Reports

Food Globalization and Local Diversity

The Case of *Tejate*

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Globalization is often assumed to lead to a reduction in cultural and biological diversity, but a view from the beginning of plant domestication suggests that the interaction of foods with forces along the global-local continuum has outcomes for biological and cultural diversity that are contingent and difficult to predict. This phenomenon is apparent in the case of *tejate*, one of a family of beverages made with maize and cacao that have a very long history in Mesoamerica. Today, *tejate* is arguably the most important traditional drink in the Central Valleys region of Oaxaca, in southern Mexico. It is commonly made with maize, seeds of one or two species of cacao, seeds of mamey, and *rosita de cacao* blossoms. Analysis of *tejate*'s current role and its relationship with farmer-named maize diversity in two communities of the Central Valleys, one less and one more indigenous, reveals that the preparation of *tejate* is positively associated with greater local maize diversity. At the same time, it suggests that this relationship could change as a result of contemporary globalization, in which *tejate* has become more popular with urban consumers and has moved to the United States with Oaxacan migrants. *Tejate* is an example of the persistence and change of an important traditional food over time—its origins in indigenous America made possible by interregional migration and trade, its persistence and change through European colonization and independence, its decline during late-twentieth-century economic globalization, and its current change and expansion in an era of intensified globalization.

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Leaving out massive fragments of the past to discuss globalization as a unique contemporary event is not only shortsighted but often ethnocentric and limits our understanding of the global-local dynamic (Mintz 2000). Globalization is often assumed to lead to a reduction in cultural and biological diversity, but a view from the beginning of plant domestication suggests that the interaction of foods with forces along the global-local continuum has outcomes for biological and cultural diversity that are contingent and difficult to predict.

Since plant domestication began ~10,000 years BP, crops and foods made from them have often been part of long-distance migration and trade and imperial networks, and many local foods are the products of processes at broader scales. Today, accelerating changes in the world's economic, sociocultural, and biophysical systems are creating unprecedented challenges for the distinction between local and global foods. The relationship among food, globalization, and agrobiodiversity is apparent in the case of *tejate*, one of a family of beverages made with maize and cacao that have a very long history in Mesoamerica, and the cultural and biological diversity of maize (see CA+ online supplement A). *Tejate* is made in the Central Valleys region of Oaxaca, Mexico, with maize domesticated and grown in the region and products of trees indigenous to Central or South America but imported to the region in ancient times—seeds of two species of cacao (*Theobroma cacao* and *T. bicolor*), *pixtle* (the seed of mamey, *Pouteria sapota*), and flowers of *Quararibea funebris*, known as *rosita de cacao*. Additional products of other nonindigenous plants are frequently used, including sugarcane (*Saccharum* spp.), introduced by Europeans, and coconut (*Cocos nucifera*), both from Southeast Asia (see CA+ online supplement B). *Tejate* has been one of the most important drinks in the Central Valleys and has played a traditional sociocultural role in work parties, festivities, and family meals. Despite its cultural importance, its history, preparation, and use have not been documented (J. Iturriaga de la Fuente, personal communication, February 2005), only a few anecdotal descriptions being available (e.g., Santiago Santiago 2002; González Esperón 2006).

An account of *tejate* preparation and the results of interviews with members of 60 rural households indicate that, while the traditional home preparation and use of *tejate* in some communities has been decreasing as a result of external social and economic changes, its cultural and social significance remains high. *Tejate* illustrates the persistence and change of an important traditional food over time—its origins in indigenous America, made possible by interregional migration and trade, its persistence and change through European colonization and independence, and its decline during late-twentieth-century economic globalization. Now it appears to be entering a new stage of globalization that promises not only to expand the geographical extent of its consumption but also to change its traditional composition. In this paper we analyze the current state of *tejate* preparation and maize

diversity in two communities that differ in the extent to which they have been affected by globalization, as reflected by assimilation into mestizo culture. We also document the recent globalization of *tejate* both within Oaxaca and through migration to the United States.

