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Macrobotanical Study: Zacatecas, México

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Location: Zacatecas, México

Site: Malpaso Valley

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Project Summary

Although the Malpaso Valley, Zacatecas, México was part of the Mesoamerican cultural tradition, it is unique in its removed geographical location, environmental marginality, and social organization. Monumental architecture and a settlement hierarchy suggest a complex social system, but other indicators of social complexity, such as elaborate burials and prestige items are absent. Consequently, I suggest that differential involvement in domestic activities is an alternative way to examine variation in social status. As remains of diet, fuel use, building materials, medicines, and specialized craft production, macrobotanical remains from household contexts of sites representing the three settlement tiers in the Malpaso Valley provide one of the most important data classes to address variation in domestic activities.

A Contingency Grant from FAMSI allowed me to take advantage of an opportunity to add a macrobotanical component to a third tier site excavation conducted by Dr. Charles Trombold of Washington University, in conjunction with the Universidad Autónoma de Zacatecas. This support complements my research objectives by expanding the botanical sample from third-tier sites, and also provides a rare case for Mesoamerican archaeology in which contexts representing a broad spectrum of social status are sampled. Funds were used to implement a sampling strategy, to conduct

flotation of soil samples for macrobotanical remains, and to analyze samples. Funds were also used to visit the Ethnobotanical Laboratory at the Universidad Nacional Autónoma de México in México City to verify seed identifications.

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Introduction

The Foundation for the Advancement of Mesoamerican Studies, Inc. (FAMSI), provided support to design, implement, and analyze macrobotanical samples taken from excavations at site MV206 in the Malpaso Valley, Zacatecas, México. Although macrobotanical analysis has the potential to inform us on a myriad of issues related to plant use, including diet and environmental conditions, there has been little macrobotanical analysis in this region. Questions relating to these issues, therefore, have only been addressed indirectly. The data produced by this analysis, in conjunction with data analyzed from other valley sites, provides the first evidence of diet and its variation in relation to social status in this region.

Problem

Although the Malpaso Valley, Zacatecas, México was part of the Mesoamerican cultural tradition, it is unique in its removed geographical location, environmental marginality, and social organization. Monumental architecture and a settlement hierarchy suggest a complex social system, but other indicators of social complexity, such as elaborate burials and prestige items are absent. Consequently, I suggest that differential involvement in domestic activities is an alternative way to examine variation in social status. As remains of diet, fuel use, building materials, medicines, and specialized craft production, macrobotanical remains from household contexts of sites representing the three settlement tiers in the Malpaso Valley provide one of the most important data classes to address variation in domestic activities.

Background

The Mesoamerican occupation of the northern frontier appears to have reached its northernmost limit around A.D. 850 (Trombold, 1991:146). This limit is defined primarily by the presence of sedentary villages and towns that have architectural and stylistic traits that are pervasive throughout Mesoamerica. The presence and absence of sites

with Mesoamerican traits produces a sharp cultural boundary, with the Mesoamerican occupation to the south, and occupation on the northern side restricted to mobile hunter/gatherers and part-time agriculturalists. Researchers have suggested that what at present seems to be a symbolic/cultural boundary was once also an environmental/geographical boundary determined by sufficient annual rainfall to support a relatively dense sedentary, agricultural, and socially complex society (Armillas, 1964; 1969; Trombold, 1991). Armillas (1964; 1969) hypothesized that the Mesoamerican occupation on the northern frontier may have co-occurred with a period of increased rainfall that supported a large, agriculturally based population. In modern times, however, the Mesoamerican boundary surpasses the northern edge of the arid zone by up to 160 km (Armillas, 1969:698).

