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Social Differentiation as Indicated by Archaeological Data from Late Moche Households at Galindo, Moche Valley, Peru

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Introduction

Social differentiation is a defining characteristic of complex societies. One of the principal means of investigating social differentiation is the comparison of the wealth of people at different socioeconomic levels. In the case of societies that lack currency, the wealth of different groups is evaluated by comparing the staple goods, as well as exotic and prestige items, to which they had sole or increased access. Archaeologists studying prehistoric complex societies usually approach this topic by comparing the material remains from contexts associated with different groups. In Peru, such investigations usually involve a comparison of the grave goods of individuals from these groups. While this research is certainly valuable, burial goods do not always adequately reflect the resources to which an individual had access in life. Instead, they are a better reflection of the resources to which living mourners had access, and their willingness to include them in the burial ritual (Parker Pearson 1982; Shanks and Tilley 1982). Furthermore, burial goods rarely reflect differential access to staple goods, which are the most important resources in preindustrial societies. In the evaluation of differential access to staple goods, comparisons of residential contexts tend to be considerably more informative. This is because residential contexts more often contain the material correlates of staple goods, namely faunal and botanical remains.

Households are the basic unit of social organization in complex societies. When households can be differentiated based on socioeconomic class, a comparison of the material remains from these contexts can be utilized to determine the staple goods to which these groups had differential access. This is not always the case for other archaeological contexts with faunal and botanical remains, such as middens, which often cannot be differentiated based on socioeconomic group.

This paper presents an investigation of social differentiation at the archaeological site of Galindo, in the Moche Valley on the north coast of Peru, during the site's principal Late Moche occupation (A.D. 700-800). The investigation focuses on staple goods, although other resources are also considered. It utilizes data from two field projects at the site that involved the excavation of residential contexts. The first project was directed by Garth Bawden from 1970 to 1973, and the second was directed by the author from 2000 to 2002.

Household Archaeology at Galindo by Bawden

In 1970 Garth Bawden (1977, 1978, 1982a, 1982b, 1983, 1987, 1990, 1994, 2001) initiated the first major investigation of the archaeological site of Galindo (Figure 1). A major component of this project was the excavation of Late Moche households. Bawden's project was affiliated with the larger Chan Chan-Moche Valley Project, directed by Michael Moseley from 1969 to 1974 (Moseley and Day 1982; Moseley and Mackey 1974). Affiliated projects that included

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household archaeology at other sites in the Moche Valley include Curtis Brennan's (1978, 1980) investigation of Salinar households at Cerro Arena and Theresa Topic's (1977, 1982) investigation of Moche households at the Huacas de Moche. In addition, the Chan Chan-Moche Valley Project itself included the excavation of Chimu households at Chan Chan (Day 1973; Klymyshyn 1976, 1982; J. Topic 1977, 1982). Together, these investigations spanned almost 2000 years of Moche Valley history and formed what was, at the time, the largest source of regional information on prehispanic households in Peru (Bawden 1982b).

Bawden (1977) performed excavations within thirty-eight structures at Galindo, twenty-eight of which were determined to have a solely residential function. These households formed the principal database utilized by Bawden to investigate Late Moche social organization at Galindo. As a result of this investigation, Bawden defined three basic functional components in Late Moche households at Galindo: kitchens (*cocinas*), living rooms (*salas*), and storage bins (*depositos*) (Bawden 1990; Figure 2). All of the households excavated by Bawden contained these components, although their number and size varied. The households investigated by Bawden also varied widely in terms of their overall size and their method and quality of construction. Bawden utilized all of these attributes to divide households into three status groups thought to have been occupied by different socioeconomic classes (Bawden 1982b).

Bawden's research at Galindo also included an extensive survey of the entire site. As a result of this survey, Bawden determined that residential architecture was confined to four geographically distinct areas, which were separated from one another by natural topography, as well as by a series of walls and ditches (Figure 3). A comparison of the households within each of these areas indicated a strong tendency for residences of the same status group to be located within the same area (Bawden 1982b). The following is a brief description by area of the households excavated by Bawden, as well as comparative data on the artifacts that they contained:

1. *Area A* (Plain A2): Households are moderate to large in size, relatively well constructed, and appear to have been formally planned, with an average total area of 133.5 square meters. Area A residences therefore appear to have been occupied by people of moderate status. No silver was found in any of the households, and 14.18 percent of the ceramics recovered during their excavation were decorated fine-wares.

2. *Area B* (Hillside A): Households are small, irregular, poorly constructed, and not well planned compared to residences in other parts of the site, with an average total area of 44.6 square meters. These characteristics suggest that Area B was occupied by people of low status. No silver was found in any of the households, and only 4.18 percent of the ceramics recovered were decorated fine-wares.

3. *Area C* (Plain A1 northeast of Wall E): Households are moderate in size and relatively well constructed, with an average total area of 78.2 square meters. Area C residences therefore appear to have been occupied by people of moderate to low status. No silver was found in any of the households, and only 3.15 percent of the ceramics recovered were decorated fine-wares.

4. *Area D* (Quebrada Terrace [QT], Plain A1 southwest of Wall E): Access to Area D is restricted by walls to the northeast and southwest, the outwash channel of the Quebrada Caballo Muerto to the southeast, and a large administrative structure (Cercadura B) to the northwest. Households are large, elaborate, formally planned, and well constructed, with an average total area of 190.8 square meters. Based on these characteristics, Area D appears to have been occupied by people of high status (*i.e.*, elites). Silver was found in each household

excavated, and 16.45 percent of the ceramics recovered were decorated fine-wares.

Based on their restricted location, size, and quality of construction, the structures in Area D appear to be elite households. Of all of the residences excavated by Bawden, only those located in Area D contained silver. In addition, these households had the highest proportion of fine-ware ceramics. Based on these data, Galindo elites appear to have had sole access to silver and increased access to fine-ware ceramics.

The Galindo Archaeological Project

In 2000, the author initiated the Galindo Archaeological Project, or GAP (Lockard 2005, 2008, 2009a, 2009b; Figure 4). One of the goals of this project was to further investigate social differentiation at the site during its principal Late Moche occupation. To accomplish this goal, the material remains recovered from contexts associated with different socioeconomic groups were compared. This investigation built upon Bawden's work by including a comparison of faunal and botanical remains across the groups in order to determine to which staple goods Galindo's Late Moche elites had differential access. Faunal and macro-botanical remains were recovered from Galindo households by Bawden and later analyzed by Shelia Pozorski (1976). Pozorski's analysis, however, compared the faunal and macro-botanical remains recovered from Galindo with those recovered from other sites in the Moche Valley. She did not compare the remains from households of different socioeconomic groups at Galindo, and her original data were not available for this study.

A total of seven Late Moche households were excavated as part of the GAP. The socioeconomic status of these households was determined by utilizing the formal attributes identified by Bawden as being indicative of status, namely size, method and quality of construction, and location. Based on these formal attributes, three of the households are low status (Structures 39, 40 and 50), two are moderate status (Structures 51 and 52), and two are high status (Structures 41 and 42). A low status building (Structure 46) that was probably utilized for storage, rather than as a residence, is also included in the analyses. Faunal and botanical remains recovered from contexts within the Huaca de las Abejas and the Huaca de las Lagartijas are also included, but treated as a separate comparative group. Although these are civic/ceremonial contexts rather than households, they do represent the byproducts of food production activities. Due to their location within large huacas, their contents are assumed to represent resources utilized by political rulers and/or religious specialists. As a result, they provide at least some information regarding the staple goods to which Galindo's Late Moche rulers and/or religious specialists, who were no doubt elites, had access.

Field Methods

All sediment excavated during the GAP was screened with quarter inch mesh. During screening, all artifacts, faunal remains, and botanical remains were retained, with the exception of charcoal. Charcoal was only retained from select primary contexts for radiocarbon analysis (Lockard 2009a). Each field sample (FS), which is a bag of artifacts or ecofacts of the same type, or a single sample collection, was separated by provenience designation (PD), which denotes the structure, excavation unit, stratum, arbitrary level, and/or feature from which the sample was recovered (Lockard 2005: Appendix 1). The volume of the sediment excavated in each provenience was measured in liters (Table 1). This was done in order to provide a means to measure the density (quantity per unit volume) of faunal and botanical taxa in different contexts.

							Excellent Integrity		Good Integrity		Bad Integrity		All Contexts	
Zone	Area	area	Structure	Structure/Location Type	Units	Size (m^2)	PDs	Volume (L)	PDs	Volume (L)	PDs	Volume (L)	PDs	(L)
PB	101	1-5	39	Moche low status residence	12	45.80	2	1.50	36	5,899.95	12	2,663.00	50	8,564.45
PB	102	1-5	40	Moche low status residence	20	78.62	25	2,514.00	49	8,470.90	31	4,125.00	105	15,109.90
HA	103	1	-	Stratigraphic Cut	2	10.00	0	NR	11	NR	9	NR	20	NR
PB	201	1-6	-	Platform B, Huaca de las Lagartijas	10	23.75	8	NR	16	NR	19	NR	43	NR
PB	202	1	-	Terrace 2a, Huaca de las Lagartijas	1	1.50	0	NR	3	NR	3	NR	6	NR
QT	203	1-5	41	Moche high status residence	22	77.89	12	667.00	37	2,848.00	30	2,323.50	79	5,838.50
QT	204	1-3	42	Moche high status residence	9	35.40	22	591.00	11	434.50	20	2,277.50	53	3,303.00
PB	301	1-3	-	Platform A, Huaca de las Abejas	10	24.00	3	NR	26	NR	18	NR	47	NR
PB	302	1	-	Plaza 1, Huaca de las Abejas	5	22.00	4	NR	13	NR	23	NR	40	NR
PB	303	1	-	Cemetery	3	27.00	0	NR	0	NR	10	NR	10	NR
PB	304	1	43	Moche structure, Plaza 2,	3	10.75	0	0.00	0	0.00	9	614.50	9	614.50
PB	305	1	44	Moche structure, Plaza 3,	3	9.75	10	341.00	3	405.00	8	1,042.00	21	1,788.00
PB	305	2	-	Plaza 3, Huaca de las Abejas	1	4.00	0	0.00	4	753.75	3	375.00	7	1,128.75
PB	306	1	45	Moche structure, Plaza 1,	3	9.00	0	0.00	1	37.50	6	230.75	7	268.25
HA	307	1	46	Moche low status storage structure	9	16.83	0	0.00	4	97.50	17	630.00	21	727.50
HA	307	2	47	Chimu residence	7	22.50	1	22.50	36	1,775.00	17	1,680.50	54	3,478.00
HA	307	3	48	Chimu residence	4	14.65	1	82.50	4	304.00	9	1,602.50	14	1,989.00
HA	307	4-6	49	Chimu residence	24	83.25	10	477.50	39	4,434.50	56	7,916.75	105	12,828.75
HA	308	1	50	Moche low status residence	4	10.93	0	0.00	1	3.50	7	505.50	8	509.00
PB	309	1	-	Cemetery	2	8.50	0	NR	1	NR	10	NR	11	NR
PA	310	1-2	51	Moche moderate status residence	5	23.04	0	0.00	17	1,323.50	25	2,248.05	42	3,571.55
PA	311	1	52	Moche moderate status residence	4	20.24	1	5.00	20	1,929.25	13	1,475.00	34	3,409.25
TOTALS					163	579.38	99	4,702.00	332	28,716.85	355	29,709.55	786	63,128.40

Note: Volumes do not include soil samples.