Methods

The data reported here come from ongoing investigations of *tejate* being conducted in the Central Valleys of Oaxaca as part of a larger study of farmers' knowledge and management of maize diversity. They were collected in interviews with a random sample of 60 families in two communities in the Central Valleys: Santa Maria in August 2002 and San Antonio in February 2003 (pseudonyms are used here). These communities were chosen to represent contrasting social and agroecological variation in the Central Valleys (table 1). Most important for this study is that Santa Maria's originally Zapotec population has been largely assimilated into mestizo culture, including displacement of the native Zapotec language by Spanish, the disappearance of traditional dress, and the institution of municipal governance following the federal system. Until recently, Santa Maria sent relatively few migrants to the United States. In contrast, San Antonio's Zapotec population maintains the Zapotec language, women's traditional dress, and some key social institutions such as municipal governance by customary rule (*usos y costumbres*) (Oaxaca State Government 2006), the *tequio* (community labor), and other forms of communal responsibility, even while many of its inhabitants have migrated to the United States. Although San Antonio has likely had greater contact with nonlocal culture through its migrants, it appears to have resisted acculturation in terms of important social and linguistic criteria to a far greater extent than Santa Maria. It is on the basis of this lesser degree of acculturation that we characterize it as less affected by globalization.

Information on *tejate* ingredients and preparation comes from detailed formal documentation of its preparation in one Santa Maria household in August 2002, February and June–July 2003, August 2004, and March 2006. This household continues regular *tejate* preparation and consumption and was well known to us from our previous research in that community.

In July 2003 we interviewed vendors of *tejate* ingredients (*patlaxtleras*) in the Zaachila and Ocotlan markets and the two major markets of Oaxaca City (Centro de Abastos and Benito Juárez) and vendors of *tejate* (*tejateras*) in the latter two markets about their sources for those ingredients. In April 2007 we interviewed a *tejatera* from San Antonio who lives and makes *tejate* in metropolitan Los Angeles, California.

Maize Diversity in Mexico

Many important crops were domesticated in southern Mexico, including maize, chile pepper, three species of squash, common bean, amaranth, and avocado (McClung de Tapia 1992), and it is probably the only place where maize was domesticated (Matsuoka et al. 2002). Indigenous cuisine was extremely diverse in both ingredients and recipes (Museo Nacional de Culturas Populares 1987; Pico and Nuez 2000; CONACULTA 2004) and was documented by the Spanish (Sahagún 1988). However, Mexico's rich agricultural and culinary heritage has not been supported by recent changes in its agriculture. Since the beginning of the Green Revolution in the 1960s, agricultural development there has been dominated by a goal of transition to industrial agricultural production by means of technological innovations revolving around the use of modern crop varieties as opposed to locally selected farmers' varieties and has focused on industrial food processing. The North American Free Trade Agreement (NAFTA) (Nadal 2000; Fitting 2006) has resulted in greatly increased imports of maize from the United States and changes in Mexico's maize production (Soleri, Cleveland, and Aragón Cuevas 2006; Wise 2007).

Although maize diversity has been reduced in the course of these changes, much is still conserved in situ by small-scale, low-resource producers (e.g., for Oaxaca; Aragón-Cuevas et al. 2006). Neoliberal reforms have made it increasingly difficult for them to make a living (Appendini 1994; Hewitt de Alcántara 1994), however, and their responses to

Table 1. Characteristics of the Two Study Communities in the Central Valleys of Oaxaca, Mexico

								White Maize Cultivation, 2005			Study Sample Average (SD)[d]	
Municipality	Total Population	Indigenous Language Speakers (%) (*n*)	Do Not Speak Spanish (%) (*n*)	Illiterate Population (%)[a]	Sex Ratio[b]	Total Working Population[c]	Self-Employed (%) (*n*)	Area Harvested (ha)	Production (MT)	Yield (MT/ha)	Respondent Age (years)	Maize Area Sown (ha)
San Antonio	2,410	96.6 (2,327)	15.4 (359)	29.6	77.8	559	86.0 (481)	435.0	445.5	1.02	59.3 (13.7)	3.7 (2.3)
Santa Maria	2,518	0.6 (14)	0	15.3	87.4	673	68.1 (458)	779.0	958.6	1.23	50.0 (12.3)	2.6 (1.4)

Sources: INEGI (2000) and, for maize cultivation, SAGARPA (2007).

[a]15 years and older; estimated by CONAPO on the basis of the INEGI (2000).

[b]Males/100 females.

[c]>12 years old.

[d]$n = 60$ (30 in each community).

