Evidence of Botanical Diversity and Species Continuity from Chancay Sites in The Huaura Valley, Peru[1]

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Evidence Of Botanical Diversity and Species Continuity from Chancay Sites in The Huaura Valley, Peru. This study reports on new botanical evidence from the north-central coast of Peru. The material dates to the Late Intermediate Period (approximately CE 1100–1435) and is from archaeological excavation at the sites of Rontoy, Quipico, and Chambara located in the Huaura Valley. All three sites belong to what has been defined as the Chancay culture. The diversity of species present is consistent with the plants utilized in the region beginning in the Preceramic Period. Data also show differential distribution of plant taxa by site that cannot be explained by ecological zone or site location.

Evidencia de diversidad y continuidad en las especies identificadas en los materiales botánicos de los sitios Chancay en el Valle de Huaura. El presente estudio reporta nueva evidencia botánica recuperada en la costa norte-central de Perú. Los materiales corresponden al periodo Intermedio Tardío (aproximadamente entre A.D. 1100–1435) y provienen de las excavaciones arqueológicas en los sitios Rontoy, Quipico, and Chambara en el Valle de Huaura. Los tres sitios pertenecen a lo que ha sido definido como la cultura Chancay. La diversidad de especies encontrada es consistente con las plantas utilizadas en la región desde el periodo Pre-cerámico. Esta información también muestra una distriución diferencial en las especies de plantas analizadas en cada sitio, la cual no puede ser explicada como consecuencia de la zona ecológica o la ubicación de cada uno de los asentamientos.

Key Words: Peru, Chancay, species diversity, Late Intermediate Period, archaeological material, ancient plants.

Introduction

How small polities in the Andes are organized has long been a question for the archaeologist. For the Chancay of the north-central coast, a polity that arose during the Late Intermediate Period (LIP) (approximately CE 1100–1435), interpretations of organization have been as varied as loosely integrated systems (Parsons and Hastings 1988) to kingdoms or chiefdoms (Lumbreras 1974). Missing from these broad generalizations are data to support these assumptions. Using initial results from analysis of macrobotanical material collected from small-scale excavations at three sites in the Huaura Valley, Peru (Fig. 1), differential distribution of plant material was identified. Although only a small part of a complete picture of the organization of the Chancay, results from this initial analysis can begin to address the question of the economic system through the basic variability in which plants were present at the three Chancay sites of Rontoy, Quipico, and Chambara.

All three sites, occupied during the LIP and one into the Late Horizon (LH), can be characterized as being part of the Chancay culture

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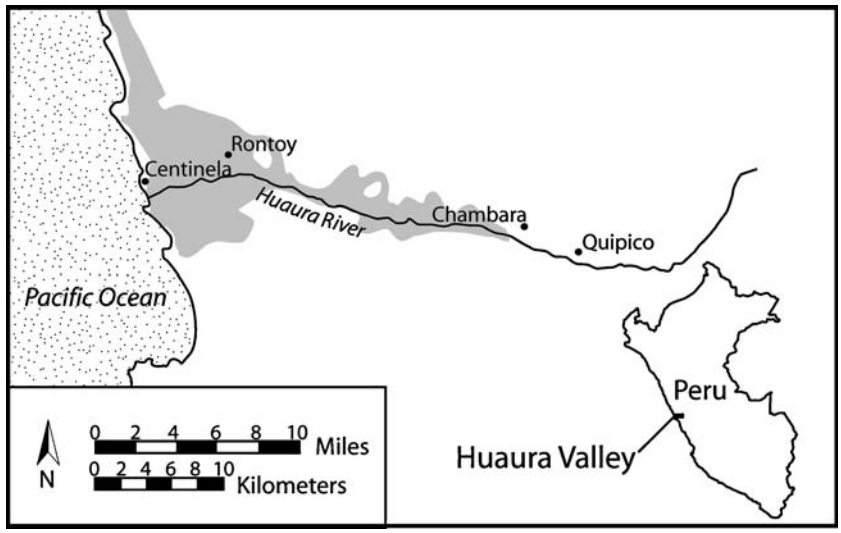

