In 2007 she and Campbell planted Chimayó and Big Jim chiles side by side in the same field

## **The chile seeds were as much a part of the property as the rooftop or the dim interior closet from which they came.**

at the same time to compare their development. The Chimayó, a landrace, produced a significantly higher number of mature plants than the hybrid Big Jim. “Even if we were to plant the hybrids here, they wouldn’t grow well,” she said.

Among the long-term improvements to benefit the crop is the use of all-organic pest-control treatments. Methods to boost the crop’s nutritional and genetic quality include small organic amounts of potassium and sulfur during critical growing periods. How the crop responds to these techniques will ultimately be measured and documented in terms of crop yield, pod size, and most important,

nutritional qualities. To that end, the women are partnering with a scientific laboratory that specializes in nutritional testing.

Comparing the nutritional qualities of landraces to that of hybrids, which Sandoval contends are less nutritious than landraces, is another major goal. For comparison, a distant section of Field #7 hosts such hybrid chiles as Sandia and Española Improved, far enough from the Cañoncito chiles to ensure that they don't cross-pollinate. "I believe that protecting the landraces is critical to the diets and health of traditional Hispanic and Native American cultures," Sandoval said. "It's important to keep these crops pure to preserve their nutritional—and medicinal—qualities."

Still farther down the dirt path, amid flourishing orchards of apples, cherries, pears, and wild plums, is Field #6. Sitting low in a landscape, where it is irrigated by the Acequia Sancochada, this field recalls a time when farmers were prohibited from building on irrigated land, instead building horse barns and corrals high above the fields. At 1.77 acres, Field #6 boasts a fifteen-row medley of landraces connected to communities outside of

## **Protecting landraces is critical to the diets and health of traditional Hispanic and Native cultures.**

Embudo, including Velarde, Alcalde, and Chimayó. For Arellano, the assortment is a reflection of how communities in northern New Mexico have traded crops and other goods through time. "When you look at growing traditional chile, you have to consider chile from the whole Española Valley," he said. "Families exchanged seeds in different communities, so it makes sense that people here would also grow different types of chile."

In the same vein, Sandoval collects seeds from various northern New Mexico communities for her field research and the development of a landrace seed bank. Her living room is home to twenty

landrace seed varieties collected from farmers throughout the Española Valley. She regularly visits area farmers markets to collect seeds, where she also sells potatoes, cucumbers, and other fruits of her farm labors. In an effort to keep the Cañoncito seed thriving in the Embudo Valley, she and Campbell have shared the Cañoncito chile with Arellano and his second cousin, Fred Martinez.

An apple grower from nearby Dixon, Martinez owns the biggest apple orchard in the valley and hasn't lost an apple crop in forty-three years. In 2006 the New Mexico Department of Agriculture named him and his wife, Ruby, the New Mexico Farm Family of the Year for their progressive apple-growing techniques. Like Arellano, however, Martinez's early farming roots are in chile; he says his grandparents' chile crops in the 1930s and 1940s helped them to survive the Depression, and his father farmed chile into the 1970s. But eventually, the financial and environmental challenges of chile prompted his father to plant apple and peach orchards instead.

"Chile is one of the most difficult crops to grow. It needs a lot of attention, and there are a lot of things that can go wrong," Martinez said. "In the Embudo Valley, the growing season, if you're lucky, might be about three-and-a-half months. There's not much room for error there."

Despite his success in apples, Martinez isn't completely willing to give up the chile crop. Each season, he grows about a quarter-acre of chile, mostly for family use. In addition to the seed that Sandoval and Campbell shared, Martinez plants seed passed down from his mother and grandmother.

"Every year, I plant some, and I save some for the future. I feel like I need to do my part to keep this tradition alive," he said. "It's always been a thing of pride to grow your own chile. Loretta is now planting my grandparents' fields. Things are kind of intertwined here."

Integral to the tradition, Martinez says, is maintaining the taste of the local chile, which he describes as mildly hot, with a subtle sweetness. "I can tell a local chile from a hybrid or a native chile from a neighboring valley just by the taste, the hotness, the texture of the meat, even how it

looks when you grind it into red chile powder,” he said. “The people who are familiar with the chile from this valley will pay a premium just for its taste.”