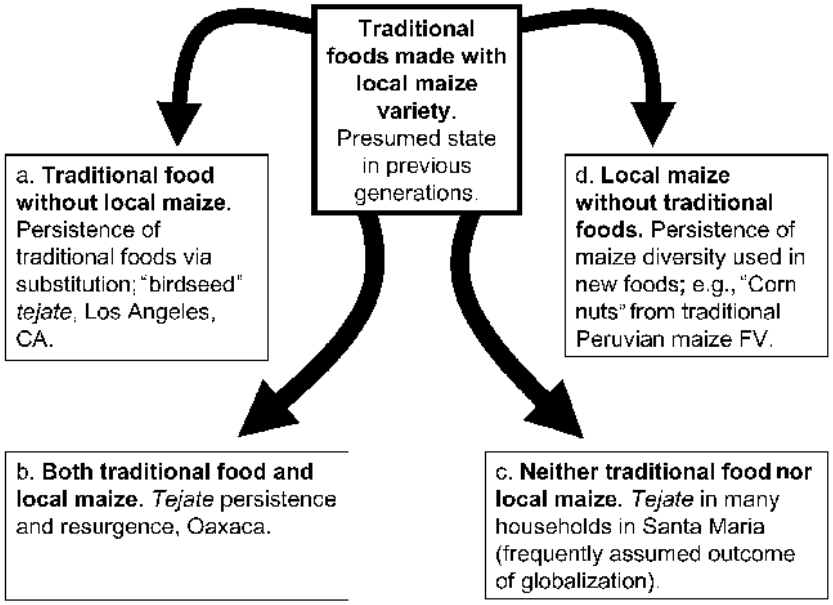

Figure 1. Possible outcomes of globalization for diversity of traditional foods and associated crops: the case of maize and *tejate* in Oaxaca, Mexico. FV = farmer variety.

changing socioeconomic conditions in rural Mexico could have significant effects on maize diversity. Farmers may continue to grow traditional maize varieties for their cultural value even when it is no longer economically rational in the narrow sense (Appendini, García Barrios, and de la Tejera 2003). Some farming households have responded to worsening economic conditions during the past decade by expanding their maize production (Nadal 2000; Preibisch, Herrejon, and Wiggins 2002), which may be subsidized by migrant remittances. During the same period, however, others have reduced or abandoned maize production entirely in favor of international labor migration, which, in turn, may lead to decreasing knowledge of how to grow maize and prepare maize foods (Fitting 2006). Research in Veracruz has documented a decline in total maize area and the proportion of maize area sown to farmer varieties since the implementation of NAFTA and the economic changes that followed (Wise 2007, 7–9).

Maize's long history as the central staple in Mexico has imbued this crop and the many foods of which it is an ingredient, with enduring cultural significance (Museo Nacional de Culturas Populares 1987; Echeverría and Arroyo 2000; Esteva and Marielle 2003). Indeed, Mexico has proposed to UNESCO that its maize cuisine be recognized and protected as a patrimony of humanity (CONACULTA 2004). The assumed relationship between the cultural and the biological diversity of food in Mexico has been suggested as the basis for new strategies for conserving crop genetic diversity and supporting cultural identity and economic development (e.g., Larson and Neyra 2004); however, in many cases, little is known about the foods or their place in historical and contemporary society. Research in Chiapas, Mexico, showed that cultural diversity as measured by ethnolinguistic differences was not reflected in maize diversity as measured by isozyme variation but was reflected in some morphological characteristics (Perales, Benz, and Brush 2005). Later research in Chiapas and in Oaxaca suggested that maize diversity was associated with culturally based networks or practices that structured these maize populations against a background of ongoing gene flow (Benz, Perales, and Brush 2007; Pressoir and Berthaud 2004). The Chiapas study found no difference in the way maize was used between the two groups, and the Oaxaca study did not evaluate maize use as a variable affecting maize diversity.

There are four main possible outcomes of globalization for traditional foods and the crop diversity originally associated with them, including either the loss or the retention of both food and crop diversity (fig. 1). If migrant farmers take their traditional foods and ingredients with them, as is the case for many indigenous migrants to Mexican cities (Bonfil Batalla 1996), loss of food diversity in some rural areas may be mitigated by an overall increase in cities. Modernization and acculturation can also contribute to the loss of traditional foods and the consumption of less nutritious industrial foods, leading to malnutrition, as documented in Yucatán (Leatherman and Goodman 2005). We use the case study of *tejate*

to explore the extent of any relationship between maize diversity and traditional food.

