The Food Economy of Paquimé and its Neighbors, Northwestern Chihuahua

P.E. Minnis[1]*, M.E. Whalen[2]

[1]University of Oklahoma
[2]University of Tulsa

*Corresponding author:
3332 N. Calle Largo, Tucson, AZ, 85750, EEUU,
minnis@ou.edu

Abstract

Paquimé in northwestern Chihuahua was the center of an important archaeological tradition that included hundreds of related communities during the Medio Period (A.D. 1200-1450). Here we summarize archaeobotanical research at sites near Paquimé. Crops, especially maize, were the mainstay of the food economy with many native plants supplementing the diet. If special note is the first recovery of little barley from Mexico and the first prehispanic chile remains from northwestern Mexico and the U.S. Southwest. Plant foods were also important for the society beyond supplying the daily needs of the population. Multiple lines of archaeological evidence indicate that various plants were used in community-wide rituals and may have been essential to the florescence of the Paquimé-centered polity.

***Keywords**:* archaeobotany, Casas Grandes Archaeological Tradition, cuisine, farming, social hierarchy, Paquimé

Resumen

Paquimé, en el noroeste de Chihuahua, fue el centro de una importante tradición arqueológica que incluyó cientos de comunidades relacionadas durante el Período Medio (1200–1450 d.C.). Aquí resumimos las investigaciones arqueobotánicas realizadas en sitios cercanos a Paquimé. Los cultivos, especialmente el maíz, constituyeron la base de la economía alimentaria, mientras que numerosas plantas nativas complementaban la dieta. Destaca particularmente el primer hallazgo de una cebadilla (little barley) en México y los primeros restos prehispánicos de chile recuperados en el noroeste de México y el suroeste de Estados Unidos. Los alimentos de origen vegetal también fueron importantes para la sociedad más allá de satisfacer las necesidades cotidianas de la población. Múltiples líneas de evidencia arqueológica indican que diversas plantas fueron utilizadas en rituales comunitarios y pudieron haber sido esenciales para el florecimiento de la entidad política centrada en Paquimé.

***Palabras clave**:* agricultura, arqueobotánica, cocina, jerarquía social, tradición arqueológica de Casas Grandes, Paquimé

Introduction

Paquimé (or Casas Grandes) in northwestern Chihuahua was the central community in the local Casas Grandes Archaeological Tradition (CGAT) as well as being influential in the wider U.S. Southwest/ Northwest Mexico (SW/NW) (Figure 1). It reached its pinnacle of importance in the fourteenth century, during the Medio Period (ca. AD. 1200-1450) (Figure 2). There is ongoing debate about to the degree of its hierarchy, the importance of other archaeological traditions in its development, and its influence on surrounding peoples. There is general agreement

Figure 1. Location of Paquimé and the extent of the CGAT in northwestern Chihuahua (map courtesy of Michael Searcy).

that Paquimé was more than an exceptionally large community of family farmers; it represented the most important location in the ritual, political, and economic life of the CGAT, especially after A.D. 1300 (e.g. Braniff, 2001; Di Peso, 1974; Cruz Antillón & Maxwell, 2017; Minnis & Whalen, 2015, 2016; Nelson et al., 2015; Newell & Gallaga, 2001; Pailes & Searcy, 2022; Whalen & Minnis, 2025). Here we discuss how its food economy was embedded within and was an important part of the history of the CGAT.

To that end, we identify two levels of food economy. In the domestic level, families or small local units produced and consumed according to their own needs. At the higher level of the community food economy, production and consumption decisions and actions involved elites and/or entire communities and localities. Of course, the two are interrelated, but we hope this distinction will help us understand how the CGAT food economy was related to its history.

This article summarizes archaeobotanical and general archaeological research we have conducted for more than three decades in the Casas Grandes area. For the most detailed discussion of the archaeobotany of the CGAT, consult Minnis & Whalen (2020) and for our view of the structure and history of the CGAT, see Whalen & Minnis (2025).

While we will emphasize the plant remains recovered from CGAT site, other archaeological data are cited to give a fuller understanding of the domestic and community food economy. These include artifacts such as ceramics, and features, especially agricultural fields and elaborate underground ovens.