Fig. 1. Location of the sites of Rontoy, Chambara, and Quipico in the Huaura Valley.

as seen in their shared iconography, pottery types, architecture construction, and site layout. Based on the taxa of botanical remains recovered, the relationship between humans and plants during the LIP and LH in the Huaura Valley includes utilization of a suite of plants that represents a similar range of species to that found in the Precermic and Initial Periods on the north-central coast. In this paper we provide new data on the diversity of ancient plant remains from domestic contexts at three sites in the Huaura Valley of the north-central coast Peru. Based on these data, we suggest that differences between two sites in the upper valley (Quipico and Chambara) and one in the lower valley (Rontoy) may be due to environmental differences such as verticality (Murra 1972, 1975) or ecological niche or economic specialization. This differentiation does not occur in all species, but does include a selection of both food and nonfood species.

Methods

Located in the Huaura Valley, which is part of the north-central coast region known as the Norte Chico, the three LIP sites tested for this study were documented during two surveys examining the valley from the coast to approximately 50 km inland, one by Cárdenas (1977, 1977–1988, 1988; Miasta Gutiérrez and Merino Jiménez 1986) and a more detailed survey by Nelson and Ruiz (2004). No other excavations and only small-scale analysis of these sites had been conducted (Horkheimer 1962, 1965; Ruiz Estrada 1991) until 2007 when these sites were revisited for initial testing (Nelson and Ruiz Estrada 2008). These three sites were tested because they are located at varying distances from the coast, include typical LIP architecture and Chancay style pottery, and are at risk of being destroyed by looting and modern agriculture. The goals of the project were to map and test a sample of LIP sites throughout the valley and, from these data, create a general chronology of the LIP occupation.

The sites tested differ in several respects. Although they all share adobe *tapial* (poured adobe) construction and Chancay material culture, they differ in their associated Accelerator Mass Spectrometry (AMS) dates, details in their construction, and their location. AMS dates fall within the general range usually associated with the Chancay Culture and extend into the early Historic Period. Rontoy has the earliest dates, ranging from CE 1265–1455 based on three AMS samples. Quipico has a tight date cluster with a range from CE 1365–1405 based on three AMS samples. Dates from Chambara, CE 1375–1625 based on four samples, extend well into the Early Historic Period. Rontoy and Quipico share very similar architectural features, each site composed of separate compounds, while Chambara differs from this model, with the major architectural feature being small pyramids with ramps. Important to this study is the variation in

TABLE 1. DISTANCE FROM THE COAST AND ALTITUDE OF THE SITES OF RONTOY, QUIPICO, AND CHAMBARA.

Site	Distance to coast (km)	Altitude (m)
Rontoy	8	90
Chambara	31	940
Quipico	36	1,000

site location. Rontoy is located on the coastal plain, while Chambara and Quipico are further inland, as the valley rises to toward the Andes, and are located within dry washes called *quebradas* (Table 1). Chambara and Quipico are within the area designated as a transitional zone, or *chaupiyunga*. This area is out of the fog zone and so is sunnier. Historically it has been an area known for coca production (Keatinge 1988).

If there were no restrictions on land use due to such forces as political boundaries or social networks, Rontoy would have the greatest access to arable land as it is surrounded by the flat and wide coastal plain. The sites of Chambara and Quipico are located where the valley begins to narrow, and so less land within the floodplain would have been available for cultivation. Agricultural fields could have been expanded by hand-watering, and trees may have been grown on the slopes of fingering ridges that form the edge of the valley.