Tejate Today

The tradition of making foam-topped beverages, including cacao-based ones, was established millennia ago and continues among contemporary peoples of Mesoamerica (McNeil 2006, 347–48), with the production of abundant foam an important aesthetic and gastronomic criterion. One form in which the people of the Central Valleys of Oaxaca continue this tradition is their typical morning beverage of *chocolate*, for which cacao beans, granulated sugar, cinnamon, and almonds ground together at home or in small local mills are heated with water and then mixed and frothed just before serving with a wooden stirring device (the *molinillo*—probably introduced by the Spaniards).

Another form of frothed beverage is the family of foamed Mesoamerican maize and cacao beverages (McNeil 2006) that includes *pozol* (maize soaked and cooked with calcium carbonate and mixed with cacao and sugar), *pinol* (thoroughly toasted maize, cacao, and spices; known as *pinole* in Mexico) (Popenoe 1919), and *chilate* (boiled ground maize and untoasted cacao) (Kufer, Grube, and Heinrich 2006), all from Guatemala. These and a number of similar drinks are prepared in southern Mexico (Chapa Benavides 2003), including *tascalate* (toasted maize, cacao, and sugar) and *achiote* (*Bixa orellana*) in Chiapas and *pozol* (cacao and toasted maize) in Tabasco (Javier Quero 2000) and adjacent areas, as well as *chorote* (fermented maize and cacao) (Castillo-Morales, Wacher-Rodarte, and Hernández-Sánchez 2005). In Oaxaca, beverages similar to *tejate* but with different names are drunk in areas outside of the Central Valleys, among them *pozonque* (maize, cacao, and *cocolmeca* [*Dioscorea macrostachya* Benth.]) in the Sierra Juárez and *pozol* (boiled maize and *pixtle*) and *bu'pu* (boiled maize, toasted cacao, cinnamon, and flowers of *Plumeria rubra* L. [frangipani]) in the Isthmus of Tehuantepec (Musálem Lopez 2002). As the frothed maize and cacao beverage that is made today in the Central Valleys of Oaxaca, *tejate* has become emblematic of traditional Zapotec culture there.

Ricardo Salvador, a maize physiologist, native Oaxacan, and Zapotec-speaker, suggests that the term *tejate* may be derived from the Nahuatl words *textli* (flour or dough) and *atl* (water) (definitions for Nahautl words are from Karttunen 1992), combined as *texatl* (floury water) and then Hispanicized into *tejate* (personal communication, 2005). Interestingly, Hernández (1959 [1577], 305, cited in Dillinger et al. 2000) described *atextli* as a medicine made from a paste of cacao beans and maize, sometimes with vanilla or *Piper sanctum* as additives. Today in the Mitla Valley, Zapotec-speakers refer to *tejate* as *cu'uhb* and to the foam as *ghilo cu'uhb*, or flower of *tejate* (Munro et al. 1999; Lucila Martínez Martínez, personal communication, March 2006).

In recent times *tejate* has been an essential food in the Central Valleys, particularly in the Mitla and Zimatlan valleys (González Esperón 2006) and especially during periods of strenuous field work. Although many households and communities no longer regularly make it, it is frequently considered a required food and often expected as part of the payment for hired labor during the maize harvest. In our survey we found that everyone identified *tejate* with the hard work of harvest time, with many commenting that it is cooling, refreshing, and fortifying. However, the study communities showed differences in the frequency of *tejate* preparation and its uses. In Santa Maria, all those who make *tejate* prepare and consume it during the maize harvest and give it to the workers they hire to help with that harvest. There and in other mestizo communities *tejate* has also become a traditional part of Christian festivities such as those of Easter week, although only three households said that they prepared *tejate* for these occasions.

Depending on the quantity being made, *tejate* preparation takes two or more hours, in addition to the time required for cooking the maize (see CA+ online supplement C). None of the households in Santa Maria reported making *tejate* daily, though they said that members of the previous generation, who were less involved in off-farm employment and outmigration and more completely dependent on agriculture, had done so. In San Antonio, 97% of households interviewed made and consumed *tejate* at least every two to three days. Most did so daily and considered it a staple part of the diet and an essential food for periods of heavy work. The frequency of *tejate* consumption in rural Oaxacan communities such as San Antonio suggests a significant dietary contribution, but there are no published data on its nutritional content. In other regions of Mexico, analysis of the nutritional content of traditional maize-based beverages shows that they can make valuable contributions to nutrition, especially for poorer households (Wacher et al. 2000; Guyot et al. 2003).