Table 1: Summary of GAP excavations.

A total of 108 soil samples were taken during the GAP and processed as described below. Most of these samples are from primary contexts (*i.e.*, floors and features), especially hearths (Figures 5 and 6). However, a few samples were taken of fill, as controls. All soil samples were passed through a series of screens in the field. First, the samples were measured in liters (Lockard 2005: Appendix 9). Next, the samples were passed in their entirety through quarter inch and eighth inch nested screens. Finally, a maximum of one liter of the material that passed through the eighth inch screen was passed through one millimeter and 0.5 millimeter nested screens. All of the material that did not pass through each of the screens was bagged separately and kept for laboratory analysis.

LABORATORY ANALYSES

All of the diagnostic ceramic sherds recovered from undisturbed Late Moche residential contexts excavated during the GAP were analyzed. Undisturbed contexts are herein defined as those proveniences that were coded in the field as having "excellent" (generally primary contexts) or "good" (*e.g.*, subsurface fill) integrity by the archaeologists who excavated them. Artifacts from proveniences coded as having "bad" integrity (*e.g.*, surface sediment and wall fall) were not analyzed. It should be noted that most archaeological deposits at Galindo are very shallow, and few artifacts were recovered from primary contexts during the GAP. In households, artifacts from primary contexts are confined to those recovered from features (mostly hearths) and from directly on top of floors (*i.e.*, floor contact). As a result, artifacts from proveniences with good integrity are included in the following analyses, even though some of these probably represent secondary deposits (*e.g.*, midden). Sherds recovered during the 2000 and 2001 field seasons were analyzed under the direction of Flor Díaz, a Peruvian archeologist who specializes in north coast ceramics. Sherds recovered during the 2002 field season were analyzed under the direction of Kari Schleher, an American ceramic specialist. The attributes in these ceramic analyses are vessel form, temper type, paste color, firing environment, border or lip form, neck form, decoration area, type and motif(s), lip diameter, base diameter, wall thickness, neck height, the presence or absence of soot, and culture and/or type (Lockard 2005: Appendix 3).

All invertebrate faunal remains (*i.e.*, molluscs and crustaceans) recovered from undisturbed Late Moche residential contexts were analyzed by the author using the book *Intertidal Mollusks of Iquique, Chile* (Marincovich 1973; see also Eisenberg 1981; Keen 1971; Olsson 1961; Sabelli 1979). Species that could not be identified by the author were identified by Víctor Vásquez using the extensive library and comparative collection of the Centro de Investigaciones Arqueobiológicas y Paleoecológicas Andinas "Arqueobios" at the Universidad Nacional de Trujillo (Vásquez and Rosales 2002; see also Vásquez *et al.* 2003). The attributes in this analysis, calculated for each provenience, include taxon, the Number of Individual Specimens Present (NISP) per taxon, and the Minimum Number of Individuals (MNI) per taxon (Lockard 2005: Appendices 5a and 5b). All vertebrate faunal remains (*i.e.*, mammals, fish, and birds) recovered from undisturbed Late Moche contexts were also analyzed. Vertebrate faunal remains recovered during the 2000 field season were analyzed in Peru by Kendall Campbell using several published sources (Altamirano 1983; Cooper and Schiller 1975; Pacheco *et al.* 1986; Wheeler and Jones 1989), as well as comparative collections (see Campbell 2000:50). The attributes in this analysis are taxon, element, side, portion, epiphysis, modifications, width, and length (Lockard 2005: Appendix 6). Vertebrate remains recovered during the 2001 and 2002 field seasons were analyzed by Víctor Vásquez and Teresa Rosales using the library and comparative collection of the Centro de Investigaciones Arqueobiológicas y Paleoecológicas Andinas "Arqueobios" (Lockard 2003:A1-2; see also Vásquez and Rosales 2002; Vásquez *et al.* 2003). The attributes in this analysis, calculated for each provenience, are taxon, NISP per taxon, and MNI per taxon (Lockard 2003:A1-3). These attributes were later calculated by the author for each provenience in the 2000 sample based on the data in Campbell's analysis (Lockard 2005: Appendices 7a and 7b). It is these attributes that are used in the data analyses presented below.

Macro-botanical remains were retained from the quarter inch screening of all contexts excavated during the GAP. Excluding soil samples, however, only those recovered during the 2002 field season were analyzed (*ibid.*: Appendix 8). Because only moderate status Late Moche households were excavated during the 2002 field season, there are no comparative data presently available from Late Moche low and high status households excavated during the GAP. Botanical remains were analyzed, however, from soil samples recovered during all three years of the GAP. The first stage in the laboratory analysis of these soil samples was to separate botanical remains by hand from the quarter inch, eighth inch and 1 millimeter fractions. The presence/ absence of various artifact categories was recorded for each fraction during this process (*ibid.*: Appendix 10), which is herein referred to as sorting (Dionne 2002:72-79). The second stage in the laboratory analysis consisted of the identification of the taxon and plant part of the botanical remains. This work was started in Peru and completed in the Paleoethnobotany Laboratory at Northern Arizona University (NAU) under the direction of George Gumerman IV, a palaeoethnobotanist who collaborated with the author in the field during the 2000 and 2001 seasons of the GAP. The 0.5 millimeter fractions of samples were floated, light fractions were sorted, and botanical remains analyzed at NAU. Botanical remains were identified with the aid of published sources (Sagastegui 1973; Towle 1961), as well as the extensive comparative collection of the Paleoethnobotany Lab at NAU. Of the 108 soil samples processed in the field during the GAP, the quarter inch and eighth inch fractions were sorted for 99 samples, and the 1 millimeter fraction was sorted for 84 of these 99 samples. All four fractions were sorted, and all of the

recovered botanical remains were analyzed, for 26 samples (Lockard 2005: Appendix 11).

Ten of these fully analyzed samples are from Late Moche contexts (Table 2). Three of the samples are from three different low status residential contexts (a hearth, an ash deposit, and fill on top of the floor of a storage bin), and five of the samples are from two different high status residential contexts (two hearths, two ash deposits, and floor context sediment in a storage bin).

Another sample is from an ash deposit in a very small (approximately 3 by 2.5 meters) structure located in Plaza 3 of the Huaca de las Abejas. Structure 44 has a masonry perimeter wall and is divided into three bins by adobe walls. The bins were most likely utilized for storage (*ibid.*: 268-270). The last sample is from an ash deposit in the northern corner of the same plaza. This sample was not associated with any visible architecture other than the perimeter wall of the plaza (*ibid.*: 270). The two floor context samples contained only a single identifiable seed each and are excluded from the analyses below.

PD	FS	Area	Subarea	Structure	Structure Type	Context	Total Sample Volume (l)	1 and 0.5 mm Sample Volume (l)
88	90	101	1	39	Low status residence	Ash deposit	6.50	1.00
4	93	102	1	40	Low status residence	Hearth	6.00	1.00
271	205	203	2	41	High status residence	Floor contact	5.00	1.00
304	155	203	3	41	High status residence	Ash deposit	11.30	1.00
332	196	203	3	41	High status residence	Hearth	14.50	1.00
260	225	204	1	42	High status residence	Hearth	3.75	1.00
371	269	204	3	42	High status residence	Ash deposit	12.75	1.00
428	570	305	1	44	Civic/ceremonial storage structure	Ash deposit	2.75	1.00
587	577	305	2	-	Civic/ceremonial ash deposit	Ash deposit	3.25	1.00
594	581	308	1	50	Low status residence	On top of floor (fill)	5.30	1.00
TOTALS							71.10	10.00

Table 2: Summary of GAP soil samples from Late Moche contexts.

DATA ANALYSES

In this section, the results of data analyses of Moche fineline sherds, invertebrate faunal remains, vertebrate faunal remains, and botanical remains from soil samples are presented. The results of the analyses from high status, moderate status, and low status contexts are compared in order to determine the staple goods to which Galindo elites had differential access. As previously mentioned, most of the contexts are residential.

Moche fineline sherds

Moche fineline sherds are commonly found in high status, but rarely in low status, burials. In addition, many Moche fineline sherds depict elite activities and communicate ideological themes (Donnan and McClelland 1999). As a result, Moche elites no doubt controlled the production and distribution of this ware. The proportion of fineline sherds and fineline sherds with figurative designs varies considerably by context at Galindo (Table 3).

Context	Diagnostic Sherds	Moche Finelines Count	Moche Finelines Percent Diagnostic	With Figurative Designs Count	With Figurative Designs Percent Diagnostic	With Figurative Designs Percent Finelines
Low status contexts						
Structure 39 (residence)	473	8	1.7%	0	0%	0%
Structure 40 (residence)	452	28	6.2%	0	0%	0%
Structure 50 (residence)	24	5	20.8%	0	0%	0%
Structure 46 (storage)	283	10	3.5%	1	0.4%	10.0%
Subtotal	1232	51	4.1%	1	0.1%	2.0%
Moderate status residential contexts						
Structure 51	78	5	6.4%	0	0%	0%
Structure 52	161	62	38.5%	31	19.3%	50.0%
Subtotal	239	67	28.0%	31	13.0%	46.3%
High status residential contexts						
Structure 41	318	44	13.8%	1	0.3%	2.3%
Structure 42	213	18	8.5%	1	0.5%	5.6%
Subtotal	531	62	11.7%	2	0.4%	3.2%
Civic/ceremonial contexts	257	44	17.1%	1	0.4%	2.3%
Chimu contexts	1268	3	0.2%	0	0.0%	0.0%
Other contexts	336	19	5.7%	0	0.0%	0.0%
TOTAL	**3863**	**246**	**6.4%**	**35**	**0.9%**	**14.2%**

Note: Counts are before refits.

Table 3: Percentage of Moche fineline sherds and Moche fineline sherds with figurative designs from GAP contexts.

Not surprisingly, high and moderate status Moche households had significantly higher proportions of fineline sherds (11.7 percent and 28.0 percent, respectively) than low status Moche contexts (4.1 percent). The proportion of fineline sherds with figurative designs, however, was extremely low in all contexts but one–Structure 52. Structure 52 is a large, moderate status household located on Plain A2. Four excavation units were excavated just inside the southern entrance to the residence. This area was utilized, presumably after the household was abandoned, as a midden. Within the midden, 62 fineline sherds were encountered. This amounts to 38.5 percent of the total number of diagnostic sherds that were recovered. Of these, 31 (50 percent) were classified as figurative (Lockard 2009b). This proportion would have likely been even higher if it were not for the fact that many of the fineline sherds are very small, making it difficult to determine what is depicted on them. In some cases, multiple sherds appear to be from the same vessel. Based on the color of the slip paints and the designs on the sherds, however, at least several different vessels are represented. No more than one figurative sherd was encountered in any other area excavated during the GAP, despite the fact that a significant number of fineline sherds were encountered from several of these areas. It is unclear why such a high proportion of fineline sherds and particularly figurative sherds were encountered within this moderate status household. Due to the fact that they were recovered from a midden, however, it is unlikely that the high proportion of fineline sherds adequately reflects the degree to which moderate status individuals at Galindo had access to this ware.