The major data considered here comes from decades of our research in the Casas Grandes region beginning in 1989 and continuing until 2014 as summarized in Whalen & Minnis (2025). Our overall strategy was to acquire information from a range of site types so we could compare how these communities operated and interacted. In addition to recording hundreds of sites during reconnaissance and systematic surveys, we excavated nine sites, six of which provided the majority of archeobotanical data (Figure 3). Four of these are located approximately 15 km from Paquimé in upland settings away from major drainages. These included two smaller communities (sites #319 and #231), one of the largest villages in the region (#204), and a specialized ritual and administrative center (#242). The sample also includes two large sites within two kilometers of Paquimé (#315

Figure 2. Aerial photograph of Paquimé looking south showing the unexcavated portion of the site and the western part excavated by the Joint Casas Grandes Expedition in the mid-twentieth century (photography courtesy of the Amerind Foundation; Russell Rosene, photographer).

and #565) next to the Río Casas Grandes. Additionally, we surveyed ancient fields and test excavated elaborate ovens. Small sites along the Río Casas Grandes were tested, but few plant remains were recovered. Nearly all Medio Period sites in the region have been severely looted to acquire ceramic vessels to sell. This activity mixes most deposits so archaeological context is often destroyed. Obviously, this affects how we sampled botanical remains. In general, the best samples were taken from known contexts such as hearths.

We collected a variety of botanical remains. A total of 495 flotation samples were sorted. These yielded 18,789 propagules (seeds and fruits). Two large sites, 204 (155 flotation samples) and 315 (159 flotation samples), dominate the archaeobotanical assemblage. These two sites were in different environmental settings, allowing us to examine differences in food economies within the Casas Grandes region. We identified 6,294 pieces of wood from flotation samples, plus an additional 2670 wood fragments from room fill. Like the propagules, most wood came from the two large sites.

A large number of propagule taxa were recovered from the flotation samples (Table 1). These include crops: maize, beans, gourd, squash, cotton, little barley, and chile, as well agave, a possible a domesticate. In addition, remains of many non-cultivated plants were recovered. All these plant taxa were likely present in the area around the sites and in the nearby Sierra Madre Occidental range. Propagules from na-