Even as some communities appear to be experiencing a reduction in the frequency of *tejate* making, *tejate* is being sought out in the markets of Oaxaca City and other market towns in the Central Valleys. During a three-week period in 1996 Cervantes Servin (n.d., 49–50, 52) recorded 29–35 *tejateras* registered in the Centro de Abastos market and 11 in the Benito Juárez market, both in Oaxaca City. He estimated a net annual income of 39,000 pesos/*tejatera* (approximately US$5,100, using 1996 conversion rates), making selling *tejate* an important economic activity.

Tejate and Maize Diversity: What We Know So Far

From our interviews it is clear that *tejate* preparation and consumption are not distributed evenly throughout Central Valley communities or among households within communities, but our understanding of this and its implications for maize diversity is limited. Farming communities maintain maize farmer varieties for postharvest agronomic reasons (Ortega Pazka 1995) and gastronomic and cultural reasons (Gon-

Table 2. *Tejate* and Maize Diversity in the Two Sample Communities

	Santa Maria		San Antonio		Overall	
	Households (%) (*n*)	Maize Varieties per Household (Average)	Households (%) (*n*)	Maize Varieties per Household (Average)	Households (%) (*n*)	Maize Varieties per Household (Average)
Ever make *tejate*						
Yes	83 (25/30)	1.64[A]	100 (30/30)	1.87	92 (55/60)	1.76[A]
No	17 (5/30)	1.00[B]	0 (0/30)		8 (5/60)	1.00[B]
Make *tejate* more than rarely						
Yes	10 (3/30)	2.33[A]	100 (30/30)	1.87	55 (33/60)	1.91[A]
No	90 (27/30)	1.44[B]	0 (0/30)		45 (27/60)	1.44[B]
Make *tejate* with yellow or black maize						
Yes	16 (4/25)	2.50[A]	50 (15/30)	2.27[A]	35 (19/55)	2.32[A]
No	84 (21/25)	1.50[B]	50 (15/30)	1.47[B]	65 (36/55)	1.46[B]

Note: Means with different superscript letters are significantly different from each other; Tukey's test, $p < 0.05$.

zález 2005). For example, farmer varieties may have different harvest times, kernel characteristics, processing qualities, and flavors (Hernández Xolocotzi 1985, 1987, 764–66; Soleri and Cleveland 2001). Research on maize farmer varieties in the state of Puebla showed that the *nixtamal* (maize cooked with calcium carbonate) and the cooking time of tortillas made from it differ for different-colored varieties (Rangel-Meza et al. 2004). Our data allow the testing of hypotheses about current associations between maize diversity and *tejate* in the rural Central Valleys and offer insights regarding the direction of future change.

Maize diversity in this preliminary study was measured at the simplest level as the number of farmer-named varieties, recognized as a useful first step for diversity inventories (e.g., Sadiki et al. 2006). Named varieties provide an indication of the diversity perceived and intentionally managed by farmers, but they cannot be taken as a proxy for genetic diversity; this will need to be assessed using molecular and morphological data. There was no significant difference (Cochran's *t*-test, $p = 0.0973$) in the average number of farmer-named maize varieties grown per household between Santa Maria (1.53) and San Antonio (1.87), with the same range in each community (one to three varieties per household), indicating evenness (see Magurran 1988, 7, 11–15) in the distribution of named diversity. However, San Antonio had more varieties (eight, including four different varieties of *blanco criollo*) than Santa Maria (five, including two *blanco criollos* and one modern variety). These results suggest that maize diversity is being maintained at the community rather than the individual household level.

Households in both Santa Maria and San Antonio reported using white, yellow, and black maize (96%, 33%, and 9% of all households, respectively) for their *tejate*, though significantly more San Antonio residents (15/30 vs. 4/25) used yellow and/or black varieties ($\chi^2 = 6.971$, $p = 0.0083$). Those interviewed consistently said that traditional maize varieties (*maíz criollo*) are the best for making *tejate*. Only one household (in San Antonio) made *tejate* with a maize variety that it did not grow. Across communities, making *tejate*, making it more often, and making it with colored maize varieties are all associated with maintaining greater diversity of farmer-named maize varieties (table 2).

These same three *tejate* variables were significantly associated with other variables characterizing maize agriculture for the two communities combined (table 3). Farmers whose households made *tejate* planted significantly more hectares of maize (3.71) than those whose households never made *tejate* (0.90) (Tukey's test, $F = 11.85$, $p = 0.002$). Households that made *tejate* also had lower maize planting densities, perhaps because many of them were in San Antonio, where the climate is drier and intercropping with other species (e.g., *Phaseolus vulgaris* and *Cucurbita* spp.) is more common. Finally, respondents were significantly older in households that made *tejate* more than rarely or made it with yellow or black maize.