The Mesoamerican occupation in the northern frontier region is characterized by a series of small settlement systems, located primarily in the river drainages that run north/south from the mountains. The Malpaso Valley regional system is one of the northernmost and larger of the regional systems that form the Mesoamerican frontier (Trombold, 1985). It is located in the southern end of the modern state of Zacatecas on the eastern foothills of the Sierra Madre Occidental at 2240 m above sea level. It is situated on an ecotone between the arid Mesa del Norte to the north and east, and the more tropical highlands to the south and west (Trombold, 1985). The region is centered around the northernmost Malpaso River drainage and its tributaries, which provide seasonal water for agriculture. Annual rainfall is less than 400 mm per year, 75% of which is deposited between the months of June and September (Comision Nacional del Agua, 1994; Turkon, 1995). Because the presence of water is primarily seasonal, much of the vegetation is also seasonal, dependent mostly on rainfall, which converts the dry season desert into a sub-tropical steppe (Schoenwetter, 1963).

The Malpaso Valley settlement system was organized into a three-tier hierarchy. Most valley sites are located close to waterways, suggesting that agriculture was one of the determining factors for settlement (Elliot, 2001). Excavations have previously been conducted and data are available from three of these sites. El Potrerito represents the lowest settlement tier and was probably a small ranch from which agricultural activities occurred. Los Pilarillos represents the second settlement tier, is substantially larger than El Potrerito, and contains some evidence of public architecture. La Quemada is the only site in the first settlement tier and consists of more than sixty residential terraces and two ceremonial centers located on a mountaintop overlooking the valley. Its location, at least 1 km from the river, along with its impressive views of the valley, suggest that it may have served a different function than other valley sites, perhaps for defense or ritual (Nelson, *et al.*, 1992; Trombold, 1991; Wells, 2000).

In 1999 Dr. Charles Trombold of Washington University, in conjunction with the Universidad Autónoma de Zacatecas, began excavations at the site of MV206, a hypothesized third-tier site, with the goal of collecting more data to address issues of functional complexity between sites and to further address Armillas' climatic hypothesis. MV206 is located at the base of the mountain on which the site of La Quemada is located and is hypothesized to be the residences of the people who served the La Quemada elite. Trombold's project focused on excavation as well as analyses relating

to environmental reconstruction, such as pollen, phytolith, and macrobotanical analyses (Trombold, 2000). Excavation results show that, like the second tier site of Los Pilarillos, MV206 is composed of a series of plazas surrounded by raised walkways and rooms. MV206, then, may not represent a third tier site, but may be either a second tier site, or an anomaly due to its relationship and proximity to La Quemada.

Methods

FAMSI supported two aspects of my research. First, I traveled to Zacatecas to set up a macrobotanical sampling and processing strategy for MV206. The main function of my presence was to teach Dr. Trombold and his students how to process the soil samples. This was accomplished using a version of the SMAP machine (Watson, 1976). The SMAP machine is time efficient and has a high recovery rate. It uses a pump to cycle water from the water source into a metal drum, where it is forced through an upside-down showerhead. Soil is poured into an inner bucket whose bottom is replaced with .35 mm screen (smaller mesh than minimum seed diameter). The water coming through the showerhead agitates the drum water enough to allow light material to float to the top. The floating material runs over a sluiceway and is caught in fine fabric, allowing the water to filter through. Fine silt (>.35mm) passes through the inner bucket screen. The material remaining in the inner bucket, mostly rocks and pebbles, makes up the heavy fraction. Flotation occurred throughout the excavation seasons that occurred during the years of 1999-2000. The light fractions and part of the heavy fractions were exported to Arizona State University for processing and identification.

The second part of this research was to verify the identifications of macrobotanical remains extracted from soil samples at the Ethnobotanical Laboratory at the Universidad Nacional Autónoma de México. Emily McClung de Tapia and her staff generously examined many of my seeds and plant tissues and compared them to other taxa recovered from other Mesoamerican sites.