All test units at these three sites were placed within the LIP architecture and include both midden and construction material. The units used in this study—Rontoy, Profile 1; Quipico, Pit 3; and Chambara, Pit 2 and Profile 1—included both 1 × 1 meter test units and excavation to clean profile walls of large exposures. The profiles were first cleaned of disturbed debris from the surface and exposed face, then excavated into intact remains (Fig. 2).

Material was excavated by natural layer following well-defined stratigraphy, with layers often separated by adobe floors. All of the excavated sediment from the excavation units and profiles at all three sites was passed through a 1/4-inch screen and labeled by unit and natural layer. The botanical material was handpicked from the screen and placed in acid-free plastic bags. In areas where botanical material was large, such as partial corn stalks, all of the material was bagged without passing through the screen. The samples included in this study were only from screened sediment and included 13,439 g of botanical material from Rontoy, 173 g from Quipico and 7,890 g from Chambara. The discrepancy among sites is due to the context. The Quipico sample does not include any layers of construction material present in the other samples, which usually contained cotton plants, cotton, and maize plants that added weight and count, but

Fig. 2. Profile 1 at the site of Rontoy. Macrobotanical remains visible throughout the cross-section.

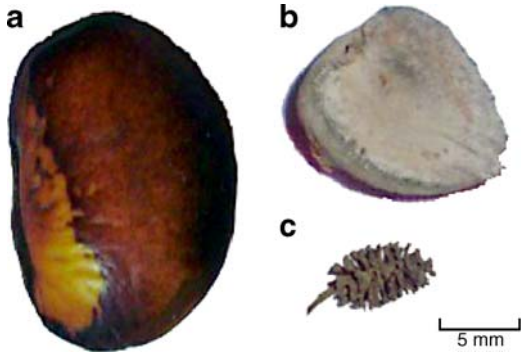

Fig. 3. Samples of material: **a**. *Canavalia* cf. *plagiosperma*, **b**. *Persea americana*, **c**. *Alnus* cf. *acuminata.*

not species diversity. Even with its much smaller sample size, Quipico still shows a range of variability similar to that of Chambara. Both sediment samples and pollen samples were also taken, but have not yet been analyzed. Overall, the macrobotanical material was well preserved and included intact stem, fruit, and seed remains. The remains of textiles, rope and string, pottery, and stone tools were also present in these assemblages, but the majority of material recovered was botanical remains. All material was collected and taken to the laboratory for analysis. Due to the high level of preservation, analysis of the macrobotanical materials was based on anatomical comparisons with known species using the reference collection of the Museum of Natural History of San Marcos University (Fig. 3).

Results

This is the first macrobotanical study of botanical remains from excavated archaeological context associated with the Chancay culture. In addition, with the exception of a single sample of manioc (*Manihot* cf. *esculenta*) collected from the surface of a Chancay cemetery located in the Chancay Valley that was examined as part of a starch grain size study (Perry 2002) and sample identification of macrobotanicals from the site of Acaray (Brown Vega 2008), it is the only detailed botanical study of any Chancay botanical material. The results of this study show the continued importance of plants that have long been utilized in Norte Chico, while also indicating some interesting differences among botanical assemblages that may point to distinct economic foci by site.

A variety of plants are present within these assemblages, including an assortment of cultivated crops, wild plants, tree fruits, and wood. This diversity is not surprising given that the excavation units were placed in habitation areas, where plants would be utilized for a variety of reasons, including consumption, housing, clothing, and other material culture products (Table 2). The majority of plant taxa present are used today primarily for food (n=17). Although they may have more than one known use, their exploitation for food in these contexts is confirmed by the presence of parts of the plant such as stems, seed casings, and internal seeds registered in these deposits. Among the species identified are some of the major staples of Peruvian cuisine: maize, beans, squash, and chilies. This is much greater than the diversity registered for plants used in a variety of other functions such as construction (2), woods (1), fibers (1), and containers (1).