We have assumed that assimilation into mestizo culture is indicative of greater globalization and that farmer-named varieties are indicative of genetic diversity. Based on these assumptions, the results of these interviews suggest that, at the community level, greater globalization is not associated with significant differences in the average named maize diversity per household (evenness of diversity) but is associated with lower named diversity richness and less use of that diversity for some traditional foods (*tejate*), including variations of those foods (*tejate* made with different colors of maize). At the household level across communities we found that greater named maize diversity was significantly associated with making *tejate*, making it more often, and making it with colored maize.

The Future of *Tejate*

Modernization in Mexico, as elsewhere, is often correlated

Table 3. Maize Agriculture and *Tejate* across the Two Communities (Pooled Data)

	Maize Area Planted		Respondent Age		Reported Planting Density	
	Households (%) (*n*)	Average Hectares	Households (%) (*n*)	Average Years	Households (%) (*n*)	Average kg/ha
Ever make *tejate*						
Yes	92 (55/60)	3.71[A]	92 (55/60)	56.31[A]	92 (54/59)	4.91[A]
No	8 (5/60)	0.90[B]	8 (5/60)	47.80[A]	8 (5/59)	6.90[B]
Make *tejate* more than rarely						
Yes	55 (33/60)	3.68[A]	55 (33/60)	59.06[A]	54 (32/59)	4.37[A]
No	45 (27/60)	2.54[B]	45 (27/60)	51.37[B]	46 (27/59)	5.93[B]
Make *tejate* with yellow or black maize						
Yes	35 (19/54)	3.54[A]	35 (19/54)	62.26[A]	36 (19/53)	4.50[A]
No	65 (35/54)	3.29[A]	65 (35/54)	53.26[B]	64 (34/53)	5.10[A]

Note: Means with different superscript letters are significantly different from each other; Tukey's test, $p < 0.05$.

with loss of traditional culture, including a diminished role for traditional foods (Esteva and Marielle 2003; CONACULTA 2004, 152–53). In Oaxaca this process is present but is tempered by other forces, including a strong cultural affinity for local maize varieties and foods made from them that in some cases contributes to their persistence or resurgence. Today there is a resurgence of traditional Oaxacan foods in general and especially of the maize-based foods deemed important for maintaining cultural identity in the face of perceived threats such as transgenic maize (e.g., Consejo Indígena Popular de Oaxaca "Ricardo Flores Magón" 2002; González 2005) and industrial fast foods (e.g., Weiner 2002). In these cases traditional food, maize, and agriculture are the foci of resistance. The interplay of change and tradition as manifest in food is apparent in some of the processes of contemporary globalization, including migration of people and ideas, commercialization, and industrialization. These processes are affecting and will continue to affect *tejate* and local maize diversity.

One form of the resurgence of traditional foods in Mexico is their growing popularity and commercialization outside of rural communities, among local urbanites and tourists (Barkin 2002). For example, the new restaurant Itanoni in Oaxaca City features traditional Oaxacan foods made with maize farmer varieties, though not *tejate* (e.g., Caistor 2002). *Tejateras* are not only making *tejate* available to consumers in Oaxacan markets but also taking it to Oaxacan consumers elsewhere; it is featured in the street fairs accompanying the annual Guelaguetza celebration in the city and at the Fiesta de Tejate in the Central Valley town of San Andrés Huayapam, both of which attract Mexican and foreign visitors. Individually and in groups, women from San Andrés Huayapam actively market *tejate* as well as novel foods based on it such as *tejate* cookies. Still, commercial *tejate* production is not a recent phenomenon; reports of the sale of frothed maize and cacao beverages in Mexican markets date back to the time of the Spanish invasion (Sahagún 1988, 625–26). Not surprisingly, the quality, purity, and taste of commercialized *tejate* are frequently criticized by those who regularly prepare it for their own consumption. Negative comments about the maize varieties and quality of maize used and the use of industrial fats as foaming agents are the most common. A new commercial form of industrially produced *tejate* sold under the name *tejatli* even eliminates the role of the *tejateras. Tejatli* is an enriched, powdered form of *tejate* for *preparación instantánea* (instant preparation) developed by entrepreneurs in Oaxaca (Martinez 2008), who told us that they used local farmer-variety maize in its production.