Results

Taxa recovered from the 19 samples analyzed are presented in [Table 1](#). Results show that, overall, few charred seeds and plant tissues were recovered. There were, however, quite a few uncharred botanical remains, as well as many roots and bugs in the processed samples. This finding, combined with the fact that many of the samples were taken from shallow excavations, suggests that preservation was poor and may account for the generally low recovery. In addition, many of the recovered wild plants are found naturally in the immediate vicinity (Trombold, 1998). All these factors suggest that the remains encountered may be more suggestive of incidental charring than economic use of plants.

Table 1 Macrobotanical Remains from MV206 Samples, Malpaso Valley, Zacatecas, México							
Sample #	2	3	5	8	9	10	11
c.f. Brassica							
Cactaceae							
Chenopodium							
Asteraceae	1						
Asteraceae sp.2	1						
Euphorbia	2						
c.f. Helianthus							
Poaceae	3				1		
Fabaceae-wild	2	1					
Maize cupule		1	2				1
Misc Tissue (g)	0.05				0.01	0.01	
Opuntia	4						1
Physalis							2
Unid 6							1
Unid 14	1						
Unid 16	4						
Unid seed fragments	36		1		2	3	
Unid Spine					2		
Wood Charcoal (g)	0.21	0.03	0.01	0.04	0.01		
Wood Identification	Legume 2, small twigs	Legume 1	Monocot 2	Legume 2, Salicaceae 1	Legume 1	Pinus 3, Legume 1	

Table 1 (continued) Macrobotanical Remains from MV206 Samples, Malpaso Valley, Zacatecas, México								
Sample #	13	14	15	16	17	18	19	20
c.f. Brassica	2							
Cactaceae								
Chenopodium			1					
Asteraceae								1
Asteraceae sp.2								
Euphorbia								

c.f. Helianthus				1				
Poaceae								
Fabaceae-wild								
Maize cupule	1						1	
Misc Tissue (g)					0.01	0.03		0.01
Opuntia								
Physalis								
Unid 6								
Unid 14								
Unid 16								
Unid seed fragments		3	1	4		1		
Unid Spine			1					
Wood Charcoal (g)	0.06	0.01	0.02	0.03	0.04	0.09	0.27	0.01
Wood Identification	Legume 2	too small to id			Legume 1	Legume 2	Pine 3, Legume 2	

Table 1 (continued)				
Macrobotanical Remains from MV206 Samples, Malpasó Valley, Zacatecas, México				
Sample #	21	22	23	24
c.f. Brassica				
Cactaceae	1			
Chenopodium				
Asteraceae	2			
Asteraceae sp.2				
Euphorbia				
c.f. Helianthus	1			
Poaceae				1
Fabaceae-wild				
Maize cupule				
Misc Tissue (g)	0.01			
Opuntia		1		
Physalis				
Unid 6				
Unid 14				

Unid 16				
Unid seed fragments		1		
Unid Spine				
Wood Charcoal (g)	0.01	0.01	0.31	0.02
Wood Identification		Pine 1	Legume 4, Monocot 2	Pine 1

Paleoethnobotanists most frequently determine economic importance by ubiquity measures, or the frequency with which specific plants occur in relation to the total number of samples analyzed (Dennell, 1976; Jones, 1984; Pearsall, 1988; Popper, 1988). Although the ubiquity measure ignores straight counts (Kandane, 1988), it is a good indication of economic importance since it evens out variation in natural plant processes, such as the variation in the number of seeds a plant produces, and cultural variation, such as the result of an accident, activity area, or the mixing of many years or different activities (Asch and Asch Sidell, 1988; Dennell, 1976; Fritz, 1994; Hastorf, 1988; Miksicek, 1987; Miller, 1988; Minnis, 1981). On the other hand, because the ubiquity measure ignores the quantity and nature of plants recovered, it also has the potential to overestimate the economic importance of naturally occurring or low frequency plants (Minnis, 1989:544).