Faunal remains

The data for each context in the faunal analyses includes species richness and four attributes calculated for each taxon. These attributes were calculated from the original data obtained during the laboratory analyses.

Species richness is the total number of species encountered in a context. Taxa that could only be identified to the level of family or genus were only counted if no specimens in the sample could be identified to a particular genus within that family or species within that genus. The four attributes calculated for each taxon are Aggregate Minium Number of Individuals (MNI), Number of Individual Species Present (NISP), NISP percent, and NISP per hundred liters of excavated sediment.

It is very important to recognize that Aggregate MNI is not the same as MNI. The NISP of a particular context can be correctly ascertained by adding together the NISP of its constituent analytical units in the laboratory analysis (*i.e.*, provenience). In other words, the value derived by adding together the NISP of different proveniences is the same as the NISP of the combined remains from those proveniences. This is not the case, however, with MNI. The value derived by adding together the MNI of different proveniences is not always the same as the MNI of the combined remains from those proveniences (Grayson 1984). For example, if a provenience has 10 right-sided and 20 left-sided *Donax obesulus* shells, the MNI for that provenience is 20. If another provenience has 20 right-sided and 10 left-sided *Donax obesulus* shells, the MNI for that provenience is also 20. By adding these two values together, the Aggregate MNI is 40. If the remains in these proveniences had been combined before the laboratory analysis, however, there would be 30 right-sided and 30 left-sided shells, for a total MNI of 30. The total NISP for these proveniences is 60, however, regardless of how this value is derived. The faunal remains recovered during the GAP were not available during the data analysis phase of this study. It was therefore impossible to calculate the correct MNI values of the various contexts in the analyses. Aggregate MNI data is presented in this paper, however, as a means, albeit an imperfect one, to evaluate the degree to which divergent NISP values reflect natural site formation processes (*e.g.*, fragmentation) rather than cultural ones.

Due to the problems associated with Aggregate MNI, interpretations of faunal data in the following sections focus on NISP attributes. NISP percent is the NISP per taxon in each context divided by the total NISP for that context. NISP per hundred liters of excavated sediment is the NISP per taxon in each context divided by the number of liters of sediment excavated in that context multiplied by 100. The only reason for the multiplication by 100 was to eliminate decimals. For comparative purposes, NISP per liter and NISP per 100 liters are the same.

It should be noted that there are problems associated with the use of density measures such as NISP per liter for comparing the faunal and botanical remains from different contexts. The most significant problem is that density measures can be significantly affected by cultural and natural formation processes, most notably sedimentation rate. As a result, many archaeobotanists prefer to utilize ubiquity or presence measures when comparing botanical remains from different contexts. Such measures, however, have their own biases. According to Popper, this method for quantifying archaeobotanical data

> disregards the absolute count of a taxon (it assumes that the absolute counts of any particular taxon are too influenced by the degree of preservation to be meaningful) and instead looks at the number of samples in which the taxon appears within a group of samples. Each taxon is scored present or absent in each sample. The taxon is considered present whether the sample contains 1 remain of the taxon or 100, thereby giving the same weight to 1 or 100. The frequency score

> of a taxon is the number of samples in which the taxon is present expressed as a percentage of the total number of samples in the group.
>
> Popper 1988:60-61.

In discussing the problems of ubiquity measures, she states that one

> methodological problem that can skew frequency scores is having too few samples, which inflates frequency scores. For example, in a group of four samples the minimum presence of a taxon is 25%, while in a group of twenty samples the minimum presence is 5%. Comparing scores from the two groups can be misleading .
>
> *Ibid*.:63

Similarly, a "taxon whose 'real' presence is 10 percent cannot be properly assessed with less than 10 samples" (Hubbard 1976:160). Having few samples more severely skews frequency scores of rare taxa, so with few samples rare taxa should be excluded from analyses or interpreted with caution" (Popper 1988:63).The small number of samples in the present study makes this problem of far greater concern than the potential problems associated with cultural and natural formation processes.

There is a significant literature supporting the use of density measures of botanical remains from archaeological contexts. Pearsall states that

> [m]acroremain analyses should include counts and/or weights of recovered remains. . . . Counts or weights may add little new information to an analysis until converted into ratios. . . In a density ratio, the denominator is the total volume of soil processed to obtain the count or weight of botanical material of interest. In flotation analysis, for example, it is not uncommon to express seed, nut, or wood occurrence by count or weight per liter of soil (2010: 194; see also D'Andrea 1995; Miller and Smart 1984; Thompson 1996).

Popper has used counts per five liter flotation sample as the basis for ranking, which "aims to measure plant frequencies more precisely than ubiquity analysis by estimating and adjusting for noncultural sources of patterning" (1988: 64). Miller states that

> [o]ne of the most basic ratios for paleoethnobotanists is density, where the denominator (sometimes called the norming variable [Mueller, Schuessler, and Costner 1974]) is the total volume of the sediment sample from which the plant remains were extracted. Typically, the density is expressed as the number of charred items or the weight of the charred material in a given amount of sediment. It is largely a matter of convenience whether one uses count, weight, or some other unit of measurement. The basic assumption of density ratios is that all things being equal, larger sediment samples have more plant remains. By choosing volume of floated or processed sediment as the norming variable against which another variable can be measured, one can test the assumptions of uniform deposition, preservation, and recovery rates".
>
> Miller 1988:73.

In discussing comparability of data, Wagner states that the

> first problem is to quantify the amounts of plant remains in a manner that lends itself to comparison. The simplest method is to count and/or weigh plant remains by size and amount of matrix examined. The result can be ratios such as 20 seeds per

> liter of fill or X fragments of wood greater than 2 mm in size per liter of midden.
>
> Wagner 1988: 29.

Ford states that "[n]o discussion of samples of plant remains can ignore soil volume" (1988:216). Finally, density measures have been utilized in comparing botanical remains recovered from archaeological contexts on the north coast of Peru (Dionne 2002:72-80; Gumerman and Briceño 2003:221). The methods utilized in these studies are identical to those of the present study.

The problem of differential sedimentation has been mitigated in the present study by the manner in which the samples were taken. First, all of the soil samples in the comparisons below are from primary contexts (hearths and ash deposits). As primary contexts, these contexts did not contain any wall fall or general fill. As for the faunal data, only faunal data and soil volumes from undisturbed contexts are included. As a result, faunal remains and soil volumes of wall fall, a significant amount of which was excavated from the residences, are not included in the analyses. This is true of surface sediment as well. While differential sedimentation and other formation processes probably do have an effect on the soil volumes of these contexts, this effect is most likely not significant enough to lead to major differences in density measures, and interpretations are not made on the basis of subtle differences.

Invertebrate faunal remains (i.e., *crustaceans and molluscs)*

The remains of at least forty invertebrate species were recovered from Late Moche contexts during the GAP (Table 4). Some of these species could only be identified to the level of genus (*Balanus* sp., *Hypollobocera* sp., *Macrobrachium* sp., and *Tagelus* sp.). Nine of the species are crustaceans, nineteen are gastropods, nine are bivalves (Class Pelecypoda), and three are chitons (Class Polyplacophora).

The analysis of invertebrate remains recovered from different Late Moche contexts is presented in Table 5. This analysis demonstrates that species richness is greater in all three residential contexts than it is in the two civic/ceremonial contexts. In addition, species richness is progressively greater in higher status households. A chi-square analysis, which does not include the civic/ceremonial structures because they produced an expected value of less than one, indicates that the differences in species richness are highly significant (Table 5).

The expected values, however, indicate that species richness is higher than expected in moderate status households and lower than expected in elite households due to the disparity of the sample sizes. As a result, the data do not demonstrate that Late Moche elites had access to a greater variety of invertebrate species than other status groups at Galindo.

Taxon	Spanish Common Name*	Taxon	Spanish Common Name*
Phylum Arthropoda, Class Crustacea		Phylum Mollusca, Class Gastropoda (cont.)	
Balanus sp.	(percebe)	*Scurria parasitica*	-
Cancer polyodon	Cangrejo peludo	*Scutalus proteus*	Caracol de tierra
Chthomalus cirratus	-	*Tegula atra*	Caracol negro
Cycloxanthrops sexcedimdentalus	Cangrejito violáceo	*Thais chocolata*	Caracol común
Hepatus chilensis	Cangrejo de arena	*Thais haemastoma*	Caracol
Hypollobocera sp.	N/A	*Thais kiosquiformis*	-
Macrobrachium sp.	N/A	*Xanthochorus buxea*	-
Paraxanthus barbiger	(cangrejo)	Phylum Mollusca, Class Pelecypoda	
Platyxanthus orbignyi	Cangrejito violáceo	*Argopecten purpuratus*	Concha abanico
Phylum Mollusca, Class Gastropoda		*Donax obesulus*	Conchita
Bostryx turritus	-	*Mesodesma donacium*	Macha
Concholepas concholepas	Pata de burro	*Perumytilus purpuratus*	Chorito playero
Crepipatella dilatata	Pique	*Pholas chiloensis*	Alas de angel
Drymaeus tigris	-	*Protothaca thaca*	Almeja
Fissurella crassa	Lapa	*Semimytilus algosus*	Chorito playero
Fissurella limbata	Lapa	*Tagelus* sp.	N/A
Fissurella maxima	Lapa	*Trachycardium procerum*	Piconuda
Littorina peruviana	Caracolillo	Phylum Mollusca, Class Polyplacophora	
Mitra orientalis	-	*Acanthopleora echinata*	Barbón
Nassarius dentifer	-	*Chiton granosus*	Barquillo
Polinices uber	Caracol blanco	*Enoplochiton niger*	Barquillo
Prisogaster niger	Caracolito negro		

* *From Vásquez and Rosales (2002).*

Table 4: Invertebrate species encountered during the GAP.