The resurgent interest in traditional foods beyond Mexico will also affect their future. For example, at the Disneyland amusement park in California an exhibit of a *tortillería* has been built that promotes an industrial version of this food while playing on its traditional status (Lind and Barham 2004). Also in southern California, a tamale museum has recently opened, funded by Maseca, the world's largest producer and processor of dry maize flour made from maize modern varieties (Tamale Museum 2006). *Tejate* itself is moving into new locations far from Oaxaca. Migrants from San Antonio in metropolitan Los Angeles told us that three women from the Central Valleys were making *tejate* in their homes there and selling it to fellow migrants. We interviewed one of them, a woman who had been living in Los Angeles for six years and making *tejate* for her family and for sale for the past three. Each week, she prepares *tejate* from 50 pounds of both yellow and white maize purchased at the neighborhood pet store as whole-grain birdseed. The ashes used in cooking the maize come from a fast-food chain that produces wood-barbecued chicken. *Pixtle*, cacao, and *rosita de cacao* are sent to her by her family in Oaxaca via a courier service, and in grinding them she uses a metate and mano carried from Oaxaca by a family member. Another family is starting to make *tejate* for its own consumption using tablets of dried *pixtle* dough sent by relatives in Oaxaca and, presumably, maize flour purchased in Los Angeles.

These new events in the globalization of *tejate* indicate that it is important to distinguish between the fate of traditional maize foods and the extent to which local maize diversity is used to prepare them. In the case of *tejate* the impact will depend on many factors. For example, the maize varieties available for use in homemade and commercial *tejate* in Oaxaca will be determined in part by the varieties grown by local farmers and by their cost. The changing cultural value of *tejate* could, in turn, influence farmers' decisions about maintaining maize varieties. For example, the husband of one third-generation *tejatera* in the city of Oaxaca recently left a professional position to devote himself to full-time cultivation of organically grown local maize farmer varieties to supply her *tejate* and tortilla *masa* business (D. Soleri, field notes, February 2007). In contrast, in the United States the contribution of *tejate* production to conservation of Oaxacan maize diversity may be negative because of farmer varieties' replacement by locally available modern varieties. We are not aware of any Central Valley migrants' planting Oaxacan maize farmer varieties in the United States, and day-length sensitivity may prohibit this. While the importation of *tejate* into the United States by some Oaxacan migrants is evidence of its importance to them, how this will affect its symbolic and material content and maize diversity both in its new context and in rural Oaxacan households remains to be seen.

Other consequences of globalization for food within and beyond Mexico's borders may also have a profound effect on local maize diversity. For example, the availability of maize farmer varieties will be influenced by their use in other foods, especially tortillas, a staple of Mexican cuisine that is increasingly being industrialized. This is relevant in the case of *tejate* because none of the households reported growing a maize variety that was used exclusively for *tejate* (although we are now finding households in which the only traditional food still made at home with their own maize is *tejate* [D. Soleri et al., field notes, November 2007]). Maseca has aggressive marketing plans to expand into smaller towns and replace the "inferior wet" maize method that is used in making 49% of Mexico's tortillas (Maseca 2004, 11). Some of the commercial *tortillerías* still use the "wet" method (on-site cooking with calcium carbonate of whole grain), sometimes including farmer-variety grain. This would be eliminated by conversion to equipment for the use of dry flour.

Finally, the rapidly increasing use of transgenic maize in the United States and elsewhere and intense pressure to permit its planting in Mexico may also have a significant effect on traditional foods and maize diversity. While the presence of transgenes in Oaxacan maize farmer varieties has been reported in some locations (Alvarez-Morales 2002), the data indicating presence or absence in Oaxaca (Quist and Chapela 2001; Ortiz-García et al. 2005) are inconclusive (Cleveland et al. 2005). There is, however, new evidence that transgene flow to farmers' traditional varieties has occurred elsewhere in Mexico (Serratos-Hernández et al. 2007). The probability that transgenes have entered populations of Mexican maize farmer varieties and their potential to affect maize diversity are widely debated (Cleveland and Soleri 2005; Soleri, Cleveland, and Aragón Cuevas 2006). Ongoing concerns about unintentional flow of transgenes via seed and pollen into maize farmer varieties in Oaxaca and the possible future approval of transgenic maize for commercial production in Mexico could affect *tejate* production and consumption, as has been reported for other traditional maize foods in Oaxaca (Caistor 2002). Consumers concerned about the cultural, health, or environmental consequences of transgenes may avoid foods thought to contain them. For some, transgenic maize is a significant violation of their cultural heritage and values, and the presence of transgenes threatens the survival of their maize farmer varieties, traditions, and identities (CEC 2004; González 2005). Alternatively, these concerns may diminish and disappear with time.