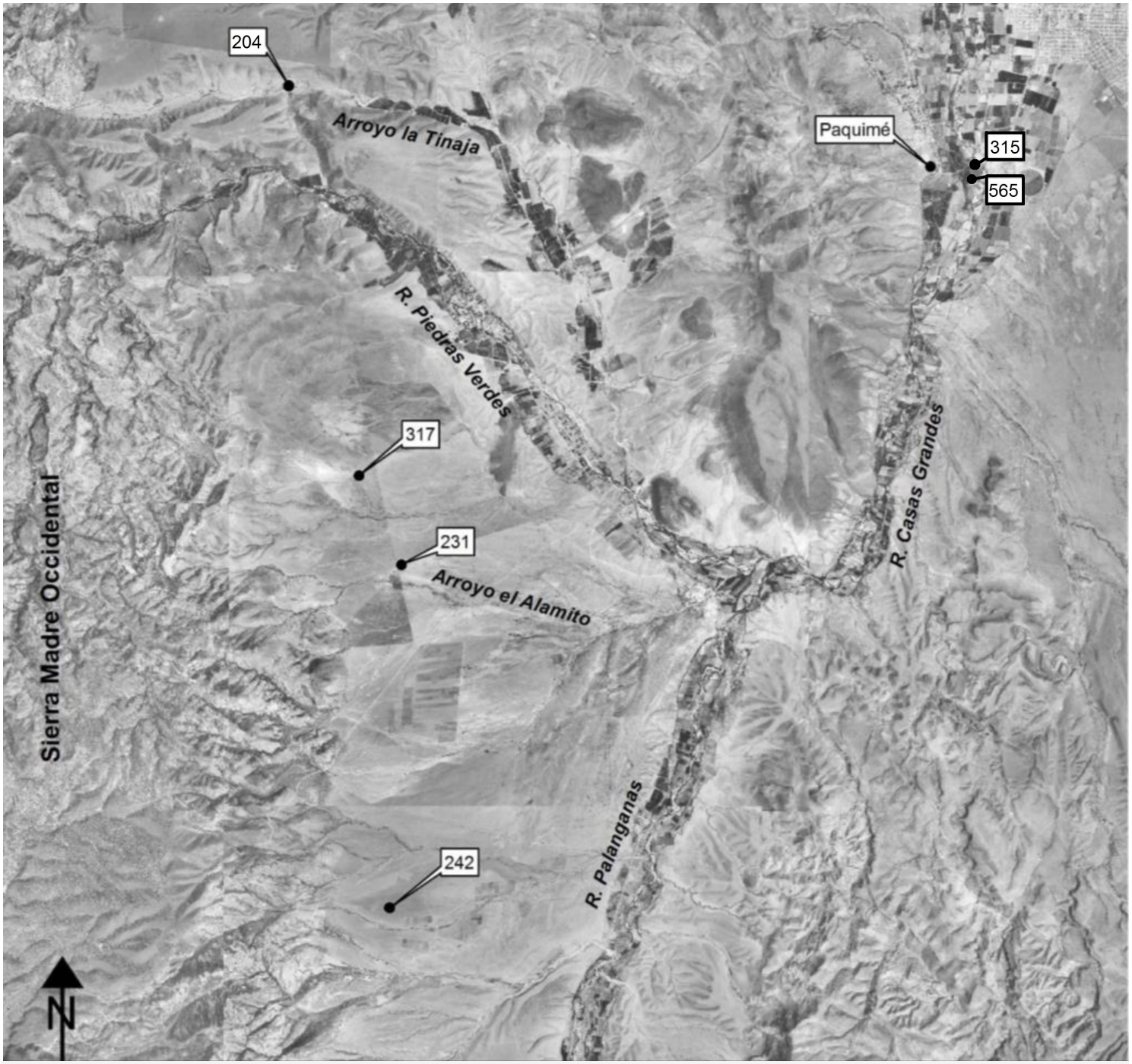

Figure 3. The six excavated sites with plant remains discussed here.

tive weedy plants, such as *Chenopodium*, *Portulaca* and *Amaranthus,* were the most common non-cultigens.

Basic Domestic Economy

First, we will briefly summarize domestic production, the foundation of the CGAT food economy. Regardless of whether the communities were located along the floodplains with the best farming potential or in upland settings, the archaeobotanical assemblages suggest a general similarity in their domestic plant food economies, especially sites in the same environmental setting (Figure 4). Maize was the core food supplemented by beans and squash with cotton was

Table 1. Charred, non-wood taxa from flotation simples

Taxa		
Agave (tissue and spine)	*Euphorbia*	*Phaseolus vulgaris*
Amaranthus	Fabaceae	*Pinus cembroides*
Asteraceae	cf. *Gaura*-type	*Plantago*
Atriplex	Geraniaceae	Poaceae
Brassicaceae	*Gossypium hirsutum*	*Polygonum*
cf. *Calandrinia*-type	cf. *Hedioma*-type	*Portulaca*
Capsicum annuum	*Helianthus*	*Prosopis*
Cheno-Am. (*Chenopodium* or *Amaranthus*)	*Hordeum pusillum*	*Quercus*
Chenopodium	*Iva*	Solanaceae
cf. *Cleome*	*Juniperus*	*Sporobolus*
cf. *Crotolaria*	*Kallstroemia*	*Trianthema*
Corispermum	*Lagenaria siceraria* (rind)	*Verbena*
Cucurbita (rind)	*Mentzelia*	*Vitis*
Unknow	*Opuntia* (nopal)	*Zea mays* (corn kernels and cob fragments)
Echinocactus	Papaveraceae	

grown primarily for its fiber, although the seeds are also edible. Likewise, gourds were produced for containers, but immature fruits are edible. Agave likely was cultivated, but it also could have been harvested from native stands. We will discuss chile and little barley separately. Food production was supplemented by many native plants such as listed in Table 1.

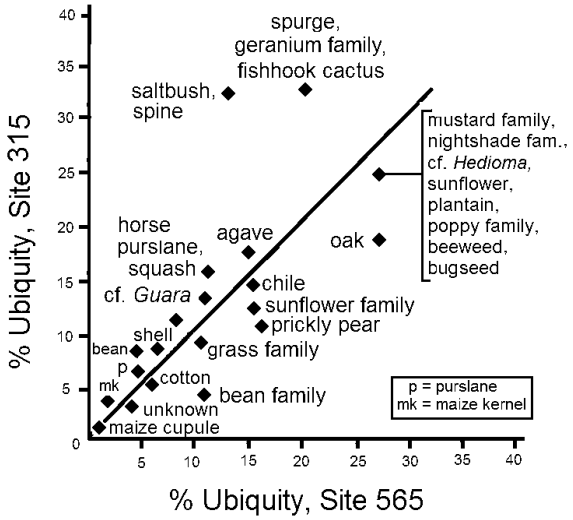

Figure 4. Rank-order scattergram of the taxa from the two sites (315 and 565) along the Río Casas Grandes valley.

Their availability varied by season, weather differences between years, and extent of human effects on the local flora. This list does not completely summarize the plant foods eaten by the ancient peoples in the region as numerous edible plant foods are unlikely to be preserved in the archaeobotanical record; greens/quelites would be an obvious example.