Taxon	Aggregate MNI					NISP					NISP Percent					NISP Per 100 l		
	Low Status Res.	Mod. Status Res.	High Status Res.	Civic/ Cerem. (plat.)	Civic/ Cerem. (struct.)	Low Status Res.	Mod. Status Res.	High Status Res.	Civic/ Cerem. (plat.)	Civic/ Cerem. (struct.)	Low Status Res.	Mod. Status Res.	High Status Res.	Civic/ Cerem. (plat.)	Civic/ Cerem. (struct.)	Low Status Res.	Mod. Status Res.	High Status Res.
Phylum Arthropoda																		
Class Crustacea																		
Balanus sp.	0	0	3	0	0	0	0	4	0	0	0.0%	0.0%	0.1%	0.0%	0.0%	0.00	0.00	0.09
Cancer polyodon	0	1	1	0	0	0	1	1	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.02
Chthomalus cirratus	2	0	33	0	0	2	0	33	0	0	0.1%	0.0%	0.5%	0.0%	0.0%	0.04	0.00	0.73
Cycloxanthrops sexcedimdentalus	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Hepatus chilensis	0	1	1	0	0	0	1	1	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.02
Hypollobocera sp.	4	7	4	2	2	17	22	4	1	3	0.8%	2.3%	0.1%	0.2%	3.9%	0.30	0.68	0.09
Macrobrachium sp.	0	0	1	0	0	0	0	1	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.00	0.00	0.02
Paraxanthus barbiger	1	1	4	0	0	1	1	7	0	0	0.0%	0.1%	0.1%	0.0%	0.0%	0.02	0.03	0.15
Platyxanthus orbignyi	9	13	14	2	1	17	46	25	5	1	0.8%	4.8%	0.3%	1.1%	1.3%	0.30	1.41	0.55
Crustacea n.d.	1	0	0	0	0	2	0	0	0	0	0.1%	0.0%	0.0%	0.0%	0.0%	0.04	0.00	0.00
Phylum Mollusca																		
Class Gastropoda																		
Bostryx turritus	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Concholepas concholepas	0	2	0	0	0	0	2	0	0	0	0.0%	0.2%	0.0%	0.0%	0.0%	0.00	0.06	0.00
Crepipatella dilatata	0	0	1	0	0	0	0	1	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.00	0.00	0.02
Drymaeus tigris	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Fissurella crassa	3	6	7	0	1	3	10	10	0	1	0.1%	1.1%	0.1%	0.0%	1.3%	0.05	0.31	0.22
Fissurella limbata	3	0	8	2	0	3	0	16	0	2	0.1%	0.0%	0.2%	0.0%	2.6%	0.05	0.00	0.35
Fissurella maxima	2	2	5	0	0	3	3	28	0	0	0.1%	0.3%	0.4%	0.0%	0.0%	0.05	0.09	0.62
Fissurella sp.	0	0	1	0	0	0	0	1	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.00	0.00	0.02
Littorina peruviana	0	0	1	0	0	0	0	1	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.00	0.00	0.02
Mitra orientalis	0	0	4	0	0	0	0	4	0	0	0.0%	0.0%	0.1%	0.0%	0.0%	0.00	0.00	0.09
Nassarius dentifer	0	1	6	0	0	0	1	6	0	0	0.0%	0.1%	0.1%	0.0%	0.0%	0.00	0.03	0.13
Polinices uber	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Prisogaster niger	9	34	64	1	0	9	35	83	1	0	0.4%	3.7%	1.1%	0.2%	0.0%	0.16	1.07	1.83
Scurria parasitica	0	0	1	0	0	0	0	1	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.00	0.00	0.02
Scutalus proteus	52	132	160	27	3	106	340	405	49	15	5.3%	35.8%	5.6%	10.8%	19.7%	1.90	10.44	8.92
Tegula atra	30	115	119	10	12	44	216	225	12	20	2.2%	22.7%	3.1%	2.6%	26.3%	0.79	6.63	4.96
Thais chocolata	4	20	26	5	0	4	26	39	3	3	0.2%	2.7%	0.5%	0.7%	3.9%	0.07	0.80	0.86
Thais haemastoma	24	17	62	2	4	27	37	82	4	6	1.3%	3.9%	1.1%	0.9%	7.9%	0.48	1.14	1.81
Thais kiosquiformis	1	1	4	0	0	1	1	4	0	0	0.0%	0.1%	0.1%	0.0%	0.0%	0.02	0.03	0.09
Thais sp.	0	1	1	0	0	0	1	1	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.02
Xanthochorus buxea	2	2	3	0	0	2	2	3	0	0	0.1%	0.2%	0.0%	0.0%	0.0%	0.04	0.06	0.07
Class Pelecypoda																		
Argopecten purpuratus	0	1	1	0	0	0	1	1	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.02
Donax obesulus	699	46	2075	170	0	1678	102	5932	353	15	83.8%	10.7%	81.4%	77.6%	19.7%	30.08	3.13	130.65
Mesodesma donacium	3	16	38	5	0	6	47	137	15	0	0.3%	4.9%	1.9%	3.3%	0.0%	0.11	1.44	3.02
Perumytilus purpuratus	13	20	37	6	0	18	26	57	8	0	0.9%	2.7%	0.8%	1.8%	0.0%	0.32	0.80	1.26
Pholas chiloensis	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Protothaca thaca	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Semimytilus algosus	8	4	53	0	4	11	9	131	0	9	0.5%	0.9%	1.8%	0.0%	11.8%	0.20	0.28	2.89
Tagelus sp.	0	0	0	0	1	0	0	0	0	1	0.0%	0.0%	0.0%	0.0%	1.3%	0.00	0.00	0.00
Trachycardium procerum	0	0	1	0	0	0	0	1	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.00	0.00	0.02
Class Polyplacophora																		
Acanthopleora echinata	5	6	2	2	0	8	6	3	2	0	0.4%	0.6%	0.0%	0.4%	0.0%	0.14	0.18	0.07
Chiton granosus	1	0	2	0	0	1	0	2	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.02	0.00	0.04
Enoplochiton niger	16	3	16	1	0	33	3	28	1	0	1.6%	0.3%	0.4%	0.2%	0.0%	0.59	0.09	0.62
Chitonidae n.d.	1	0	0	0	0	1	0	0	0	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.02	0.00	0.00
Mollusk n.d.	5	5	6	1	0	5	5	7	1	0	0.2%	0.5%	0.1%	0.2%	0.0%	0.09	0.15	0.15
TOTALS	**898**	**463**	**2765**	**236**	**28**	**2002**	**950**	**7285**	**455**	**76**	**100%**	**100%**	**100%**	**100%**	**100%**	**35.88**	**29.16**	**160.44**
ACTUAL RICHNESS (total=40)	**21**	**29**	**32**	**12**	**11**	**21**	**29**	**32**	**12**	**11**								
EXPECTED RICHNESS	**19.39**	**10.38**	**59.00**	**5.23**		**17.63**	**8.53**	**63.77**	**4.07**									
Chi-square		**55.8362**					**81.7361**											
p-value		**0.0000**					**0.0000**											

Table 5: Invertebrate faunal data from Late Moche contexts at Galindo.

The total NISP per hundred liters of excavated sediment in high status households is over four times greater than it is in low status residences (160.44 vs. 35.88). This indicates that Late Moche elites had access to and consumed greater quantities of invertebrate species than people of low status at Galindo. Interestingly, the total NISP per hundred liters of excavated sediment in low status households is greater than that of moderate status residences (35.88 vs. 29.16). NISP per hundred liters of excavated sediment of individual taxa indicates that several marine species, including *Prisogaster niger*, *Tegula atra*, *Thais haemastoma*, *Mesodesma donacium*, *Perumytilus purpuratus*, *Semimytilus algosus*, and especially *Donax obesulus*, are more frequent in high status households than they are in low status residences. The terrestrial gastropod *Scutalus proteus* is also more frequent in high status households than it is in low status residences. This indicates that Late Moche elites had access to and consumed greater quantities of both marine and terrestrial invertebrates than people of low status at Galindo.

With the exception of *Tegula atra* and *Donax obesulus*, all of the marine species listed above are also more frequent in moderate status households than they are in low status residences, and less frequent than in high status households. *Tegula atra* is more frequent and *Donax obesulus* is less frequent in moderate status households than they are in both low and high status residences. The terrestrial gastropod *Scutalus proteus* is also more frequent in moderate status households than it is in both low and high status residences. The reason for this pattern is unclear. It may be the result of the fact that most of the invertebrate remains from the moderate status households came from a midden in Structure 52. Many of the invertebrate remains from the low and high status households, on the other hand, came from food preparation areas (*i.e.*, kitchens).

Vertebrate faunal remains (i.e., *mammals, fish, and birds)*

The remains of at least fifteen vertebrate species were recovered from Late Moche contexts during the GAP (Table 6). Some of these species could only be identified to the level of genus (*Otaria* sp., *Lama* sp., and *Larus* sp.) or family (Crecetidae). Six of the species are mammals, six are fish, and three are birds. The fish species come from two different classes (Chondrichthyes and Osteichthyes).

Taxon	English Common Name	Spanish Common Name*
Class Mammalia		
Canis familiaris	Dog	Perro
Cavia porcellus	Guinea pig	Cuy
Lama sp.	Llama/alpaca	Llama/alpaca
Odocoileus virginianus	White-tailed deer	Venado cola blanca
Otaria sp.	Sea lion	Lobo marino
Cricetidae n.d.	field mouse	Ratones de campo
Class Chondrichthyes		
Galeorhinus sp.	dogfish	Cazón
Rhinobatos planiceps	Pacific guitarfish	Guitarra
Class Osteichthyes		
Anisotremus scapularis	N/A	Chita
Cheilodactylus variegatus	Peruvian morwong	Pintadilla
Galeichthys peruvianus	Peruvian sea catfish	Bagre
Sciaena deliciosa	croaker	Lorna
Class Aves		
Dives dives	Melodious blackbird	Tordo
Larus sp.	gull	Gaviota
Phalacrocorax bougainvillei	Guanay cormorant	Guanay

* *From Vásquez and Rosales (2002).*

Table 6: Vertebrate species encountered during the GAP.

The analysis of vertebrate faunal remains from different Late Moche contexts is presented in Table 7. This analysis demonstrates that moderate status households have the highest species richness, followed by high status residences. Low status households and civic/ceremonial platform and plaza contexts have the same species richness, followed by civic/ceremonial structures other than platforms.

A chi-square analysis, which does not include civic/ceremonial structures because they produced an expected value of less than one, indicates that the differences in species richness are not very significant (Table 7). As a result, the data do not demonstrate that Late Moche elites had access to a greater variety of vertebrate faunal species than people of low status at Galindo.