The basic botanical assemblage for sites within the Norte Chico begins in the Preceramic (3000–1800 BCE) and continues as staples into the LIP (Table 3). Botanical remains from the sites of Aspero, Caral, and Las Gavilanes (summarized in Sandweiss et al. 2001 and Shady Solis and Leyva 2003) have all but a few of the taxa recorded for the three LIP sites in the Huaura Valley. The assemblage is even more similar to the remains recovered from Initial Period sites in the nearby Casma Valley (Table 3) recorded by Pozorski and Pozorski (1987; Ugent et al. 1986). The general pattern may be a wider coastal adaptation as seen in similar species utilized at the Initial Period site of Gramalote, located further north in the Moche Valley (Pozorski 1976; Pozorski and Pozorski 1979).

Two important crops, maize and cotton, are present in the assemblages of all three sites. These two are major staples of the economical system from early on in this region and continue to be important through the LIP. Both are regularly found on the surface of archaeological sites throughout the Huaura Valley and were vital to everyday use and possibly exchange as well. Cotton (*Gossypium barbadense*) has the longest history of exploitation in this area (for example, Haas and Creamer 2004; Hather Staff et al. 2005; Moseley 1992; Pozorski and Pozorski 1987; Quilter et al. 1991; Sandweiss et al. 2001; Shady Solis et al. 2001), with evidence of

TABLE 2. PRESENCE/ABSENCE TABLE BY SPECIES FOR THE SITES OF RONTOY, QUIPICO, AND CHAMBARA.

Family	Species	Chambara	Quipco	Rontoy	Casma[1]	Norte Chico[2]
Betulaceae	*Alnus* cf. *acuminata*	✓				
Cannaceae	*Canna indica*	✓	✓	✓	✓	
Cucurbitaceae	*Cucurbita moschata*	✓	✓			
	Cucurbita sp.	✓	✓		✓	✓
	Cyclanthera pedata	✓				
	Lagenaria siceraria	✓	✓		✓	✓
Euphorbiaceae	*Manihot* cf. *esculenta*	✓			✓	✓
Fabaceae	*Arachis hypogaea*	✓	✓		✓	✓
	Canavalia cf. *plagiosperma*	✓		✓	✓	
	Erythrina sp.			✓		
	Inga sp.	✓	✓	✓	✓	✓
	Phaseolus lunatus	✓			✓	
	Phaseolus vulgaris	✓	✓	✓	✓	✓
Lauraceae	*Persea americana*	✓	✓		✓	✓
Malpighiaceae	*Bunchosia armeniaca*	✓	✓		✓	
Malvaceae	*Gossipium barbadense*	✓	✓	✓	✓	✓
Myrtaceae	*Psidium guajava*		✓	✓	✓	
Poaceae	*Gynerium sagittatum*		✓		✓	
	Phragmites Australis	✓	✓			
	Zea mays	✓	✓	✓	✓	✓[a]
Sapotaceae	*Pouteria lucuma*	✓	✓	✓	✓	✓
Solanaceae	*Capsicum* sp.		✓		✓	✓
	TOTAL	18	16	9		

[1] Composite of botanical information from Casma (Pozorski and Pozorski 1987).
[2] Summary of botanical information for Preceramic sites in the Norte Chico (adapted from Sandweiss et al. 2001).
[a] Presence of *Zea mays* is contested.

its early importance as material for fishing nets and clothing (Quilter et al. 1991; Sandweiss et al. 2001). It has been argued to be a major component of the rise of complexity during the Norte Chico Preceramic (Feldman 1980; Haas and Creamer 2001, 2004; Moseley 1975; Shady Solis et al. 2001; Shady Solis and Leyva 2003).

For the Chancay, cotton was the primary material used in the production of textiles, which are famous for their detail and diversity (Fung 1995; Kula 1991). A wide variety of textile types are associated with the Chancay, including plain weave, counter-spun embroidery, knotted netting, and, probably the best known, gauze (Kula 1991). The presence of raw cotton and cotton bolls at sites in the lower and middle valley reveals its widespread importance, indicating either production at or acquisition by sites throughout the Huaura Valley. This is important because it opens the possibility of textile production at various, if not all localities.