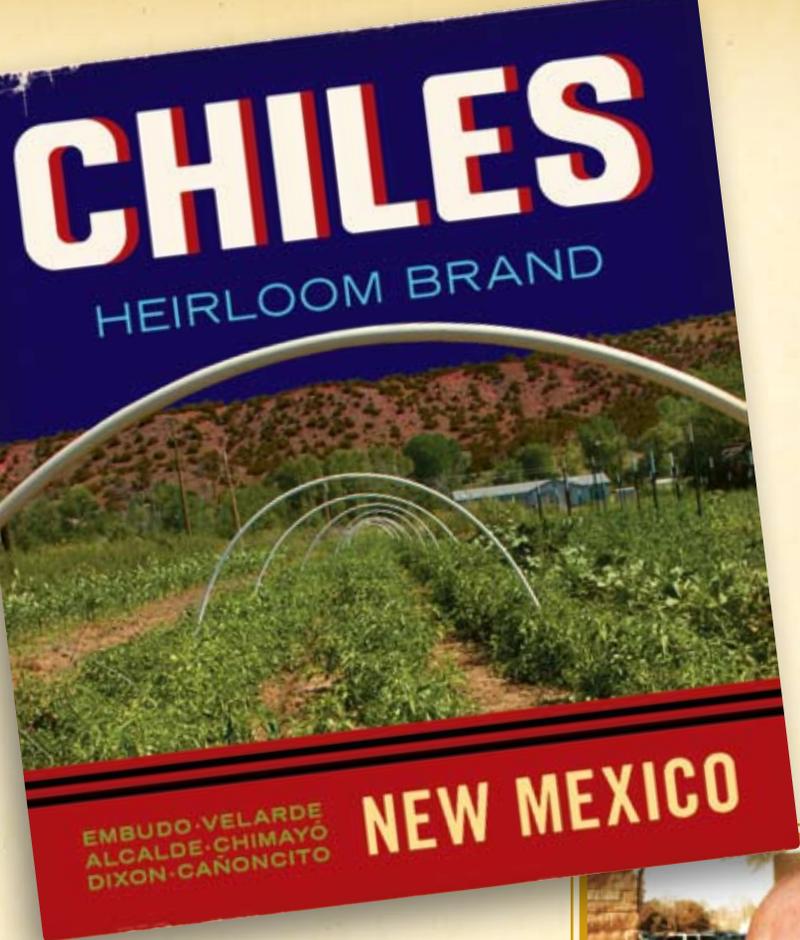
Martinez isn't the only local who stands by the taste of his community landrace. Campbell and Martinez often host blind taste tests with both landrace and hybrid chiles. More often than not, Campbell says, residents say they prefer the local varieties. “They all claim the hybrids are not as good as the landraces, that they just don't taste right,” she said.

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For Charles Martin of the Sustainable Agriculture Science Center at Alcalde, the social aspects of landrace chiles are an essential part of the agricultural equation, one that researchers too often forget. “Many researchers are specialists and are not trained to be aware of the social consequences of new technology,” he said. “I grew up on a farm, and I've seen the loss of family farms over the years. Besides technology and economics, we have to consider the social dimension of agriculture. It's ultimately a policy issue, and you can't solve a policy issue with technology.”

Martin says helping small farmers find ways to maintain sustainability is a first step toward policy that will make small-scale farming profitable. “It's industrialized commercial agriculture that, in the long term, is not sustainable. Monoculture farming has resulted in a buildup of plant diseases,” he said. “If we put funding and other assistance into these crops, it's not too late to turn things around. But if we let the biotech industry patent the crops, it raises the possibility of genetic contamination of the landraces. At that point, they're out of the small farmers' hands.”

Under the portal at the old Medina house, the past is palpable. Sandoval, who feels and sees reminders of it daily, says that losing the landraces is not an option. “The old-time farmers didn't give up,” she said, pointing out the uneven rows of rusty nails on her front porch where generations of chile ristras have hung to dry. Even as she prepares for the chile



harvest later in the week, Sandoval is thinking about next year. She plans to spend the winter writing a grant to assist her and Campbell in their research. If successful, by next season she'll have the resources to enlist eleven additional northern New Mexico farmers to grow their own local landraces. If she can expand her research base—and solidify its results—she just may stay one step ahead in the race to save the landraces.

“I would love to, some day, have the landrace chiles be reincorporated into northern New Mexicans' daily life and diet,” she said. “My dream is to see all the old families growing them again. That's what I would consider progress.” ■

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**Carmella Padilla** is a contributor to *El Palacio* and the author of several books, including *The Chile Chronicles: Tales of a New Mexico Harvest* and *El Rancho de las Golondrinas: Living History in New Mexico's La Ciénega Valley*, two of many she produced with photographer Jack Parsons. Padilla is also a 2009 recipient of a Governor's Award for Excellence in the Arts.

To see more of **Blair Clark's** photographs of Mary Campbell and Loretta Sandoval's chile fields, visit [elpalacio.org](http://elpalacio.org).



Top **Cañoncito Field #7** has been farmed by local chile growers for at least 150 years. Photo by Blair Clark.

Above **Charles Martin**, an agricultural specialist at New Mexico State University's Sustainable Agriculture Science Center in Alcalde, is a strong voice for supporting small chile farmers in north-central New Mexico. Courtesy of University Communications and Marketing Services, New Mexico State University.