To contrast the archaeobotanical assemblage from sites in two different environmental settings, we calculated a Spearman's rank-order correlation between the assemblages from 204, the large upland community and 315, a large site in the major river valley (Figure 5). Taxa found from both sites showed a statistically significant similarity (r^2 =. 08), as well as some differences. Cotton and beans are more common from river valley sites (#315 and 565), while agave was more common at the upland site (#204). Little barley and chile were not recovered from any upland sites. These differences might indicate that villages in different locations exchanged crops with other communities in the region. A number of other taxa were found from only one of the two sites, but these are infrequent. Their presence or absence could simply be a sampling issue rather than reflecting differences in resource use.

The plant remains from large site 204 and the presence of other villages in upland areas indicated that the smaller floodplains of secondary drainages were also cultivated. In addition, the hills above these valleys were also farmed. We recorded a sample of 186 upland fields of check dam systems on slopes and hill

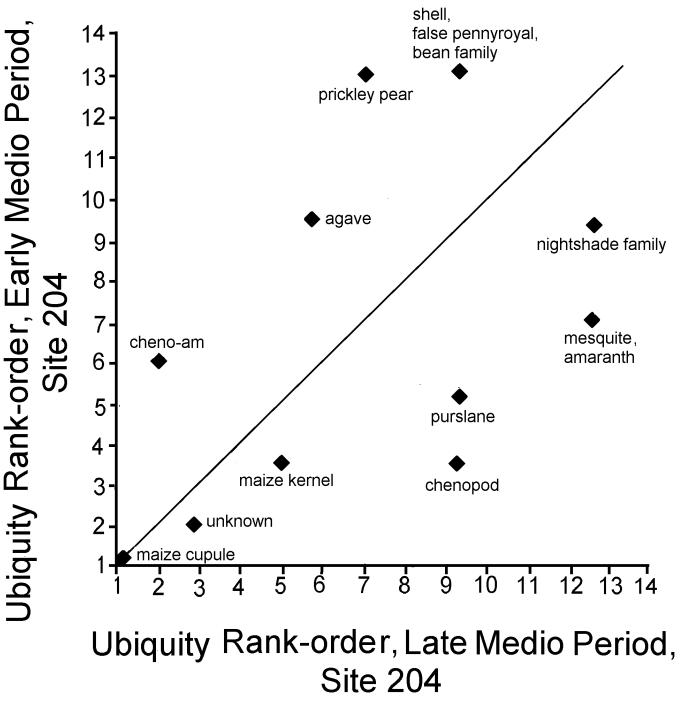

Figure 5. Rank-order scattergram, of taxa from Site 315 along the Río Casas Grandes and Site 204 located in an upland setting.

sides. Hundreds of these features, known locally as trincheras, dot the landscape in the Casas Grandes region. All but six of the 186 upland field systems were small, suggesting that they were cultivated by individual family groups. The larger field systems will be considered shortly.

Community Economy

Regardless of how various scholars envision the history of the CGAT, all recognize that Paquimé was more than simply a community of domestic farmers. The concentration and diversity of ceremonial architecture, the astonishing variety and quantity of imported exotica, and the presence of more elaborate burials are suggestive of some degree of inequality and centralized control (e.g., Di Peso, 1974; Di Peso et al., 1974). The prehispanic ethnobotany of Paquimé and the CGAT supports these suppositions through evidence of the production, distribution, and consumption of food beyond the domestic economy. There are special plants, evidence elite controlled food production, as well as artifacts and features for specialized food production and preparation. Finally, there is biological evidence for certain patterns of consumption. All are discussed below.

Special Plants

Several plants may have had special places in the community food economy. These include little barley, chile, and plants such as cacao or yaupon holly that can be used to produce caffeinated drinks (Figure 6).

Little Barley (*Hordeum pusillum* Nutt.). Evidence of this plant's domestication is the presence of naked grain, a trait very uncommon in wild grass populations. Like most grasses, the seeds of wild populations are naturally tightly attached to the grain. Loosening of the chaff from the grain is a frequent characteristic of domesticated grasses such as wheat, barley, oats, rice, and rye (e.g., Glémin & Battaillon, 2009).

Little barley seems to have been a minor but widespread crop north of Mexico. Ancient naked grains of little barley are most common from Eastern North America (Gremillion 2018). In the NW/SW this plant is most commonly found in the Hohokam region of southern and central Arizona, but a few examples have been recovered from Ancestral Pueblo sites (Adams 2014; Graham et al., 2017).