Maize was also probably widely grown on the coast in later periods and appears in small amounts at Preceramic sites (Bonavia and Grobman 2000). Horkheimer (1973) notes it as a prehistoric staple, and its widespread presence at both Chancay habitation and cemetery sites in the Huaura Valley shows its continued significance during the LIP.

The greatest diversity in taxa is present at the site of Chambara, followed closely by the site of Quipico. These two neighboring sites are located at the beginning of the constriction of the valley, while the site of Rontoy, located on the open coastal plain, has half of the diversity of taxa as that recorded for Chambara. This is an unexpected finding for several reasons. First, the uneven distribution of taxa may be related to the ecological zones in which these sites are located, but this is not strongly supported by the data. All of the sites are adjacent to or within the river valley and would have access to irrigation, and they differ only slightly in altitude. Some of the plants missing from the Rontoy assemblage are better suited to higher elevations, including *Alnus* cf. *acuminata* (Andean alder) and

TABLE 3. LIST OF THE SPECIES ACCORDING TO THEIR BEST-KNOWN USAGES.

FOODS	
Grains and Seeds	**Roots and Stems**
Arachis hypogaea (peanut)	*Canna indica* (*achira*)
Canavalia cf. *plagiosperma* (jack bean)	*Manihot* cf. *esculenta* (manioc)
Phaseolus lunatus (Lima bean)	
Phaseolus vulgaris (common bean)	
Zea mays (maize)	
Erythrina sp. (*pajuro*)	

EDIBLE FRUITS

Fruits

Bunchosia armeniaca (*ciruelo del fraile* or *cansaboca*)
Inga sp.(*pacae*)
Persea americana (avocado)
Pouteria lucuma (*lúcuma*)
Psidium guajava (*guayaba*)

Condiments

Capsicum sp. (chili)

Nonsweet Fruits (Vegetables)

Cucurbita sp. (squash)
Cyclanthera pedata (wild cucumber)
Cucurbita moschata (squash)

WOOD	FIBER
Alnus cf. *acuminata* (Andean alder)	*Gossypium barbadense* (cotton)
Inga sp. (*pacae*)	
Pouteria lucuma (*lúcum*a)	
Psidium guajava (*guayaba*)	
CONTAINERS	**CONSTRUCTION MATERIAL**
Lagenaria siceraria (gourd)	*Phragmites australis* (reed)
	Gynerium sagittatum (cane)

Persea americana (avocado), but this does not explain the absence of other species such as *Bunchosia armeniaca* (*ciruelo del fraile* or *cansaboca*), *Cucurbita moschata* (squash), *Cucurbita* sp. (squash), *Cyclanthera pedata* (wild cucumber), *Manihot* cf. *esculenta* (manioc), *Gynerium sagittatum* (cane), and *Lagenaria siceraria* (gourd) that commonly grow in lower elevations. In addition, squashes are currently grown in the field adjacent to Rontoy. In all, the majority of taxa present at these sites are herbs and trees that develop in altitudes from 0 to 2,500 m on the average, which corresponds to the altitudes of the middle and lower valley, and so could be grown near all three sites.

Second, the site of Rontoy is located in probably the richest and largest agricultural area of the three sites and yet does not have the species diversity seen in the assemblages of the other two sites. Its importance in agriculture is visible in historical documents, where it had a prominent role during the early Colonial Period as an area chosen by Spaniards traveling with Pizarro as part of the *encomienda* system (Cook 1982) and continued to be a sought-after productive area through the formation of haciendas in the 17th century (Cushner 1980). Today it remains an important agricultural area for vegetables and sugarcane, and several tree species and cane line irrigation canals that are found around the site.