In a study of farmers' knowledge and attitudes relevant to transgenic maize, we interviewed 110 farmers from two Oaxacan communities different from those described above. The farmers ranked the following four types of maize in terms of their preference for sowing them in their own fields and eating them in their homes (Soleri et al. 2005): their local farmer variety, a locally available modern variety, their local farmer variety containing a transgene commonly used in maize, and the locally available modern variety containing the same transgene. For sowing and especially for eating, the farmer variety was the most strongly favored, and those containing transgenes the least, with some farmers refusing to include the latter in their rankings at all. These results suggest that farmers' attitudes toward transgenic varieties could affect maize diversity and that traditional foods made with them such as *tejate* might be jeopardized by the presence of transgenes if farmers and consumers knew of their presence.

Conclusion

Tejate is a local specialty in the Central Valleys of Oaxaca—a traditional beverage made with ingredients many of which have been grown in the region for centuries and techniques that have been developed and used by the people of Mesoamerica for millennia. It is one of a group of foam-topped Mesoamerican beverages made today with similar ingredients that have long been valued and enjoyed for their cultural significance, flavor, and nutrition. The Europeans brought sugarcane from the Old World, and cane sugar was eventually integrated into some forms of these beverages. Today some new tools, such as hand or electric mills, are being used in *tejate* preparation.

Our study found that contemporary *tejate* preparation is associated with maize diversity, suggesting the need for better understanding of the role traditional foods play in diversity conservation. The traditional role of *tejate* does not appear to be changing dramatically for many rural households in communities such as San Antonio that still prepare and enjoy it frequently. However, the extent of out-migration from San

Antonio, especially to the United States, and our finding that *tejate* preparation was significantly more common in older households indicate that a massive change in maize diversity conservation and traditional food preparation may occur there and in similar communities in the next generation. *Tejate* making has already diminished in more acculturated, globalized communities such as Santa Maria, although even among households there that no longer make their own *tejate* it retains much of its traditional cultural value. At the same time, demand appears to be increasing in urban areas served by commercial *tejateras*, with changes in how it is made, by whom, and when and where it is consumed.

Commercialization of prepared *tejate* combined with human travel and migration and more recently its industrialization appear to be extending the geographic and social territories of *tejate*. This may be facilitated by a change in expectations: respondents in Oaxaca said that *tejate* should be made only with local (as opposed to commercial or modern) maize varieties, primarily because they make it taste better. And yet, Oaxacans in Los Angeles, some from the very same families as those interviewed in San Antonio, are now purchasing *tejate* made with U.S. maize modern varieties packaged as birdseed. Perhaps nostalgia leads to concessions that might not otherwise be made, as is the case for Hopi farmers who substitute commercial sweet maize in traditional religious ceremonies if Hopi sweet maize is not available (Soleri and Cleveland 1993).

Although *tejate* making continues to be based on traditional processing and maize varieties and other plant species domesticated and still grown in Mesoamerica, its future may increasingly depend on the evolving forces of globalization. These include increasing migration from the Central Valleys to the United States and increasing interest on the part of local Oaxacans, tourists, and others from outside of the Central Valleys in traditional local foods. It will also depend on efforts to support the role of traditional foods and their nutritional, culinary, and cultural contributions to Oaxacan society. The potential effects of such variables are a part of our current research on *tejate* in Oaxaca. Thus, *tejate* will continue to provide a case study of a traditional food for which globalization has played a role in its creation, expansion, contraction, and movement into new contexts. Whether globalization will ultimately support, enhance, or diminish the biological and cultural diversity that *tejate* depends on and reinforces will depend on the confluence of many different forces, and simple generalizations are inappropriate. For now, although changes are occurring, *tejate* is persisting as a cultural icon and may even be flourishing in the current wave of globalization. However, these changes seem to mark a transition of *tejate* out of poorer households into the diets of better-off and foreign populations, perhaps with less discriminating palates—a movement away from its rural context with unknown consequences for the diversity of traditional cultures and maize.

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