The first example of prehispanic little barley from Mexico is a single seed from Site 315 (Minnis & Whalen, 2020). It was recovered from a small oval hearth in a domestic room. Its archaeological context does not permit us to argue that little barley was a special resource used in the community economy, or that it was a minor food used at the domestic level. The site itself, however, is one of the large, near-neighbors of Paquimé, and little barley has as yet to have been found at any other sites.

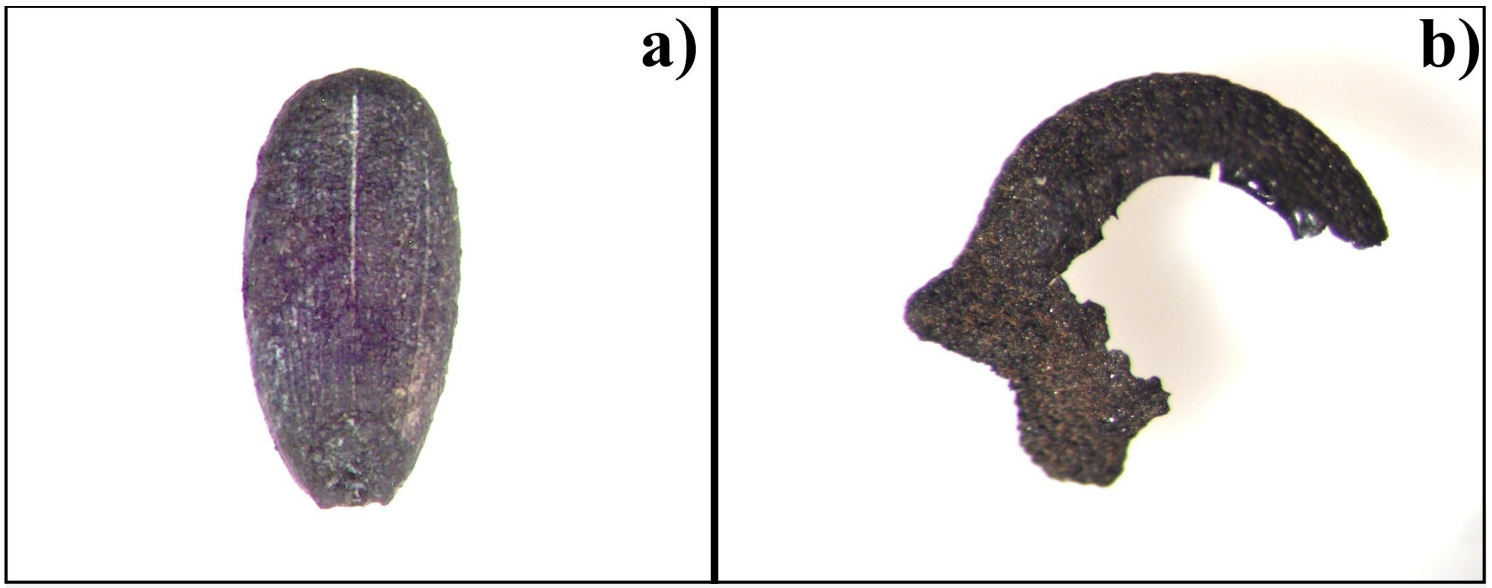

Figure 6. A) the little barley seed (*Hordeum pusillum* Nutt.); B) chile seed (*Capsicum annuum* L.).

Chile (*Capsicum annuum* L.). The remains of chile from our excavations are especially noteworthy. The most important crops used by the indigenous people in the NW/SW originated to the south in Mesoamerica (Minnis, 1992). It therefore is curious that chile, an important Mesoamerican crops, had not been found in the NW/SW in prehispanic times. However, after the Spanish entrada, chile remains are found in post-contact sites, especially in the northern Río Grande/ Río Bravo del Norte in New Mexico. Ever since, chile has been an important part of NW/SW cuisine. There is no obvious reason for the absence of chile remains in prehispanic sites in the NW/SW, as it is small, hardy, and easily transported (Minnis & Whalen, 2010).