Taxon	Aggregate MNI					NISP					NISP Percent					NISP Per 100 Liters		
	Low Status Res.	Mod. Status Res.	High Status Res.	Civic/ Cerem. (plat.)	Civic/ Cerem. (struct.)	Low Status Res.	Mod. Status Res.	High Status Res.	Civic/ Cerem. (plat.)	Civic/ Cerem. (struct.)	Low Status Res.	Mod. Status Res.	High Status Res.	Civic/ Cerem. (plat.)	Civic/ Cerem. (struct.)	Low Status Res.	Mod. Status Res.	High Status Res.
Class Mammalia																		
Canis familiaris	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Cavia porcellus	0	11	13	0	0	0	20	35	0	0	0.0%	3.0%	5.5%	0.0%	0.0%	0.00	0.61	0.77
Lama sp.	12	27	40	7	2	42	602	510	107	11	8.1%	89.7%	79.7%	55.4%	35.5%	0.75	18.48	11.23
Odocoileus virginianus	0	0	0	7	1	0	0	0	49	1	0.0%	0.0%	0.0%	25.4%	3.2%	0.00	0.00	0.00
Otaria sp.	0	0	0	1	0	0	0	0	2	0	0.0%	0.0%	0.0%	1.0%	0.0%	0.00	0.00	0.00
Cricetidae n.d.	1	1	5	2	1	3	1	21	2	9	0.6%	0.1%	3.3%	1.0%	29.0%	0.05	0.03	0.46
Marine Mammal n.d.	0	1	0	0	0	0	7	0	0	0	0.0%	1.0%	0.0%	0.0%	0.0%	0.00	0.21	0.00
Mammalia n.d.	21	3	10	10	3	472	6	61	33	10	90.8%	0.9%	9.5%	17.1%	32.3%	8.46	0.18	1.34
Class Chondrichthyes																		
Galeorhinus sp.	0	1	0	0	0	0	1	0	0	0	0.0%	0.1%	0.0%	0.0%	0.0%	0.00	0.03	0.00
Rhinobatos planiceps	0	1	0	0	0	0	3	0	0	0	0.0%	0.4%	0.0%	0.0%	0.0%	0.00	0.09	0.00
Class Osteichthyes																		
Anisotremus scapularis	0	1	1	0	0	0	1	1	0	0	0.0%	0.1%	0.2%	0.0%	0.0%	0.00	0.03	0.02
Cheilodactylus variegatus	0	0	2	0	0	0	0	2	0	0	0.0%	0.0%	0.3%	0.0%	0.0%	0.00	0.00	0.04
Galeichthys peruvianus	0	0	2	0	0	0	0	2	0	0	0.0%	0.0%	0.3%	0.0%	0.0%	0.00	0.00	0.04
Sciaena deliciosa	0	0	2	0	0	0	0	3	0	0	0.0%	0.0%	0.5%	0.0%	0.0%	0.00	0.00	0.07
Fish n.d.	1	0	1	0	0	1	0	1	0	0	0.2%	0.0%	0.2%	0.0%	0.0%	0.02	0.00	0.02
Class Aves																		
Dives dives	0	1	1	0	0	0	1	1	0	0	0.0%	0.1%	0.2%	0.0%	0.0%	0.00	0.03	0.02
Lanus sp.	0	2	0	0	0	0	2	0	0	0	0.0%	0.3%	0.0%	0.0%	0.0%	0.00	0.06	0.00
Phalacrocorax bougainvillei	0	6	1	0	0	0	24	1	0	0	0.0%	3.6%	0.2%	0.0%	0.0%	0.00	0.74	0.02
Ave n.d.	2	1	2	0	0	2	2	2	0	0	0.4%	0.3%	0.3%	0.0%	0.0%	0.04	0.06	0.04
TOTALS	37	57	80	27	7	520	671	640	193	31	100%	100%	100%	100%	100%	9.32	20.60	14.10
ACTUAL RICHNESS (total=15)	4	11	9	4	3	4	11	9	4	3								
EXPECTED RICHNESS (total=15)	5.32	8.82	11.54	4.02	1.30	7.15	9.31	8.86	2.69	-								
Chi-square			4.2077				2.3711											
p-value			0.3786				0.499											

Table 7: Vertebrate faunal data from Late Moche contexts at Galindo.

The total NISP per hundred liters of excavated sediment in high status households is considerably higher than in low status residences (14.1 vs. 9.32). These data indicate that Late Moche elites had greater access to vertebrate species than people of low status at Galindo. Moderate status households, however, have a greater total NISP per hundred liters of excavated sediment (20.6 vs. 14.1) than high status residences. NISP per hundred liters of excavated sediment of individual taxa indicates that guinea pig remains are progressively more frequent in higher status households, and Camelid remains are more frequent in high status than in low status residences. This suggests that, not surprisingly, Late Moche elites had greater access to domesticated animals than people of low status at Galindo. Camelid remains are more frequent in moderate status households, however, than they are in high status residences. The reason for this is unknown. It may be the result of the differences discussed above between the moderate and high status residential contexts excavated during the GAP.

Botanical remains from soil samples

A total of thirty taxa of plants were identified from soil samples from Late Moche residential contexts that were analyzed as part of the GAP (Table 8). Some of the botanical remains could be identified to the level of species, while others could only be identified to the level of genus or family. In the following analyses, the identified taxa are divided into six plant types. These are cereals, fleshy fruits, herbaceous plants, industrial plants, legumes, and other. The plants classified as herbaceous were most likely utilized in several different ways, including as food, culinary herbs, and in medicines (Sagastegui 1973; Towle 1961).

Type	Family	Genus/species	English Common Name	Spanish Common Name
Cereal	Poaceae (Grass)	*Zea mays*	Maize or corn	Maíz
Fleshy fruit	Cactaceae (Cactus)	(Cactaceae)	Cactus Family	
Fleshy fruit	Cucurbitaceae (Gourd)	*Cucurbita moschata*	Crookneck squash	Calabaza
Fleshy fruit	Myrtaceae (Myrtle)	*Psidium guajava*	Guava	Guayaba
Fleshy fruit	Sapotaceae (Sapodilla)	*Pouteria lucuma*	Lúcuma	Lúcuma
Fleshy fruit	Solanaceae (Nightshade)	*Capsicum* sp.	Chili pepper	Ají
Fleshy fruit	Solanaceae (Nightshade)	*Physalis peruviana*	Goldenberry	Capulí
Herbaceous plant	Aizoaceae (Carpetweed)	*Trianthema portulacastrum*	Desert horse-purslane	Verdolaga
Herbaceous plant	Amaranthaceae (Amaranth)	*Amaranthus* sp.	Amaranth	Bledos
Herbaceous plant	Asteraceae (Sunflower)	(Asteraceae)	Sunflower Family	
Herbaceous plant	Asteraceae (Sunflower)	*Ambrosia* sp.	Ragweed	Ambrosía
Herbaceous plant	Euphorbiaceae (Euphorbia)	*Euphorbia* sp.	(varies by species)	(varies by species)
Herbaceous plant	Malvaceae (Mallow)	*Malva* sp.	Mallow	Malva
Herbaceous plant	Papaveraceae (Poppy)	(Papaveraceae)	Poppy Family	
Herbaceous plant	Plantaginaceae (Plantain)	*Plantago* sp.	Plantain	Plátano
Herbaceous plant	Poaceae (Grass)	(Poaceae)	Grass Family	
Herbaceous plant	Poaceae (Grass)	*Cenchrus echinatus*	Southern sandbur	Pega pega
Herbaceous plant	Portulacaceae (Purslane)	*Portulaca oleracea*	Common purslane	Verdolaga
Herbaceous plant	Solanaceae (Nightshade)	(Solanaceae)	Nightshade Family	
Herbaceous plant	Verbenaceae (Verbena)	*Phyla canescens*	Fog fruit	Turre hembra
Herbaceous plant	Verbenaceae (Verbena)	*Verbena* sp.	Verbena	Verbena
Industrial plant	Cucurbitaceae (Gourd)	*Lagenaria siceraria*	Gourd	Mate
Industrial plant	Cyperaceae (Sedge)	*Cyperus farex*	Bulrush	Junco
Industrial plant	Malvaceae (Mallow)	*Gossypium* sp.	Cotton	Algodón
Legume	Fabaceae (Pea)	*Arachis hypogaea*	Peanut	Maní
Legume	Fabaceae (Pea)	*Fabacea* sp.	Fabacea	Fabacea
Legume	Fabaceae (Pea)	*Phaseolus lunatus*	Lima bean	Pallar
Legume	Fabaceae (Pea)	*Phaseolus vulgaris*	Common bean	Frejol
Legume	Fabaceae (Pea)	*Prosopis chilensis*	Chilean mesquite	Algarroba
Other	Erythroxylaceae (Coca)	*Erythroxylon* sp.	Coca	Coca

Table 8: Botanical taxa encountered during the GAP.

As a woody-stemmed plant that does not fit in any of the above categories, coca (*Erythroxylum* sp.) was classified as other. It should be noted that some species could be classified in more than one category. For example, chili pepper is a fleshy fruit. As a member of the Nightshade family (Solanaceae), however, it could also be classified as a herbaceous plant. Another example is amaranth, a herbaceous plant that yields an edible seed that, in terms of its culinary uses, resembles a grain. Amaranth is not believed to have been domesticated in Peru, however, but instead collected in the wild.

The first stage in the data analysis of the botanical remains recovered from soil samples was the consolidation of the original data into a usable format. First, all unidentified remains were excluded from the analysis. This includes specimens that compare favorably with, but could not be definitively identified as, a particular taxon. Next, the number of complete plant parts (*i.e.*, whole seeds) was combined with the number of fragmentary plant parts for each taxon. These totals are presented as the NISP per plant part for each taxon. The data from the quarter inch and eighth inch fractions was combined, as was the data from the 1.0 and 0.5 mm fractions. These data were combined because they share the same sample volumes. The quarter and eighth inch data could not be

combined with the 1.0 and 0.5 millimeter data, however, as the sample volumes of the former are not the same as those of the latter. The botanical remains from the quarter and eighth inch fractions are presented as large macro-botanical data. The botanical remains from the 1.0 and 0.5 millimeter fractions are presented as small macro-botanical data. The final stage in the data analysis involved combining the data from individual soil samples from similar contexts into two separate analyses.

Each analysis includes species richness and three attributes calculated for each plant part of each taxon. These are the NISP, NISP percent, and NISP per hundred liters of sediment. For the large macro-botanical remains (*i.e.*, quarter and eighth inch fractions), the volume of sediment used to calculate the latter is the total volume of the soil samples. For the small macro-botanical remains (*i.e.*, 1.0 and 0.5 millimeter fractions), the volume of sediment for each of the soil samples is one liter. These attributes were also calculated as subtotals for each plant type. Richness average was also included in the analyses due to the disparity in the number of samples in each context.

Large macro-botanical remains

The analysis of large macro-botanical remains from soil samples recovered from different Late Moche contexts is presented in Table 9. A comparison of the NISP per hundred liters of sediment of each plant type is also graphically illustrated in Figure 7. This analysis indicates that every plant type is more frequent in the high status households than in the low status residences. The most dramatic differences are in maize, cotton, and algarroba. Maize is over nine times more frequent and cotton is over ten times more frequent in the high status households than in the low status residences. Algarroba seeds are relatively frequent in the high status households, but completely absent in the low status residences. Although not very frequent in the high status households, fleshy fruits are virtually absent and herbaceous taxa are completely absent in the low status residences. Although it is not frequent in any context, coca (*Erythroxylum* sp.) is present in the high status households, but completely absent in all other contexts. This is significant because ethnohistoric documents indicate that coca had a ritual function in prehispanic Andean societies. Maize, herbaceous plants, and legumes are more frequent in the civic/ceremonial ash deposits than in the high status households. Interestingly, chili peppers are present in the civic/ceremonial ash deposits, but absent in the high status and low status households. Fleshy fruits are absent in the civic/ceremonial ash deposits, and cotton is more frequent than in the low status households, but less frequent than in the high status residences.