Third, all three sites can be argued to be part of a larger cultural phenomenon known as the Chancay and so participated in a larger political and economic system that linked these sites

through various networks of interaction that was controlled by a single chief or lord (Conlee et al. 2004; Rostworowski 1977, 1978, 1989, 1993). As part of this system, it might be expected that all of the site would have had access to the various species through interaction, trade, and transport. As part of a larger system, some agricultural goods would have been moved from the small secondary sites to the principal administrative core in the Chancay Valley, for example, the site of Pisquillo Chico (Horkheimer 1962; Krzanowski 1991). This was not the case. Although unification is visible in the shared material culture, it does not appear, based on these data, that all sites had access to the wealth of products being produced in the valley.

Although there are differences among these sites, the absence of species from outside of the region in the registered material is shared among all three sites. The lack of nonlocal species is interesting, especially given the connections in material culture with the Cayash region located in the upper Huaura Valley (Krzanowski 1986). Although Chancay sites are not present beyond approximately 50 km inland, shared pottery styles of the lower and middle valley with the upper valley are present, and the link through trade or other types of interaction is visible in this and other types of material culture. In addition, Brown Vega (2008) uncovered offering bundles within LIP context at the site of Acaray, located near Rontoy, with *Huperzia crassa* (firmoss or *shimba*) and *Nectandra floribundo* (*ishpingo*), both of which are more commonly found in the highlands. Their presence marks access to some of the highland varieties, and context may be the important difference between these assemblages. The material from Rontoy, Quipico, and Chambara was household debris excavated in domestic contexts. This material represents the diversity expected for everyday domestic refuse, while the context at Acaray represents single ritual events. The absence of species of plants from outside the region does not then represent the lack of movement of plant material from the highlands to the coast, but instead documents the importance of these items and their purposeful deposition.

The differences and similarities in the types of plants present at each site are telling of the Chancay during the LIP in both the production and distribution of plants. The presence and abundance of the major staples such as cotton and maize denotes either the widespread exchange or production of these goods and their importance in the overall Chancay economy. This is supported by the occurrence of stalks, seeds, and flowers of these plants on the surfaces of habitation sites throughout the valley. For corn, whole plants were recovered from both Rontoy and Chambara, and for cotton, the presence of all parts of the plant, including bolls, burrs, locks, and branch fragments, points to either local production at each site or transport of unrefined cotton among sites. These two staples, which are important species utilized from as early as the Preceramic Period, continue to be important in the Chancay culture.

Other taxa are not evenly distributed among these sites and instead show limited production and/or access by consumers to these goods. For example, several tree fruits, including *Bunchosia armeniaca* (*ciruelo del fraile* or *cansaboca*) and *Persea americana* (avocado), are absent from the Rontoy sample, and *Canavalia* cf. *plagiosperma* (jack beans) is absent from the sites of Chambara and Quipico. This uneven distribution does not appear to be solely the result of verticality, but instead may signal the presence of other factors at play. Although these are the results of small-scale excavations, the preservation, the large quantity of botanical material collected, and the patterning of upriver versus coastal supports these findings.

Conclusion

Although preliminary, this study provides some initial results on the types and the distribution of plant species at LIP sites in the Huaura Valley. A variety of these species have long histories of use in this area, with some first appearing in archaeological context during the Preceramic Period. Findings also show a differential distribution among sites, with more variation in the plants present in the two sites, Quipico and Chambara, located further inland. The greater diversity is discussed in terms of ecological zone and site location, which do not explain this patterning. Instead it appears that this distribution represents other factors that may have implications as to the structure of production, access, and exchange for the Chancay culture.

Context is also an important feature in understanding the presence and absence of certain types of plant material. No species from outside the region was registered in the assemblages from the

three sites, but one has been noted at the nearby site of Acaray (see Brown Vega 2008:286). The context of midden and construction fill excavated from within habitation areas may limit the types of materials recovered, but does demonstrate a wide range of plants produced and consumed which document the uneven production and/or exchange of botanicals during the LIP.

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