The cultivated chile remains from our excavations are the first from the NW/SW, as discussed elsewhere (Minnis & Whalen, 2010). Subsequent analyses identified more remains (Minnis & Whalen2020). A total of 10 chile seeds were recovered from six rooms at two sites (# 315 and # 565), both of which are large, elaborate sites located in the Río Casas Grandes valley near Paquimé. Most were from common small hearths, but two were found in subfloor contexts in what appear to have been domestic rooms. We do not know the status of chiles. Their occurrence to date in substantial communities near Paquimé is suggestive of special status, but we cannot yet say whether chile was special item used by important people or was only minor ingredient in domestic cuisine. We suspect the former, because of the presence of chile at both excavated large near neighbors of Paquimé and the absence of the plant's remains at site 204, a large but distant community. Unfortunately, the limited archaeobotanical record from Paquimé prevents pursuit of this issue.

Cacao/Yaupon. One of the most recent and surprising archaeobotanical discoveries in the NW/SW has been the chemical signature of caffeine-like chemicals, especially theobromine, discovered in ancient ceramics (Crown & Hurst, 2009; Crown et al., 2015). This chemical signature was detected in a small sample of sherds from 315, previously described as one of the large, near neighbors of Paquimé (Crown et al., 2015). In fact, the 315 samples had the highest percentage of sherds with theobromine residue of all sites tested in the NW/SW. These presently are the only analyzed sherds from the Casas Grandes area, so we do know how widely the plant was used. The tested sherds came from small Ramos Polychrome vessels that also bore traces of exterior soot. These are

Figure 7. An example of an upland agricultural fields noted by rock alignments.

very time-consuming ceramics to produce, suggesting beverage consumption during special circumstances (Whalen & Minnis, 2025). We hope that similar sherds from Paquimé and from the more distant large site 204 will be tested for theobromine residue in the future.

The identification of the plant from which the caffeine-like substance is complicated. The scholars originally suggested that cacao, which is present far to the south in Mesoamerica, is the most likely source. However, yaupon holly (*Illex vomitoria* Aiton) also contains theobrimine, and it was the source for a commonly consumed simulant among indigenous groups in the Southeast U.S. (Hudson, 1979). Moreover, there are Ilex species in northern Mexico (Robert Bye, personal communication, 2020). It is possible, therefore, that these Ilex plants or yaupon could have been the source of the chemical signature detected in the sherds from site 315.

Fields

Some field systems provide clear evidence of specialized production associated with the community food economy. As mentioned previously, we mapped 186 upland fields that were marked by trincheras, or low terraces; 180 of which were small, likely farmed by

Figure 8. Trincheras on a cacique/chief field. This one is located near El Pueblito on Cerro Moctezuma, just west Paquimé.

small family groups (Figure 7). Beyond these were six large field systems, the smallest of which was much larger than any of the small fields (Figure 8). Most interestingly, five of these large field systems were near sites with special administrative or ritual functions (such as 242 and El Pueblito [Pitezel, 2011]). Simple domestic villages were not associated with such facilities (Minnis, et al., 2006). The sixth large field was near one of the two largest sites we recorded (178) and is located in an upland setting. We suggest that these were chief or cacique fields cultivated by the local population under the direction of leaders. Their produce would have supported the feasting events of the community food economy. If so, they are the first archaeologically documented chief fields in the NW/SW.

We also have recorded upland fields dotted with the small stone piles that likely served as moisture-retaining "mulch" probably for agavaceous plants. All these data indicate that there were large production areas in the Casas Grandes area by Late Medio times, the productive capacities of which exceeded local domestic needs.

Food and Drink Preparation for Feasting Events

Finally, there is evidence from features, artifacts, and human remains for the role of plants in several aspects of the community economy for baking large quantities of plants and for preparation of fermented drinks. Preceding discussion showed that there was large productive capacity for maize and perhaps agave, both of which could have been fermented.

Underground ovens are very common in the borderlands and are recorded for many archaeologically documented groups (e.g., Fish & Fish, 2014) and historical cultures (Castetter et al., 1938; Gentry, 1982). Similar ovens in a wide range of sizes are found in the CG area, probably representing food production from domestic to communal scales (Figure 9). The largest examples are unusually well constructed. There were constructed to hold a large amount of wood, especially pine, which produced very high temperatures (MacWilliams et al., 2001). Such ovens would be ideal for baking of large quantities of agavaceous plant food for feasting during ceremonial events. Some large ovens are next to ritual ball courts in the Paquimé hinterland, as well, further emphasizing their ceremonial association (Minnis & Whalen 2005; 2020). In addition to these hinterland examples five large ovens were excavated at Paquimé (Di Peso, 1974; Di Peso et al., 1974). This is the region's largest concentration of these large facilities. Four are clustered in what appears to be a specialized production area. More impressive is a huge oven next to a ceremonial platform mound

Figure 9. A well-constructed earthen oven excavated at Site 204. This feature is next to a ball court.