Type/Taxon	NISP			NISP Percent			NISP Per 100 L		
	Moche Low Status Hearths	Moche High Status Hearths	Moche Civ./Cerem. Ash Dep.	Moche Low Status Hearths	Moche High Status Hearths	Moche Civ./Cerem. Ash Dep.	Moche Low Status Hearths	Moche High Status Hearths	Moche Civ./Cerem. Ash Dep.
Cereals									
Zea mays cob	0	4	1	0.0%	0.9%	1.2%	0	9	17
Zea mays cupule	1	120	33	4.3%	27.5%	38.4%	8	284	550
Zea mays embryo	0	3	1	0.0%	0.7%	1.2%	0	7	17
Zea mays kernel	7	116	15	30.4%	26.5%	17.4%	56	274	250
Zea mays part	0	8	0	0.0%	1.8%	0.0%	0	19	0
Subtotal	**8**	**251**	**50**	**34.8%**	**57.4%**	**58.1%**	**64**	**593**	**833**
Fleshy Fruits									
Capsicum sp.	0	0	3	0.0%	0.0%	3.5%	0	0	50
Cucurbita moschata	0	3	0	0.0%	0.7%	0.0%	0	7	0
Cucurbita sp.	0	7	0	0.0%	1.6%	0.0%	0	17	0
Physalis peruviana	0	2	0	0.0%	0.5%	0.0%	0	5	0
Pouteria lucama testa	0	3	0	0.0%	0.7%	0.0%	0	7	0
Psidium guajava	1	8	0	4.3%	1.8%	0.0%	8	19	0
Subtotal	**1**	**23**	**3**	**4.3%**	**5.3%**	**3.5%**	**8**	**54**	**50**
Herbaceous plant									
Poaceae	0	2	0	0.0%	0.5%	0.0%	0	5	0
Solanaceae	0	1	0	0.0%	0.2%	0.0%	0	2	0
Ambrosia sp.	0	3	0	0.0%	0.7%	0.0%	0	7	0
Cenchrus echinatus	0	0	2	0.0%	0.0%	2.3%	0	0	33
Subtotal	**0**	**6**	**2**	**0.0%**	**1.4%**	**2.3%**	**0**	**14**	**33**
Industrial plant									
Gossypium sp.	3	114	7	13.0%	26.1%	8.1%	24	270	117
Lagenaria siceraria	2	2	0	8.7%	0.5%	0.0%	16	5	0
Subtotal	**5**	**116**	**7**	**21.7%**	**26.5%**	**8.1%**	**40**	**274**	**117**
Legumes									
Arachis hypogaea pod	3	0	0	13.0%	0.0%	0.0%	24	0	0
Fabacea sp.	1	0	0	4.3%	0.0%	0.0%	8	0	0
Phaseolus lunatus	0	1	0	0.0%	0.2%	0.0%	0	2	0
Phaseolus vulgaris	5	7	6	21.7%	1.6%	7.0%	40	17	100
Prosopis chilensis	0	27	18	0.0%	6.2%	20.9%	0	64	300
Subtotal	**9**	**35**	**24**	**39.1%**	**8.0%**	**27.9%**	**72**	**83**	**400**
Other									
Erythroxylum sp.	0	6	0	0.0%	1.4%	0.0%	0	14	0
TOTALS	**23**	**437**	**86**	**100%**	**100%**	**100%**	**112**	**950**	**1033**
RICHNESS (total=18)	**7**	**14**	**6**						
RICHNESS AVERAGE	**4**	**7**	**4**						

Note: Plant parts are seeds unless otherwise noted.

Table 9: Large macro-botanical data (quarter and eighth inch fractions) from soil samples recovered from Late Moche contexts at Galindo.

Small macro-botanical remains

The analysis of small macro-botanical remains from soil samples recovered from different Late Moche contexts is presented in Table 10. A comparison of the NISP per hundred liters of sediment of each plant type is also graphically illustrated in Figure 8. As is the case for the large macro-botanical remains, maize and herbaceous plants are significantly more frequent in the high status households than they are in the low status residences. Coca is again present in the high status households but absent in all other contexts. Coca is even less frequent in the smaller fractions, however, than it is in the larger fractions. Cactus, golden berry (*Physalis peruviana*), and especially guava, are all frequent in the high status households but completely absent in the low status residences. Cotton is also frequent in the high status households, but absent in the low status residences. Contrary to in the larger fractions, legumes are slightly more common in the low status households. Herbaceous plants are over seven times more frequent in the civic/ceremonial ash deposits than in the high status households. Chili peppers are again present in the civic/ ceremonial ash deposits, but absent in all other contexts. All other plant types are more frequent in the civic/ceremonial ash deposits than they are in the low status households, but less frequent than in the high status residences.

Type/Taxon	NISP			NISP Percent			NISP Per 100 L		
	Moche Low Status Hearths	Moche High Status Hearths	Moche Civ./Cerem. Ash Dep.	Moche Low Status Hearths	Moche High Status Hearths	Moche Civ./Cerem. Ash Dep.	Moche Low Status Hearths	Moche High Status Hearths	Moche Civ./Cerem. Ash Dep.
Cereals									
Zea mays cob	0	1	0	0.0%	0.4%	0.0%	0	25	0
Zea mays cupule	6	41	40	22.2%	16.1%	14.7%	300	1025	2000
Zea mays embryo	2	17	5	7.4%	6.7%	1.8%	100	425	250
Zea mays kernel	0	1	1	0.0%	0.4%	0.4%	0	25	50
Zea mays part	1	63	9	3.7%	24.8%	3.3%	50	1575	450
Subtotal	**9**	**123**	**55**	**33.3%**	**48.4%**	**20.2%**	**450**	**3075**	**2750**
Fleshy Fruits									
Cactaceae	0	4	0	0.0%	1.6%	0.0%	0	100	0
Capsicum sp.	0	0	7	0.0%	0.0%	2.6%	0	0	350
Physalis peruviana	0	12	20	0.0%	4.7%	7.4%	0	300	1000
Psidium guajava	0	29	0	0.0%	11.4%	0.0%	0	725	0
Subtotal	**0**	**45**	**27**	**0.0%**	**17.7%**	**9.9%**	**0**	**1125**	**1350**
Herbaceous plant									
Asteraceae	0	1	10	0.0%	0.4%	3.7%	0	25	500
Papaveraceae	1	0	1	3.7%	0.0%	0.4%	50	0	50
Poaceae	0	2	1	0.0%	0.8%	0.4%	0	50	50
Solanaceae	0	6	0	0.0%	2.4%	0.0%	0	150	0
Amaranthus sp.	4	14	21	14.8%	5.5%	7.7%	200	350	1050
Euphorbia sp.	0	1	0	0.0%	0.4%	0.0%	0	25	0
Malva sp.	4	6	121	14.8%	2.4%	44.5%	200	150	6050
Phyla canescens	0	3	0	0.0%	1.2%	0.0%	0	75	0
Plantago sp.	0	0	12	0.0%	0.0%	4.4%	0	0	600
Portulaca oleracea	0	10	0	0.0%	3.9%	0.0%	0	250	0
Trianthema portulacastrum	1	4	11	3.7%	1.6%	4.0%	50	100	550
Verbena sp.	0	0	1	0.0%	0.0%	0.4%	0	0	50
Subtotal	**10**	**47**	**178**	**37.0%**	**18.5%**	**65.4%**	**500**	**1175**	**8900**
Industrial plant									
Cyperus farex	0	1	0	0.0%	0.4%	0.0%	0	25	0
Gossypium sp.	0	24	8	0.0%	9.4%	2.9%	0	600	400
Subtotal	**0**	**25**	**8**	**0.0%**	**9.8%**	**2.9%**	**0**	**625**	**400**
Legumes									
Fabacea sp.	6	9	1	22.2%	3.5%	0.4%	300	225	50
Phaseolus vulgaris	0	0	3	0.0%	0.0%	1.1%	0	0	150
Prosopis chilensis	2	3	0	7.4%	1.2%	0.0%	100	75	0
Subtotal	**8**	**12**	**4**	**29.6%**	**4.7%**	**1.5%**	**400**	**300**	**200**
Other									
Erythroxylum sp.	0	2	0	0.0%	0.8%	0.0%	0	50	0
TOTALS	**27**	**254**	**272**	**100%**	**100%**	**100%**	**1350**	**6350**	**13600**
RICHNESS (total=23)	**7**	**18**	**14**						
RICHNESS AVERAGE	**4.5**	**9.75**	**10.5**						

Note: Plant parts are seeds unless otherwise noted.

Table 10: Small macro-botanical data (1.0 and 0.5 mm fractions) from soil samples recovered from Late Moche contexts at Galindo.

Summary

The analysis of the botanical remains from different Late Moche contexts indicates that elites had increased access to maize, fruits, herbaceous plants, and cotton. Increased access to cotton suggests that Galindo elites may have had control over the production and distribution of this plant, which was used to make textiles. Elites may have also had sole access to coca, which was used in a variety of rituals in Andean history. Herbaceous plants are more common in the civic/ceremonial ash deposits in the Huaca de las Abejas, which may indicate that many of these plants were used in rituals that were performed at the huaca. Interestingly, chili peppers are present, albeit not frequent, only in the civic/ceremonial ash deposits. This may indicate that the chili peppers were tightly controlled by Galindo elites and only consumed at civic/ceremonial structures, most likely during feasts and/or rituals. All of these interpretations,

however, are at present tentative due to the small number of samples in the analyses. Samples from only three low status residential contexts (a hearth, an ash deposit, and fill on top of the floor of a storage bin), five high status residential contexts (two hearths, two ash deposits, and the floor of a storage bin), and two ash deposits in civic/ceremonial contexts were fully analyzed, and the two floor context samples contained only a single identifiable seed each and are excluded from the analyses above. Together, these samples provide valuable evidence concerning the plants that were utilized at Galindo during the Moche Period. Due to the small number of samples, however, these interpretations should be regarded as hypotheses for further testing.

Conclusion

The above analyses of different Late Moche contexts provide important information concerning the resources to which Galindo elites had differential access, although additional testing would be required to draw firm conclusions regarding the faunal and, especially, the botanical remains. Bawden's investigation reveals that Galindo's Late Moche elites had sole access to silver and increased access to fineware ceramics. Although no silver was recovered during the GAP, the results of this project confirm that Galindo elites had increased access to a specific kind of fine-ware ceramics– Moche finelines. The results of the GAP also indicate that Galindo elites had increased access to marine and terrestrial invertebrate species. They also appear to have had increased access to vertebrate species, especially Camelids and guinea pigs. Botanical remains recovered from different Late Moche contexts excavated during the GAP suggest that Galindo elites had increased access to all of the plants identified in the analyses, with the exception of legumes. Most significant is their apparent increased access to maize and cotton and sole access to coca. Increased access to maize is significant because it was the principal plant domesticate of the Moche, and increased access to cotton is noteworthy because it was used to make textiles. Finally, sole access to coca is significant because it is known to have been used for ritual purposes by prehispanic Andean societies, including the Moche.