Ubiquities from MV206 are presented in [Table 2](#), along with the ubiquities from three other Malpaso Valley sites. Like at all the other sites, at MV206 maize has the highest ubiquity of all taxa recovered. This is expected, as archaeological and ethnographic studies show that maize was the most economically important food resource throughout Mesoamerica and the American Southwest. However, the low ubiquities of wild plants may be due to the low frequency of remains, probably a result of poor preservation. In addition, the contexts sampled at MV206, which include a variety of architectural features such as hearths, postholes, burials, and drains, can also be expected to have lower yields than the contexts sampled at the other three sites, which are all middens and have a high density of all artifact classes.

	MV206 (n=19)	El Potrerito (n=19)	Los Pilarillos (n=26)	La Quemada (n=57)
Maize	26	74	88	88
Fabaceae-domesticated	0	5	23	23
Curcubita	0	0	0	7
Opuntia	16	0	27	42
Agave Tissue	0	53	65	26
Fabaceae-wild	16	0	19	23

Chenopodium	5	16	54	44
Amaranthus	0	5	8	25
Mammalaria	0	0	4	4
Cactaceae	5	0	0	7
Physalis	5	16	38	75
Solanaceae	0	0	8	7
Euphorbiaceae	11	0	4	11
Brassica	5	0	0	14
Portulaca	0	16	31	14
Asteraceae	16	0	4	11
Helianthus	11	0	0	5
Pinus nut frag	0	0	0	4
Prosopis	0	0	0	7
Stellaria	0	0	0	4
Poaceae	0	0	4	12
Polygonum	0	0	4	2
Lychnis	0	0	0	2
Labiataeae	0	0	0	4
Unid 1	0	5	0	5
Unid 2	0	0	4	12
Unid 3	0	0	0	2
Unid 4 or 6	5	0	0	46
Unid 7	0	0	19	14
Unid 8	0	0	4	5
Unid 9	0	0	0	2
Unid 10	0	0	0	2
Unid 11	0	0	0	2
Unid 12	0	0	0	5
Unid 13	0	0	0	2
Unid 14	5	0	4	5
Unid 16	5	0	0	4
Unid 17	0	0	0	2
Unid 18	0	0	0	0
Unid 20	0	0	8	0
Unid 21	0	0	0	2
Unid 22	0	0	0	2
Unid 23	0	0	0	4
Unid 24	0	0	0	2
Unid 25	0	0	8	0
Unid 26	0	0	4	0
Unid Fruit 1	0	0	0	2

Unid Fruit 2	0	0	0	2
Unid Fruit 3	0	0	0	2
Unid Fruit 4	0	0	0	2
Unid Fruit 5	0	0	4	0

The low recovery of remains from MV206 precludes using statistical analyses to compare MV206 to botanical remains from other sites. However, if we assume that the remains encountered are representative of cultural use, it appears that MV206 residents used a narrower range of foods than did residents of La Quemada and Los Pilarillos. However, MV206 does have a comparable, or even more diverse, assemblage than found at El Potrerito. If both sites are representative of the lowest social groups, then it can be suggested that diverse diets were a characteristic of elite groups in the Malpaso Valley. Lower status residents may not have had economic or social access, or the time required to collect and process a large diversity of foods.

Most of the wild plants found at MV206 are found only at La Quemada, and not the other two lower ranked sites. On the one hand this finding could be explained by the proximity of the two sites to each other, which would result in the same incidental weedy plant assemblage. On the other hand, if MV206 was a residence of the population that served the La Quemada residents, then MV206 residents may have had access to these plants due to their association with the La Quemada elite.

Conclusion

Plant use in the Malpaso Valley does appear to have varied by social status. Although all Malpaso Valley residents had a high reliance on maize, sites identified as elite appear to have used a more diverse plant assemblage than households identified as non-elite. Data from MV206 supports the findings by showing a similar pattern to El Potrerito, the hypothesized third tier site. Future work will incorporate other artifact classes such as groundstone, ceramic assemblages into the analysis to examine variation in other domestic activities.

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