(Figure 10). We think that it is the largest earthen oven known from the NW/SW, capable of baking over 3,000 kg (7,000 lbs.) of agave hearts during a single cooking episode (Minnis & Whalen, 2005). That quantity is evidence of the large number of people fed at Paquimé on ceremonial occasions.

What was prepared in the ceremonial ovens? The many flotation samples from those we excavated provided no unambiguous evidence of what was being cooked. The excavators of the largest oven at Paquimé indicated that remains of agave and sotol were present (Di Peso et al., 1974), but no specimens were collected. Still, the most likely material cooked in the oven was agave. This baked product could have been both eaten and fermented into a beer-like drink.

There is additional evidence from artifacts and human remains for the production and consumption of fermented drink in the Casas Grandes area. Many

Figure 10. The enormous earthen oven is located next to a ceremonial mound (Unit 9) at Paquimé. We suspect that this is the largest earthen oven in the NW/SW (photograph courtesy of the Amerind Foundation; Alfred Cohn, photographer).

large vessels from 242 have the internal pitting indicative of fermentation (Whalen & Minnis, 2025). Their combined capacity would have been far above domestic needs. Site 242 lies beside a very large system of agricultural terraces, the productive capacity of which would have been far in excess of domestic requirements. We envision consumption of fermented drinks in rituals associated with the site's large ball court. Finally, we note that a study of dental calculus from Medio Period teeth shows evidence of consumption of fermented maize starch (King et al., 2017).

Concluding Thoughts

Paquimé was an influential and important community in the CGAT and beyond. Unfortunately, general archaeological research there long has been very limited, and archaeobotanical research has been even less common. Despite this, our research and that of others (e.g. Adams, 2017) provided a basic model of plants in the domestic and community food economies. All over the NW/SW, and in the Casas Grandes area, maize-based farming was the dietary foundation, supplemented with other common crops and a wide range of native plants (Adams & Fish, 2011). These appear to have been produced, prepared, and consumed at both domestic and community scales that supported both individual households and fueling the rich ceremonial and political structure.

Understanding the food economy has implications beyond what people ate and how food was used. Paquimé was situated near the most abundant floodplain field settings along the largest river valley in the region. Consequently, it probably was more easily able to produce abundant harvests and surpluses. This may have been a key factor in its rise as the most important community in the CGAT. It is widely recognized that an important way to build alliances and acquire power and influence is to host ritual feasts. This requires production beyond domestic needs, and Paquimé was better situated than other communities in the region to produce what was needed to build and sustain its political and religious structures (Whalen & Minnis, 2025).

Acknowledgements

The results just discussed are from several decades of archaeological research in the Casas Grandes area. Thus, it would be prohibitively long to name everyone who contributed to our project. Suffice it to say, we would not have been able complete our work without the student participants who came from Mexico, the United States, Canada, and the Netherlands. Members of the INAH Consejo de Arqueología, INAH Centro Regional Chihuahua, and the Museo de las Culturas del Norte de México provided professional help and advice. Finally, the local population, who love Paquimé, facilitated our research, and we especially want to thank Prof. Julian Hernández Chavez for his invaluable and unstinting friendship and help.

References Cited

Adams, K. (2014). Little barley (*Hordeum pusillum* Nutt.): A pre-hispanic New World domesticate lost to history. In P. Minnis (Ed.), New lives for ancient and extinct crops (pp. 179-191). University of Arizona Press.

Adams, K. (2017). Ancient plant use in west-central Chihuahua. In J. Kelley and D. Phillips (Eds.), Not so far from Paquimé: essays on the archaeology of Chihuahua, Mexico (pp. 81-98). University of Utah Press.

Adams, K., & S. Fish. (2011). Subsistence through time in the Greater Southwest. In B. Smith (Ed.), The subsistence economies of indigenous North American societies (pp. 147-184). Smithsonian Institution Press.

Braniff Cornejo, B. (2001). La Gran Chichimeca, el lugar de las rocas secas. CONACULTA/ Jaca Books.

Castetter, E., Bell, W. & Grove, A. (1938). Ethnobiological studies of the American Southwest iv: the early utilization and distribution of *Agave* in the American Southwest.

(University of New Mexico Bulletin No. 335). University of New Mexico Press.

Crown, P., & Hurst, J. (2009). Evidence of cacao use in the prehispanic American Southwest. Proceedings of the National Academy of Sciences of the Unites States of America, 106 (7), 2110–2113.