The above interpretations concerning the food resources to which Galindo elites had increased access pose an important question. If Late Moche elites had increased access to all of the food resources listed above, than what were people of low status at Galindo eating? One solution to this problem is that they were consuming resources that do not preserve well in the archaeological record. An alternative explanation is that the low status contexts upon which the analyses are based are somehow unrepresentative of the diet of the people who utilized them. For example, the low status hearths may have been more thoroughly cleaned before they fell into disuse than the high status contexts. It should be noted that only three low status contexts are represented in the soil samples that were fully analyzed during the GAP, and only two of these are hearths. The faunal remains from low status contexts are more comprehensive. The above interpretations concerning elite's increased access to invertebrate species and domesticated animals are therefore more significant than those concerning elite's increased access to various plants. In all probability, Galindo elites did have increased access to animal protein during the Moche Period, and people of low status were forced to rely more heavily on plant foods.

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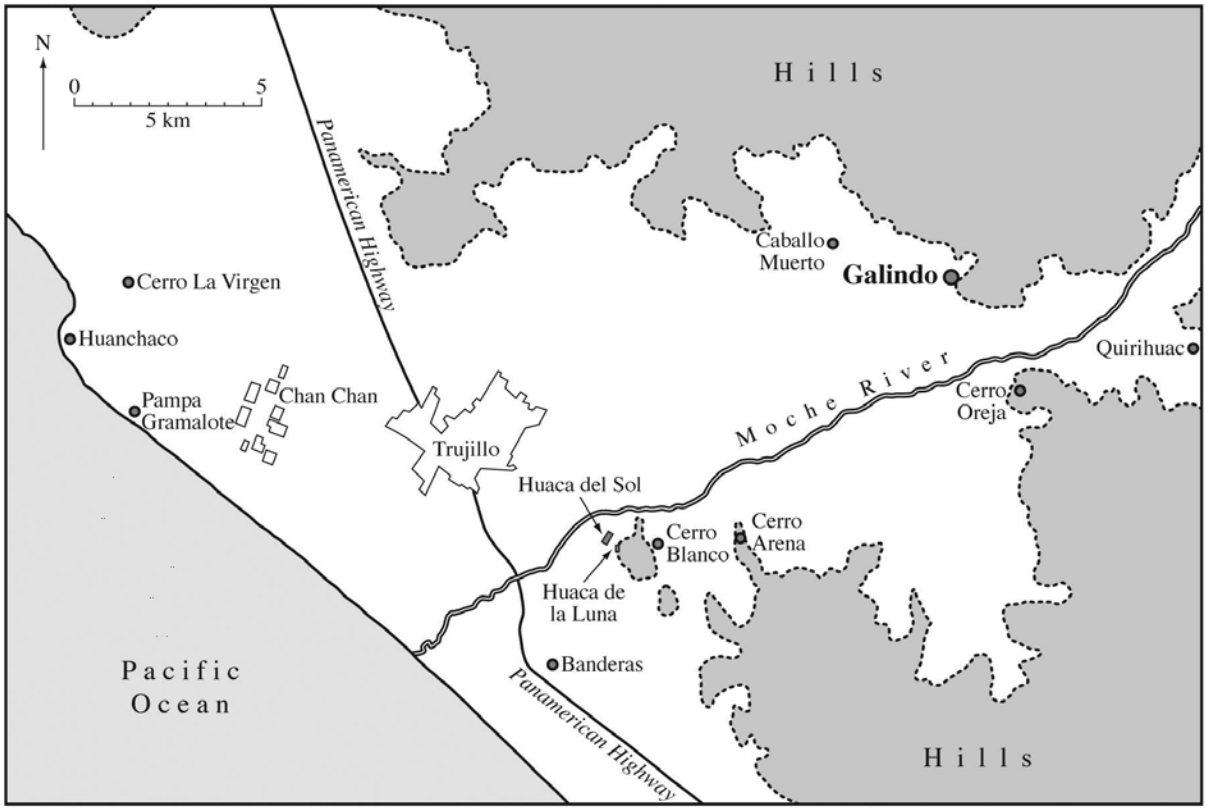

Figure 1: Galindo in relation to other principal archaeological sites in the Moche Valley, Peru.

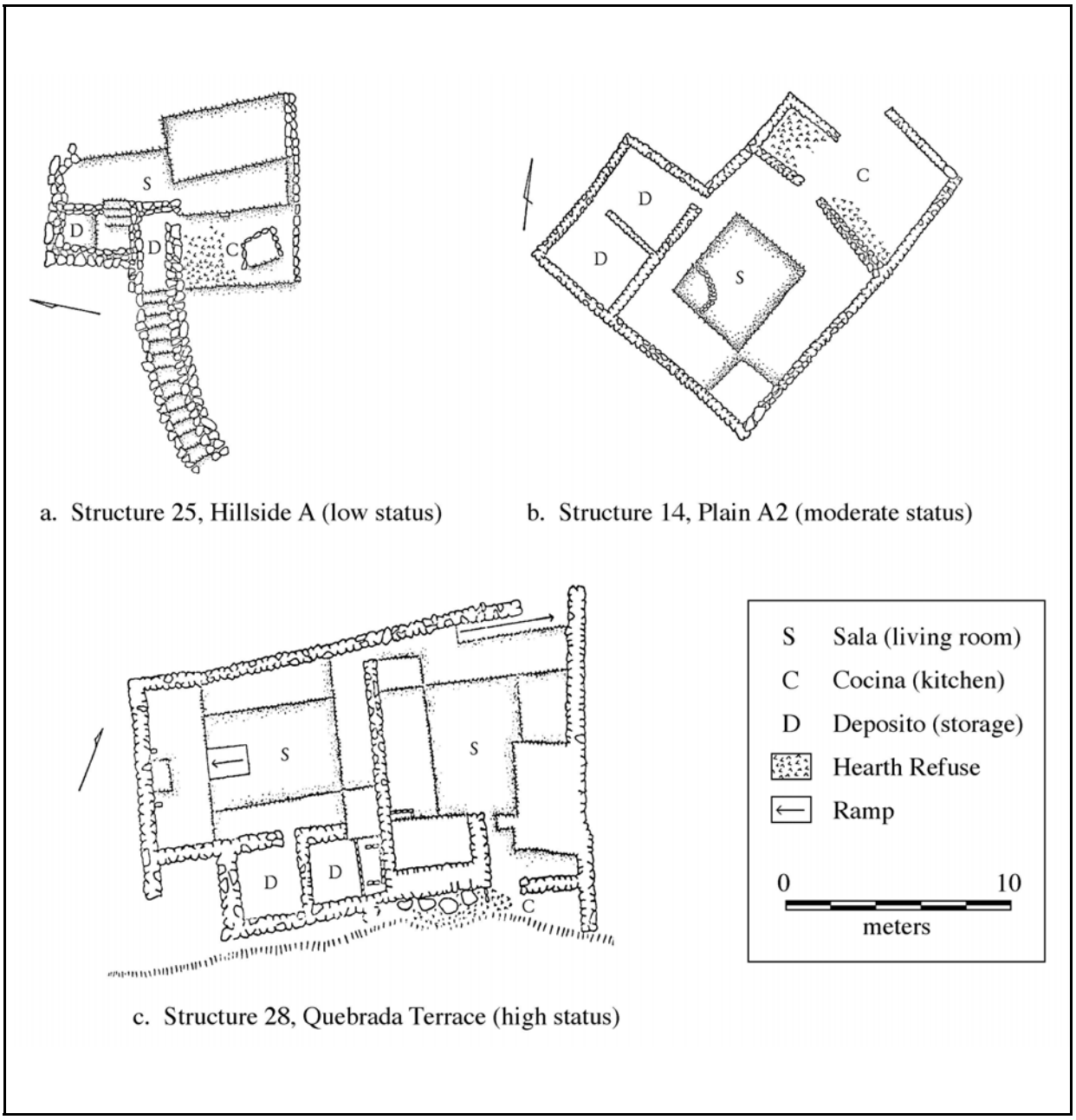

Figure 2: Low, moderate, and high status households at Galindo (after Bawden 1982b: figure 11 [a above], figure 4 [b above], and figure 15 [c above]).

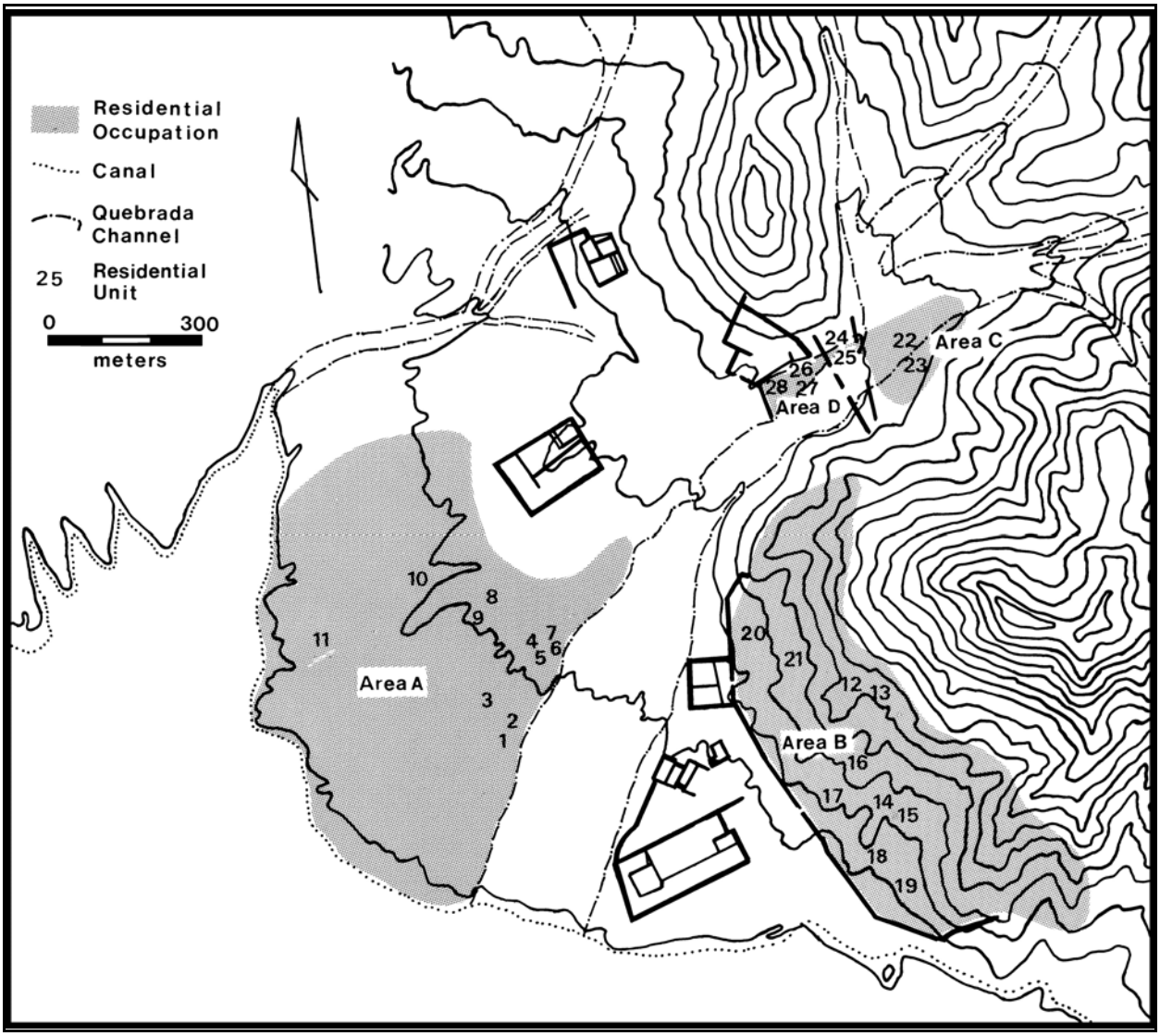

Figure 3: Map of Galindo, indicating the location of residential areas (shaded) and residential structures excavated by Bawden (numbered; after Bawden 1982b: figure 2).