Crow, P., Gu J., Hurst, W., Ward, T., Bavenec, A., Ali, S., Kebert, L., Berch, M., Redman, E., Lyons, P., Mereweather, J., Phillips, D., Reed, L., & Woodson, K. (2015). Ritual drinks in the prehispanic US Southwest and Mexican Northwest. Proceedings of the National Academy of Sciences of the United States 112 (37), 11426-11442.

Cruz Antillón, R., & Maxwell, T. (2017). La provincia oriental de Casas Grandes. In R. Cruz Antillón and T. Maxwell (Eds.). La cultura Casas Grandes (pp. 177–90). INAH Chihuahua y Secretaría de Cultura de Chihuahua, Gobierno del Estado de Chihuahua.

Di Peso, C. (1974). Casas Grandes: a fallen trading center of the Gran Chichimeca (Vols. 1-3). Northland Press.

Di Peso, C., Rinaldo J., & Fenner, G. (1974). Casas Grandes: a fallen trading center of the Gran Chichimeca (Vols. 4-8). Northland Press.

Fish, S., & Fish P. (2014). Agave (Agave spp.): A crop lost and found in the US-Mexico borderlands. In P. Minnis (Ed.) New lives for ancient and extinct crops (pp.102-138). University of Arizona Press.

Graham, A., Adams, K., Smith, S., & Murphy, T. (2017). A new record of domesticated little barley (*Hordeum pusillum* Nutt.) in Colorado: travel, trade, or independent domestication. Kiva 83 (4), 414-442.

Gentry, H. (1982). Agave in continental North America. University of Arizona Press.

Glémin, S. & Bataillon, T. (2009). A comparative view of the evolution of greases under domestication. New Phytologist, 183 (2), 273-290.

Gremillion, K. (2018). Food production in native North America. Society for American Archaeology Press.

Hudson, C. (1979). Black Drink: A native American tea. University of Georgia Press.

King, D., Searcy, M., Yost, C., & Waller, K. (2017). Corn, beer, and marine resources at Casas Grandes, Chihuahua, Mexico. Journal of Archaeological Sciences Reports, 16, 365-379.

MacWilliams, A.C., Killick, D., Minnis, P., & M. Whalen. (2001). Thermal conditions in Medio Period roasting pits, northwest Chihuahua. Paper presented at the 80th annual meeting of the Society for American Archaeology.

Minnis, P. (1992). Earliest plant cultivation in the desert borderlands of North America. In Cowan & P. J. Watson (Eds.), The origins of agriculture: An international perspective (pp. 121–141). Smithsonian Institution Press.

Minnis, P., & Whalen M. (2005). At the other end of the Puebloan world: feasting at Casas Grandes, Chihuahua, Mexico. In M. Hegmon & B. Eiselt (Eds.), Engaged anthropology: research essays on North American archaeology, ethnobotany, and museology (pp. 114–28). University of Michigan Museum of Anthropology, Papers No. 94.

Minnis, P., & Whalen, M. (2010). The first prehispanic chile (*Capsicum annum*) from the U.S. Southwest/Northwest Mexico and its changing use. American Antiquity 75 (2), 245–257.

Minnis, P. & Whalen, M. (2015). Ancient Paquimé and the Casas Grandes World. University of Arizona Press.

Minnis, P. & Whalen, M. (2016). Discovering Paquimé. University of Arizona Press.

Minnis, P. & Whalen, M. (2020). The Prehispanic ethnobotany of Paquimé and its neighbors. University of Arizona Press.

Minnis, P., Whalen, M., & Howell, R. (2006). Fields of power: upland farming in the prehispanic Casas Grandes polity, Chihuahua, Mexico. American Antiquity 71:707–722.

Nelson, B., Villalpando Canchola, E., Punzo Diaz, J. and Minnis, P. (2015). Prehispanic Northwest Mexico and adjacent West Mexico, 1200 B.C.-A.D. 1400: an inter-regional perspective. Kiva 81 (1), 31-61.

Newell, G., & Gallaga, E. (2001). Surveying the archaeology of Northwest Mexico. University of Utah Press.

Pailes, M. & Searcy, M. (2022). Hinterlands to cities: The archaeology of Northwest Mexico and its vecinos. Society for American Archaeology Press.

Pitzel, T. (2011). From Archaeology to ideology in Northwest Mexico: Cerro de Moctezuma in the Casas Grandes ritual landscape. Ph.D. dissertation, Department of Anthropology, University of Arizona.

Whalen, M., & Minnis, P. (2025). Reframing Paquimé: community formation in Northwest Chihuahua. University Arizona Press.