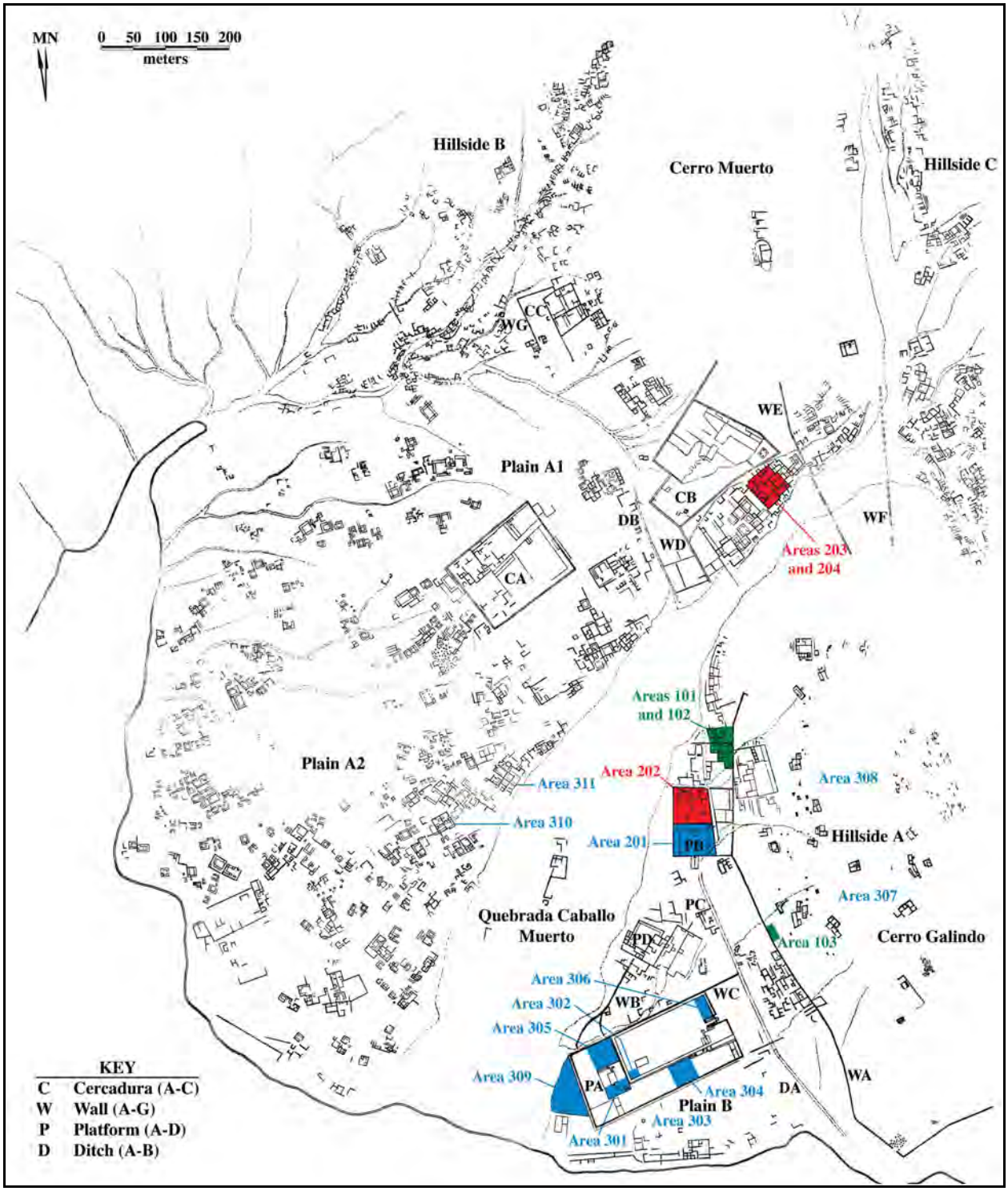

Figure 4: Map of Galindo, indicating GAP excavation areas. Green areas were investigated in 2000, red areas in 2001, and blue areas in 2002 (after Bawden 1977: Figures 121-124).

Figure 5: Hearth from a low status household at Galindo (Structure 40, Feature 2).

Figure 6: Hearth from a high status household at Galindo (Structure 41, Feature 1).

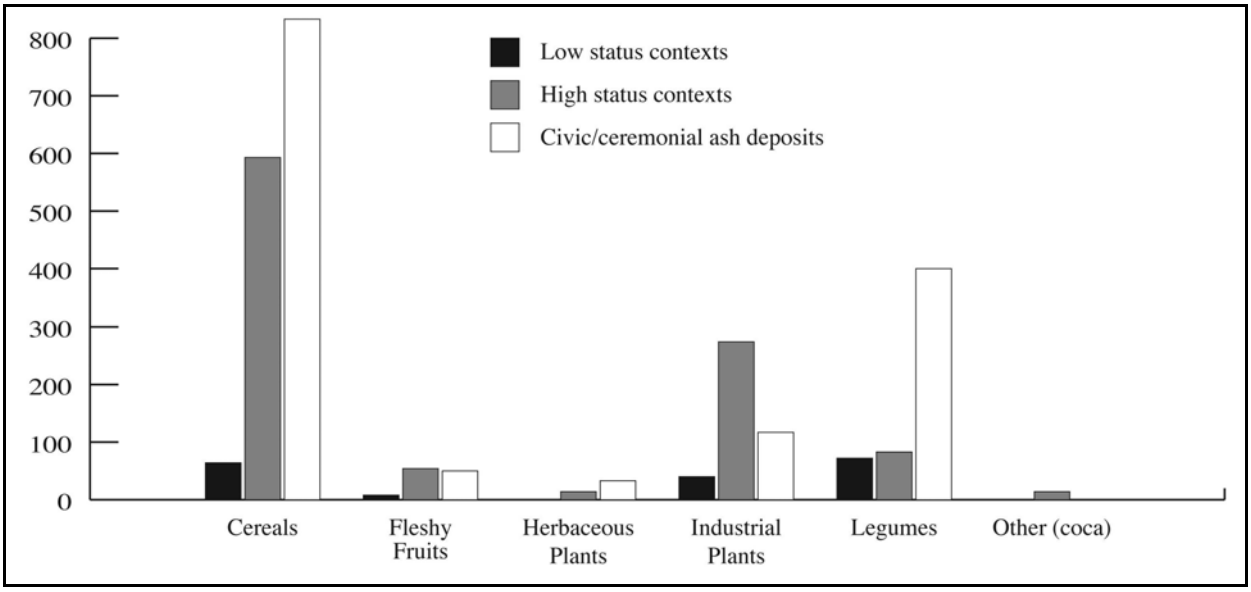

Figure 7: NISP per hundred liters of excavated sediment of soil sample, large macro-botanical plant types for different Moche contexts at Galindo.

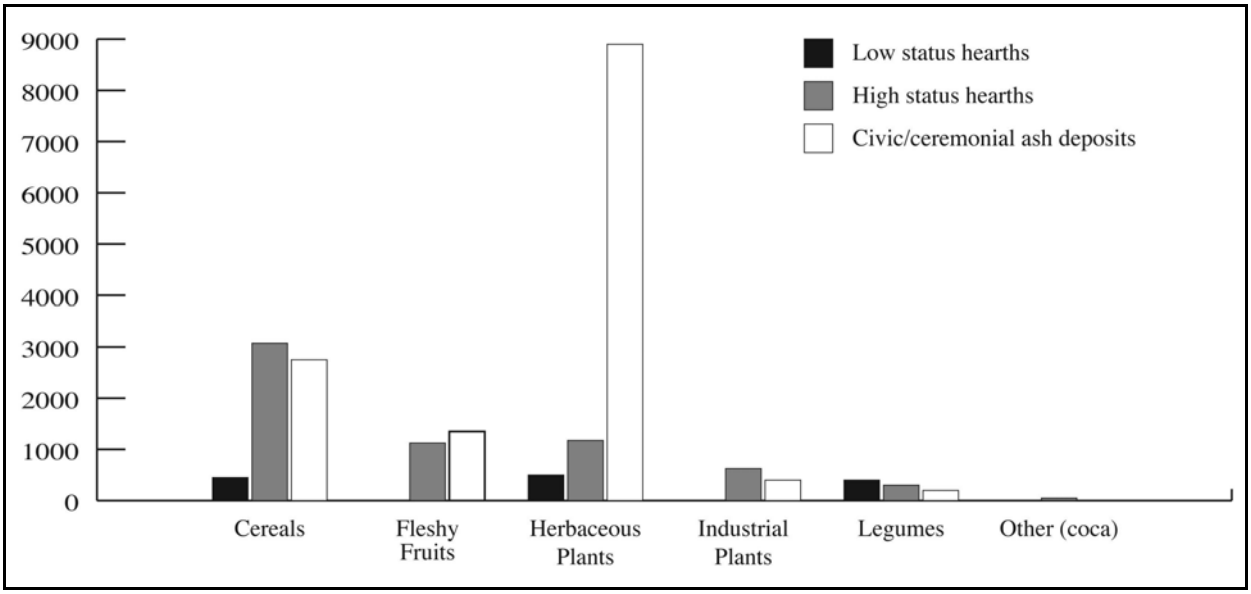

Figure 8: NISP per hundred liters of excavated sediment of soil sample, small macro-botanical plant types for different Moche contexts at Galindo.